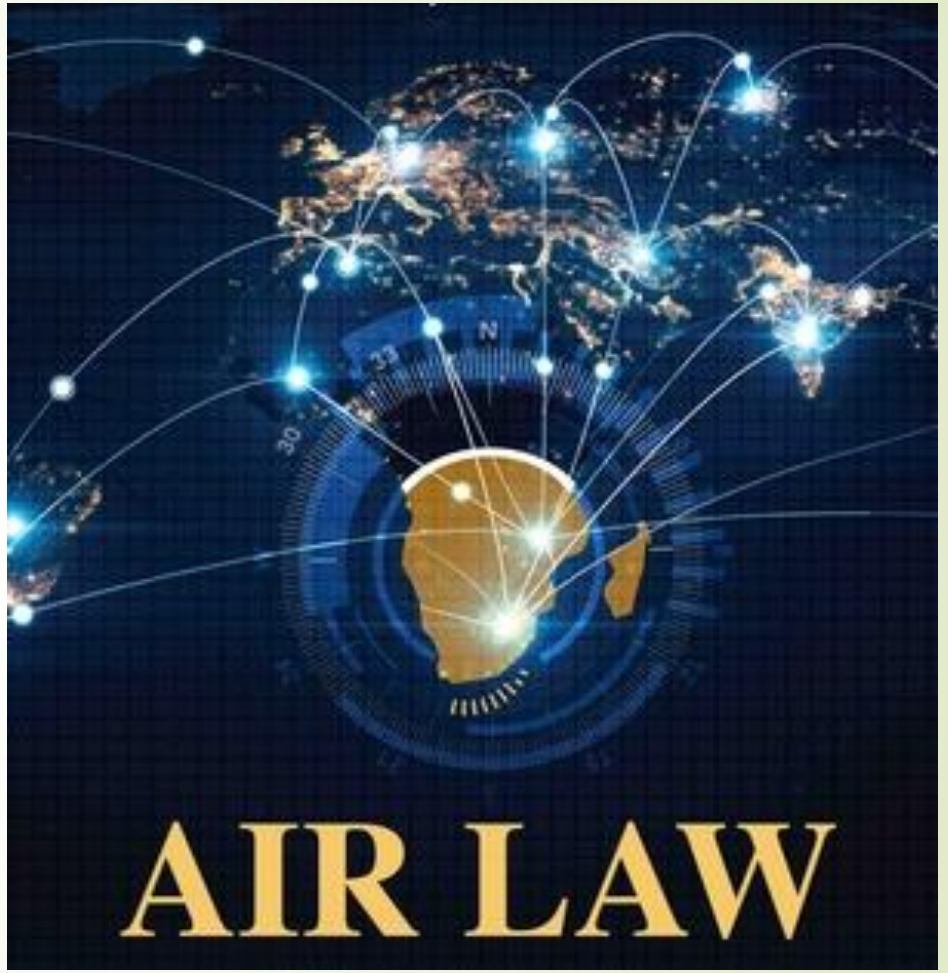
AIRLAW

K.SHIRAZI
P.Shirazi

NOV 2020



Air traffic services:

Module objectives

At the end of this module you will be able to Describe the **roll of ATS in aviation** based on standard ICAO regulations.

Time 01:00

ANNEX 2/11

Air traffic service:

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).***

ANNEX 2/11

The Air Traffic Services (ATS)

Annex 11 to the Chicago Convention lays down the SARPs for the establishment of an Air Traffic Control services in each of the contracting states. Each state is required to establish an authoritative body responsible for setting up and regulating the operation of the ATS of the state.

ANNEX 2/11

Objectives.

The objectives of an ATS are to:

- ***Prevent collisions** between aircraft;*
- ***Prevent collisions** between aircraft on the maneuvering area(RWY + TWY) and obstructions thereon;*
- ***Expedite and maintain** an orderly flow of air traffic;*
- ***Provide advice and information useful** for the safe and efficient conduct of flights;*
- ***Notify appropriate organizations** regarding aircraft in need of SAR aid, and assist such organizations as required.*

ATC Service

The ATC Service is divided into ***three sub-divisions:***

- ***Area Control Service***. The provision of ATC for controlled flights **within CTAs and en route in FIRs and UIRs.**
- ***Approach Control Service***. The provision of ATC for controlled flights associated with ***arrival and departure***. Usually provided within ***CTRs***.
- ***Aerodrome Control Service***. The provision of ATC to aerodrome traffic at ***controlled aerodromes.***

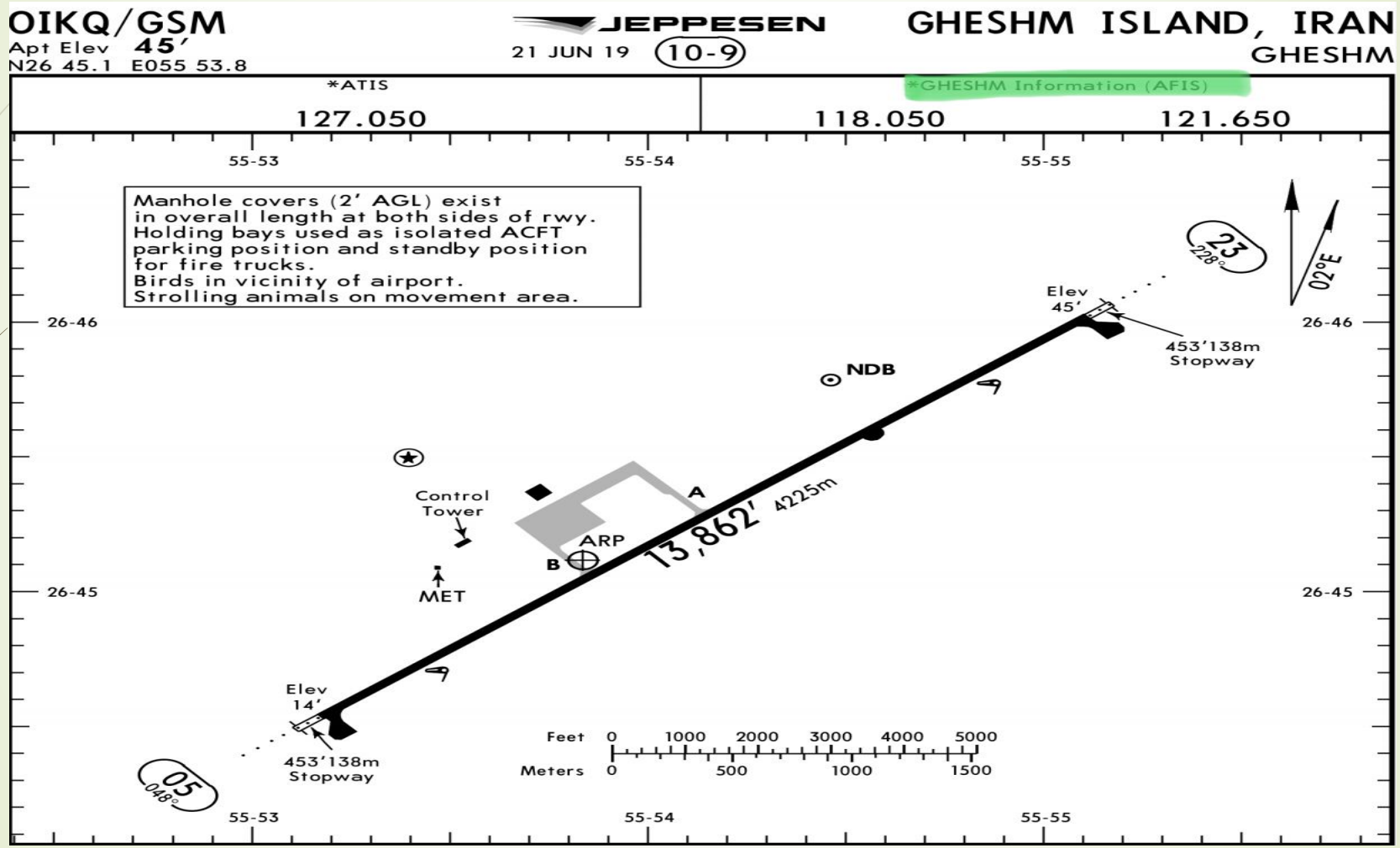
➢ *The Flight Information Service*

As already stated, the basic unit of airspace within a state is the Flight Information Region (FIR). ***In theory, an FIR can exists without CAS,*** in which case the only services provided to air traffic would be a ***flight information service (FIS) and the alerting service***. Even where ATC is provided inside CAS, FIS will be provided although at a lower priority to ATC. The provision of any service relies on a regular flow of information and the provision of FIS relies heavily on the Aeronautical Information Service (AIS) established by each state in accordance with Annex 15.

ANNEX 2/11

Outside of CAS and at uncontrolled aerodromes, flight information is provided by Flight Information Service Officers (FISOs) ***operating from a Flight Information Centre (FIC)***. Where a FIS is provided the name of the office providing the service will be suffixed '***information***.' FISOs are licensed to provide the service but are not permitted to offer any service that can be described as ATC. The only exception to this is the provision of ATC to aircraft taxiing on the ground at a controlled aerodrome but this is strictly limited to movements prior to entering the runway for take-off.

ANNEX 2/11


OIKQ/GSM
Apt Elev 45′
N26 45.1 E055 53.8
JEPPESEN
21 JUN 19
10-9
GHESHM ISLAND, IRAN
GHESHM
*ATIS
127.050
*GHESHM Information (AFIS)
118.050
121.650
55-53
55-54
55-55
26-46
26-45
Manhole covers (2′ AGL) exist in overall length at both sides of rwy.
Holding bays used as isolated ACFT parking position and standby position for fire trucks.
Birds in vicinity of airport.
Strolling animals on movement area.
23
228°
02°E
Elev 45′
453′138m Stopway
NDB
Control Tower
MET
ARP
A
B
13,862′ 4225m
Elev 14′
453′138m Stopway
05
048°
Feet 0 1000 2000 3000 4000 5000
Meters 0 500 1000 1500

ANNEX 2/11

The information provided by the FIS is to include:

- ***SIGMET and AIRMET (see definition below);***
- ***Volcanic eruption activity;***
- ***Release of radioactive or toxic material into the atmosphere;***
- ***Information concerning change of serviceability of radio navigation aids;***
- ***Information concerning change of conditions concerning aerodromes;***
- ***Information concerning unmanned free balloons;***
- ***Other information considered pertinent to safety.***

ANNEX 2/11

Additionally, information is to be provided concerning:

- ***Weather conditions reported or forecast at departure, destination or alternate aerodromes;***
- ***Collision hazards to aircraft operating in classes C, D, E, F and G airspace;***
- ***For flights over sea areas (when requested by pilots), details of surface vessels.***

Apart from the delivery of FIS on discrete VHF frequencies, the majority of 'routine' FIS is broadcast by the **Operational Flight Information Service (OFIS).**

ANNEX 2/11

ATIS

Automatic Terminal Information Service broadcasts (ATIS) consist of **two** types of broadcast: ***Voice ATIS and Data ATIS.***

The preparation and dissemination of ATIS is the responsibility of ATS.

Voice ATIS

This is provided at aerodromes where there is a requirement to reduce voice channel communications.

ANNEX 2/11

ATIS broadcasts comprise:

- ***One broadcast serving arriving aircraft; or***
- ***One broadcast serving departing aircraft; or***
- ***One broadcast serving both arriving and departing aircraft; or***
- ***Two broadcasts serving arriving or departing aircraft where one broadcast would be exceptionally long.***

ANNEX 2/11

Voice ATIS is usually transmitted on a ***discrete VHF frequency*** (displayed on all aerodrome plates). It may be transmitted on the voice channel of a relevant VOR (e.g. departure ATIS on the VOR used as the primary VOR for a SID; or arrival ATIS on the VOR that serves as the IAF for a procedure). ATIS is ***never transmitted on the voice channel of ILS. Voice ATIS is continuous and repetitive.***

ATIS information normally relates to a single aerodrome and the broadcast ***should not last longer than 30 seconds.*** It is ***updated immediately any significant change occurs***. ATS is responsible for making sure that the service is available and up to date. Each sequence of ATIS broadcasts will have a specific sequential broadcast designator letter. ***On initial contact with ATC, aircraft are to acknowledge receipt of the relevant ATIS with reference to the current information designator.***

"Oxford Tower G-ABCD bay 27, information Charlie, QNH 1003 request start"

ANNEX 2/11

The ATIS broadcast will only include cloud cover when the ***cloud base is below 5000 ft or the highest MSA (whichever is higher), or when cumulonimbus cloud is present.***

Acknowledgment of a Non-current ATIS

Should an aircraft acknowledge an ATIS that is no longer current, any element of information that needs up-dating shall be transmitted to the aircraft by the ATCU ***without delay.***

Annex 2

➢ The Alerting Service

This service is provided by any ATS unit (ACC, ATCU, FIC etc…) regardless of the type of service normally offered. The Alerting Service is the link between the aircraft needing assistance, and the services that can provide that assistance.

Where necessary, the provision of a service to aircraft in need of assistance will have priority over all other air traffic services.

ANNEX 2/11

The Alerting Service is provided to:

- ***All aircraft provided with ATC;***
- ***As far as practicable, all aircraft that have filed a FP or are otherwise known to ATC, and***
- ***Any aircraft known (or believed to be) the subject of unlawful interference.***

ANNEX 2/11

In addition to the above, aircraft equipped with suitable two-way radio communications shall report during the ***period twenty to forty minutes*** following the time of last contact, whatever the purpose of such contact, merely to indicate that the flight is progressing according to plan, such report to comprise identification of the aircraft and the words ***"Operations normal"*** or the signal QRU.

ANNEX 2/11

Stages of Emergency. There are three stages of alert (known generically as the emergency phase), these are:

- ***Uncertainty phase (code word: INCERFA).***

This stage exists when no communication has been received from an aircraft within a period of 30 minutes after a time at which normal communication should have been made, or the aircraft fails to arrive at the destination within 30 minutes of the estimated arrival time.

ANNEX 2/11

➢ *Alert phase (codeword: ALERFA)*

The alert phase would be declared following the uncertainty phase (except when evidence exists that would allay apprehension as to the safety of the aircraft or its occupants) when:

- ***Subsequent attempts to make communication have failed and there is not further news of the aircraft; or***
- ***The aircraft fails to land within 5 minutes after the issuing of a landing clearance; or***
- ***Information has been received that the operating efficiency of the aircraft is impaired (but not that a forced landing is likely); or***
- ***It is known that an aircraft has been subject to unlawful interference.***

Distress phase (codeword: DETRESFA).

The distress phase would be declared following the alert phase (except where there is reasonable certainty that the aircraft and its occupants are not threatened by grave and imminent danger) when:

- ***Further attempts at communication are unsuccessful and widespread enquiries indicate the probability that the aircraft is in distress; or***
- ***The fuel on board is considered to be exhausted; or***
- ***Information is received that the operating efficiency of the aircraft is impaired to the extent that a forced landing is likely; or***
- ***Information is received that the aircraft is about to or has made a forced landing.***

ANNEX 2/11

- ***Air traffic control service***

A service provided for the purpose of:

- **preventing collisions:**

- ***between aircraft, and***
- ***on the maneuvering area between aircraft and obstructions, and***

expediting and maintaining an orderly flow of air traffic.

ANNEX 2/11

Air traffic control clearance.

Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.

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

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.

ANNEX 2/11

Flight crews are required to '***read back***' to the air traffic controller, safety related parts of ATC clearances and instructions which are communicated by voice. The following items must always be read back:

- ***ATC route clearances***
- ***Clearance relating to the use of runways (i.e. land, take off, cross, enter and back-track, hold short of)***
- ***Runway in use; altimeter settings; SSR codes; level instructions; heading and speed instructions; transition levels***

ANNEX 2/11

Air traffic advisory service

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

IFR flights electing to use or required by the appropriate ATS authority on the basis of regional air navigation agreements to use the air traffic advisory service when operating ***within Class F airspace.***

ANNEX 2/11

The Air Traffic Advisory Service is defined as a service provided within ***advisory airspace (class F) to ensure separation between aircraft operating on IFR flight plans.*** In practice, this service is established in response to a request where the establishment of a full ATC service has not been determined. In other words, it is a ***temporary arrangement pending a decision on whether or not a full ATC service is required.*** The objective is to make information on collision hazards more effective than it would be in the provision of a flight information service only. It is provided to IFR flights in advisory airspace or on advisory routes.

NO # 4 ***Time = 00:04***

29

For which type of operation, the advisory service may be provided?

a) Controlled IFR

b) SVFR

c) CVFR

d) IFR

30

For which type of operation, the advisory service may be provided?

a) Controlled IFR

b) SVFR

c) CVFR

d)IFR

What is the purpose of air traffic control service?

a) Prevent collision between aircraft

b) Expedite flow of traffic

c) a and b

d) a or b

What is the purpose of air traffic control service?

a) Prevent collision between aircraft

b) Expedite flow of traffic

c) a and b

d) a or b

33

Air traffic advisory service is provided in:

a) Control area
b) Advisory area
c) Advisory route
d) B&C

34

Air traffic advisory service is provided in:

a) Control area
b) Advisory area
c) Advisory route
d) B&C

35

Authorization for an aircraft to proceed under condition specified by air traffic control unit, is.....

a) ATC clearance
b) Flight permission number
c) Controlled clearance
d) Flight clearance

36

Authorization for an aircraft to proceed under condition specified by air traffic control unit, is.....

a) ATC clearance
b) Flight permission number
c) Controlled clearance
d) Flight clearance

Air Traffic Services Unit:

Module objectives

At the end of this module you will be able to explain the **ATSU in aviation** based on ICAO standard regulations.

Time 00:15

ANNEX 2/11

Unit

the term ***"unit"*** is used to designate a collective body performing a service.

- ***Air traffic services unit***

A generic term meaning variously, ***air traffic control unit, flight information centre or air traffic services reporting office.***

- ***Air traffic control unit***

A generic term meaning variously, ***area control centre, approach control unit or aerodrome control tower.***

ANNEX 2/11

- **Aerodrome control tower**

A unit established to provide air traffic control service to **aerodrome traffic.**

- ***Approach control unit***

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

- ***Area control centre***

A unit established to provide air traffic control service to controlled flights in ***control areas*** under its jurisdiction.

ANNEX 2/11

Air traffic services reporting office.

A unit established for the purpose of ***receiving reports concerning air traffic services and flight plans submitted before departure.***

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.

ANNEX 2/11

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

Unit/service available	*Call sign suffix*
area control centre	CONTROL
approach control	APPROACH
approach control radar arrivals	ARRIVAL
approach control radar departures	DEPARTURE

5-12

ANNEX 2/11

Unit/service available	*Call sign suffix*
aerodrome control	TOWER
surface movement control	GROUND
radar (in general)	RADAR
precision approach radar	PRECISION
direction-finding station	HOMER
flight information service	INFORMATION
clearance delivery	DELIVERY
apron control	APRON
company dispatch	DISPATCH
aeronautical station	RADIO

NO # 2 ***Time = 00:01***

45

The suffix of the call sign of direction finding station is...

a) Information
b) radio
c) Homer
d) delivery

46

The suffix of the call sign of direction finding station is...

a) Information

b) radio

c) Homer

d) delivery

47

The suffix of the call sign of an approach control unit providing radar service for departure traffic is:

a) Approach
b) Departure
c) Radar
d) Control

48

The suffix of the call sign of an approach control unit providing radar service for departure traffic is:

a) Approach

b) Departure

c) Radar

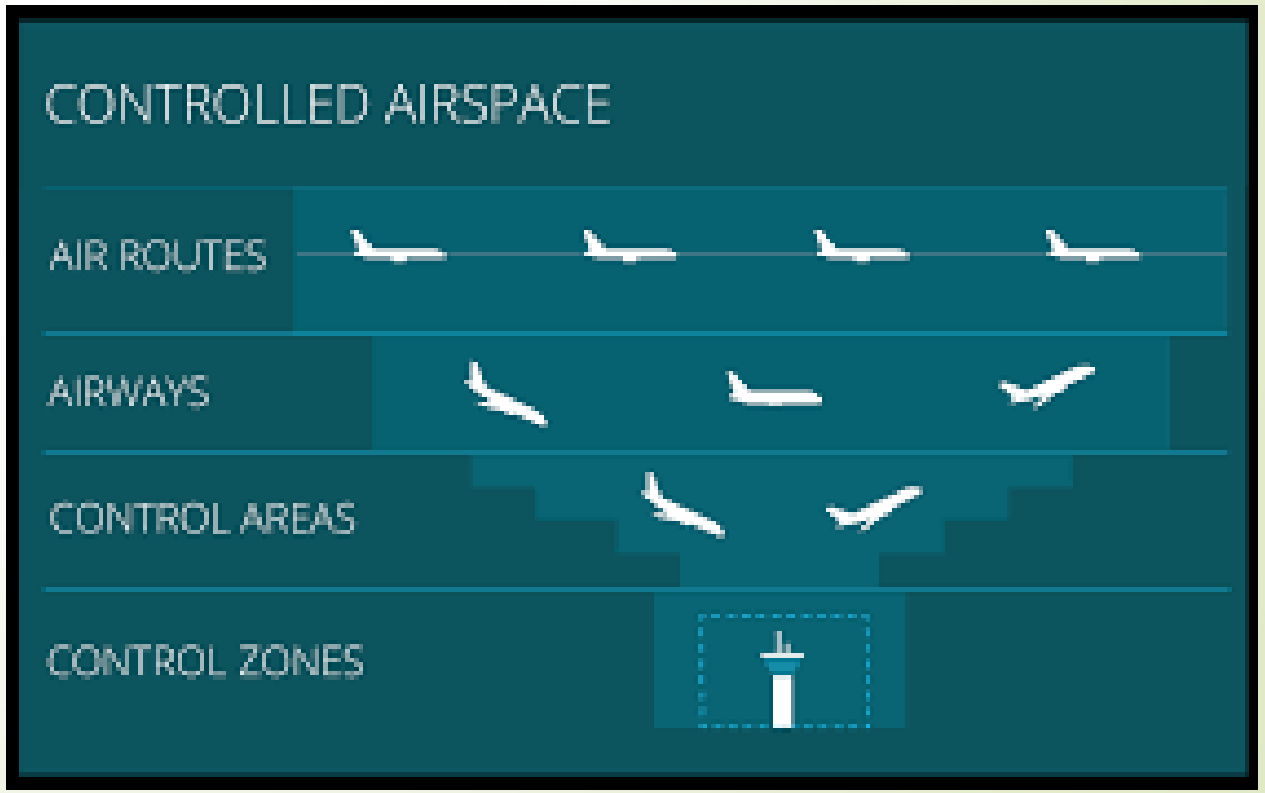
d) Control

Airspaces

FL 600
Airspace Classification
Class A
18,000' MSL
Class B
14,500' MSL
Class E
Class C
Class G
Nontowered airport with instrument approach
1,200' AGL
700' AGL
Class G
1,200' AGL
700' AGL
Class G
1,200' AGL
700' AGL
Class G
Class D
Nontowered airport with no instrument approach

Module objectives

At the end of this module you will be able to explain the **definition and type of airspace in aviation** based on ICAO standard regulations.



Time 01:00

ANNEX 2/11

Airspace

All the airspace within a state must be contained within ***one or more Flight Information Regions (FIR).***This is the basic unit of airspace within which the most basic form of Air Traffic Service, a Flight Information Service and alerting service is available in an FIR. It is usual to give each FIR a name i.e. the ***TEHRAN*** FIR, which geographically identifies the location of the FIR and its associated Area Control Centre (ACC) within which the Flight Information Centre is located.

Where a State strictly enforces its sovereignty, the boundaries of that State's FIR(s) usually coincide with the national borders of the state.

ANNEX 2/11

It is not unusual for FIR boundaries to be ‘convenient' (i.e. following Lat/Long or median lines) rather than to follow often convoluted national borders.

ENR 2. AIR TRAFFIC SERVICES AIRSPACE
ENR 2.1 FIR, UIR, TMA

There are 7 main sectors in Tehran FIR which are named numerical form 1 to 7. In dense of traffic ; sector 1 to 6 will be divided into some subsectors and in low density traffic situations the sectors may merge and consequently the alternative frequencies will not be available.

Name *Lateral limits* *Vertical limits* *Class of airspace*	*Unit providing service*	*Call sign* *Languages* *Area and conditions of use* *Hourps of service*	*Frequency/ Purpose*	*Remarks*
1	*2*	*3*	*4*	*5*
TEHRAN FIR The area bounded by two straight lines over Caspian sea joining 372100N 0535500E to 391200N 0510800E to 382630N 0485230E, thence along the Islamic Republic of Iran / Azerbaijan, Armenia, Turkey and Iraq territorial BDRY to Persian gulf 295110N 0484500E, 291300N 0494000E, 290000N 0492700E, 270500N 0505500E, 265500N 0511000E, 253800N 0552000E, 264100N 0562700E, 261000N 0564500E, 253500N 0564500E, 250000N 0573000E, 244000N 0612000E, thence along the Islamic Republic of Iran / Pakistan, Afghanistan and Turkmenistan territorial BDRY to 372100N 0535500E UNL GND	Tehran ACC	Tehran Radar/Control English - Persian H24	* See the relevant ATC sectors	BTN FL290 – FL410 inclusive, Tehran FIR is RVSM airspace

ANNEX 2/11

Upper Information Regions (UIRs)

Where a state applies a division of airspace vertically, the upper portion of the airspace is defined as an Upper Information Region UIR. Such a division facilitates the application of different rules and separation standards to those of the underlying airspace.The basic assumption is that traffic using the UIR will be essentially in transit en route, whereas lower traffic will be arriving or departing and therefore maneuvering.In Europe the division between the FIR and UIR is at FL195 whereas in the USA it is at FL180. The lower boundary of a UIR will always be a VFR FL.

Open FIR

Airspace within an FIR that is not defined as a CTA, CTR or other 'restricted' airspace is known as the open FIR. Within the open FIR the ***only air traffic services offered are a Flight Information Service and the Alerting Service.***

Oceanic Control Areas (OCAs)

Over large areas of the world's Oceans e.g. the North Atlantic, traffic control has special problems (i.e. relatively poor navigation and of ***necessity HF communications requiring the use of radio operators).*** To solve the problems, or at least to make them manageable, the airspace above FL55 over the Oceans is designated as OCAs where strict rules are enforced and special navigation procedures are applied.

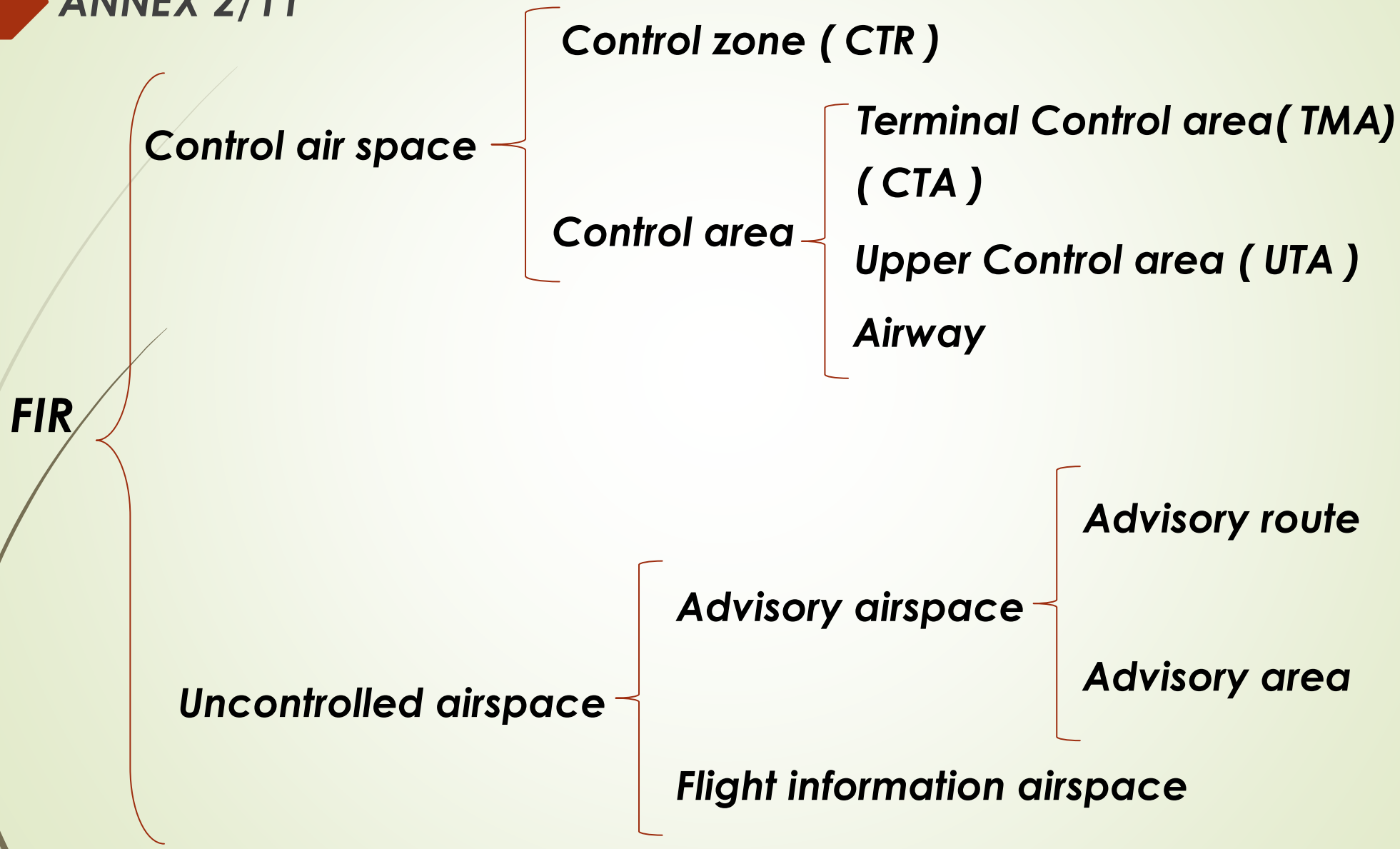
Appropriate ATS authority

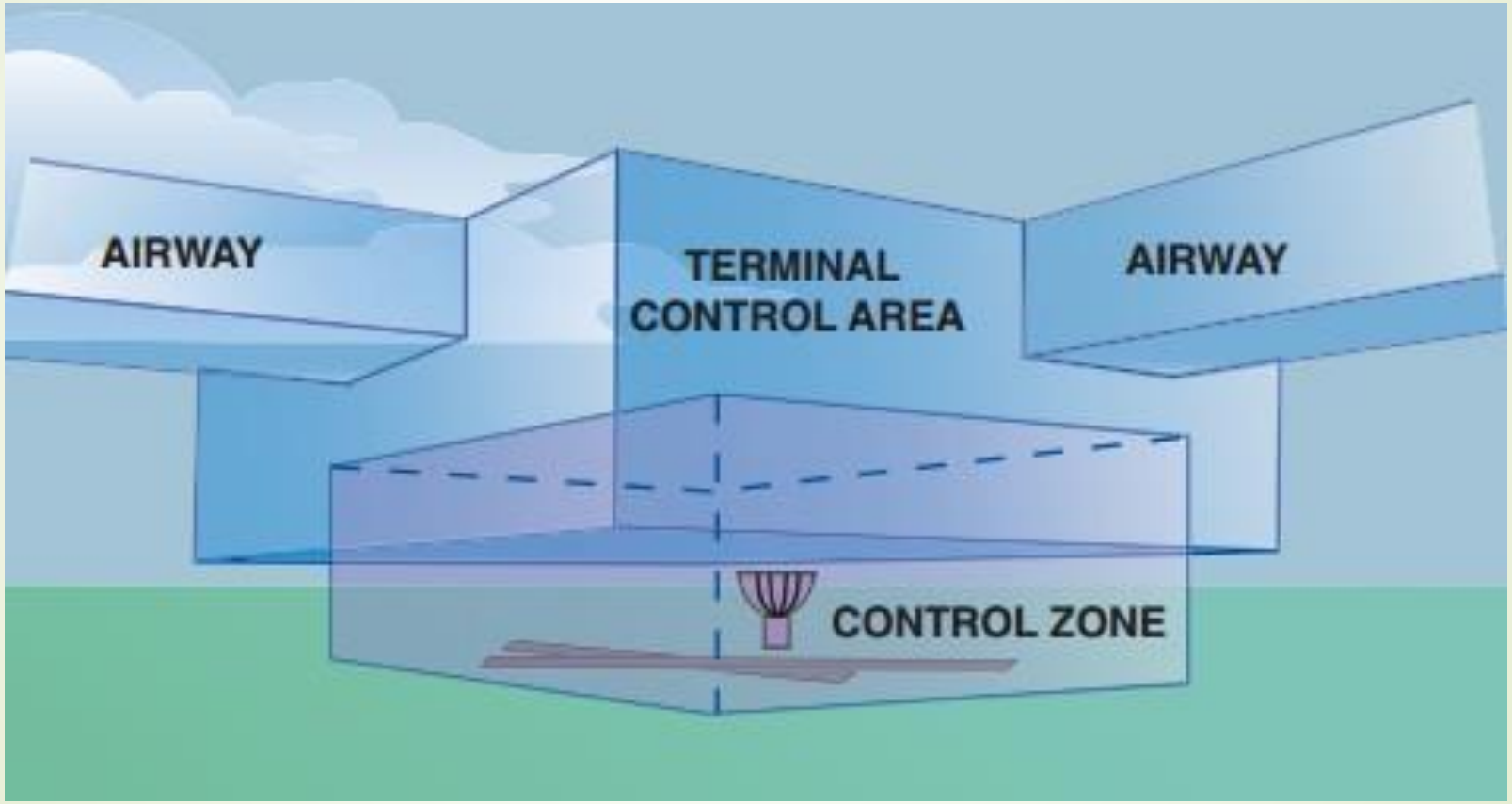
The relevant authority designated by the State responsible for providing air traffic services in the airspace concerned.

Appropriate authority

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

ANNEX 2/11


FIR
Control air space
Control zone (CTR)
Control area
Terminal Control area(TMA)
(CTA)
Upper Control area (UTA)
Airway
Uncontrolled airspace
Advisory airspace
Advisory route
Advisory area
Flight information airspace


AIRWAY
TERMINAL
CONTROL AREA
AIRWAY
CONTROL ZONE

ANNEX 2/11

- ***Controlled airspace***

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

- ***Control zone***

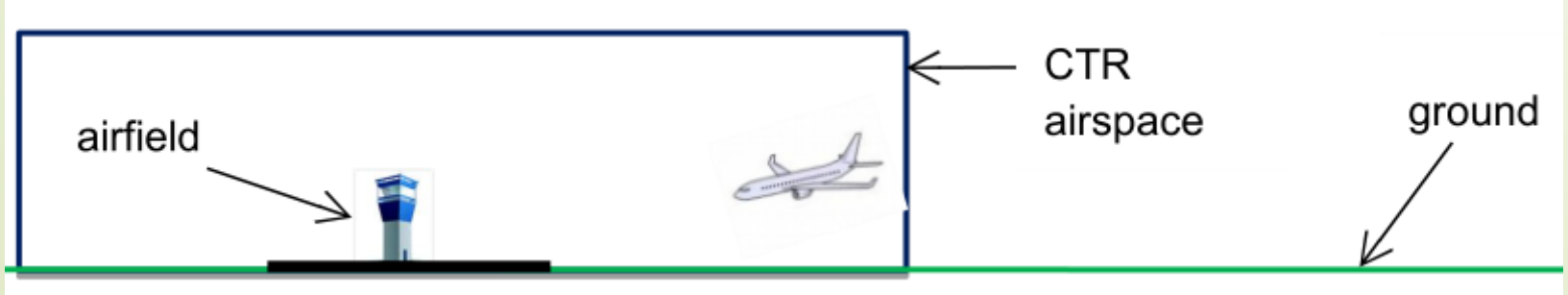
A controlled airspace extending upwards from the surface of the earth to a specified upper limit.

- ***Control area***

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

CTRs

CTRs are established in the vicinity of aerodromes to provide ATC to arriving and departing controlled traffic.Within a CTR the ATC service is provided by Approach controllers and is mandatory. A CTR may serve more than one aerodrome.Because a CTR is a zone, the base of any zone is defined as ground level or MSL.
Where the upper limit is defined as a FL it would always be a VFR FL. A CTR should be big enough to encompass the airspace required to provide the service and will usually ***extend at least 5 NM from the aerodrome reference position*** in the direction from which approaches are made. If established within the lateral limits of a CTA, the CTR must extend upwards to the lower limit of the CTA.



CTAs

A CTA is airspace within which ATC is provided to controlled flights (see definition) which are ‘en route' (i.e. not in the departure or approach phases of a flight).

CTAs are usually established in the vicinity of major aerodromes and at the confluence of airways.As already mentioned, the linking corridors of airspace (airways) are also CTAs.CTAs are defined to exist from a level above ground level (AGL) to an altitude or FL.Where the limit of a CTA is defined as a FL, it will be a VFR level.

ANNEX 2/11

- ***Terminal control area***

A control area normally established at the ***confluence of ATS routes in the vicinity of one or more major aerodromes.***

- **Airway**

A control area or portion thereof established in the form of a ***corridor***.

ANNEX 2/11

- ***Advisory airspace***

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

- ***Advisory route***

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

ANNEX 2/11

➢ Aerodrome traffic zone

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

Aerodrome traffic

All traffic on the maneuvering area of an aerodrome ***and*** all aircraft flying in the vicinity of an aerodrome.

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

Air traffic

All aircraft in flight or operating on the maneuvering area of an aerodrome.

Air traffic services airspaces

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.

In 1980, ICAO introduced a uniform system of classification of airspace to replace the disparate systems of airspace reservations throughout the world. The ICAO system classifies airspace in 7 categories from A to G each class dependent upon the rules applicable, the ATC service provided, separation standards applicable and the utilization of the airspace.

ANNEX 2/11

Class	Type of flight	Separation provided	Service provided	Speed limitation*	Radio communication requirement	Subject to an ATC clearance
"A"	IFR only	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes
"B"	IFR	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes

ANNEX 2/11

Class	Type of flight	Separation provided	Service provided	Speed limitation*	Radio communication requirement	Subject to an ATC clearance
	VFR	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes
"C"	IFR	IFR from IFR IFR from VFR	Air traffic control service	Not applicable	Continuous two-way	Yes
	VFR	VFR from IFR	a. Air traffic control service for separation from IFR; b. VFR/VFR traffic information (and traffic avoidance advice on request);	250 KT IAS below 3,050m (10,000 ft) AMSL	Continuous two-way	Yes

ANNEX 2/11

“D”	IFR	IFR from IFR	Air traffic control service, traffic information about VFR flights (and traffic avoidance advice on request)	250 KT IAS below 3,050m (10,000 ft) AMSL	Continuous two-way	Yes
	VFR	Nil	IFR/VFR and VFR/VFR traffic information (and traffic avoidance advice on request)	250 KT IAS below 3,050m (10,000 ft) AMSL	Continuous two-way	Yes
“E”	IFR	IFR from IFR	Air traffic control service and, as far as practical, traffic information about VFR flights	250 KT IAS below 3,050m (10,000 ft) AMSL	Continuous two-way	Yes
	VFR	Nil	Traffic information as far as practical	250 KT IAS below 3,050m (10,000 ft) AMSL	No	No

ANNEX 2/11

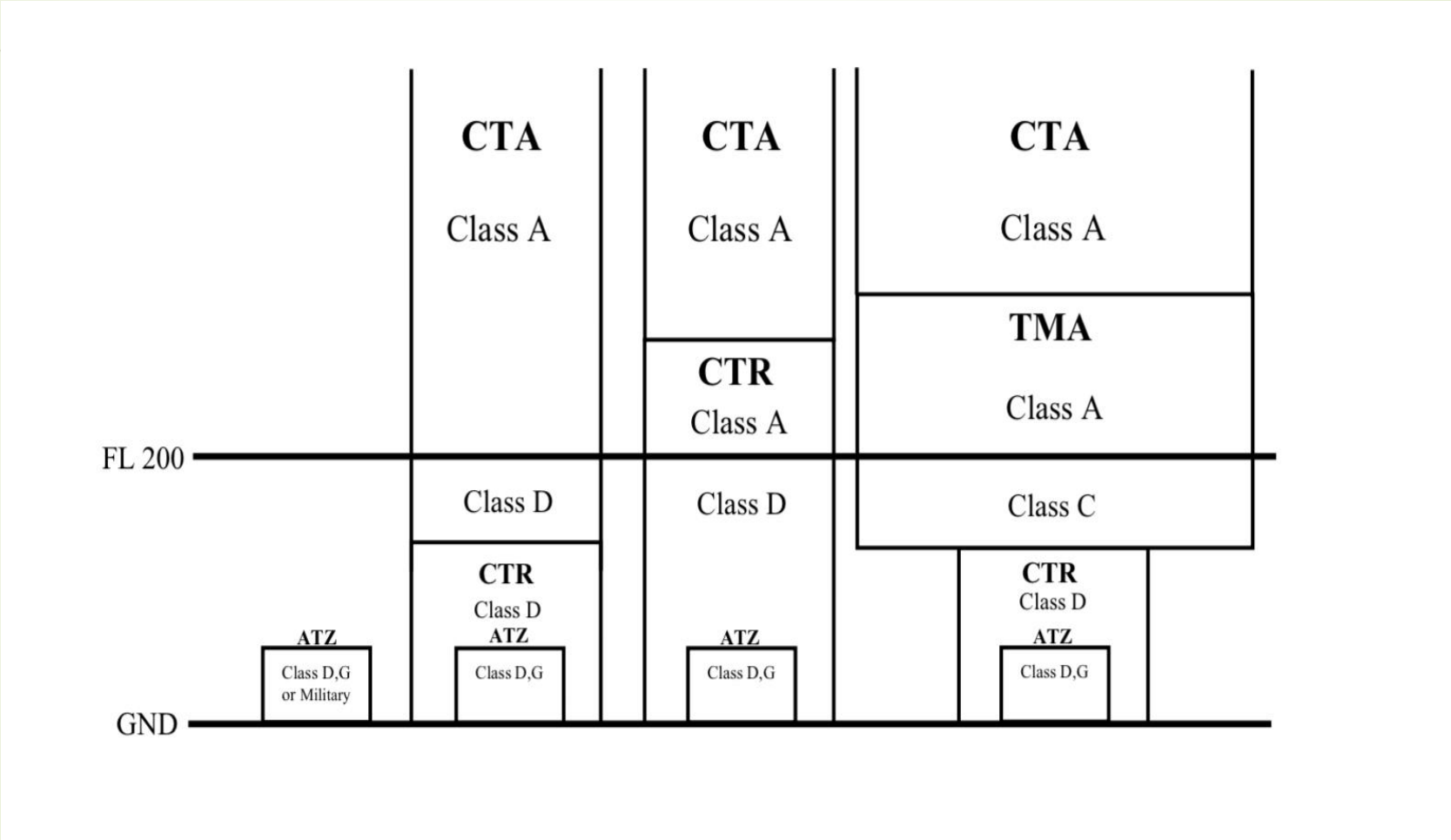
Class	Type of flight	Separation provided	Service provided	Speed limitation*	Radio communication requirement	Subject to an ATC clearance
"F"	IFR	IFR from IFR as far as practical	Air traffic advisory service; flight information service	250 KT IAS below 3,050m (10,000 ft) AMSL	Continuous two-way	No
	VFR	Nil	Flight information service	250 KT IAS below 3,050m (10,000 ft) AMSL	No	No
"G"	IFR	Nil	Flight information service	250 KT IAS below 3,050m (10,000 ft) AMSL	Continuous two-way	No
	VFR	Nil	Flight information service	250 KT IAS below 3,050m (10,000 ft) AMSL	No	No

* When the height of the transition altitude is lower than 3,050m (10,000 ft) AMSL, FL 100 should be used in lieu of 10,000 ft.

Note: - AWYs, TMAs, CTAs and CTRs above FL200 are class A. AWYs, CTAs and CTRs at FL 200 and below are class D. TMAs at FL 200 and below are class C. Airspace outside AWYs, TMAs, CTRs and CTAs are class G. - UIR: NIL	Tehran Information	Tehran Information English - Persian H24	5658 KHZ 5667 KHZ 6925 KHZ 8091 KHZ 8918 KHZ 10018 KHZ 13288 KHZ 13312 KHZ	SSB (SELCAL AVBL)

OIMM AD 2.17 ATS AIRSPACE

1	*Designation and lateral limits*	Mashhad CTR: A circle, radius 30 NM centred at 361352.2N 0593901.9E (DVOR/DME)	Mashhad ATZ: A circle , radius 7 NM centred at 361403N 0593842E (ARP)
2	*Vertical limits*	FL 125	6500 FT AMSL
3	*Airspace classification*	D	
4	*ATS unit call sign* *Language(s)*	Mashhad APP English / Persian	Mashhad TWR English / Persian
5	*Transition altitude*	8000 FT AMSL	
6	*Remarks*	NIL	


CTA
Class A
CTA
Class A
CTA
Class A
TMA
Class A
CTR
Class A
FL 200
Class D
Class D
Class C
CTR
Class D
CTR
Class D
ATZ
Class D,G
or Military
ATZ
Class D,G
ATZ
Class D,G
ATZ
Class D,G
GND

- ***Prohibited area***

An airspace of defined dimensions, above the ***land areas or territorial waters*** of a State, within which the flight of aircraft is prohibited.

- ***Restricted area***

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.

- ***Danger area***

An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

ANNEX 2/11

All Prohibited, Restricted and Danger Areas within a state are contained in the FIR(s) of that state and subject to notification of activity and change in status by NOTAM (see definition).

Each area will be assigned an individual designator consisting of the country identifier, the letter P, R or D followed by a number in the range 001 - 999. For example in the UK a danger off the north coast of Cornwall is designated OI P7. OI is the ICAO identifier for the IRAN; P means a PROHIBITED area and 001 is the unique number for that area.

OI P5 Parchin A circle, 3 NM radius centered at 353106N 0514637E.	7500 FT AMSL GND	H24 IRIAD
OI P6 Reserved		
OI P7 Shiraz (Persepolis) A circle, 3 NM radius centered at 2957N 05252E.	7000 FT AMSL GND	H24 IRICAO
OI P8 Reserved		
OI P9 Khondab A circle, 10 NM radius centered at 342200N 0491400E.	UNL GND	H24 IRIAD

ANNEX 2/11

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.

A0484/20 - OID84 ACTIVATED, REF AIP PAGE ENR 5.1.3-8. GND - 13000FT AMSL, FEB 22 TO MAR 16/0330-1930, 22 FEB 03:30 2020 UNTIL 16 MAR 19:30 2020. CREATED: 17 FEB 08:36 2020

NO # 4 ***Time = 00:04***

77

How many of airspace classes are known as controlled airspaces?

a) 5
b) 2
c) 4
d) 3

How many of airspace classes are known as controlled airspaces?

a) 5
b) 2
c) 4
d) 3

79

What is the speed limitation for IFR flight in class “B” airspace?

a) 250 kts (IAS)
b) 250 kts (TAS)
c) 250 kts (G/S)
d) Not applicable

80

What is the speed limitation for IFR flight in class “B” airspace?

a) 250 kts (IAS)
b) 250 kts (TAS)
c) 250 kts (G/S)
d) Not applicable

81

Which classification of airspace the IFR flight does not subject to ATC clearance?

a) C
b) D
c) E
d) F

Which classification of airspace the IFR flight does not subject to ATC clearance?

a) C
b) D
c) E
d) F

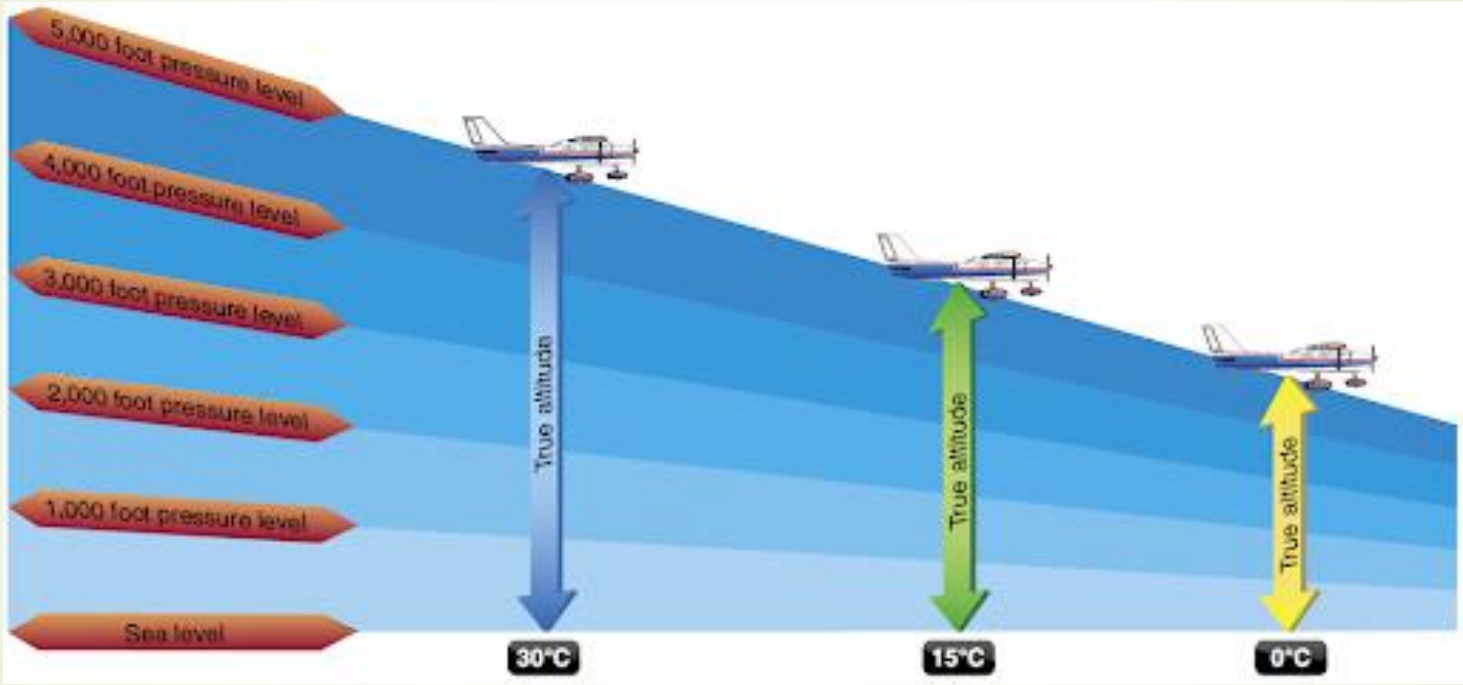
Continuous two-way communication must be applied for all type of traffic except:

a) VFR flights in class “E”
b) VFR flights in class “D”
c) IFR flights in class “F”
d) IFR flights in class “G”

Continuous two-way communication must be applied for all type of traffic except:

a) VFR flights in class “E”
b) VFR flights in class “D”
c) IFR flights in class “F”
d) IFR flights in class “G”

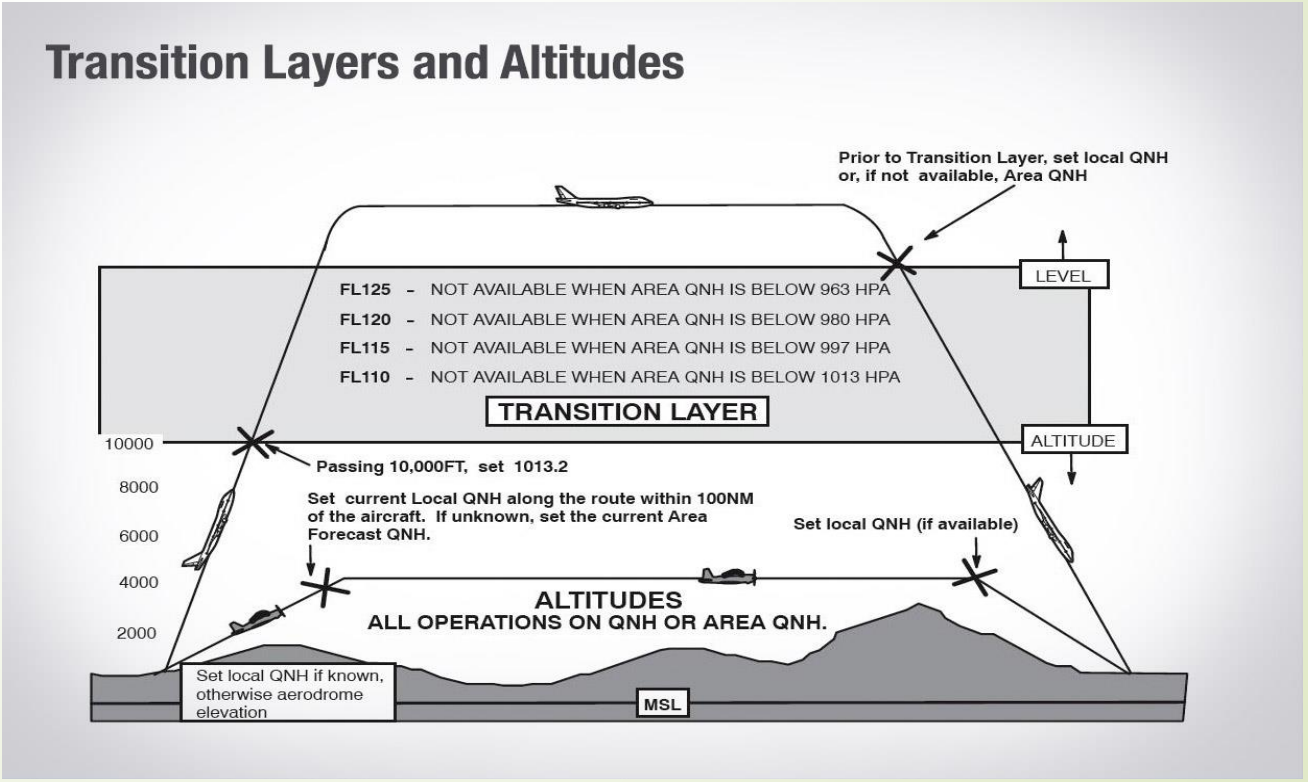
Altimeter Setting Procedures



Module objectives

At the end of this module you will be able to explain the **definition and type of pressure and their functions in aviation** based on ICAO standard regulations.

Time 01:00



ANNEX 2/11

The ***two*** main objectives of altimeter setting procedures are to:

- ***Provide adequate terrain clearance during all phases of flight especially departure and arrival.***
- ***Provide adequate vertical separation between aircraft***
- **QNH**

This is the observed barometric pressure at an aerodrome adjusted in accordance with the ISA pressure lapse rate to indicate the pressure that would be observed if the observation was carried out at sea level.If QNH is set on the altimeter subscale, the altimeter would read aerodrome elevation at touchdown.

- ***QFE***

This is the observed barometric pressure at an aerodrome which, if set on the altimeter subscale, would result in the altimeter reading zero at touchdown.

- ***QNE***

A situation can occur where the QNH is below the lowest altimeter subscale setting.For instance, if the altimeter subscale will not read below 950 hPa and the QNH is 935 hPa it would appear that the altimeter is useless.If, however, the altimeter subscale is set to a standard setting (e.g. 1013h Pa) then it would be possible to calculate what the altimeter would read at touchdown where the QNH is 930 hPa and the altimeter subscale is set to 1013 hPa using the ICAO ISA.Assume that the aerodrome elevation is 100 ft AMSL.On touchdown the altimeter will read:

State the definition for QNH:

a) QFE reduced to MSL, using standard temperature gradient.
b) QFF reduced to MSL, using standard temperature gradient.
c) QFE reduced to MSL, using actual temperature gradient.
d) QNE reduced to MSL, using standard temperature gradient.

ANNEX 2/11

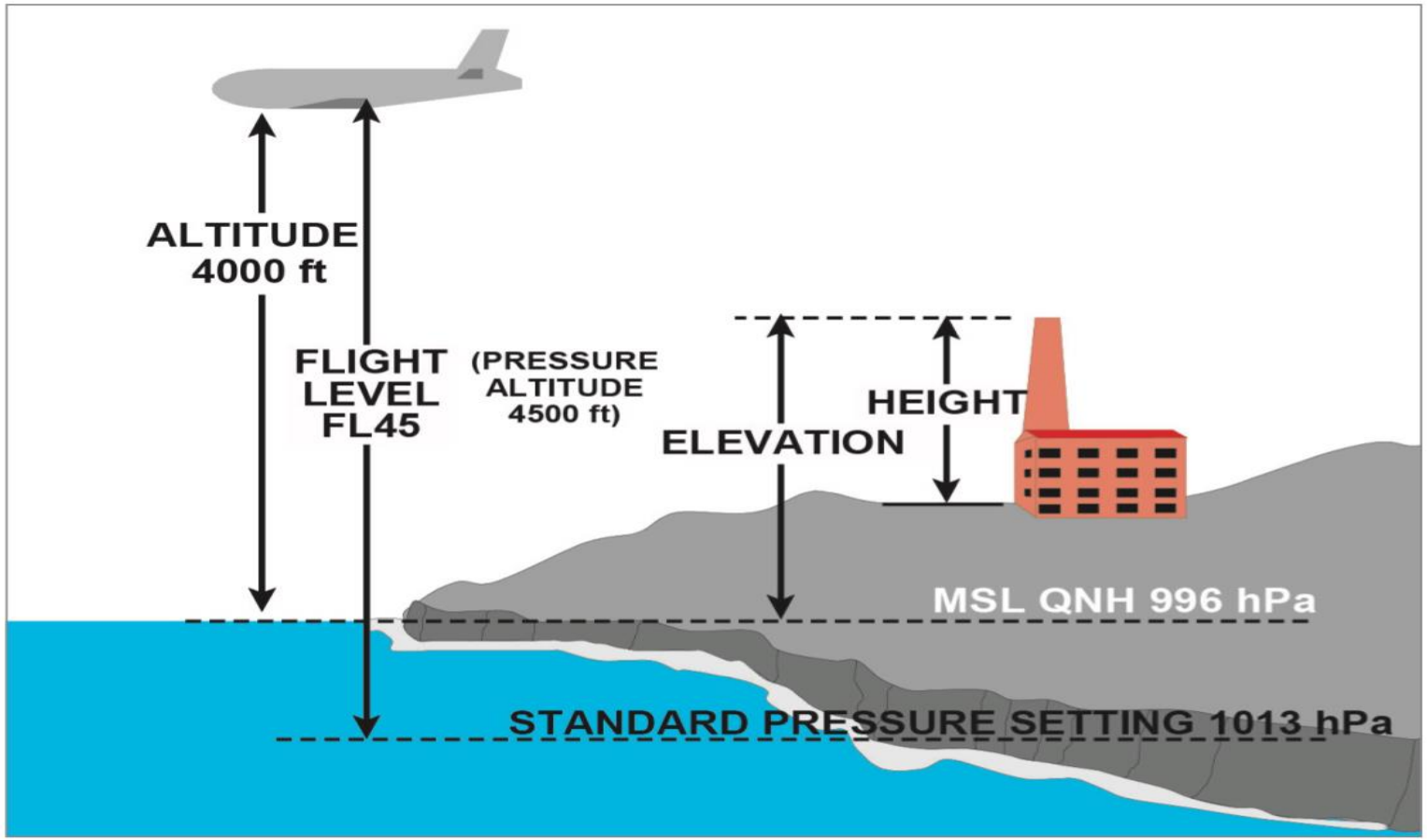


Figure 11.1

ANNEX 2/11

1013 - 930 = 83 (amount of pressure wound on)
83 × 27 ft (ISA interval) = 2241 ft + 100 ft = 2341 ft.

In this case, 2341 ft is the QNE. A pilot would be instructed by the ATCO:

"G-CD set 1013 land with QNE 2340"

Transition Altitude

This is the altitude (with QNH set) above the aerodrome at which the altimeter subscale is reset to SPS and vertical position above that is then reported as a flight level. The transition altitude is specified for every aerodrome by the Authority of the State in which the aerodrome is located. The transition altitude shall be as low as possible but normally not less than 3000 ft.Transition altitudes are published in the AIP and shown on charts and instrument plates.A state may specify a general transition altitude (as in the USA, 18 000 ft).

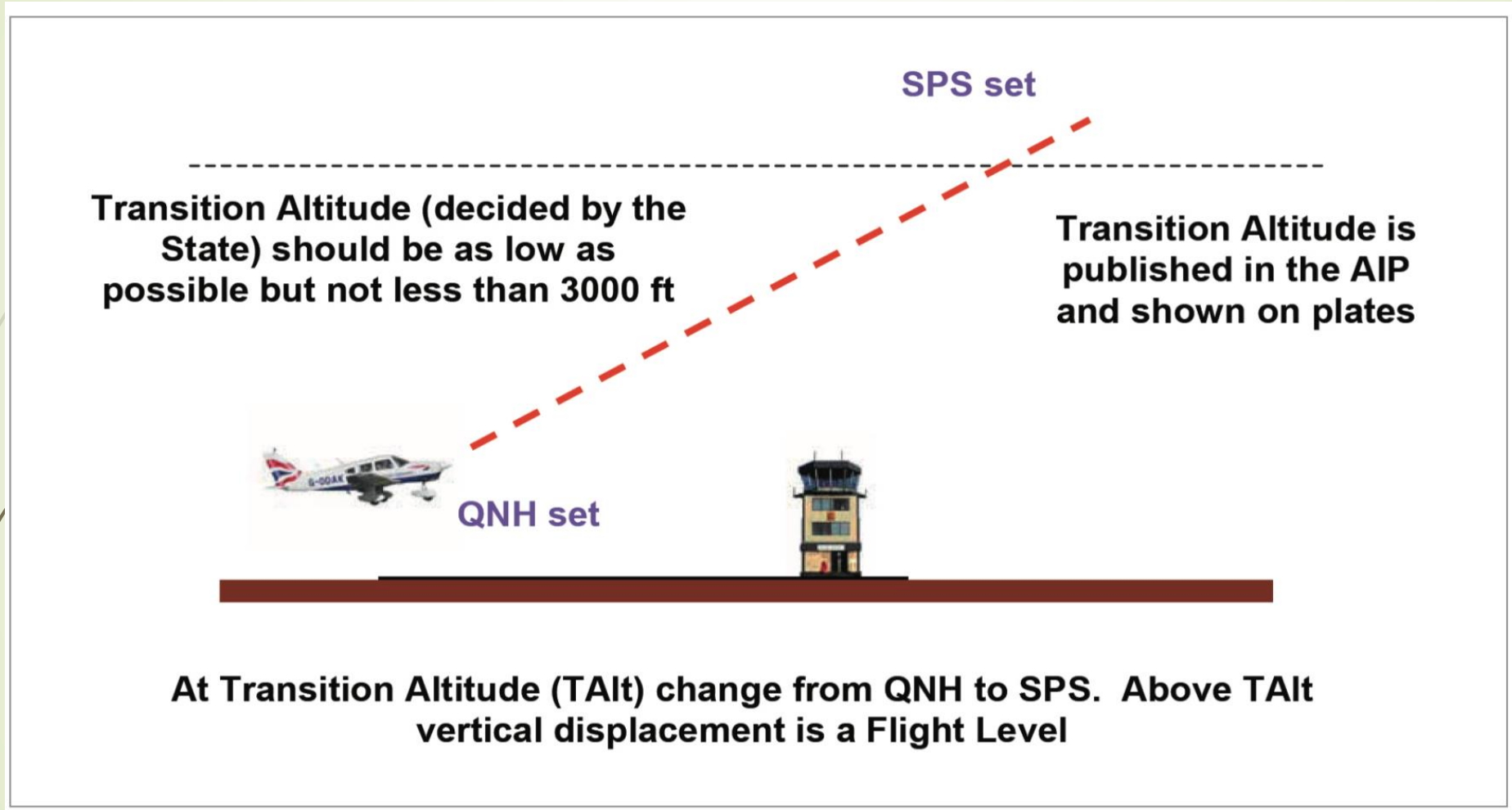


Figure 11.2 Transition altitude

ANNEX 2/11

Transition Level

The transition level is the flight level at which the altimeter is reset to the aerodrome QNH and subsequent flight is reported with reference to altitude. The transition level changes with the QNH. It is calculated by the Approach Controller at regular intervals and also when QNH changes.it is defined as the first available flight level above the transition altitude.This will be a ‘rounding up' from what the altimeter is reading at the transition level with SPS set.Calculation of transition level is not required by the learning objectives.

The flight crew shall be provided with the transition level :

- ***prior to reaching the level during the descent***
- ***in the approach clearance***
- ***when requested by the pilot***

QNH	T.L
1050.4 – 1031.8	TA + 500
1031.7 – 1013.2	TA + 1000
1013.1 – 995.2	TA + 1500
995.1 – 977.1	TA + 2000
977.0 – 959.5	TA + 2500

ANNEX 2/11

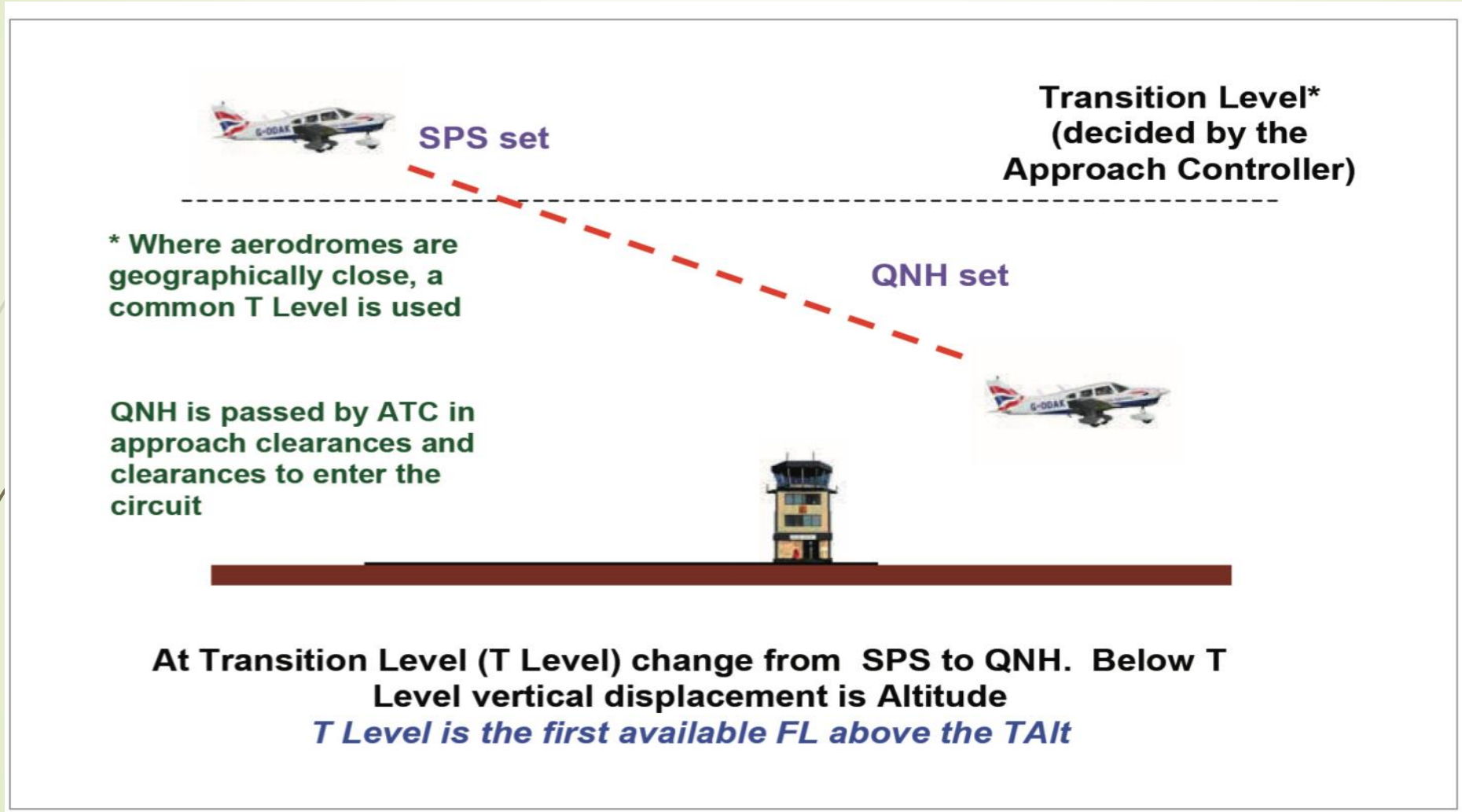


Figure 11.3 Transition level

ANNEX 2/11

Lowest Useable Flight Level.

This is the flight level that corresponds to or is immediately above the established minimum flight altitude.

Once above the ‘safe in all cases' altitude, the problem ceases to be terrain avoidance and becomes avoidance of other air traffic.In this case it essential that all aircraft have at least one altimeter referenced to the same subscale setting so that a standard separation can be applied regardless of the sea level pressure.According to ICAO ISA the average barometric pressure is 1013.25 hPa and this (when rounded down to 1013 hPa) is defined as the Standard Pressure Setting (SPS).

ANNEX 2/11

Transition Layer

This is the airspace between the transition altitude with SPS set and the transition level. It is usually insignificant but some states require a minimum depth to the transition layer. When ascending through the transition layer (with SPS set) vertical position is reported as a flight level and when descending through the layer with QNH set, as an altitude.

ANNEX 2/11

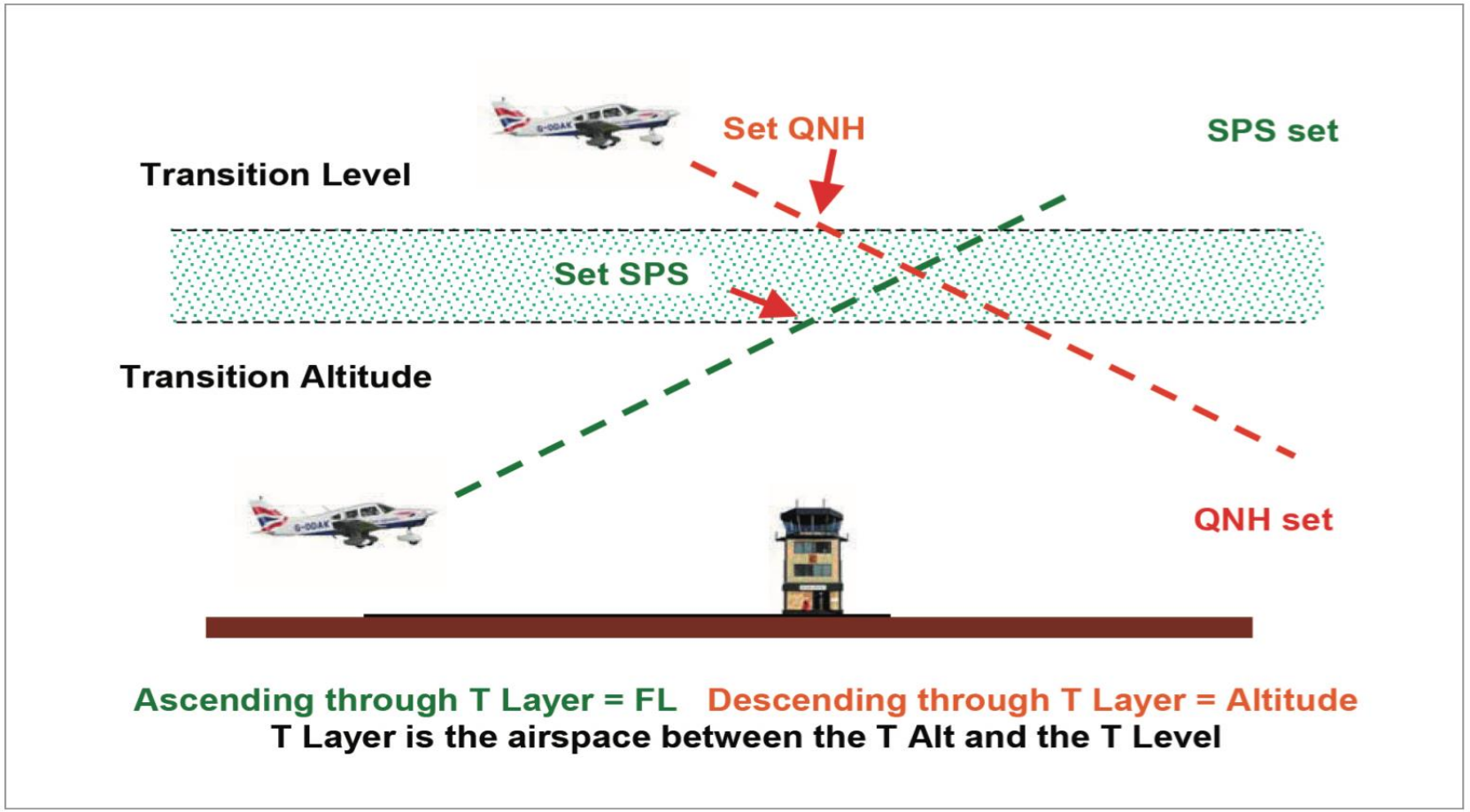


Figure 11.4 Transition layer

ANNEX 2/11

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

- ***flight levels, for flights at or above the lowest usable flight level or, where applicable, above the transition altitude;***
- ***altitudes, for flights below the lowest usable flight level or, where applicable, at or below the transition altitude.***

ANNEX 2/11

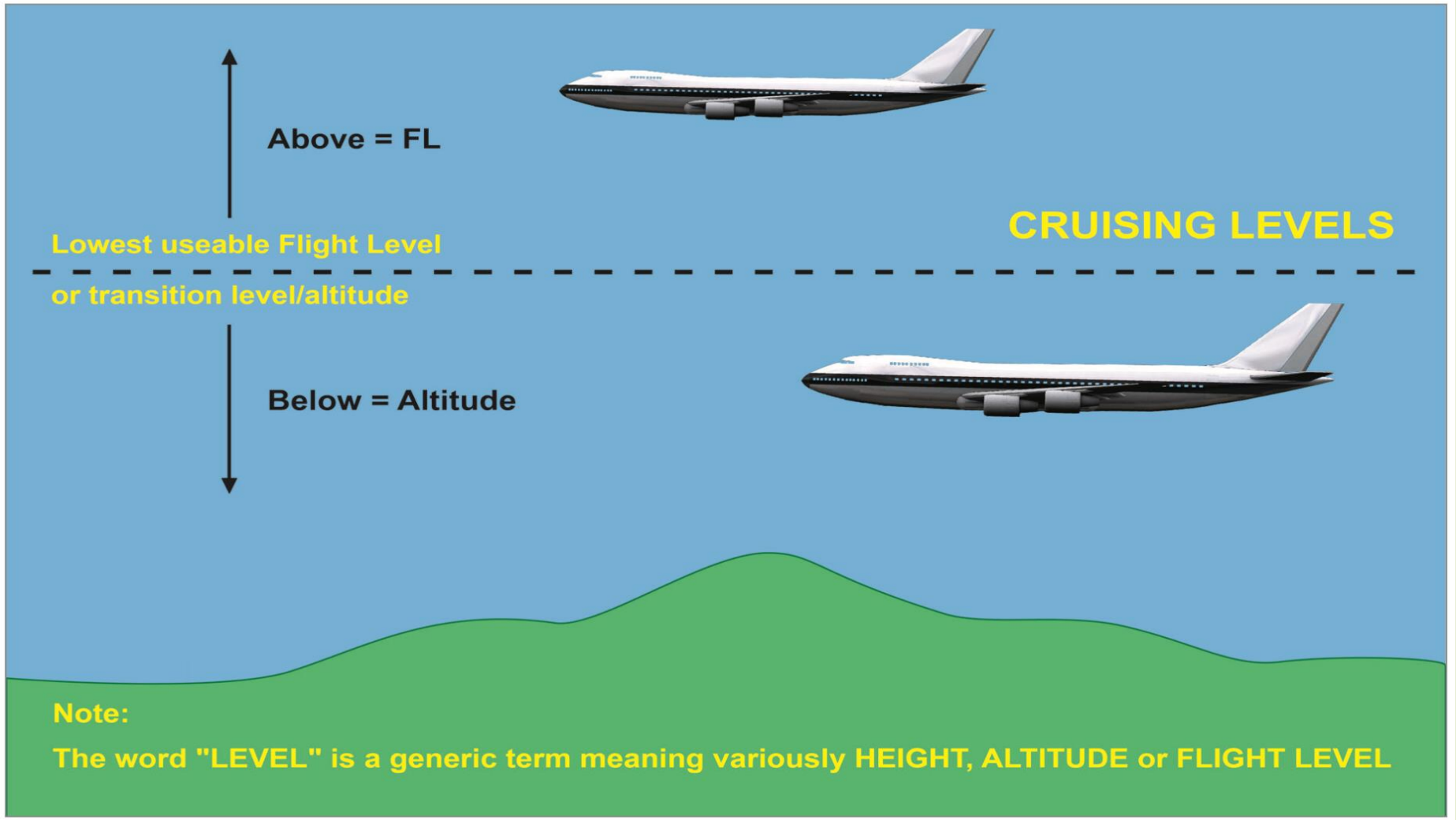


Figure 6.4

ANNEX 2/11

PRE-FLIGHT OPERATIONAL TEST

QNH Setting

- With the aircraft at a known elevation on the aerodrome, set the altimeter pressure scale to the current QNH setting

- Vibrate the instrument by tapping unless mechanical vibration is provided. A serviceable altimeter indicates the elevation of the point selected, plus the height of the altimeter above this point, within a tolerance of:

- ±20 m or 60 ft for altimeters with a test range of 0 to 9000 m (0 to 30000 ft); and

- ±25 m or 80 ft for altimeters with a test range of 0 to 15000 m (0 to 50000 ft).

Pilot's responsibility

The pilot-in-command is responsible for the safety of the operation and the safety of the aero-plane and of all persons on board during flight time (Annex 6, 4.5.1). This includes responsibility for obstacle clearance, except when an IFR flight is being vectored by radar.

Operator's responsibility

The operator is responsible for establishing minimum flight altitudes, which may not be less than those established by States that are flown over. The operator is responsible for specifying a method for determining these minimum altitudes (Annex 6, 4.2.6).

Annex 6 recommends that the method should be approved by the State of the Operator and also recommends the factors to be taken into account.

Pedram shirazi

ANNEX 2/11

ALTIMETER CORRECTIONS

PRESSURE CORRECTION

Flight levels When flying at levels with the altimeter set to 1013.2 hPa, the minimum safe altitude must be corrected for deviations in pressure when the pressure is lower than the standard atmosphere (1013 hPa).

An appropriate correction is 10 m (30 ft) per hPa below 1013 hPa. Alternatively, the correction can be obtained from standard correction graphs or tables supplied by the operator.

When using the QNH or QFE altimeter setting (giving altitude or height above QFE datum respectively), a pressure correction is not required.

TEMPERATURE CORRECTION

Requirement for temperature correction

The calculated minimum safe altitudes/heights must be adjusted when the ambient temperature on the surface is much lower than that predicted by the standard atmosphere. In such conditions, an approximate ***correction is 4 per cent height increase for every 10°C below standard temperature as measured at the altimeter setting source.*** This is safe for all altimeter setting source altitudes for temperatures above -15°C.

Table III-1-4-1 b). Values to be added by the pilot to minimum promulgated heights/altitudes (ft)

Aerodrome temperature (°C)	Height above the elevation of the altimeter setting source (feet)													
	200	300	400	500	600	700	800	900	1000	1500	2000	3000	4000	5000
0	20	20	30	30	40	40	50	50	60	90	120	170	230	280
–10	20	30	40	50	60	70	80	90	100	150	200	290	390	490
–20	30	50	60	70	90	100	120	130	140	210	280	420	570	710
–30	40	60	80	100	120	140	150	170	190	280	380	570	760	950
–40	50	80	100	120	150	170	190	220	240	360	480	720	970	1210
–50	60	90	120	150	180	210	240	270	300	450	590	890	1190	1500

ANNEX 2/11

Table III-1-4-2/3. Margin in mountainous areas

Terrain variation	MOC
Between 3000 ft and 5000 ft (900 m and 1500 m)	1476 ft (450 m)
Greater than 5000 ft (1500 m)	1969 ft (600 m)

Table III-1-4-4/5. Altimeter error due to wind speed

Wind speed	Altimeter error
20 kt (37 km/h)	53 ft (17 m)
40 kt (74 km/h)	201 ft (62 m)
60 kt (111 km/h)	455 ft (139 m)
80 kt (148 km/h)	812 ft (247 m)

ANNEX 2/11

Altitude

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

Height

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

Flight level.

A surface of constant atmospheric pressure which is related to a specific pressure datum,1 013.2 (hPa), and is separated from other such surfaces by specific pressure intervals.

ANNEX 2/11

A pressure type altimeter calibrated in accordance with the Standard Atmosphere:

- when set to a QNH altimeter setting, will indicate altitude;
- when set to a QFE altimeter setting, will indicate height above the QFE reference datum;
- when set to a pressure of 1 013.2 hPa, may be used to indicate flight levels.

Level

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

NO # 4 ***Time = 00:04***

112

The cruising level of an aircraft shall be in the term of flight level.....

a) At lowest usable flight level

b) Above lowest usable flight level

c) At or above lowest usable flight level

113 **The cruising level of an aircraft shall be in the term of flight level.....**

a) At lowest usable flight level

b) Above lowest usable flight level

c) At or above lowest usable flight level *

114

The cruising level of an aircraft shall be in the term of altitude:

a) At lowest usable flight level

b) Below the lowest usable flight level

c) At or below transition altitude

d) b and c are correct

115 **The cruising level of an aircraft shall be in the term of altitude:**

a) At lowest usable flight level

b) Below the lowest usable flight level

c) At or below transition altitude

d) b and c are correct *

116 **The position of an aircraft during descent within transition layer is:**

a) Altitude.
b) Height.
c) Flight level.
d) Elevation.

117

The position of an aircraft during descent within transition layer is:

a) Altitude.

b) Height.

c) Flight level.

d) Elevation.

118

The cruising level of an aircraft below lowest usable flight level is called:

a) Flight level.
b) Altitude.
c) Elevation.
d) None.

119

The cruising level of an aircraft below lowest usable flight level is called:

a) Flight level.
b) Altitude.
c) Elevation.
d) None.

Visibility

Module objectives

At the end of this module you will be able to explain the **definition and type of visibility and their functions in aviation** based on standard ICAO regulations.

Time 00:15

ANNEX 2/11

Visibility

Visibility for aeronautical purposes is the greater of:

- ***DAY*** ➔the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a ***bright background;***

- ***NIGHT*** ➔the greatest distance at which lights in the ***vicinity of 1 000 candelas*** can be seen and identified against an ***unlit*** background.

- ***Flight visibility***

The visibility forward from the cockpit of an aircraft in flight.

- ***Ground visibility***

The visibility at an aerodrome as reported by an accredited observer or by automatic systems.

In the METAR, the reported visibility is the ***prevailing visibility*** and, may, under certain conditions, include the minimum visibility.

Prevailing visibility

is the visibility value which is either reached, or exceeded, around at least half the horizon circle, or within at least half of the surface of the aerodrome.***If the visibility in one direction, which is not the prevailing visibility***, is less than 1500 m, or less than 50% of the prevailing visibility, the lowest visibility observed, and its general direction, should also be reported.

ANNEX 3

Up to 10 km, the visibility is measured in meters. For example, 6000 means that the prevailing visibility is 6000 meters. Once the visibility reaches 10 km or more, the code figure used is ***9999***.

Visibility of less than 50 meters is indicated by the code 0000. In this example the prevailing visibility is 800 meters.

METAR EGTK 231020Z 26012G25KT 220V300 0800

In some instances, runway visibility information is given in a METAR; this is known as Runway Visual Range (RVR.) RVR is given only when either the horizontal visibility or the RVR, itself, is less than 1500 metres.

The RVR group starts with the letter R, and then goes on to give the runway in use, followed by the threshold visibility in metres. we have a prevailing visibility of 800 metres, with an RVR, at the threshold of Runway 30, of 1100 metres.

METAR EGTK 211020Z 26012G25KT 0800 R30/1100

ANNEX 3

If the RVR is more than the maximum reportable value of 1500 metres, the code ***P*** is used in front of the ***visibility value, R30/P1500.*** If the ***visibility is less than 50 m then the prefix M will be used e.g. R30/M0050*** A letter can sometimes come after the RVR to indicate any trends that the RVR has shown.

A ***U*** means that the visibility has ***increased by 100 m or more in the last 10 minutes,*** e.g. R30/1100U. A ***D*** shows that visibility has ***decreased by 100 m or more in that same time period***, R30/1100D. An ***N*** added to the visibility group shows that ***there is no distinct trend*** observed, R30/1100N.

If the sky at an aerodrome is obscured for reasons other than cloud cover, and cloud coverage cannot easily be determined, the code ***VV*** is used in place of the cloud information. **VV is followed by the vertical visibility in hundreds of feet.**

METAR EGTK 231020Z 26005KT 0300 FG VV002
(a) (b)

The highlighted codes in this METAR indicate that:

Visibility is 300 m in fog (a), the sky is obscured and the vertical visibility is 200 ft.

If the ***vertical visibility cannot be assessed,*** ***three forward slashes will replace the cloud height figures, e.g. VV///.***

The code CAVOK is frequently used in the METAR code, being the abbreviation for ***"cloud, ceiling and visibility are OK."*** If CAVOK is used, it will replace the visibility, RVR, weather and cloud groups. There are four criteria which must be met in order for CAVOK to appear in the METAR.These are:

METAR EGTK 231020Z 26012G25KT 220V300 CAVOK

- *the visibility must be 10 kilometres or more.*
- *the height of the lowest cloud must be no less than 5000 ft, or the level of highest minimum sector altitude, whichever is the greater.*
- *there must be no cumulonimbus or 'towering cumulus' (TCU) present.*
- *there must be no significant weather at or in the vicinity of the aerodrome.*

Ceiling

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.***

- ***FEW (FEW) meaning one to two eighths of cloud coverage.***
- ***SCATTERED (SCT) meaning three to four eighths of cloud coverage.***
- ***BROKEN (BKN) meaning five to seven eighths of cloud coverage.***
- ***OVERCAST (OVC) meaning complete cloud coverage, or eight eighths.***

FEW (1-2/8)
SCT (3-4/8)
G-NEWT
BKN (5-7/8)
OVC (8/8)

NO # 4 ***Time = 00:04***

134

Which one of following statement is correct?

a) Few means 1 to 2 oktas of sky

b) Broken means 5 to 7 oktas of sky

c) Overcast means 8 oktas of sky

d) a , b and c are correct

135

Which one of following statement is correct?

a) Few means 1 to 2 oktas of sky

b) Broken means 5 to 7 oktas of sky

c) Overcast means 8 oktas of sky

d) a , b and c are correct

136

The lowest layer of clouds is called ceiling when it is:

a) Below 6000 m
b) Below 20000'
c) Above 6000 m
d) "a" or "b" are correct

137

The lowest layer of clouds is called ceiling when it is:

a) Below 6000 m

b) Below 20000'

c) Above 6000 m

d) "a" or "b" are correct

138

What does CAVOK mean?

a) Cloud and VMC is ok
b) Ceiling and visibility ok
c) No ceiling, visibility ok
d) All

What does CAVOK mean?

a) Cloud and VMC is ok

b) Ceiling and visibility ok

c) No ceiling, visibility ok

d) All

140

In CAVOK the visibility should be.....

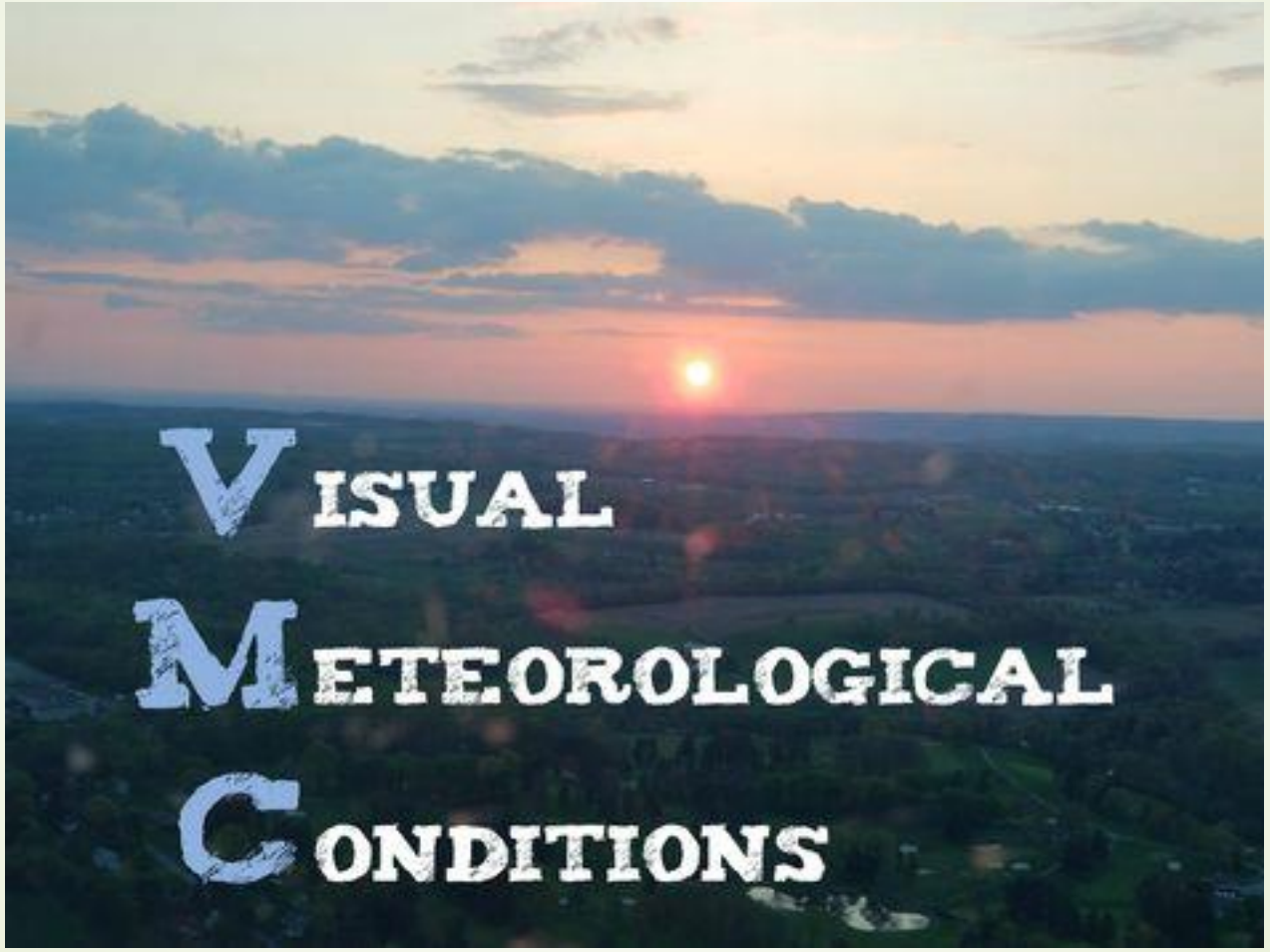
a) 10 Km or more
b) less than 10 Km
c) 5 Km
d) 8 Km

141

In CAVOK the visibility should be.....

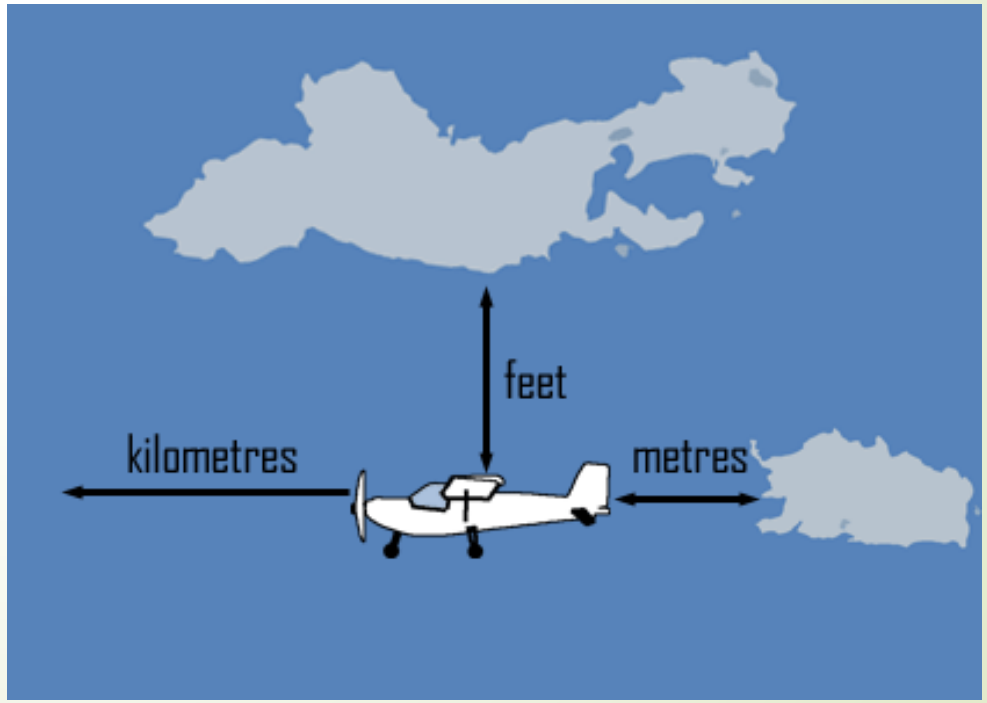
a) 10 Km or more
b) less than 10 Km
c) 5 Km
d) 8 Km

Visual Meteorological Conditions



Module objectives

At the end of this module you will be able to explain the definition **Visual Meteorological Conditions and their functions in aviation** based on standard ICAO regulations.



Time 00:15

Visual Meteorological Conditions

To fly under VFR, the visual meteorological conditions (VMC) must exist.This is defined by altitude (or Flight Level), flight visibility (the forward visibility from the flight deck of an aeroplane in flight), and distance (horizontally and vertically) from cloud, for the relevant classes of airspace.

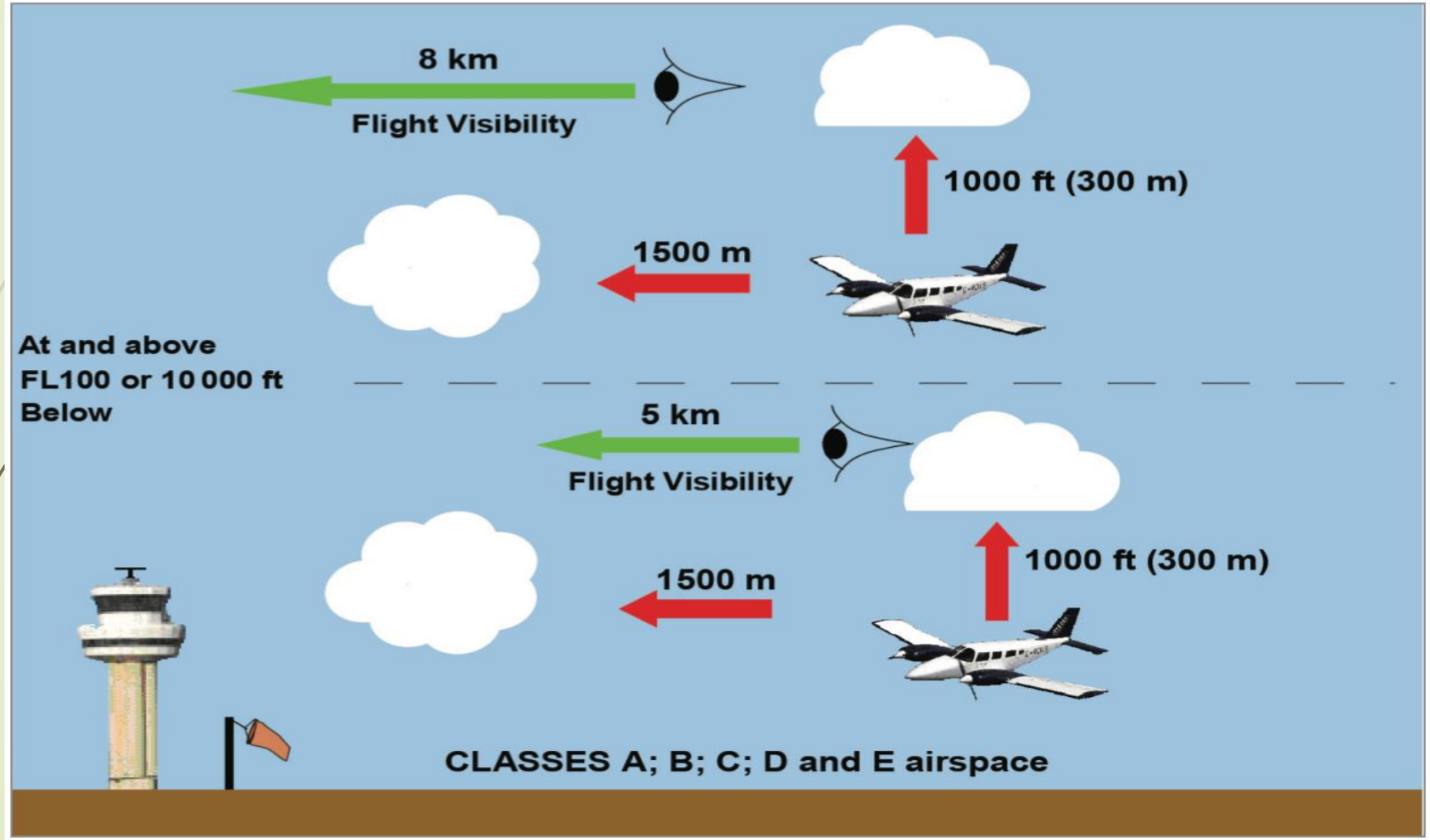
Instrument meteorological conditions

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

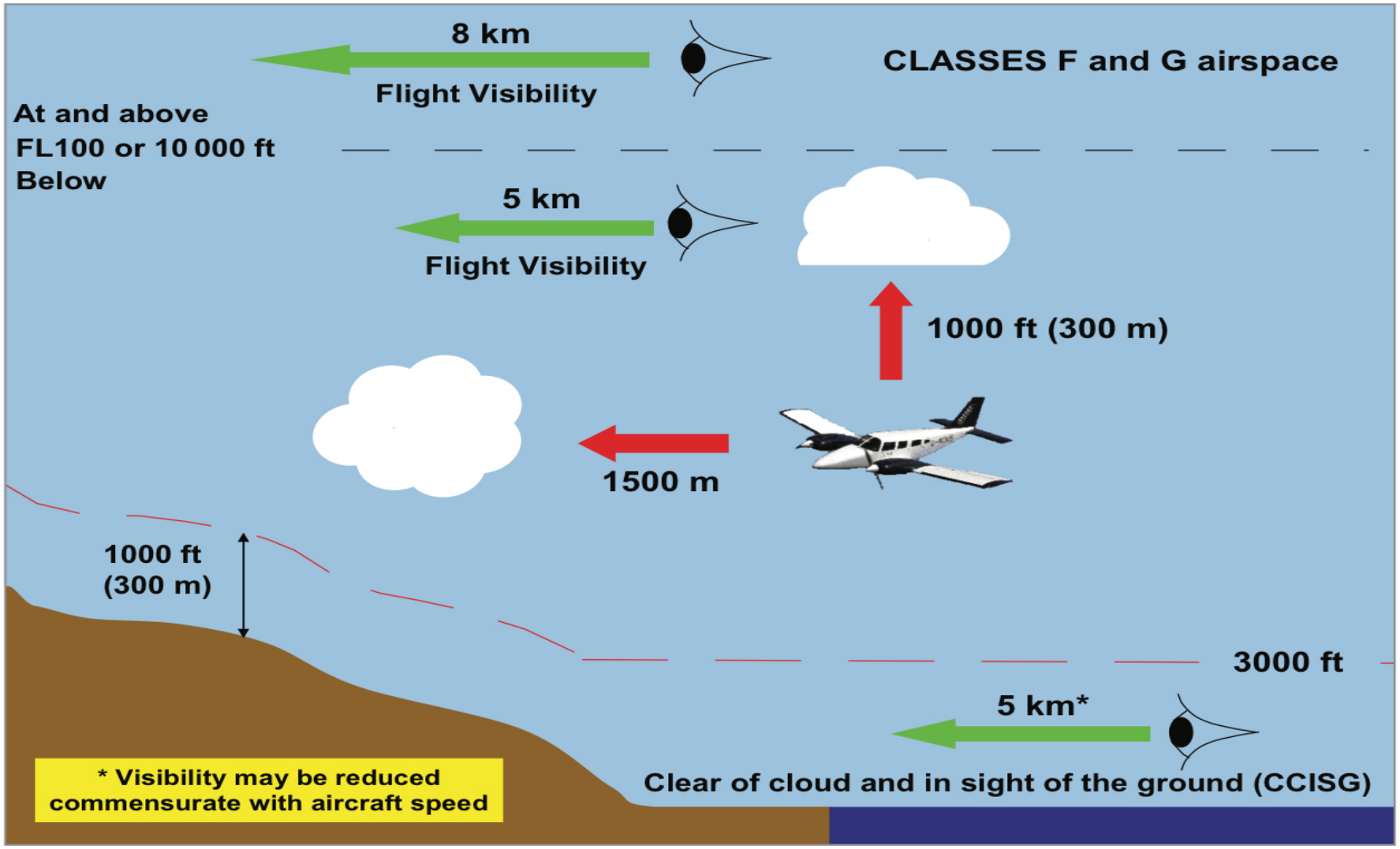
Table 3-1*
(see 4.1)

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

ANNEX 2/11


8 km
Flight Visibility
1000 ft (300 m)
1500 m
At and above
FL100 or 10 000 ft
Below
5 km
Flight Visibility
1000 ft (300 m)
1500 m
CLASSES A; B; C; D and E airspace

ANNEX 2/11


8 km
Flight Visibility
CLASSES F and G airspace
At and above
FL100 or 10 000 ft
Below
5 km
Flight Visibility
1000 ft (300 m)
1500 m
1000 ft
(300 m)
3000 ft
5 km*
* Visibility may be reduced commensurate with aircraft speed
Clear of cloud and in sight of the ground (CCISG)

NO # 4 ***Time = 00:04***

Which one is considered as minima for VMC?

a) Flight visibility 5Km / distance from cloud 1500ft horizontally, 1000 M vertically.

b) Flight visibility 5Km / distance from cloud 1500M horizontally, 1000 ft vertically.

c) Flight visibility 5Km / distance from cloud 1000M horizontally, 1500 ft vertically.

d) Flight visibility 5Km / distance from cloud 1000ft horizontally, 1500 M vertically.

Which one is considered as minima for VMC?

a) Flight visibility 5Km / distance from cloud 1500ft horizontally, 1000 M vertically.

b) Flight visibility 5Km / distance from cloud 1500M horizontally, 1000 ft vertically.

c) Flight visibility 5Km / distance from cloud 1000M horizontally, 1500 ft vertically.

d) Flight visibility 5Km / distance from cloud 1000ft horizontally, 1500 M vertically.

151

When flying under visual flight rules in class C airspace at altitudes below 10,000 feet AMSL and above 3000 feet AMSL, or 1000 feet above terrain , whichever is the higher, you must maintain a horizontal distance of at least ……. from clouds.

a) 5 kilometers.

b) 1500 meters.

c) 1000 feet.

d) 2000 feet.

152

When flying under visual flight rules in class C airspace at altitudes below 10,000 feet AMSL and above 3000 feet AMSL, or 1000 feet above terrain, whichever is the higher, you must maintain a horizontal distance of at least ..... from clouds.

a) 5 kilometers.

b)1500 meters.

c) 1000 feet.

d) 2000 feet.

153

To fly under VFR in class D airspace at or below 3000’ AMSL, or 1000 feet above terrain, whichever is higher, the flight visibility must be at least:

a) 5 kilometers.

b) 5 nautical miles.

c) 8000 meters.

d) 1500 meters.

154

To fly under VFR in class D airspace at or below 3000’ AMSL, or 1000 feet above terrain, whichever is higher, the flight visibility must be at least:

a)5 kilometers.

b) 5 nautical miles.

c) 8000 meters.

d) 1500 meters.

155

To fly under VFR in class G airspace at and below 3000 feet AMSL or 1000 feet above terrain, whichever is higher, you must:

a) Maintain a horizontal distance of at least 1500 meters from clouds.

b) Maintain a vertical distance of at least 1500 meters from the clouds.

c) Maintain a horizontal distance of at least 1500 feet from clouds.

d) Remain clear of clouds and insight of the surface.

156

To fly under VFR in class G airspace at and below 3000 feet AMSL or 1000 feet above terrain, whichever is higher, you must:

a) Maintain a horizontal distance of at least 1500 meters from clouds.

b) Maintain a vertical distance of at least 1500 meters from the clouds.

c) Maintain a horizontal distance of at least 1500 feet from clouds.

d) Remain clear of clouds and insight of the surface.

Visual Flight Rules

Module objectives

At the end of this module you will be able to explain the definition **Visual Flight Rules and their functions in aviation** based on standard ICAO regulations.

Time 00:30

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 of VMC

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.

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:

- when the ceiling is less than 450 m (1 500 ft); or
- when the ground visibility is less than 5 km.

ANNEX 2/11

Unless ***authorized*** by the appropriate ATS authority, VFR flights ***shall not*** be operated:

- ***above FL 200;***
- ***at transonic and supersonic speeds.***
- ***No VFR flights is permitted into RVSM air space in IRAN***

Authorization for VFR flights to operate above FL 290 shall not be ***granted*** in areas where a vertical separation mini-mum of 300 m (1 000 ft) is applied ***above FL 290.***

Minimum Heights

Except when necessary for take-off or landing, or except by permission of the appropriate authority, aircraft shall not be flown over the congested areas of cities, towns or settlements or over an open-air gathering 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***.No specific heights are mentioned and this rule should not be confused with the minimum height rules for IFR or VFR.

Figure 6.3 An aircraft must be flown at a height from which, in the event of an emergency, a landing can be made without undue hazard to persons or property on the surface.

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

- ***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;***

- ***elsewhere than as specified in 4.6 a), at a height less than 150 m (500 ft) above the ground or water.***

VFR flights shall comply with the control flight:

- ***when operated within Classes B, C and D airspace***
- ***when forming part of aerodrome traffic at controlled aerodromes; or***
- ***when operated as special VFR flights.***

Special VFR flight

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

flight visibilities reduced to ***not less than 1 500 m*** may be permitted for flights operating.

IRAN ➔When the ground visibility is ***not less than 2000m,*** in intended direction of flight, a special VFR flights may be authorized to:
enter a control zone for the purpose of landing/take off, depart from a control zone, cross a control zone or operate locally within a control zone.

ANNEX 2/11

Night: The hours between the end of evening civil twilight and the beginning of morning civil twilight.

Civil twilight ends in the evening when the centre of the sun's ***disc is 6 degrees below the horizon*** and begins in the morning when the centre of the sun's disc is 6 degrees below the horizon.

ANNEX 2/11

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:

- 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

- if no clearance in accordance with above 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

- if operated within a control zone, request authorization to operate as a special VFR flight; or

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

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 of VMC

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.

NO # 4 ***Time = 00:04***

171

Unless authorized by the appropriate ATS authority, VFR flights shall not be operated:

a) Above FL 200, at transonic and supersonic speeds.
b) Above FL 200, at subsonic and transonic speeds.
c) Above FL 180, at transonic and supersonic speeds.
d) Above FL 290, at transonic and supersonic speeds

172

Unless authorized by the appropriate ATS authority, VFR flights shall not be operated:

a) Above FL 200, at transonic and supersonic speeds.
b) Above FL 200, at subsonic and transonic speeds.
c) Above FL 180, at transonic and supersonic speeds.
d) Above FL 290, at transonic and supersonic speeds

173

Except when taking off or landing, or except by permission from the appropriate authority, an aircraft may not fly over the congested areas of cities, towns, or settlements or over an open-air assembly of persons at a height less than ……. above the highest obstacle.

a) 300 feet.

b) 1500 feet.

c) 500 feet.

d) 1000 feet.

174

Except when taking off or landing, or except by permission from the appropriate authority, an aircraft may not fly over the congested areas of cities, towns, or settlements or over an open-air assembly of persons at a height less than ……. above the highest obstacle.

a) 300 feet.

b) 1500 feet.

c) 500 feet.

d) 1000 feet.

175

Flight under SVFR is only permitted within:

a) a Terminal Control Area.

b) a Control Zone.

c) an Aerodrome Traffic Zone.

d) an ATS route.

176

Flight under SVFR is only permitted within:

a) a Terminal Control Area.

b)a Control Zone.

c) an Aerodrome Traffic Zone.

d) an ATS route.

177

What is the minimum ceiling for a VFR at controlled accordance?

a) 1000ft
b) 1500ft
c) 2000ft
d) 2500ft

178

What is the minimum ceiling for a VFR at controlled accordance?

a) 1000ft

b) 1500ft

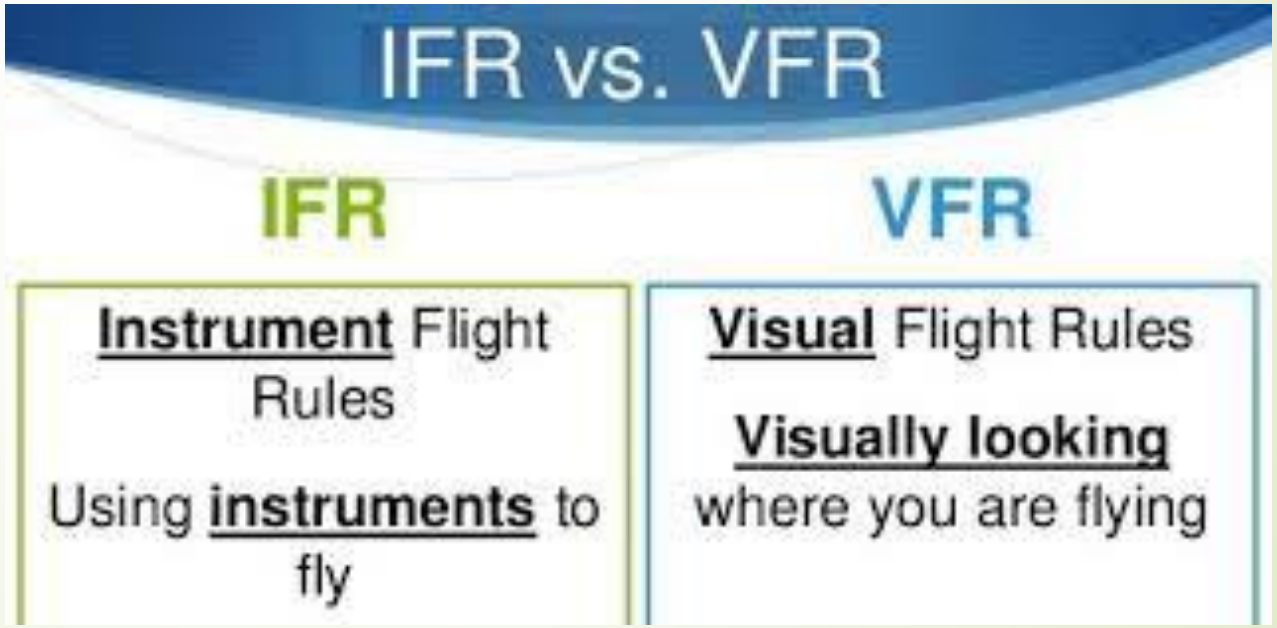
c) 2000ft

d) 2500ft

Instrument Flight Rules

Module objectives

At the end of this module you will be able to explain the definition **Instrument Flight Rules and their functions in aviation** based on standard ICAO regulations.



Time 00:15

INSTRUMENT FLIGHT RULES

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

Minimum Heights

Except when necessary for take-off or landing, or except by permission of the appropriate authority, aircraft shall not be flown over the congested areas of cities, towns or settlements or over an open-air gathering 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.*** No specific heights are mentioned and this rule should not be confused with the minimum height rules for IFR or VFR.

Figure 6.3 An aircraft must be flown at a height from which, in the event of an emergency, a landing can be made without undue hazard to persons or property on the surface.

- ***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;***

- ***elsewhere than as specified in above 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.***

Change from IFR flight to VFR flight

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.

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.

DOC 4444

Change from instrument flight rules (IFR) flight to visual flight rules (VFR) flight is only acceptable when a message initiated by the pilot-in-command containing the specific expression "***CANCELLING MY IFR FLIGHT***", together with the changes, if any, to be made to the current flight plan, is received by an air traffic services unit. No invitation to change from IFR flight to VFR flight is to be made either directly or by inference.

No reply, other than the acknowledgment "***IFR FLIGHT CANCELLED AT . . . (time)***", should normally be made by an air traffic services unit.

NO # 4 ***Time = 00:04***

189

IMC is a meteorological condition.....

a) Equal to VMC
b) Less than minima for VMC
c) More than minima for VMC
d) b and c are correct

190

IMC is a meteorological condition.....

a) Equal to VMC

b) Less than minima for VMC

c) More than minima for VMC

d) b and c are correct

191

When may an IFR flight cancel its IFR flight?

a) Ground in sight
b) In VMC
c) uninterrupted ground in sight
d) Uninterrupted VMC

192

When may an IFR flight cancel its IFR flight?

a) Ground in sight

b) In VMC

c) uninterrupted ground in sight

d) Uninterrupted VMC

193

An IFR flight shall not operate?

a) Above MEA

b) Above FL 200

c) Below minimum flight altitude

d) Along advisory route

194

An IFR flight shall not operate?

a) Above MEA

b) Above FL 200

c) Below minimum flight altitude

d) Along advisory route

195

What expression shall be used by a pilot, to cancel its IFR flight?

a) Now in VMC

b) Cancelling my IFR flight

c) Request cancelling

d) Changing to VFR

196

What expression shall be used by a pilot, to cancel its IFR flight?

a) Now in VMC

b) Cancelling my IFR flight

c) Request cancelling

d) Changing to VFR

General Rules

Module objectives

At the end of this module you will be able to explain the **responsibility of PIC and general requirement in aviation** based on standard ICAO regulations.

Time 00:30

ANNEX 2/11

Compliance with the rules of the air 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:

- ***the visual flight rules; or***
- ***the instrument flight rules.***

Responsibility of pilot-in-command

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.

Commander:

A designated pilot amongst the flight crew who is qualified as pilot-in-command who may delegate the conduct of the flight to another qualified pilot.

Pilot-in-command (PIC):

A pilot who is responsible for the operation and safety of the aeroplane during flight time.

Pilot Flying (PF):

The pilot, who for the time being, is in charge of the controls of the aeroplane.

Pilot monitoring(PM):

The pilot who is assisting the pilot flying in accordance with the multi-crew co-operation concept, when the required flight crew is more than one.

Pre-flight action

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.

Authority of pilot-in-command of an aircraft

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

Problematic use of psychoactive

substancesNo 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.

ANNEX 2/11

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

- constitutes a direct hazard to the user or endangers the lives, health or welfare of others; and/or
- causes or worsens an occupational, social, mental or physical problem or disorder.

Psychoactive substances

Alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psycho stimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded.

Formation flights 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:

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

- *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 maneuvering to attain their own separation within the formation and during join-up and breakaway; and*

- *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.**

NO # 2 ***Time = 00:02***

208

Who is responsible for the operation of aircraft?

a) Pilot-in-command

b) Operator

c) State

d) A person who recognize by ATCU

209

Who is responsible for the operation of aircraft?

a) Pilot-in-command

b) Operator

c) State

d) A person who recognize by ATCU

210

What is the max vertical separation of formation flight?

a) 100 m
b) 30 m
c) 30 ft
d) None

211

What is the max vertical separation of formation flight?

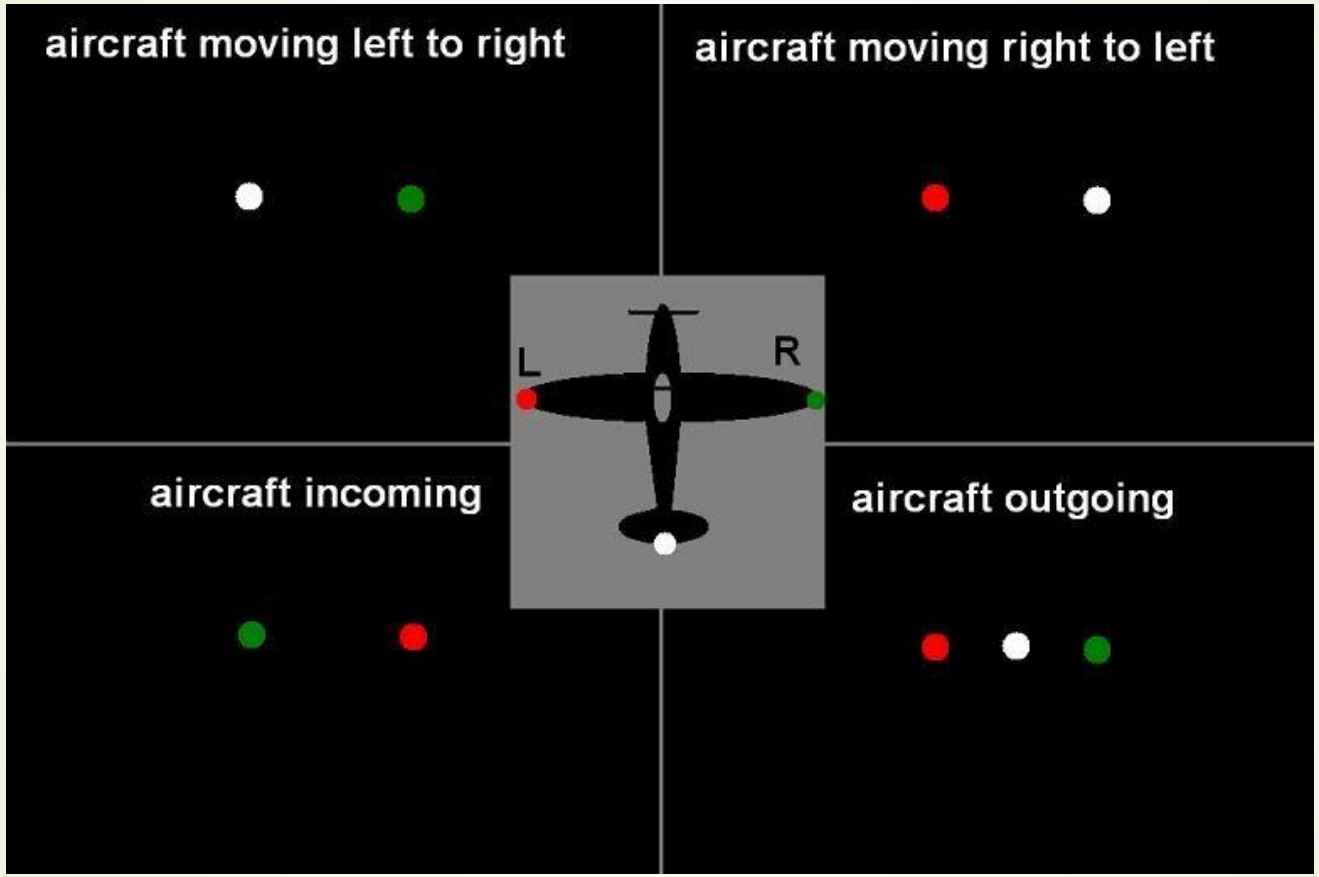
a) 100 m

b) 30 m

c) 30 ft

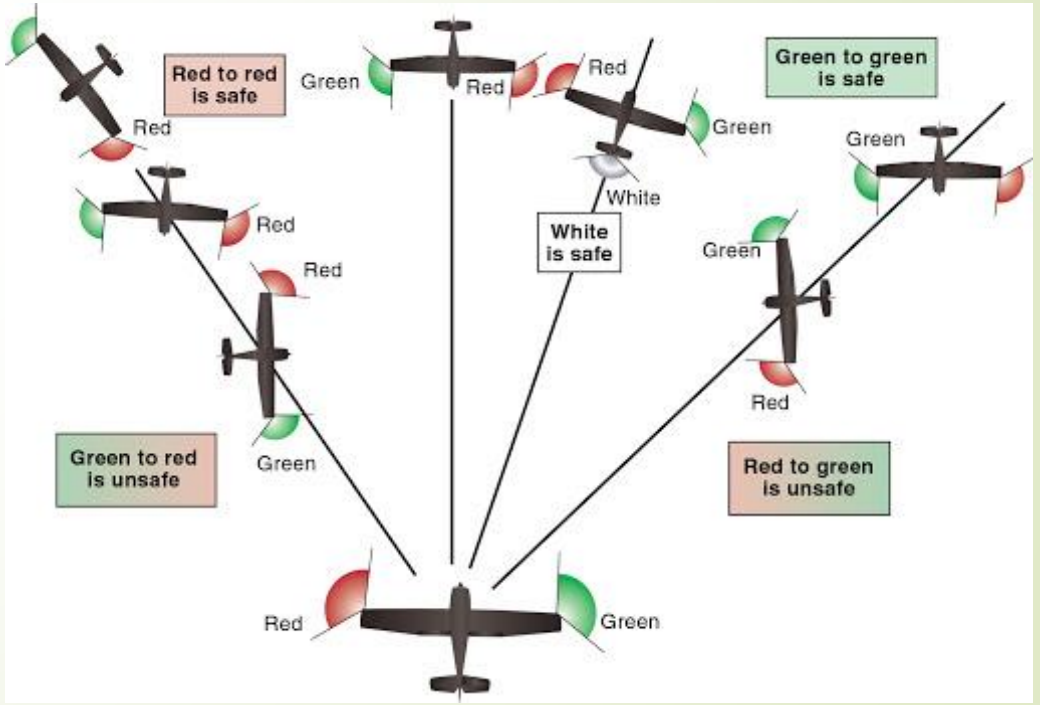
d) None

Light


aircraft moving left to right
aircraft moving right to left
L
R
aircraft incoming
aircraft outgoing

Module objectives

At the end of this module you will be able to explain the **functions of lights in aviation** based on standard ICAO regulations.



Time 00:15

Lights to be displayed by aircraft

from sunset to sunrise or during any other period which may be prescribed by the appropriate authority all aircraft in flight shall display:

- ***anti-collision*** lights intended to ***attract attention*** to the aircraft; and
- ***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.

from sunset to sunrise or during any other period prescribed by the appropriate authority:

- ***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;***
- ***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;***
- ***all aircraft operating on the movement area of an aerodrome shall display lights intended to attract attention to the aircraft; and***
- ***all aircraft on the movement area of an aerodrome whose engines are running shall display lights which indicate that fact.***

ANNEX 2/11

A pilot shall be permitted to ***switch off or reduce the intensity of any flashing lights when:***

- ***adversely affect the satisfactory performance of duties; or***
- ***subject an outside observer to harmful dazzle.***

NO # 2 ***Time = 00:01***

218

What is the purpose of using navigation light?

a) Indicate relative flight path

b) Attract attention

c) a and b

d) a or b

219

What is the purpose of using navigation light?

a) Indicate relative flight path

b) Attract attention

c) a and b

d) a or b

220

Which lights may be switched off during flight?

a) Anti-collision lights

b) Red anti-collision lights

c) Any flashing lights

d) Green flashing light

Which lights may be switched off during flight?

a) Anti-collision lights

b) Red anti-collision lights

c) Any flashing lights

d) Green flashing light

Right Of Way

Module objectives

At the end of this module you will be able to explain the **functions of right of way in aviation** based on standard ICAO regulations.

Time 00:30

Proximity and Right of Way.

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

The aircraft that has the right of way shall maintain its ***heading and speed,*** but the PIC is still responsible for avoiding collisions (including ACAS alerts). Aircraft which are obliged to give way are to do so and avoid passing over, under or in front of the other unless it is well clear, and to take into account the effect of wake turbulence.

ANNEX 2/11

Approaching Head On

FLIGHT ➔ When two aircraft are approaching head on, and there is a danger of collision, each shall alter ***heading to the right.*** Neither has right of way.

GROUND ➔ Both stop or where practicable alter ***course to the right*** to keep well clear.

Track ➔ 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).

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

ANNEX 2/11

Figure 6.6

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:

- ***power-driven heavier-than-air aircraft shall give way to airships, gliders and balloons;***
- ***airships shall give way to gliders and balloons;***
- ***gliders shall give way to balloons;***
- ***power-driven aircraft shall give way to aircraft which are seen to be towing other aircraft or objects.***

Powered aircraft must give way to non-powered
I have the right of way but I must be prepared to act if the airship doesn't give way
Glider on the right - he has the right of way

Figure 6.7

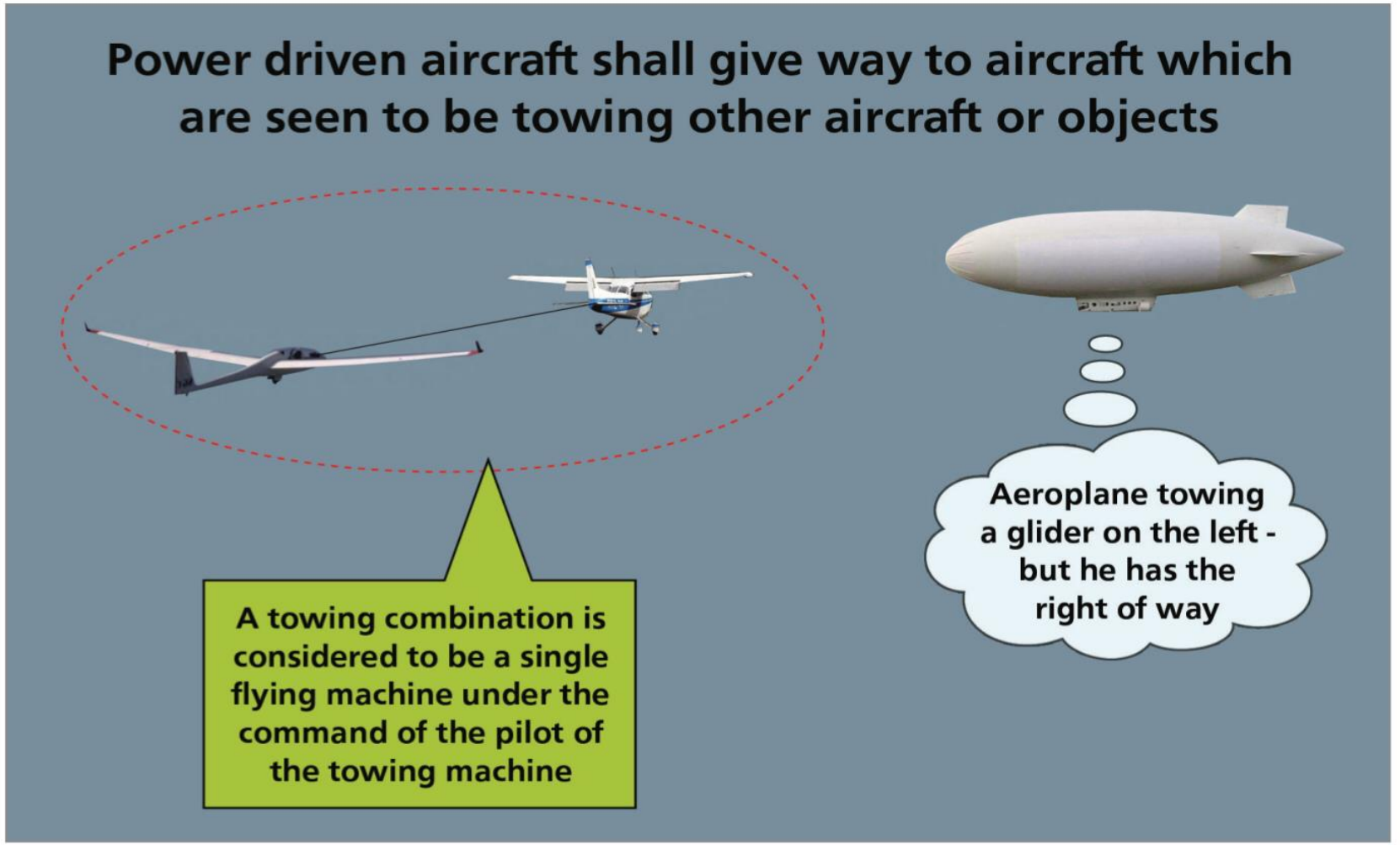

Power driven aircraft shall give way to aircraft which are seen to be towing other aircraft or objects
A towing combination is considered to be a single flying machine under the command of the pilot of the towing machine
Aeroplane towing a glider on the left - but he has the right of way

Figure 6.8

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.

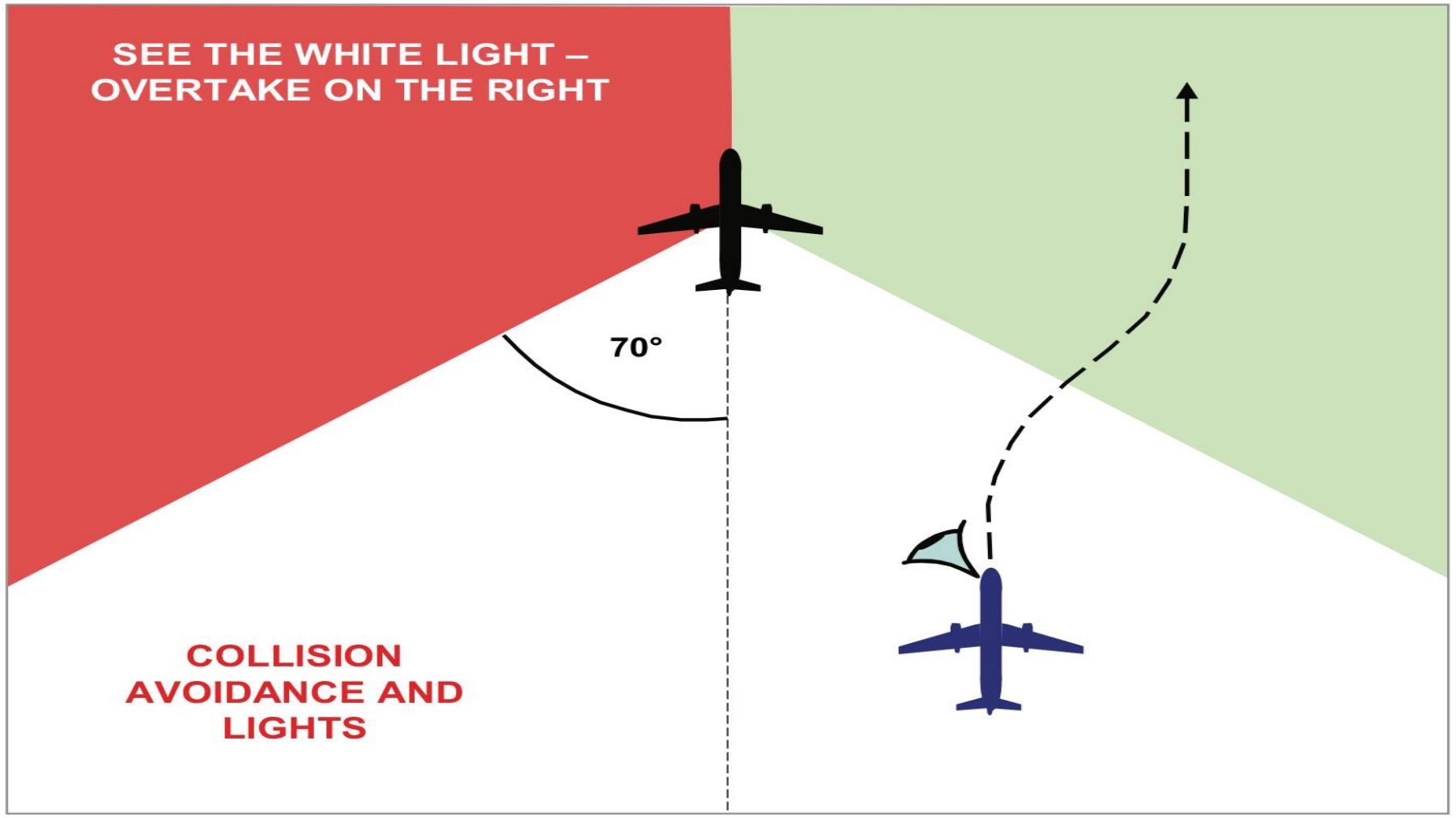

SEE THE WHITE LIGHT –
OVERTAKE ON THE RIGHT
70°
COLLISION
AVOIDANCE AND
LIGHTS

Figure 6.9

Landing

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 (see definition). When two or more heavier than air aircraft are approaching an aerodrome to land, the aircraft at the higher level shall give way to the aircraft at the lower level, but the lower aircraft must not take advantage of this rule to 'cut in' in front of another aircraft. In any event, power driven heavier than air aircraft shall give way to gliders.

Emergency Landing.

An aircraft that is aware that another aircraft is in an emergency and is compelled to land, shall give way to that aircraft.

Taking Off

An aircraft taxiing on the maneuvering area shall give way to aircraft taking off or about to take off.

Stop Bars

An aircraft taxiing on the maneuvering area shall stop and hold at all lighted stop bars (used in poor visibility) and may only proceed when the lights are switched off.

Surface movement of aircraft

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

- 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;
- when two aircraft are on a converging course, the one which has the other on its right shall give way;
- 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.
- An aircraft taxiing on the maneuvering area shall ***stop and hold at all runway-holding positions unless otherwise authorized by the aerodrome control tower.***

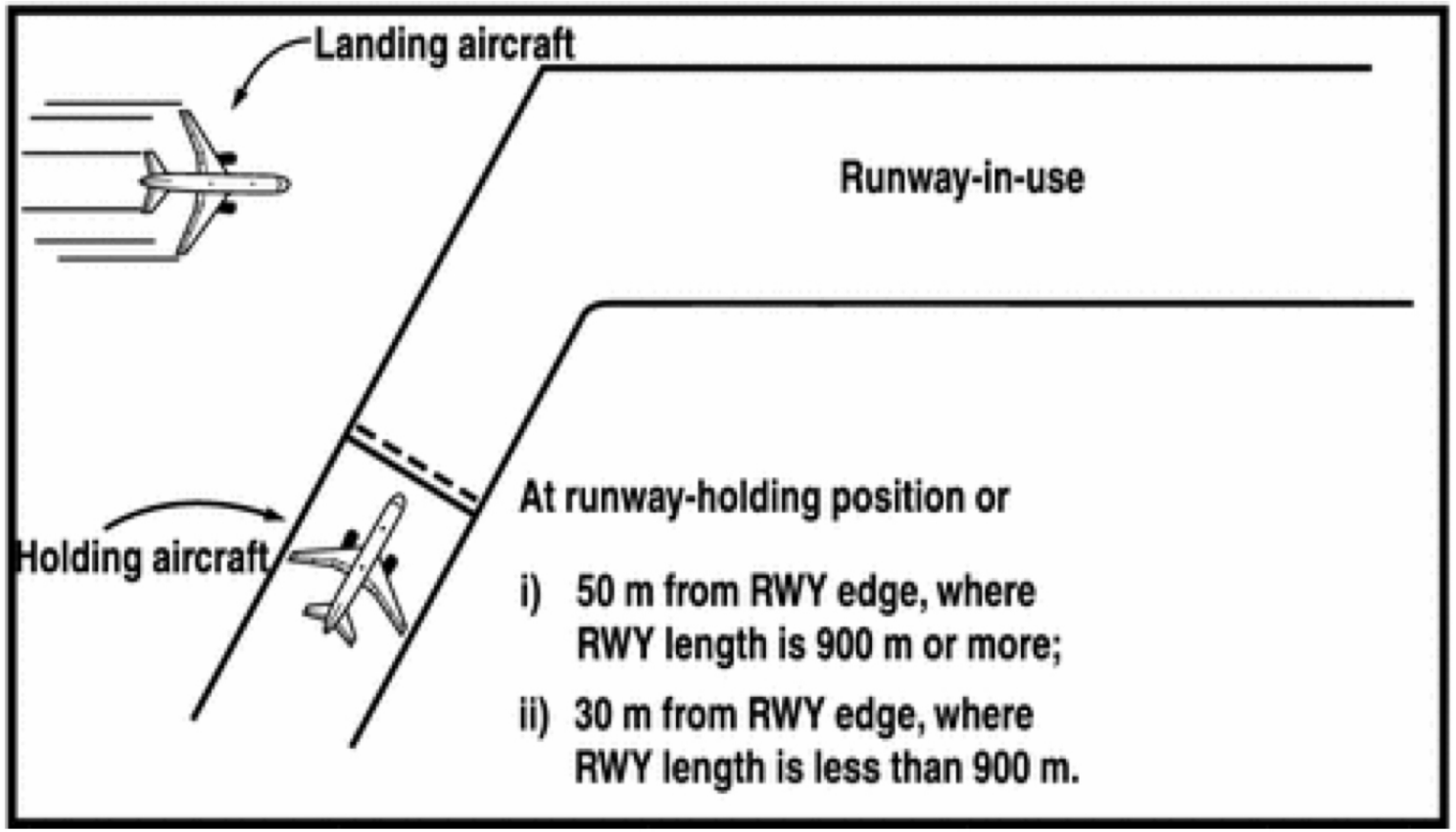
Runway-holding position

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 authorized by the aerodrome control tower.

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

12.3.4.8 *Holding* . . . to hold not closer to a runway than specified in Chapter 7, 7.6.3.1.3.1.	a. *HOLD (*direction*) OF (*position, runway number, etc.*); b. *HOLD POSITION; c. *HOLD (*distance*) FROM (*position*); d. *HOLD SHORT OF (*position*); e. **HOLDING f. **HOLDING SHORT. * *Requires specific acknowledgment from the pilot.* ** *The procedure words ROGER and WILCO are insufficient acknowledgment of the instructions HOLD, HOLD POSITION and HOLD SHORT OF (position). In each case the acknowledgment shall be by the phraseology HOLDING or HOLDING SHORT, as appropriate.*

Figure 7-2 — Method of Holding Aircraft (see 7.6.3.1.3.2)



Simulated instrument flights

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

fully functioning dual controls are installed in the aircraft; and

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.

ANNEX 2/11

Operation on and in the vicinity of an aerodrome

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

- ***observe other aerodrome traffic for the purpose of avoiding collision;***
- ***conform with or avoid the pattern of traffic formed by other aircraft in operation;***
- ***make all turns to the left, when approaching for a landing and after taking off, unless otherwise instructed;***
- ***land and take off into the wind unless safety, the runway configuration, or air traffic considerations determine that a different direction is preferable.***

NO # 4 ***Time = 00:04***

Which aircraft has right of way?

a) Landing
b) Taking off
c) Emergency
d) Urgency

Which aircraft has right of way?

a) Landing

b) Taking off

c) Emergency

d) Urgency

244

What is the first action of pilots when two aircraft are approaching head-on on the ground?

a) Alter its course to the left

b) Alter its course to the right

c) Both aircraft shall stops

d) Alter its course to the left

245

What is the first action of pilots when two aircraft are approaching head-on on the ground?

a) Alter its course to the left

b) Alter its course to the right

c) Both aircraft shall stops

d) Alter its course to the left

246

Which navigation light of overtaken aircraft may not be seen at night?

a) Port
b) Starboard
c) Rear
d) A&B

247

Which navigation light of overtaken aircraft may not be seen at night?

a) Port

b) Starboard

c) Rear

d) A&B

Which lights of the preceding aircraft will be observed by the overtaking aircraft?

a) Port

b) Starboard

c) Rear

d) A & B & C

Which lights of the preceding aircraft will be observed by the overtaking aircraft?

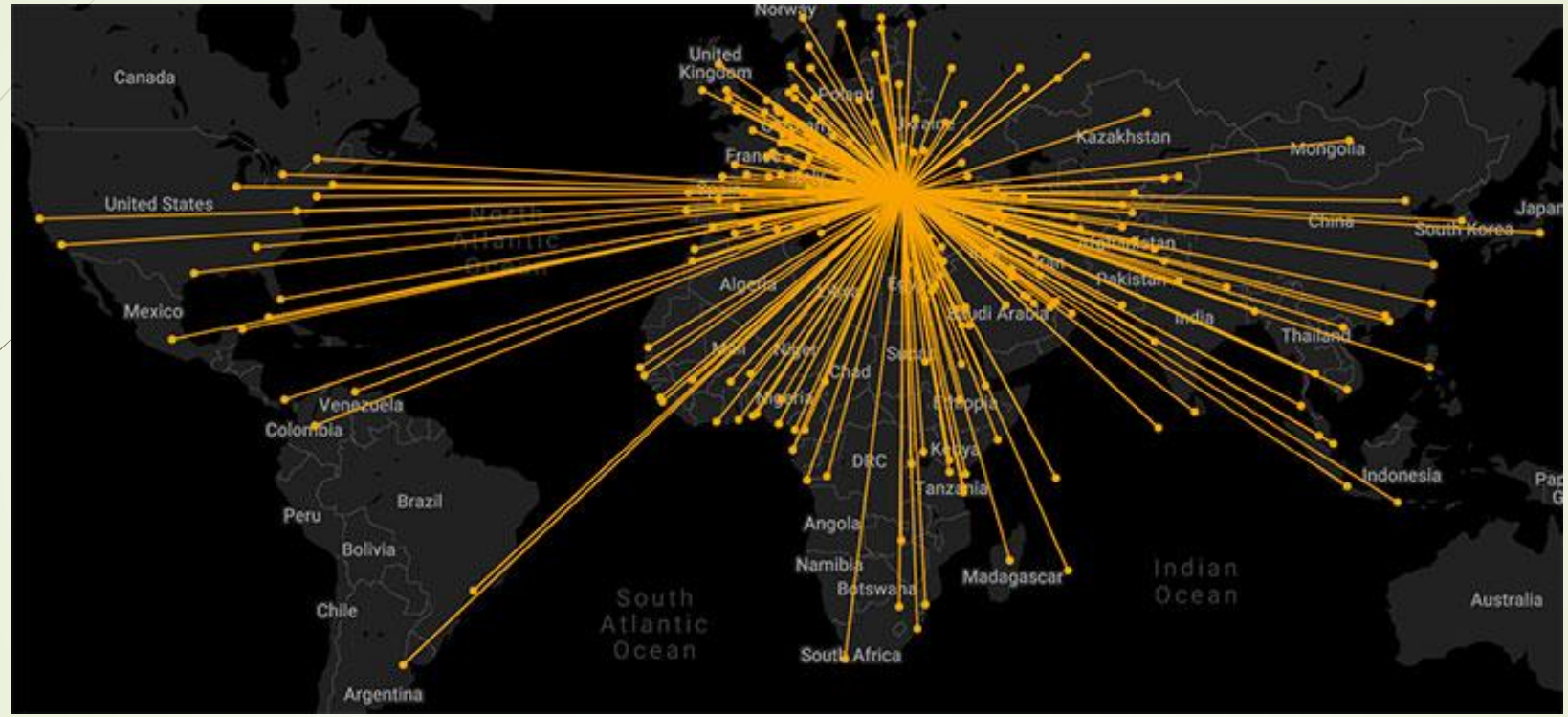
a) Port

b) Starboard

c) Rear

d) A & B & C

Flight plans



Module objectives

At the end of this module you will be able to explain the **functions of ATS FPL in aviation** based on standard ICAO regulations.

Time 00:30

ANNEX 2/11

Flight plans

ATS Flight plans ➔ Filed FPL ➔ Current FPL

A flight plan shall be submitted prior to operating:

- any flight or portion thereof to be provided with air traffic control service;
- any IFR flight within advisory airspace;
- 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;

ANNEX 2/11

- 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;

- any flight across international borders.

ANNEX 2/11

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.

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:***

- the intended point of entry into a control area or advisory area; or
- the point of crossing an airway or advisory route.

All types of operations within ***Tehran FIR*** shall not be submitted ***more than 120 hours and at least 60 minutes before EOBT at the departure*** aerodrome Except for repetitive flight plans (RPL). If a flight plan is filed more than 24 hours in advance of the estimated off block time of the flight to which it refers date of flight (DOF) shall be inserted in item 18 of the flight plan.

In the event of a ***delay of 30 minutes in excess of the estimated off-block time for a controlled flight or a delay of one hour for an uncontrolled flight*** for which a flight plan has been submitted, the flight plan should be amended or a new flight plan submitted and the old flight plan cancelled, whichever is applicable.

Only one revision is acceptable up to 30 minutes after EOBT for IFR flights/60 minutes after EOBT for VFR flights. It is applicable 10 minutes after reception by
ATS units via AFTN in IRAN

- ***A delay of 30 minutes for IFR flights/60 minutes for VFR flights, or more in excess of the EOBT; and/or***

- ***A change in type and/or registration mark of aircraft***

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.

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.

Closing a flight plan

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.

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.

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.

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.

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

- ***aircraft identification;***
- ***departure aerodrome;***
- ***destination aerodrome (only in the case of a diversionary landing);***
- ***arrival aerodrome;***
- ***time of arrival.***

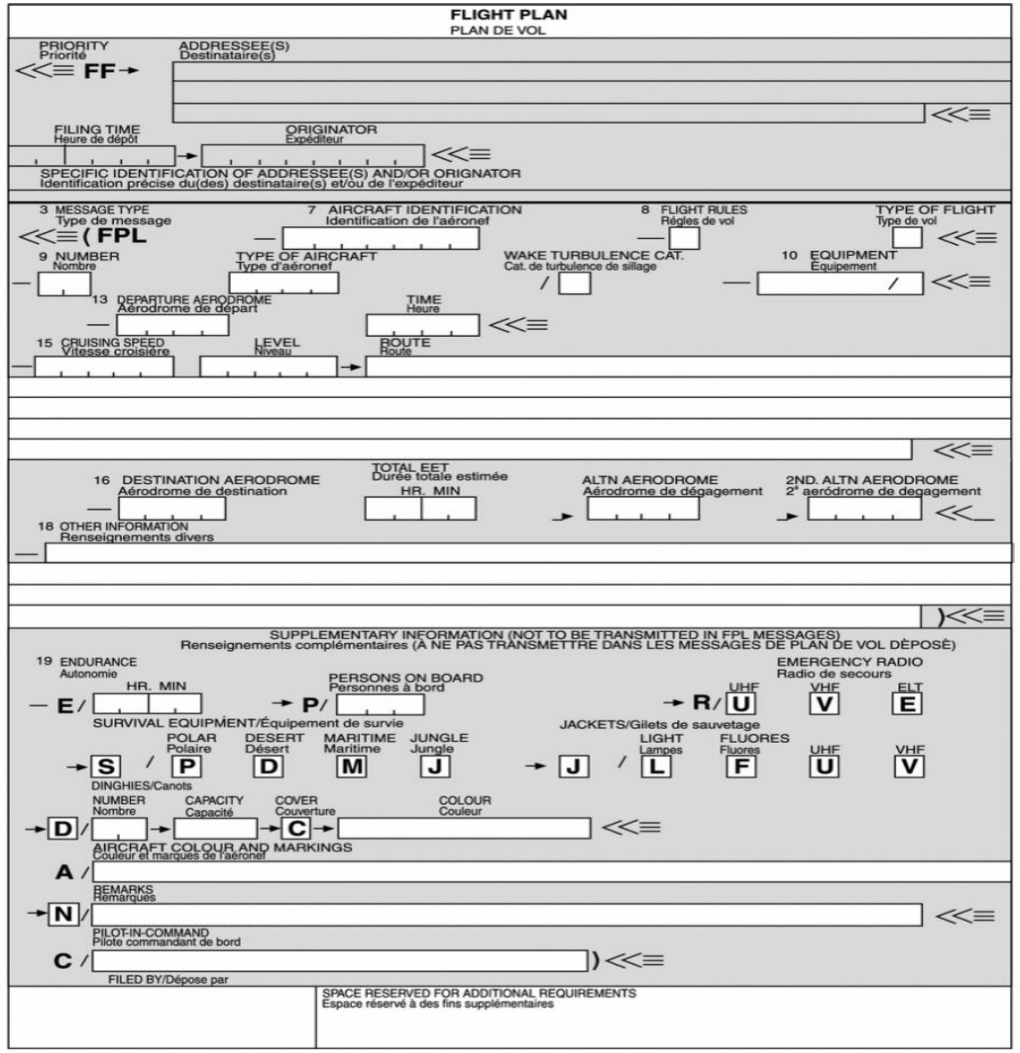
an aircraft shall adhere to the ***current flight plan*** or the applicable portion of a current flight plan for a controlled flight unless a request for a change has been made and clearance obtained from the appropriate air traffic control unit, or unless an emergency situation arises which necessitates 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.

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:

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

- ***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.***

ICAO MODEL FLIGHT PLAN FORM



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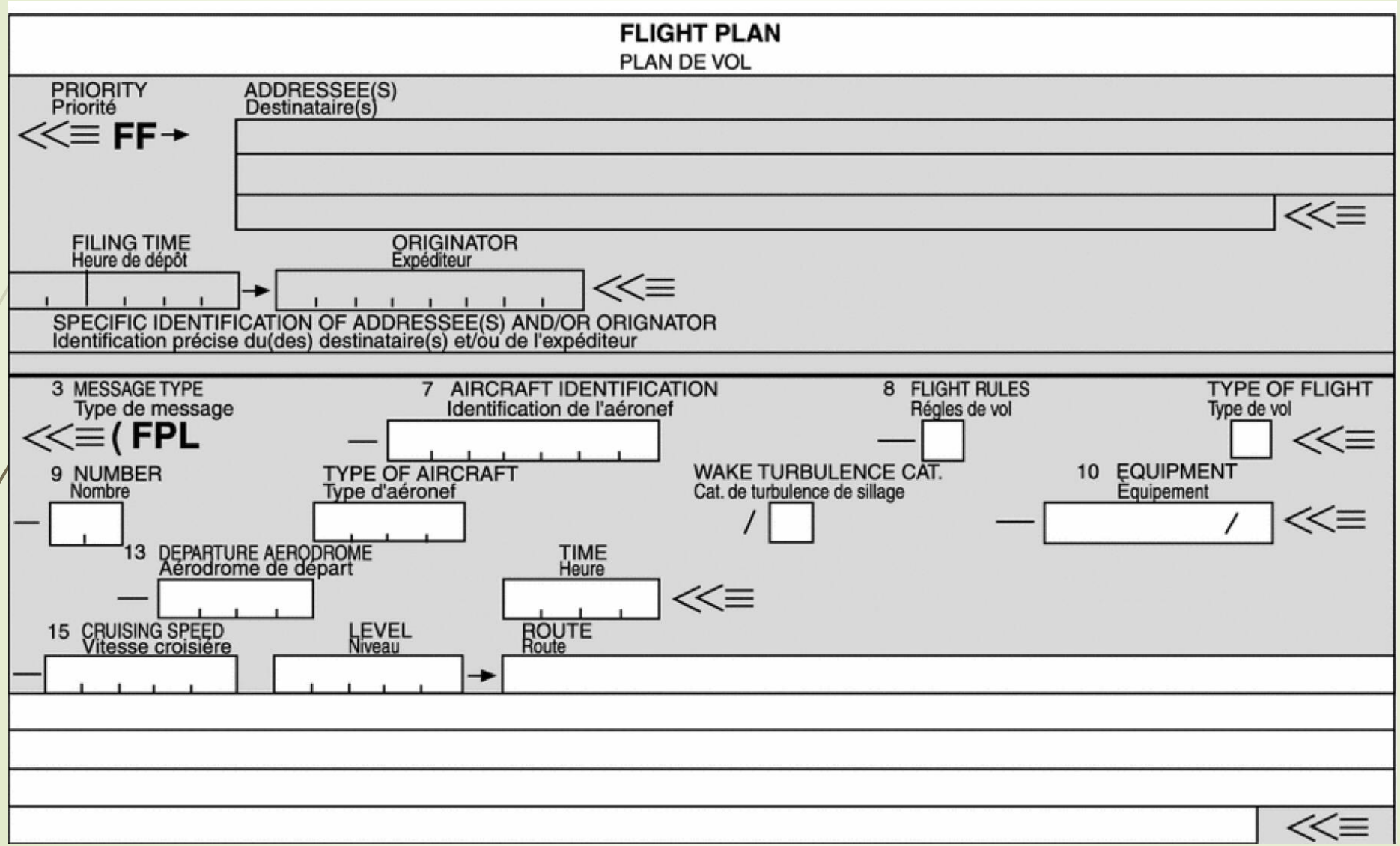

FLIGHT PLAN
PLAN DE VOL
PRIORITY
Priorité
FF
ADDRESSEE(S)
Destinataire(s)
FILING TIME
Heure de dépôt
ORIGINATOR
Expéditeur
SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGNATOR
Identification précise du(des) destinataire(s) et/ou de l'expéditeur
3 MESSAGE TYPE
Type de message
(FPL
7 AIRCRAFT IDENTIFICATION
Identification de l'aéronef
8 FLIGHT RULES
Régles de vol
TYPE OF FLIGHT
Type de vol
9 NUMBER
Nombre
TYPE OF AIRCRAFT
Type d'aéronef
WAKE TURBULENCE CAT.
Cat. de turbulence de sillage
10 EQUIPMENT
Équipement
13 DEPARTURE AERODROME
Aérodrome de départ
TIME
Heure
15 CRUISING SPEED
Vitesse croisière
LEVEL
Niveau
ROUTE
Route

ITEM 7: AIRCRAFT IDENTIFICATION

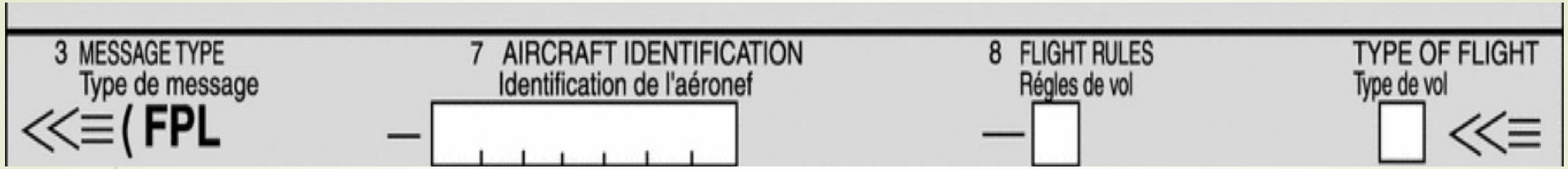
(MAXIMUM 7 CHARACTERS)

INSERT one of the following aircraft identifications, not exceeding 7 alphanumeric characters and without hyphens or symbols:

a. the ICAO designator for the aircraft operating agency followed by the flight identification (e.g., KLM511, NGA213, JTR25) when in radiotele-phony the call sign to be used by the aircraft will consist of the ICAO telephony designator for the operating agency followed by the flight identification (e.g., KLM511, NIGERIA 213, JESTER 25).

OR

b. the nationality or common mark and registration mark of the aircraft (e.g., EIAKO, 4XBCD, N2567GA), when:



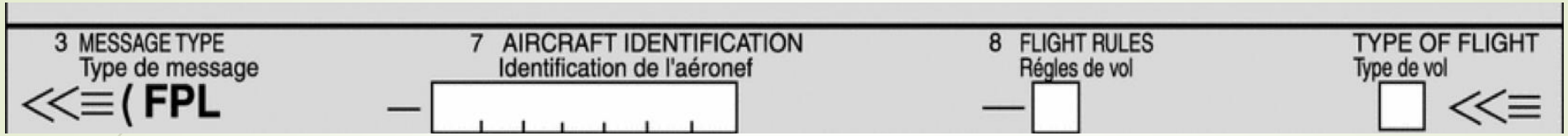
ITEM 8: FLIGHT RULES AND TYPE OF FLIGHT

(ONE OR TWO CHARACTERS)

– **Flight rules**

INSERT one of the following letters to denote the category of flight rules with which the pilot intends to comply:

I	if it is intended that the entire flight will be operated under the IFR
V	if it is intended that the entire flight will be operated under the VFR
Y	if the flight initially will be operated under the IFR, followed by one or more subsequent changes of flight rules or
Z	if the flight initially will be operated under the VFR, followed by one or more subsequent changes of flight rules



– **Type of flight**

INSERT one of the following letters to denote the type of flight when so required by the appropriate ATS authority:

S	if scheduled air service
N	if non-scheduled air transport operation
G	if general aviation
M	if military
X	if other than any of the defined categories above.

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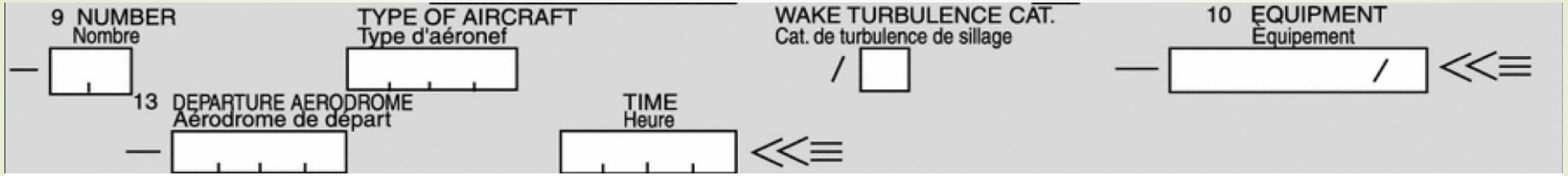

ITEM 9: NUMBER AND TYPE OF AIRCRAFT AND WAKE TURBULENCE CATEGORY

– **Number of aircraft (1 or 2 characters)**

INSERT the number of aircraft, if more than one.

– **Type of aircraft (2 to 4 characters)**

INSERT the appropriate designator as specified in ICAO Doc 8643, *Aircraft Type Designators* (not published herein)

OR if no such designator has been assigned, or in case of formation flights comprising more than one type;

INSERT ZZZZ, and *SPECIFY* in Item 18, the (numbers and) type(s) of aircraft preceded by TYP/.

– **Wake turbulence category (1 character)**

INSERT an oblique stroke followed by one of the following letters to indicate the wake turbulence category of the aircraft:

H —	HEAVY, to indicate an aircraft type with a maximum certificated take-off mass of 136,000kg or more;
M —	MEDIUM, to indicate an aircraft type with a maximum certificated take-off mass of less than 136,000kg but more than 7000kg;
L —	LIGHT, to indicate an aircraft type with a maximum certificated take-off mass of 7000kg or less.

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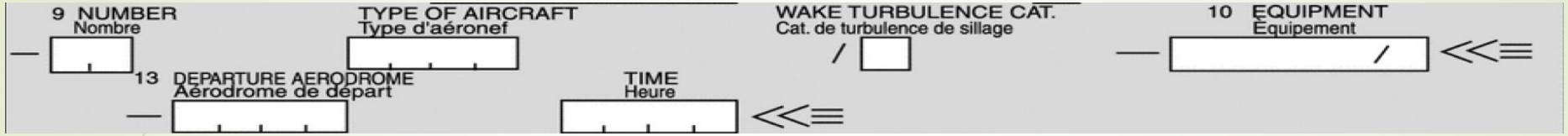

A	GBAS landing system	J7	CPDLC FANS 1/A SATCOM (Iridium)
B	LPV (APV with SBAS)	K	MLS
C	LORAN C	L	ILS
D	DME	M1	ATC SATVOICE (INMARSAT)
E1	FMC WPR ACARS	M2	ATC SATVOICE (MTSAT)
E2	D-FIS ACARS	M3	ATC SATVOICE (Iridium)
E3	PDC ACARS	O	VOR
F	ADF	P1	CPDLC RCP 400 *(See Note 7)*
G	GNSS. If any portion of the flight is planned to be conducted under IFR, it refers to GNSS receivers that comply with the requirements of Annex 10, Volume I *(see Note 2).*	P2	CPDLC RCP 240 *(See Note 7)*
		P3	SATVOICE RCP 400 *(See Note 7)*
		P4–P9	Reserved for RCP

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H	HF RTF	R	PBN approved *(see Note 4)*
I	Inertial Navigation	T	TACAN
J1	CPDLC ATN VDL Mode 2 *(see Note 3)*	U	UHF RTF
J2	CPDLC FANS 1/A HFDL	V	VHF RTF
J3	CPDLC FANS 1/A VDL Mode A	W	RVSM approved
J4	CPDLC FANS 1/A VDL Mode 2	X	MNPS approved
J5	CPDLC FANS 1/A SATCOM (INMAR-SAT)	Y	VHF with 8.33 kHz channel spacing capability
J6	CPDLC FANS 1/A SATCOM (MTSAT)	Z	Other equipment carried or other capabilities *(See Note 5)*

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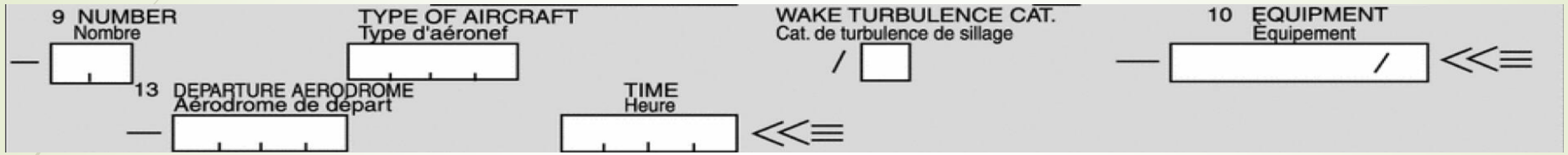

Any alphanumeric characters not indicated above are reserved.

NOTE 1: If the letter S is used, standard equipment is considered to be VHF RTF, VOR and ILS, unless another combination is prescribed by the appropriate ATS authority.

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– **Surveillance equipment and capabilities**

INSERT N if no surveillance equipment for the route to be flown is carried, or the equipment is unserviceable,

OR

INSERT one or more of the following descriptors, to a maximum of 20 characters, to describe the serviceable surveillance equipment and/or capabilities on board:

SSR Modes A and C

A Transponder — Mode A (4 digits — 4096 codes)

C Transponder — Mode A (4 digits — 4096 codes) and Mode C

SSR Mode S

E Transponder — Mode S, including aircraft identification, pressure-altitude and extended squitter (ADS-B) capability

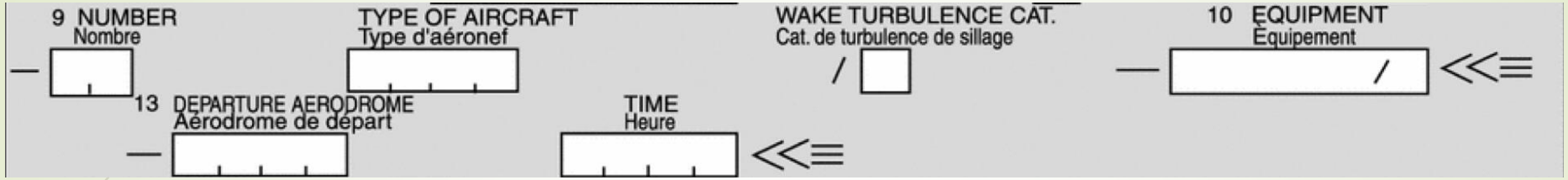
H Transponder — Mode S, including aircraft identification, pressure-altitude and enhanced surveillance capability

I Transponder — Mode S, including aircraft identification, but no pressure-altitude capability

L Transponder — Mode S, including aircraft identification, pressure-altitude, extended squitter (ADS-B) and enhanced surveillance capability

P Transponder — Mode S, including pressure-altitude, but no aircraft identification capability

S Transponder — Mode S, including both pressure-altitude and aircraft identification capability



ITEM 13: DEPARTURE AERODROME AND TIME

(8 CHARACTERS)

INSERT the ICAO four-letter location indicator of the departure aerodrome as specified in Doc 7910, *Location Indicators* (not published herein),

OR, if no location indicator has been assigned,

INSERT ZZZZ and *SPECIFY*, in Item 18, the name and location of the aerodrome preceded by DEP/,

OR, the first point of the route or the marker radio beacon preceded by DEP/..., if the aircraft has not taken off from the aerodrome,

OR, if the flight plan is received from an aircraft in flight,

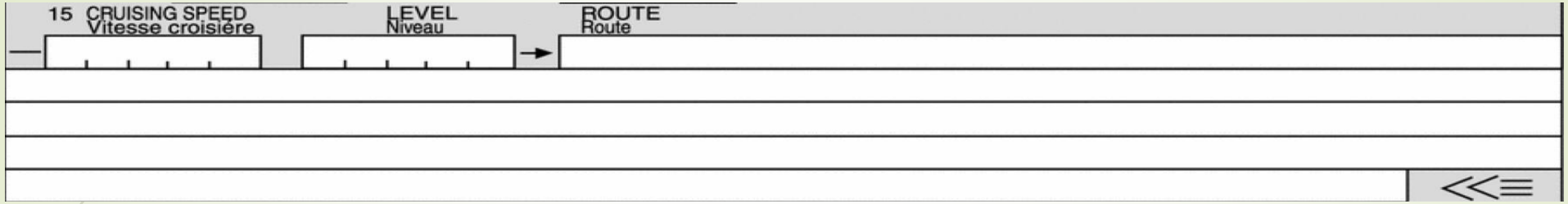
INSERT AFIL, and *SPECIFY*, in Item 18, the ICAO four-letter location indicator of the location of the ATS unit from which supplementary flight plan data can be obtained, preceded by DEP/ .

THEN, WITHOUT A SPACE,

INSERT for a flight plan submitted before departure, the estimated off-block time (EOBT),

OR, for a flight plan received from an aircraft in flight, the actual or estimated time over the first point of the route to which the flight plan applies.

Pedram shirazi



ITEM 15: ROUTE

INSERT the *first cruising speed* as in a. and the *first cruising level* as in b., without a space between them.

THEN, following the arrow, *INSERT* the route description as in c.

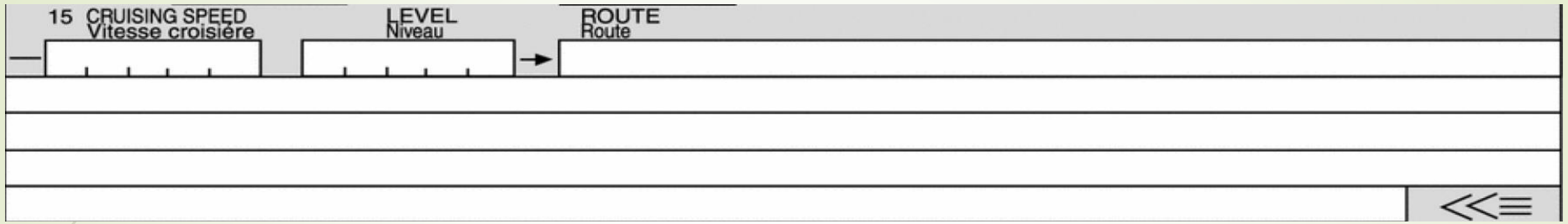
a. **Cruising speed (maximum 5 characters)**

INSERT the *True Air Speed* for the first or the whole cruising portion of the flight, in terms of:

– *Kilometers per hour*, expressed as K followed by 4 figures (e.g., K0830); or

– *Knots*, expressed as N followed by 4 figures (e.g., N0485); or

– *True Mach number*, when so prescribed by the appropriate ATS authority, to the nearest hundredth of unit Mach, expressed as M followed by 3 figures (e.g., M082).



b. **Cruising level (maximum 5 characters)**

INSERT the planned cruising level for the first or the whole portion of the route to be flown, in terms of:

- *Flight level*, expressed as F followed by 3 figures (e.g., F085; F330); or
- **Standard Metric Level in tens of metres*, expressed as S followed by 4 figures (e.g., S1130); or
- *Altitude in hundreds of feet*, expressed as A followed by 3 figures (e.g., A045; A100); or
- *Altitude in tens of metres*, expressed as M followed by 4 figures (e.g., M0840); or
- *For uncontrolled VFR flights, the letters VFR.*

NOTE: When a transition is planned between a lower and upper ATS route and the routes are oriented in the same direction, the point of transition need not be inserted.

FOLLOWED IN EACH CASE

by the designator of the next ATS route segment, even if the same as the previous one;

OR, by DCT, if the flight to the next point will be outside a designated route, unless both points are defined by geographical coordinates.

Flights Outside Designated ATS Routes

INSERT points normally not more than 30 minutes flying time or 370km (200 NM) apart, including each point at which a change of speed or level, a change of track, or a change of flight rules is planned;

1. ***ATS Route*** (2 to 7 Characters)

   The coded designator assigned to the route or route segment including, where appropriate, the coded designator assigned to the standard departure or arrival route (e.g., BCN1, B1, R14, UB10, KODAP2A).

   NOTE: Provisions for the application of route designators are contained in Annex 11, Appendix 1 (not published herein).

2. ***Significant Point*** (2 to 11 Characters)

   The coded designator (2 to 5 characters) assigned to the point (e.g., LN, MAY, HADDY); *or*

   if no coded designator has been assigned, one of the following ways:

   – *Degrees only* (7 characters):

3. ***Change of Speed or Level*** *(Maximum 21 Characters)*

The point at which a change of speed (5% TAS or 0.01 Mach or more) or a change of level is planned to commence, expressed exactly as in 2. above, followed by an *oblique stroke and both the cruising speed and the cruising level*, expressed exactly as in a. and b. above, without a space between them, *even when only one of these quantities will be changed.*

EXAMPLE: LN/N0284A045

MAY/N0305F180

HADDY/N0420F330

4602N07805W/N0500F350

46N078W/M082F330

DUB180040/N0350M0840

4. ***Change of Flight Rules*** *(Maximum 3 Characters)*

The point at which the change of flight rules is planned, expressed exactly as in 2. or 3. above as appropriate, *followed by a space and one of the following*:

(a) VFR if from IFR to VFR

(b) IFR if from VFR to IFR

EXAMPLE: LN VFR

LN/N0284A050 IFR

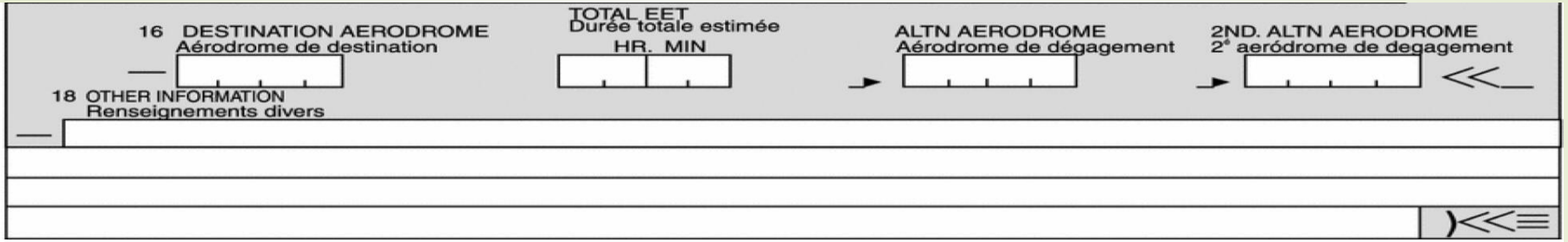
5. ***Cruise Climb*** *(Maximum 28 Characters)*

The letter C followed by an *oblique stroke; THEN the point at which cruise climb is planned to start,* expressed exactly as in 2. above, *followed by an oblique stroke; THEN the speed to be maintained during cruise climb,* expressed exactly as in a. above, followed by *the two levels defining the layer to be occupied during cruise climb,* each level expressed exactly as in b. above, *or the level above which cruise climb is planned followed by the letters "PLUS",* without a space between them.

EXAMPLE: C/48N050W/M082F290F350

C/48N050W/M082F290PLUS

C/52N050W/M220F580F620.



ITEM 16: DESTINATION AERODROME AND TOTAL ESTIMATED ELAPSED TIME, DESTINATION ALTERNATE AERODROME(S)

– **Destination aerodrome and total estimated elapsed time (8 characters)**

INSERT the ICAO four-letter location indicator of the destination aerodrome as specified in Doc 7910, *Location Indicators* (not published herein),

OR, if no location indicator has been assigned,

INSERT ZZZZ and *SPECIFY* in Item 18 the name and location of the aerodrome, preceded by DEST/.

THEN WITHOUT A SPACE

INSERT the total estimated elapsed time.

NOTE: For a flight plan received from an aircraft in flight, the total estimated elapsed time is the estimated time from the first point of the route to which the flight plan applies to the termination point of the flight plan.

– **Destination alternate aerodrome(s)**

INSERT the ICAO four-letter location indicator(s) of not more than two destination alternate aerodromes as specified in Doc 7910, *Location Indicators* (not published herein), separated by a space,

OR, if no location indicator has been assigned to the destination alternate aerodrome(s),

INSERT ZZZZ and *SPECIFY* in Item 18 the name and location of the destination alternate aerodrome(s), preceded by ALTN/.

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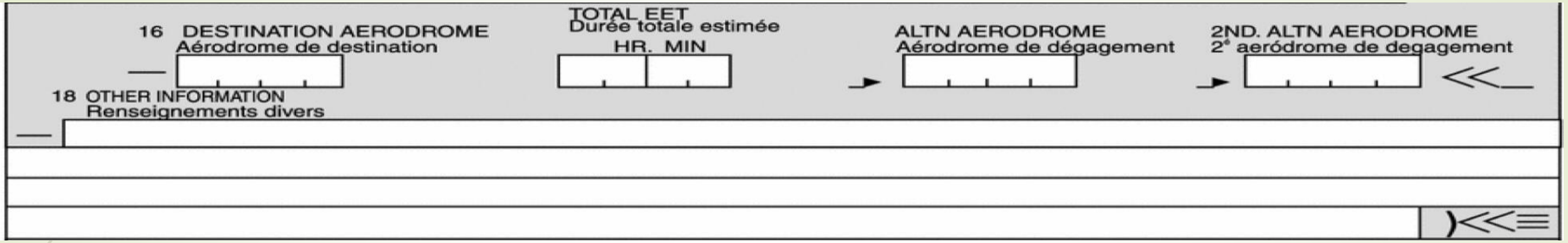

STS/	Reason for special handling by ATS, e.g., a search and rescue mission, as follows:	
	ALTRV:	for a flight operated in accordance with all altitude reservation;
	ATFMX:	for a flight approved for exemption from ATFM measures by the appropriate ATS authority;
	FFR:	fire-fighting;
	FLTCK:	flight check for calibration of navaids;
	HAZMAT:	for a flight carrying hazardous material;
	HEAD:	a flight with Head of State status;
	HOSP:	for a medical flight declared by medical authorities;
	HUM:	for a flight operating on a humanitarian mission;
	MARSA:	for a flight for which a military entity assumes responsibility for separation of military aircraft;
	MEDEVAC:	for a life critical medical emergency evacuation;
	NONRVSM:	for a non-RVSM capable flight intending to operate in RVSM airspace;
	SAR:	for a flight engaged in a search and rescue mission; and
	STATE:	for a flight engaged in military, customs or police services.

PBN/ Indication of RNAV and/or RNP capabilities. Include as many of the descriptors below, as apply to the flight, up to a maximum of 8 entries, i.e. a total of not more than 16 characters.

	RNAV SPECIFICATIONS
A1	RNAV 10 (RNP 10)
B1	RNAV 5 all permitted sensors
B2	RNAV 5 GNSS
B3	RNAV 5 DME/DME
B4	RNAV 5 VOR/DME
B5	RNAV 5 INS or IRS
B6	RNAV 5 LORANC

C1	RNAV 2 all permitted sensors
C2	RNAV 2 GNSS
C3	RNAV 2 DME/DME
C4	RNAV 2 DME/DME/IRU
D1	RNAV 1 all permitted sensors
D2	RNAV 1 GNSS
D3	RNAV 1 DME/DME
D4	RNAV 1 DME/DME/IRU

	RNP SPECIFICATIONS
L1	RNP 4
O1	Basic RNP 1 all permitted sensc
O2	Basic RNP 1 GNSS
O3	Basic RNP 1 DME/DME
O4	Basic RNP 1 DME/DME/IRU
S1	RNP APCH
S2	RNP APCH with BARO-VNAV

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DEST/	Name and location of destination aerodrome, if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described under DEP/ above.
DOF/	The date of flight departure in a six-figure formal (YYMMDD, where YY equals the year, MM equals the month and DD equals the day).
REG/	The nationality or common mark and registration markings of the aircraft, if different from the aircraft identification in Item 7.
EET/	Significant points or FIR boundary designators and accumulated estimated elapsed times from take-off to such points or FIR boundaries, when so prescribed on the basis of regional air navigation agreements, or by the appropriate ATS authority. EXAMPLE: EET/CAP0745 XYZ0830 EET/EINN0204
SEL/	SELCAL Code, for aircraft so equipped.
TYP/	Type(s) of aircraft, preceded if necessary without a space by number(s) of aircraft and separated by one space, if ZZZZ is inserted in Item 9. EXAMPLE: TYP/2F15 5F5 3B2

DLE/	Enroute delay or holding, insert the significant point(s) on the route where a delay is planned to occur, followed by the length of delay using four-figure time in hours and minutes (hhmm). EXAMPLE: DLE/MDG0030
OPR/	ICAO designation or name of the aircraft operator agency, if different from the aircraft identification in Item 7.
ORGN/	The originator's 8 letter AFTN address or other appropriate contact details, in cases where the originator of the flight plan may not be readily identified, as required by the appropriate ATS authority. *NOTE: In some cases, flight plan reception centres may insert the ORGN/ identifier and originator's AFTN address automatically.*
PER/	Aircraft performance data, indicated by a single letter as specified in the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, Doc 8168), *Volume I — Flight Procedures* (not published herein) (see Jeppesen ATC Flight Procedures (Doc 8168)), if so prescribed by the appropriate ATS authority.

ALTN/	Name of destination alternate aerodrome(s), if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.
RALT/	ICAO four letter indicator(s) for en-route alternate(s), as specified in Doc 7910, *Location Indicators* (not published herein), or name(s) of en-route alternate aerodrome(s), if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.
TALT/	ICAO four letter indicator(s) for take-off alternate, as specified in Doc 7910, *Location Indicators* (not published herein), or name of take-off alternate aerodrome, if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.
RIF/	The route details to the revised destination aerodrome, followed by the ICAO four-letter location indicator of the aerodrome. The revised route is subject to reclearance in flight. EXAMPLE: RIF/DTA HEC KLAX RIF/ESP G94 CLA YPPH
RMK/	Any other plain language remarks when required by the appropriate ATS authority or deemed necessary.

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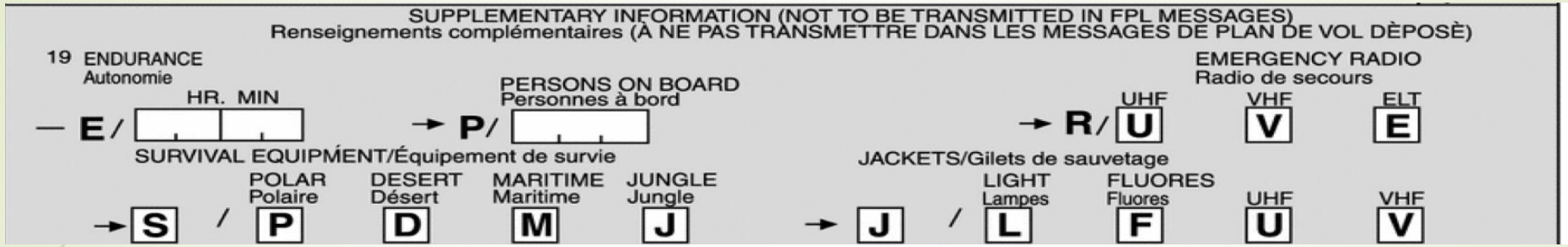

ITEM 19: SUPPLEMENTARY INFORMATION

– **Endurance**

After E/ *INSERT* a 4-figure group giving the fuel endurance in hours and minutes.

– **Persons on board**

After P/ *INSERT* the total number of persons (passengers and crew) on board, when required by the appropriate ATS authority.

INSERT TBN (to be notified) if the total number of persons is not known at the time of filing.

– **Emergency and survival equipment**

R/ (RADIO)	*CROSS OUT* U if UHF on frequency 243.0 MHz is not available.
	CROSS OUT V if VHF on frequency 121.5 MHz is not available.
	CROSS OUT E if emergency locator transmitter (ELT) is not available.
S/ (SURVIVAL EQUIPMENT)	*CROSS OUT* all indicators if survival equipment is not carried.
	CROSS OUT P if polar survival equipment is not carried
	CROSS OUT D if desert survival equipment is not carried.
	CROSS OUT M if maritime survival equipment is not carried.
	CROSS OUT J if jungle survival equipment is not carried.

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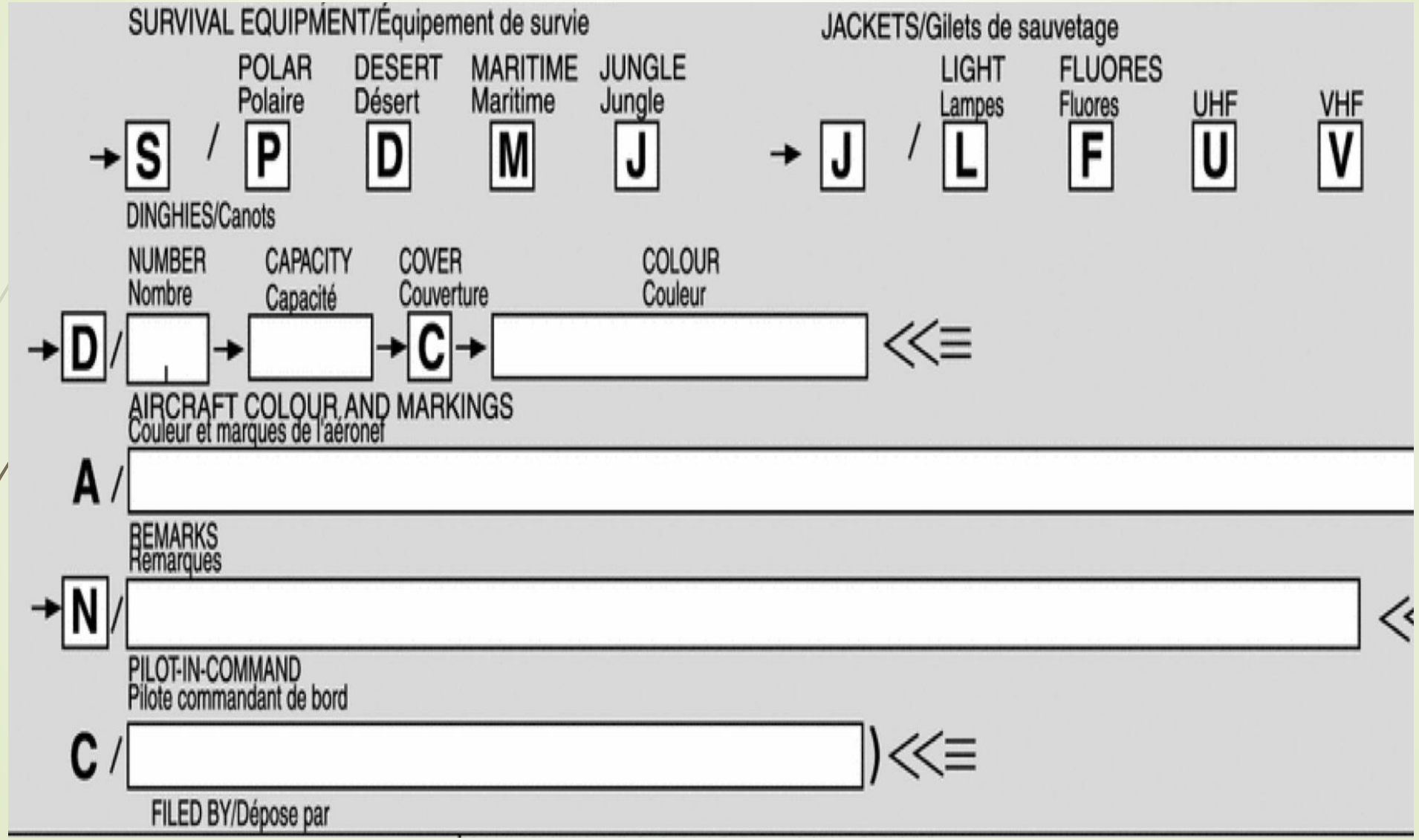

SURVIVAL EQUIPMENT/Équipement de survie
POLAR Polaire
DESERT Désert
MARITIME Maritime
JUNGLE Jungle
S / P D M J
JACKETS/Gilets de sauvetage
LIGHT Lampes
FLUORES Fluores
UHF
VHF
J / L F U V
DINGHIES/Canots
NUMBER Nombre
CAPACITY Capacité
COVER Couverture
COLOUR Couleur
D /
C
AIRCRAFT COLOUR AND MARKINGS
Couleur et marques de l'aéronef
A /
REMARKS
Remarques
N /
PILOT-IN-COMMAND
Pilote commandant de bord
C /
FILED BY/Dépose par

J/ (JACKETS)	*CROSS OUT* all indicators if life jackets are not carried.
	CROSS OUT L if life jackets are not equipped with lights.
	CROSS OUT F if life jackets are not equipped with fluores-cein.
	CROSS OUT U or V or both as in R/ above to indicate radio capability of jackets, if any.
D/ (DINGHIES)	*CROSS OUT* indicators D and C if no dinghies are carried, or
(NUMBER)	*INSERT* number of dinghies carried; and
(CAPACITY)	*INSERT* total capacity, in persons, of all dinghies carried; and
(COVER)	*CROSS OUT* indicator C if dinghies are not covered; and
(COLOUR)	*INSERT* colour of dinghies if carried.

A/ (AIRCRAFT COLOUR AND MARKINGS)	*INSERT* colour of aircraft and significant markings.
N/ (REMARKS)	*CROSS OUT* indicator N if no remarks, or *INDICATE* any other survival equipment carried and any other remarks regarding survival equipment.
C/ (PILOT)	*INSERT* name of pilot-in-command.

2.3 FILED BY

INSERT the name of the unit, agency or person filing the flight plan.

2.4 ACCEPTANCE OF THE FLIGHT PLAN

Indicate acceptance of the flight plan in the manner prescribed by the appropriate ATS authority.

DOC 4444

ISLAMIC REPUBLIC OF IRAN
CIVIL AVIATION ORGANIZATION
AIR TRAFFIC SERVICES

جمهوری اسلامی ایران
سازمان هواپیمایی کشوری
مراقبت پرواز

FLIGHT PLAN

PRIORITY: FF

ADDRESSEE(S): OIFMZTZX OIIIIZGX OIIIZAZX OIIIZTZX OIIXZQZX OIIXZRZX OIMMZAZA
OIMMZAZX OIMMZTZX OIMSZTZX

FILING TIME: 0 1 0 7 0 3

ORIGINATOR: O I I X I F P S

SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGINATOR:

3 MESSAGE TYPE: (FPL

7 AIRCRAFT IDENTIFICATION: I Z G 4 0 4 1

8 FLIGHT RULES: I

TYPE OF FLIGHT: S

9 NUMBER:

TYPE OF AIRCRAFT: A 3 2 0

WAKE TURBULENCE CAT.: / M

10 EQUIPMENT AND CAPABILITIES: SDFGIRWY / S

13 DEPARTURE AERODROME: O I I I

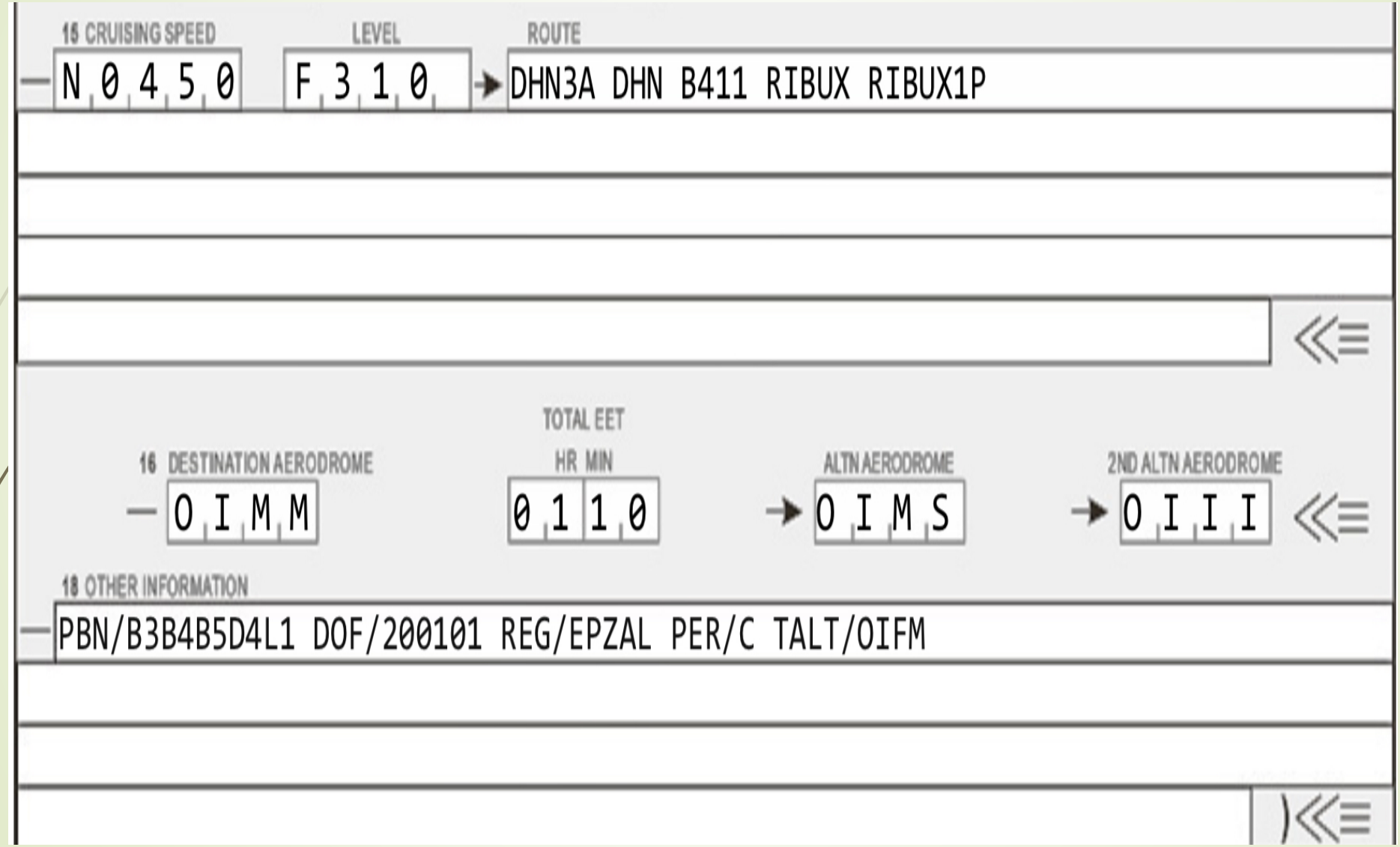
TIME: 0 8 0 0

15 CRUISING SPEED: N 0 4 5 0

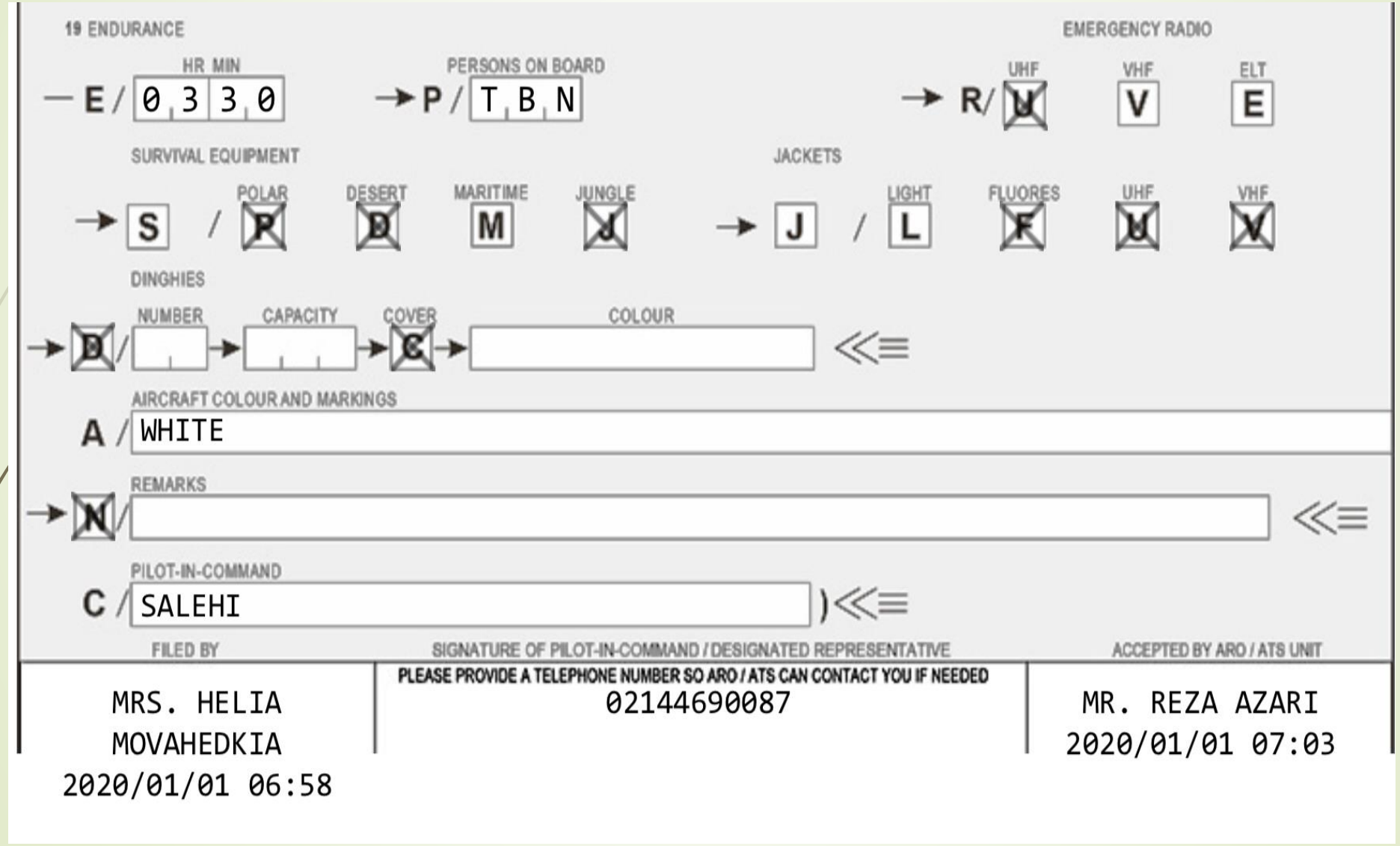
LEVEL: F 3 1 0

ROUTE: DHN3A DHN B411 RIBUX RIBUX1P

DOC 4444


15 CRUISING SPEED
LEVEL
ROUTE
N 0 4 5 0
F 3 1 0
DHN3A DHN B411 RIBUX RIBUX1P
TOTAL EET
16 DESTINATION AERODROME
HR MIN
ALTN AERODROME
2ND ALTN AERODROME
O I M M
0 1 1 0
O I M S
O I I I
18 OTHER INFORMATION
PBN/B3B4B5D4L1 DOF/200101 REG/EPZAL PER/C TALT/OIFM

DOC 4444


19 ENDURANCE
HR MIN
E/ 0330
PERSONS ON BOARD
P/ TBN
EMERGENCY RADIO
UHF
VHF
ELT
R/ U V E
SURVIVAL EQUIPMENT
POLAR
DESERT
MARITIME
JUNGLE
S / P D M J
JACKETS
LIGHT
FLUORES
UHF
VHF
J / L F U V
DINGHIES
NUMBER
CAPACITY
COVER
COLOUR
D / C
AIRCRAFT COLOUR AND MARKINGS
A / WHITE
REMARKS
N /
PILOT-IN-COMMAND
C / SALEHI
FILED BY
SIGNATURE OF PILOT-IN-COMMAND / DESIGNATED REPRESENTATIVE
ACCEPTED BY ARO / ATS UNIT
MRS. HELIA MOVAHEDKIA
2020/01/01 06:58
PLEASE PROVIDE A TELEPHONE NUMBER SO ARO / ATS CAN CONTACT YOU IF NEEDED
02144690087
MR. REZA AZARI
2020/01/01 07:03

REPETITIVE FLIGHT PLANS (RPLs)

RPLs shall not be used for flights ***other than IFR flights*** operated regularly on the same day(s) of consecutive weeks and on ***at least ten occasions or every day over a period of at least ten consecutive days.*** The elements of each flight plan shall have a high degree of stability.

The use by States of RPLs for international flight shall be subject to the provision that the affected adjacent States either already use RPLs or will use them at the same time. The procedure for use between States shall be the subject of bilateral, multilateral or regional air navigation agreement as appropriate.

Time in ATC

ATC units throughout the world are required to report time in hours, minutes and seconds with time referenced to co-ordinated universal time (UTC). This uses the 24 hour clock. UTC has been previously known as ‘Zulu' time or Greenwich Mean Time. 1200UTC would be the time at which the sun is directly overhead the Greenwich meridian (0°E/W). The use of one standard time reference (rather than local time) makes the handling of flight plans simple and facilitates co-ordination of ATC clearances.

Time Accuracy

ATSU clocks and timing devices are to be checked to ensure that the times indicated are within +/- 30 seconds of UTC at all times. Time checks round up or down to the nearest minute.

ANNEX 2/11

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.

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

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.

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

Estimated off-block time

The estimated time at which the aircraft will commence movement associated with departure.

Estimated time of arrival

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

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.

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

Total estimated elapsed time

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.

NO # 4 ***Time = 00:04***

304

Which letter is used in a flight plan to indicate that the flight commences in accordance with VFR and subsequently changes to IFR?

a)I
b)Z
c)V
d)Y

305

Which letter is used in a flight plan to indicate that the flight commences in accordance with VFR and subsequently changes to IFR?

a)I

b)Z

c)V

d)Y

Repetitive flight plans (RPLs) shall be used for flights operated regularly on the same day(s) of consecutive weeks and:

a) On at least 20 days consecutively.
b) On at least ten occasions or every day over a period of at least 20 consecutive days.
c) On at least ten occasions or every day over a period of at least ten consecutive days.
d) On at least 20 occasions.

Repetitive flight plans (RPLs) shall be used for flights operated regularly on the same day(s) of consecutive weeks and:

a) On at least 20 days consecutively.
b) On at least ten occasions or every day over a period of at least 20 consecutive days.
c) On at least ten occasions or every day over a period of at least ten consecutive days.
d) On at least 20 occasions.

308

Which letter is used in a flight plan to indicate that the flight commences in accordance with IFR and subsequently changes to VFR?

a) Y
b) I
c) V
d) Z

309

Which letter is used in a flight plan to indicate that the flight commences in accordance with IFR and subsequently changes to VFR?

a) Y
b) I
c) V
d) Z

310

The planned cruising speed for the first leg or all of the cruising portion of the flight must be entered in the speed box of a flight plan form, this speed is the:

a) Indicated air speed (IAS).
b) Estimated ground speed (G/S).
c) True air speed (TAS).
d) True air speed at 65% power

311

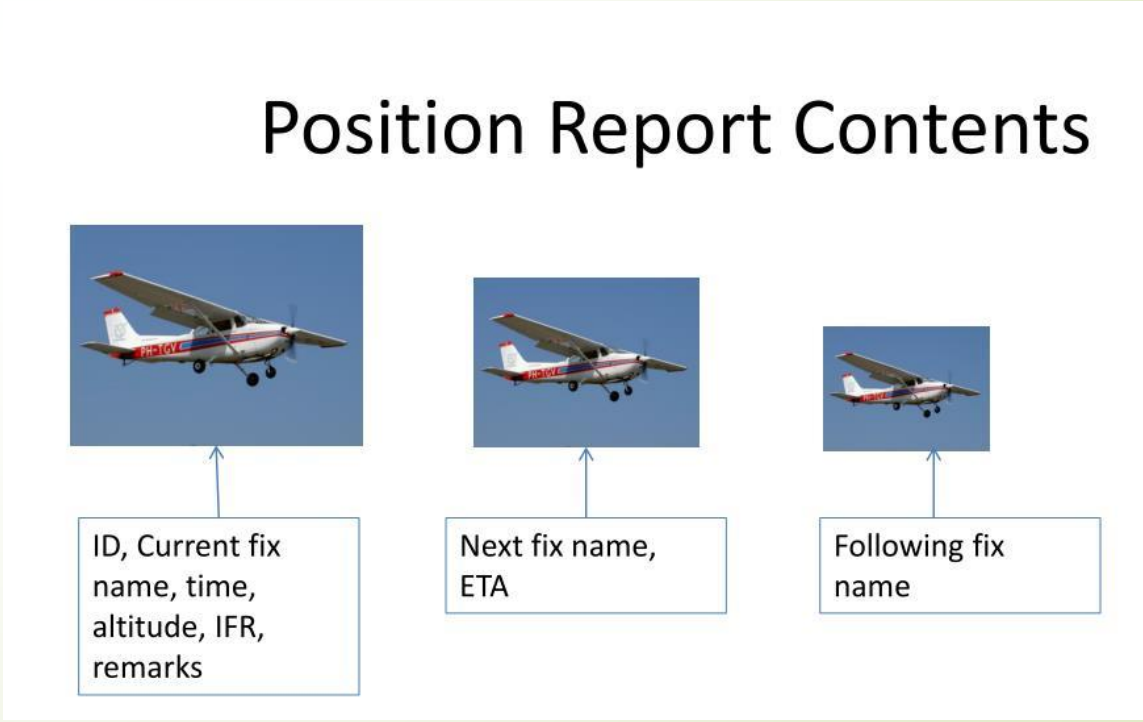
The planned cruising speed for the first leg or all of the cruising portion of the flight must be entered in the speed box of a flight plan form, this speed is the:

a) Indicated air speed (IAS).
b) Estimated ground speed (G/S).
c) True air speed (TAS).
d) True air speed at 65% power

Position Report

Module objectives

At the end of this module you will be able to explain the **functions of position report in aviation** based on standard ICAO regulations.



Time 00:15

ANNEX 2/11

Position reports

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.

DOC 4444

On routes defined by designated significant points, position reports shall be made when over, or as soon as possible after passing, each designated compulsory reporting point. Additional reports over other points may be requested by the appropriate ATS unit.

On routes not defined by designated significant points, position reports shall be made by the aircraft as soon as possible ***after the first half hour of flight and at hourly intervals there after.*** Additional reports at shorter intervals of time may be requested by the appropriate ATS unit.

4.12.2 Contents of Routine Air-Reports

4.12.2.1 Routine air-reports transmitted by data link, when ADS-C is not being applied, shall give information relating to such of the following elements as are necessary for compliance with 4.12.2.2:

– *Section 1 — Position Information:*

1. Aircraft identification
2. Position
3. Time
4. Flight level or altitude
5. Next position and time over
6. Ensuing significant point.

– *Section 2 — Operational Information:*

7. Estimated time of arrival
8. Endurance.

– *Section 3 — Meteorological Information:*

9. Wind direction
10. Wind speed
11. Wind quality flag
12. Air temperature
13. Turbulence (if available)
14. Humidity (if available).

4.12.3 Contents of Special Air-Reports

4.12.3.1 Special air-reports shall be made by all aircraft whenever the following conditions are encountered or observed:

a. moderate or severe turbulence; or

b. moderate or severe icing; or

c. severe mountain wave; or

d. thunderstorms, without hail that are obscured, embedded, widespread or in squall-lines; or

e. thunderstorms, with hail that are obscured, embedded, widespread or in squall-lines; or

f. heavy dust storm or heavy sandstorm; or

g. volcanic ash cloud; or

h. pre-eruption volcanic activity or a volcanic eruption.

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

In addition, in the case of transonic and supersonic flight;

i. moderate turbulence; or

j. hail; or

k. cumulonimbus clouds.

Termination of control

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.

Clearance Limit

A clearance limit shall be described by specifying the name of the appropriate ***significant point, or aerodrome, or controlled airspace boundary***.

If an aircraft has been cleared to an intermediate point in adjacent controlled airspace, the appropriate ATC unit will then be responsible for issuing, as soon as practicable, an amended clearance to the destination aerodrome.

When the destination aerodrome is outside controlled airspace, the ATC unit responsible for the last controlled airspace through which an aircraft will pass shall issue the appropriate clearance for flight to the limit of that controlled airspace

NO # 2 ***Time = 00:02***

322

How long after the first position report, on a route not defined by significant reporting point, the position report shall take place?

a) Half an hour
b) One hour
c) 30 minutes
d) At least one hour

323

How long after the first position report, on a route not defined by significant reporting point, the position report shall take place?

a) Half an hour

b) One hour

c) 30 minutes

d) At least one hour

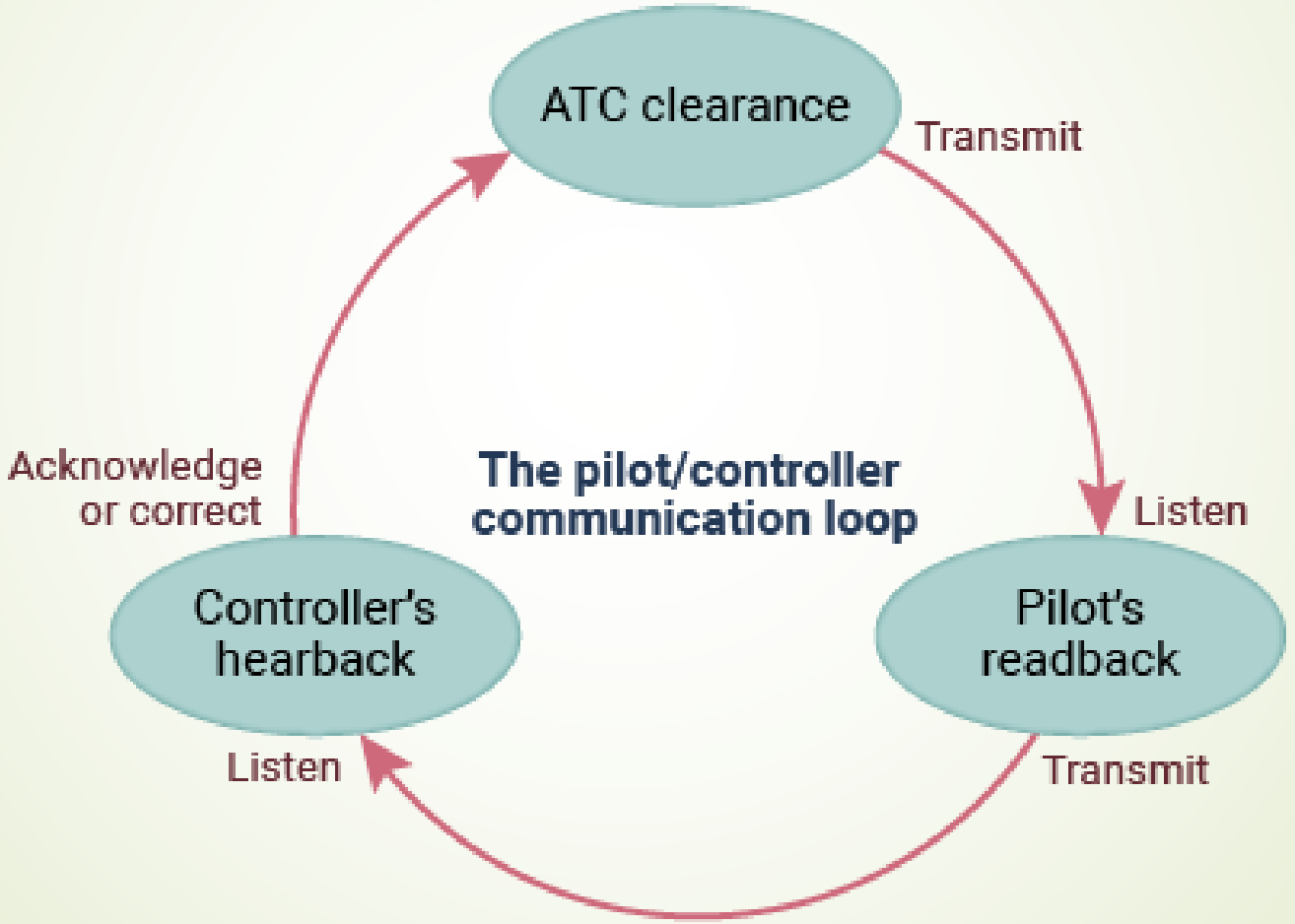
When should position reports be made?

a) When passing designated significant points referred to as "on request reporting points".
b) At the discretion of the commander.
c) When passing each designated compulsory reporting point.
d) At one hourly intervals.

When should position reports be made?

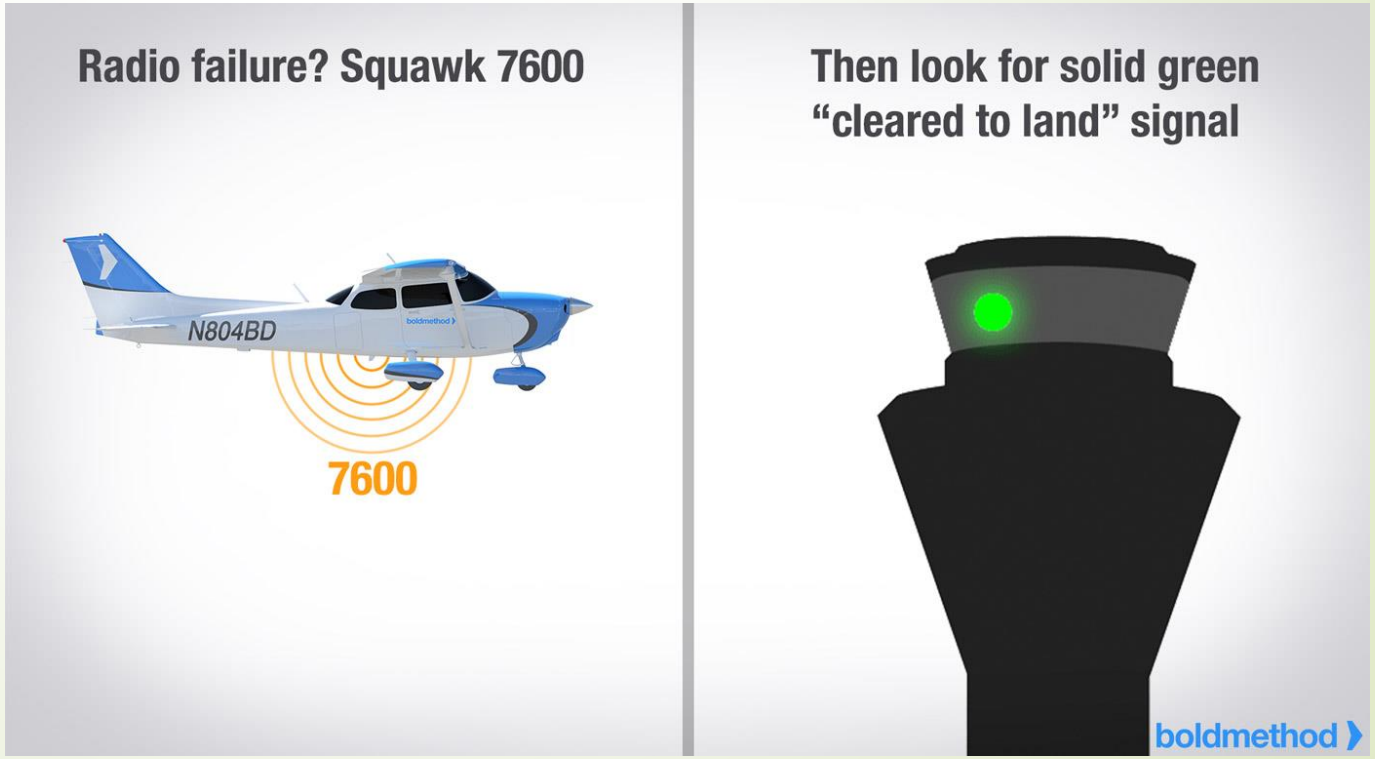
a) When passing designated significant points referred to as "on request reporting points".
b) At the discretion of the commander.
c) When passing each designated compulsory reporting point.
d) At one hourly intervals.

Communications Failure



Module objectives

At the end of this module you will be able to explain the **roll of pilots to handle radio communication failure situation** based on standard ICAO regulations.



Time 00:30

Communications Failure

Aircraft operating in accordance with an ATC clearance, where two way radio communications are required, are to comply with the requirements of ICAO Annex 10 (Telecommunications) Volume 2. This specifies the requirement for air-to-ground communications equipment and the radio frequencies allocated to the aeronautical mobile telecommunications network (SELCAL satisfies the requirement to maintain air-ground voice communications). Where CPDLC exists, the requirement for voice communications is required to be maintained.

Confirmation of Communication Failure

ATC will confirm that an aircraft is subject to a communications failure by requesting it to execute a specific maneuver which can be observed by radar or transmit a signal in order to indicate acknowledgement.

In any case ATC will transmit blind instructions to the aircraft on frequencies on which the aircraft is believed to be listening.

At a Controlled Aerodrome

If the communications system of the aeroplane (receiver or transmitter) fails when the aeroplane is flying in the traffic pattern at a controlled aerodrome, a watch shall be kept for instructions issued by visual (light and ground) signals from the control tower, and such signals complied with.

Separation of aircraft

Once ATC confirms that an aircraft has a communication failure, separation shall be maintained between the aircraft and other traffic based on the presumption that the aircraft will be carrying out the procedures specified below depending on whether the conditions are ***either VMC or IMC.***

VMC

If a failure occurs ***whilst the aircraft is flying in VMC (regardless of flight rules - VFR or IFR),***

- ***the aircraft is to continue to be flown in VMC,***
- ***landed at the nearest suitable aerodrome and***
- ***arrival reported by the most expeditious means to the appropriate ATCU.***

IMC

- When being radar vectored proceed in the most direct manner to rejoin the ***current flight plan route*** and no later than the next significant point squawking A7600 and taking into consideration the applicable minimum flight altitude.

- If the aircraft is en route and in an area where radar control is provided, the pilot is to ***squawk A7600 and maintain the current flight plan*** for a ***period of 7 minutes*** and thereafter adjust speed and level in accordance with the filed flight plan.

IMC

- If the aircraft is en route outside of an area where radar control is provided, the pilot is to maintain the current flight plan for a ***period of 20 minutes*** following the aircraft's failure to report over a compulsory reporting point (at that point the ATCO will know that there is a communication problem), and thereafter ***adjust level and speed in accordance with the filed flight plan***.

The 20 minutes is to allow the ATCO time to resolve any potential conflict that may arise during the transition to the filed flight plan profile.

Subsequent Actions

- Continue according to the filed flight plan route to the appropriate designated navigation aid serving the destination aerodrome and, when required to ensure compliance with procedure below, hold over this aid until commencement of descent. Then:

- Commence descent from the radio navigation aid as above at, or as close as possible to, the expected approach time (EAT) last received and acknowledged. If no EAT has been received and acknowledged, descend at, or as close as possible to, the ETA resulting from the current flight plan.

ANNEX 2/11

- Complete a normal instrument approach procedure as specified for the designated aid; and land, if possible, ***within 30 minutes after the ETA as above or the last acknowledged EAT, whichever is the later.***

- Report to ATC as soon as ***possible after landing.***

AIR-GROUND COMMUNICATIONS FAILURE

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

If the attempts specified above is failed, the aircraft station ***shall transmit its message twice on the designated frequency, preceded by the phrase "TRANSMITTING BLIND"*** and, if necessary, include the addressee(s) for which the message is intended.

RECEIVER FAILURE

When an aircraft station is unable to establish communication due to receiver failure, it shall transmit reports at the scheduled times, or positions, on the frequency in use, preceded by the ***phrase "TRANSMITTING BLIND DUE TO RECEIVER FAILURE".*** The aircraft station shall transmit the intended message, following this by a complete repetition. During this procedure, the aircraft shall also advise the time of its next intended transmission.

NO # 4 ***Time = 00:04***

A message preceded by the phrase "TRANSMITTING BLIND DUE RECEIVER FAILURE" shall be transmitted:

a) On the regional guard frequency.

b) On the frequency presently in use.

c) On the international emergency frequency.

d) On all available aeronautical stations.

340

A message preceded by the phrase "TRANSMITTING BLIND DUE RECEIVER FAILURE" shall be transmitted:

a) On the regional guard frequency.

b) On the frequency presently in use.

c) On the international emergency frequency.

d) On all available aeronautical stations.

When transmitting a message preceded by the phrase "TRANSMITTING BLIND DUE TO RECEIVER FAILURE" during an en-route flight, the aircraft station shall also:

a) Land at the nearest airfield/airport.

b) Join base leg when approaching the airfield for landing.

c) Advise the time of its next intended transmission.

d) Return to the airport of departure.

When transmitting a message preceded by the phrase "TRANSMITTING BLIND DUE TO RECEIVER FAILURE" during an en-route flight, the aircraft station shall also:

a) Land at the nearest airfield/airport.

b) Join base leg when approaching the airfield for landing.

c) Advise the time of its next intended transmission.

d) Return to the airport of departure.

Within how long after ETA or acknowledge expected approach time the radio failure aircraft must to be landed?

a) Within 3 min

b) Within 20 min

c) Within 30 min

d) Within 40 min

Within how long after ETA or acknowledge expected approach time the radio failure aircraft must to be landed?

a) Within 3 min

b) Within 20 min

c) Within 30 min

d) Within 40 min

345

What is the transponder code for radio communication failure?

a) 7200

b) 7600

c) 7500

d) 7700

346

What is the transponder code for radio communication failure?

a) 7200

b) 7600

c) 7500

d) 7700

Unlawful Interference

Module objectives

At the end of this module you will be able to explain the **roll of pilots to handle Unlawful Interference** based on standard ICAO regulations.

Time 00:15

Unlawful Interference

Where an aircraft is the subject of unlawful interference (hi-jacking, etc.), communication with the appropriate ATC authority is to be attempted to notify the authority of this fact together with any significant circumstances and of any intended deviation from the current flight plan, to enable the ATSU to give priority to the aircraft and to minimize conflict with other aircraft.

- Unless conditions on the aircraft dictate otherwise, the PIC is to attempt to continue flying on the assigned track and at the assigned level at least until able to notify an ATCU or until within coverage of a radar unit.

- If forced to depart from assigned track/level, without being able to notify ATC, the PIC should, if possible:

- Attempt to broadcast warnings on the VHF emergency frequency (***121.500MHz), and use other on-board systems (i.e. SSR - squawk A/7500, data links etc...)*** if circumstances permit, and then:

- ***If no regional procedures have been established, proceed at a level different from IFR levels by 1000 ft above FL290, or 500 ft below FL290.***

ANNEX 2/11

Interception of Civil Aircraft

6.55 Interception Phraseology

Phrases used by Intercepting Aircraft			Phrases used by Intercepted Aircraft		
Phrase		**Meaning**	**Phrase**		**Meaning**
Call sign	KOL SA-IN	What is your call sign?	Call sign[2]	KOL SA-IN	My call sign is (call sign[2])
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	Landing 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
			Hijack[3]	HI-JACK	I have been hijacked
			Land	LAAND	I request to land at (place name)
			Descend	DEE-SEND	I require descent

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 race-track 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.

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.

Pedram shirazi

2.2 Signals initiated by intercepted aircraft and responses by intercepting aircraft

Series	*INTERCEPTED Aircraft Signals*	*Meaning*	*INTERCEPTING 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 300 m (1 000 ft) but not exceeding 600 m (2 000 ft) (in the case of a helicopter, at a height exceeding 50 m (170 ft) but not exceeding 100 m (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.

Pedram shirazi

ANNEX 2/11

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

By day and by night, a series of projectiles discharged from the ground at ***intervals of 10 seconds***, each showing, on bursting, red and green lights or stars will indicate to an unauthorized 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.

ANNEX 2/11

INCURSION INTO RESTRICTED OR DANGER AREAS

If you see RED and GREEN 'star shell' pyrotechnics it means you are about to enter a restricted area or an active danger area

NO # 2 ***Time = 00:02***

358

Which signal may be initiated by, an intercepted aircraft, which is in distress?

a) Irregular flashing landing lights.

b) Regularly flashing all lights

c) Irregular flashing navigation lights

d) Irregular flashing all available lights.

359

Which signal may be initiated by, an intercepted aircraft, which is in distress?

a) Irregular flashing landing lights.

b) Regularly flashing all lights

c) Irregular flashing navigation lights

d) Irregular flashing all available lights.

360

Which signal may be initiated by, an intercepted aircraft, when it does not comply intercepted AC instruction ?

a) Irregular flashing landing lights.

b) Regularly flashing all lights.

c) Irregular flashing navigation lights

d) Irregular flashing all available lights.

361

Which signal may be initiated by, an intercepted aircraft, when it does not comply intercepted AC instruction ?

a) Irregular flashing landing lights.

b) Regularly flashing all lights.

c) Irregular flashing navigation lights

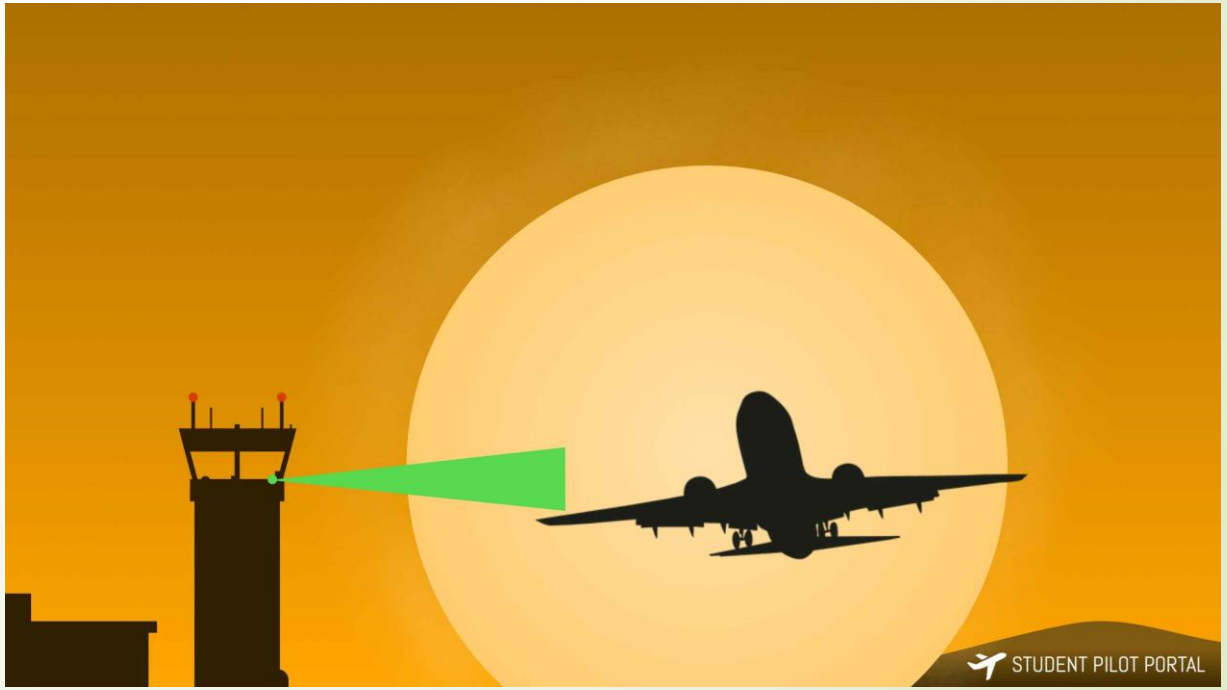
d) Irregular flashing all available lights.

Visual Signals

Module objectives

At the end of this module you will be able to analyze the **function of visual ground signal in aviation** based on standard ICAO regulations.

Time 00:15



Signals for Aerodrome Traffic

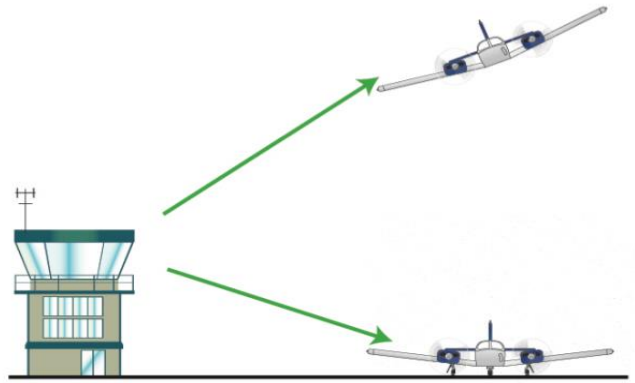
Non-radio Traffic

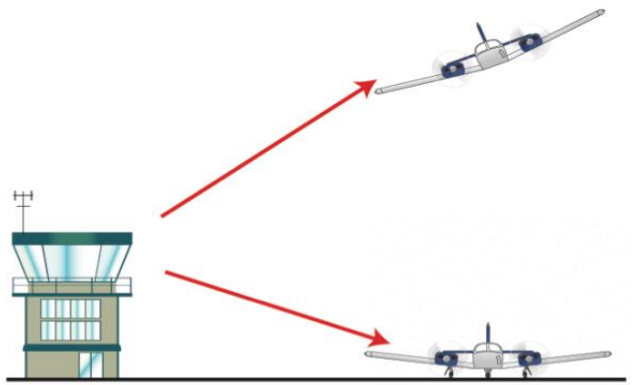
Non-radio traffic on or in the vicinity of an aerodrome is to keep a good look out for visual signals from ATC.Aeroplanes with radios are also to comply with instructions given visually.The lamp used by ATC to communicate (Aldis lamp) is directional with a narrow beam. If you see a signal light from the tower, you must assume that it is meant for you.

Visual Signals

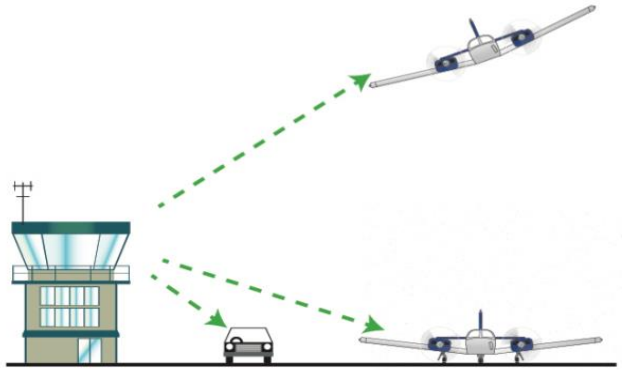
The following table gives the light and pyrotechnic signals used from ground to air:

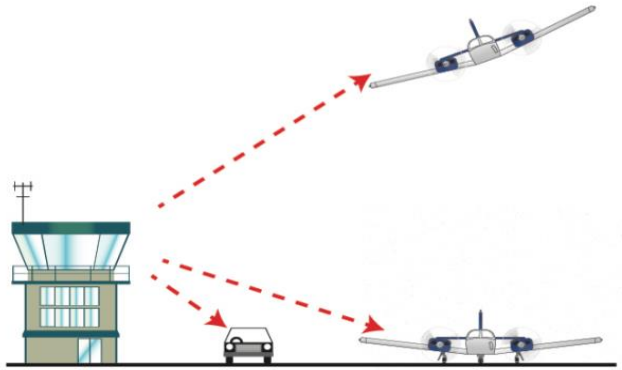
Light	From Aerodrome Control to:	
	Aircraft in Flight	Aircraft on the Ground
Steady Green	Cleared to land	Cleared for take-off
Steady Red	Give way to other aircraft and continue circling	Stop
Green flashes	Return for landing and await landing clearance	Cleared to taxi
Red flashes	Aerodrome unsafe, do not land	Taxi clear of the landing area
White flashes	Land at this aerodrome after receiving clearance to land and then proceed to the apron	Return to the starting point on the aerodrome
Red pyrotechnic (flare)	Notwithstanding any previous instructions, do not land for the time being	

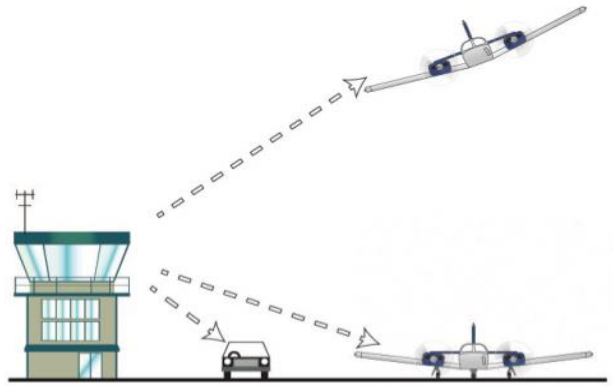
Signal		Meaning
Steady green.		Cleared to land. Cleared to take off.

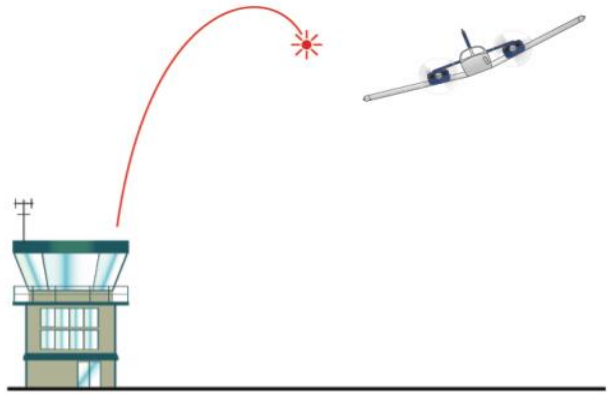
Signal		Meaning
Steady red.		Give way to other aircraft and continue circling. Stop.

ANNEX 2/11

Signal		Meaning
Green flashes.		Return for landing and await landing clearance.
		Cleared to taxi.

Signal		Meaning
Red flashes.		Aerodrome unsafe, do not land.
		Taxi clear of the landing area.

Signal		Meaning
White flashes.		Land at this aerodrome after receiving clearance to land and then proceed to the apron. Return to the starting point on the aerodrome.

Signal		Meaning
Red pyrotechnic (flare).		Notwithstanding any previous instructions, do not land for the time being.

Acknowledgement by Aircraft

To acknowledge receipt of a signal as above an aircraft may make the following:

- ***When in flight:***

- During the hours of daylight, by rocking the aircraft's wings

- During the hours of darkness, by flashing on and off twice the aircraft's landing lights or, if not so equipped, by switching on and off the navigation lights twice.

- ***When on the ground:***

- During the hours of daylight by moving the aircraft's rudder or ailerons;

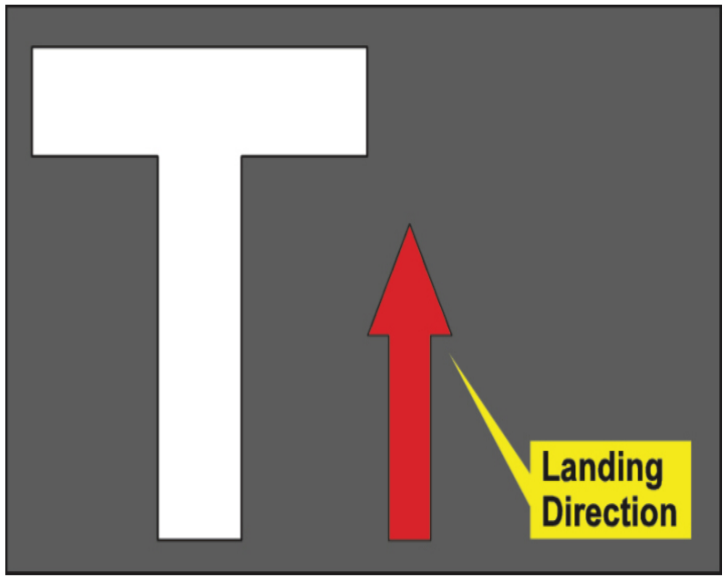
- During the hours of darkness by flashing on and off twice the aircraft's landing lights or, if not so equipped, by switching on and off the navigation lights twice.

Visual Ground Signals

The following signals may be shown on an aerodrome, either in the signal square or at other locations on the apron or movement area.A signal square is usually located in front (aerodrome side) of a control tower (visual control room) and is to be visible from the air anywhere in the vicinity of the aerodrome.

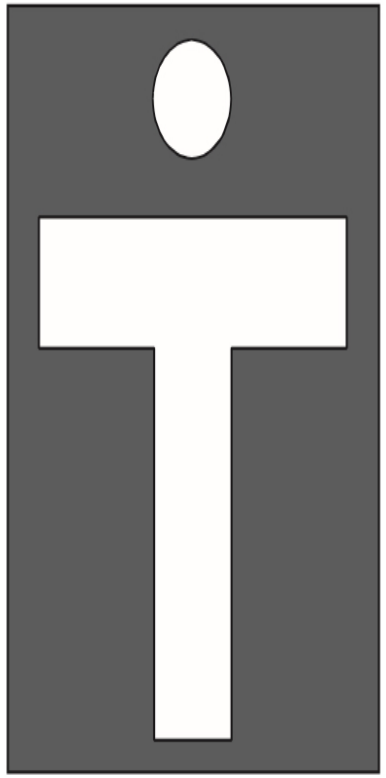
The purpose is to convey essential information to pilots unable to communicate by radio. Other signals, applicable to non-radio traffic on the ground are displayed from a signals mast (also in front of the control tower) or by means of indicator boards (information signs) located on or adjacent to the control tower. The absence of a signal square indicates that the aerodrome is not to be used by non-radio traffic.

6.88 Signals in the Signals Area. The following signals are displayed on aerodromes to pass information to non-radio aircraft. In the examination, you will be expected to interpret the meaning of a signal from a written description of the sign:



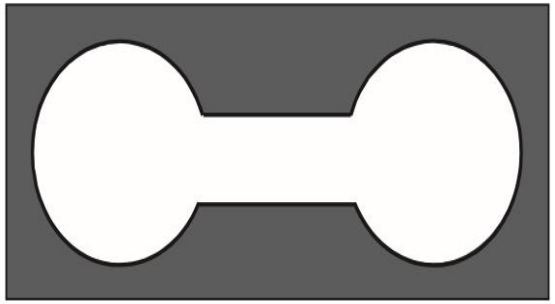
A white "T" signifies that take-offs and landings shall be in the direction of the shaft of the "T" (as indicated by the arrow).

ANNEX 2/11

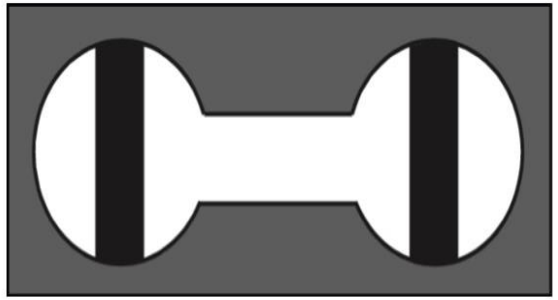


A white disc added to the "T", means that take-off and landing direction do not necessarily coincide.

ANNEX 2/11



A white dumb-bell indicates that aircraft movement on the ground is confined to paved, metalled or similar hardened surfaces.



A white dumb-bell with black stripes signifies that take-offs and landings are to be on a runway, but movement on the ground is not confined to pavements.

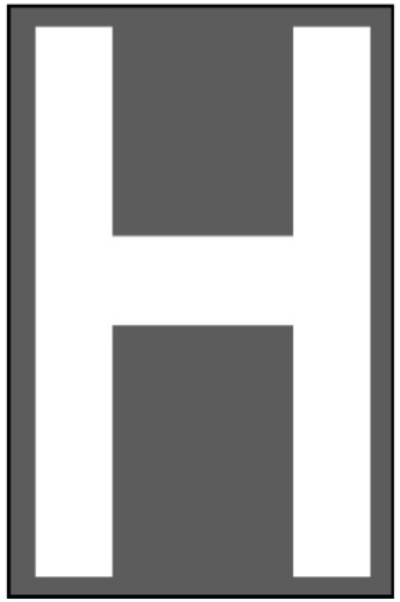
ANNEX 2/11

A red and yellow striped arrow signifies that a right hand circuit is in force.

ANNEX 2/11

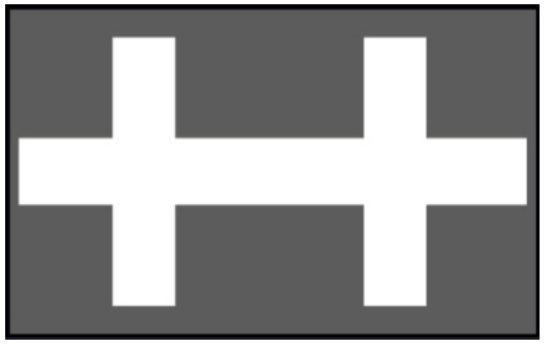
A red panel with a yellow diagonal stripe signifies that the manoeuvring area is poor and pilots must exercise special care.

A red panel with a yellow cross signifies that the aerodrome is unfit for aircraft movements, and landings are prohibited.



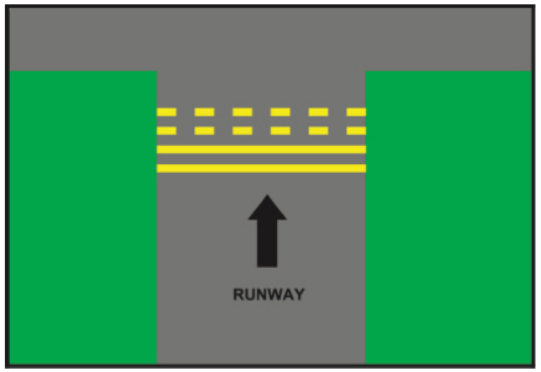
A white "H" signifies that helicopters shall take off and land only within the area designated by the marking.

A red 'L' over a dumb-bell means that light aircraft are permitted to take off and land either on a runway or on the area designated.

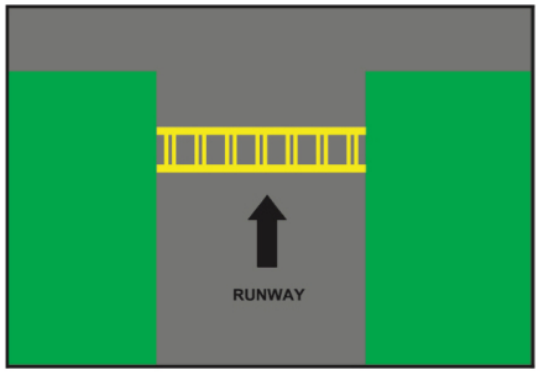


A white double cross means that glider flying is in progress.

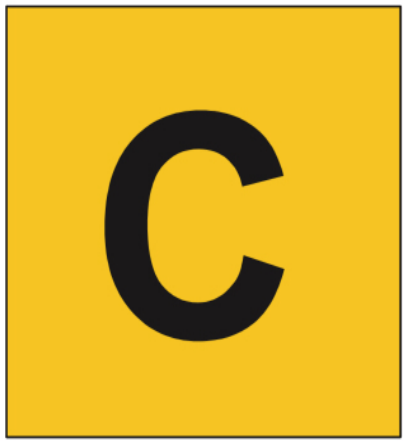
Two or more white crosses indicate that the section of the runway or taxiway (where they would be yellow crosses) is unfit for aircraft movement. Orange and white boundary markers will delineate the limit of the unusable ground or runway.



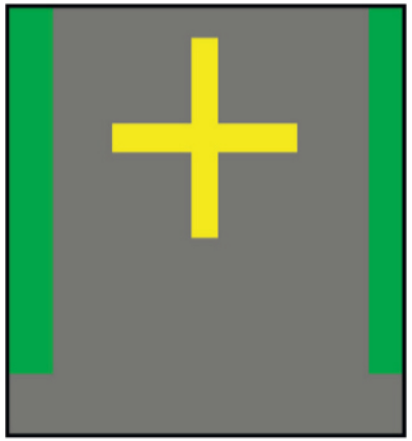
Two yellow broken lines and two continuous lines signify the holding point closest to the runway. Outside of the notified hours for ATC, this is the closest point an aircraft or vehicle can approach to the runway for the purpose of giving way to aircraft landing or taking off. This is a 'pattern A' marking.



A yellow 'ladder' marking across the taxiway indicates a holding point other than the closest to the runway. Outside ATC hours it can be ignored. This is a 'pattern B' marking.

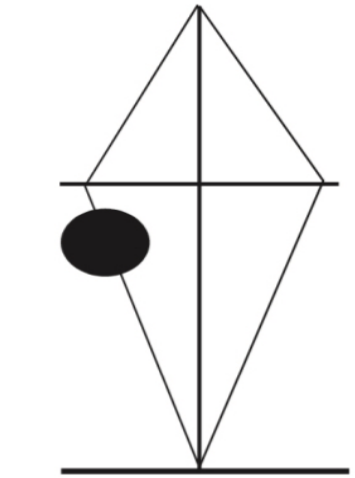


A black letter "C" on a yellow background indicates where a visiting pilot should report on arrival.

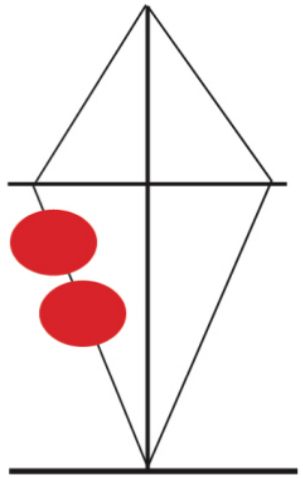


A yellow St George's cross indicates the position on the manoeuvring area where tow ropes and banner can be dropped.

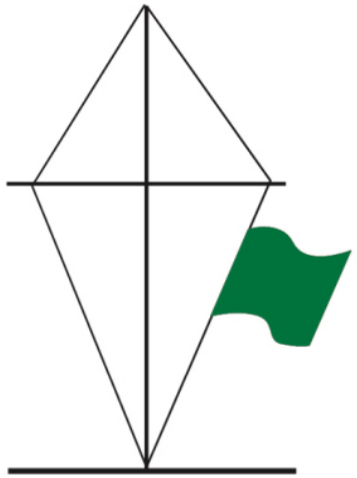
6.89 Signals Mast. The following signals are flown from the signals mast:



Take-off and landing direction not necessarily the same

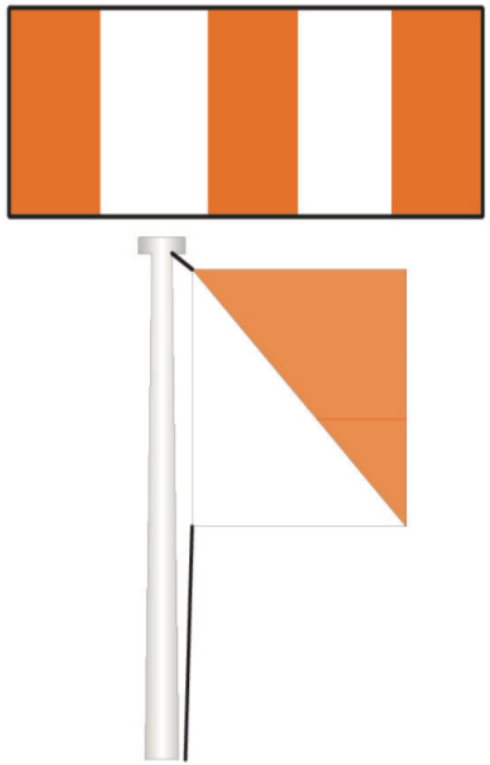


Glider flying in progress



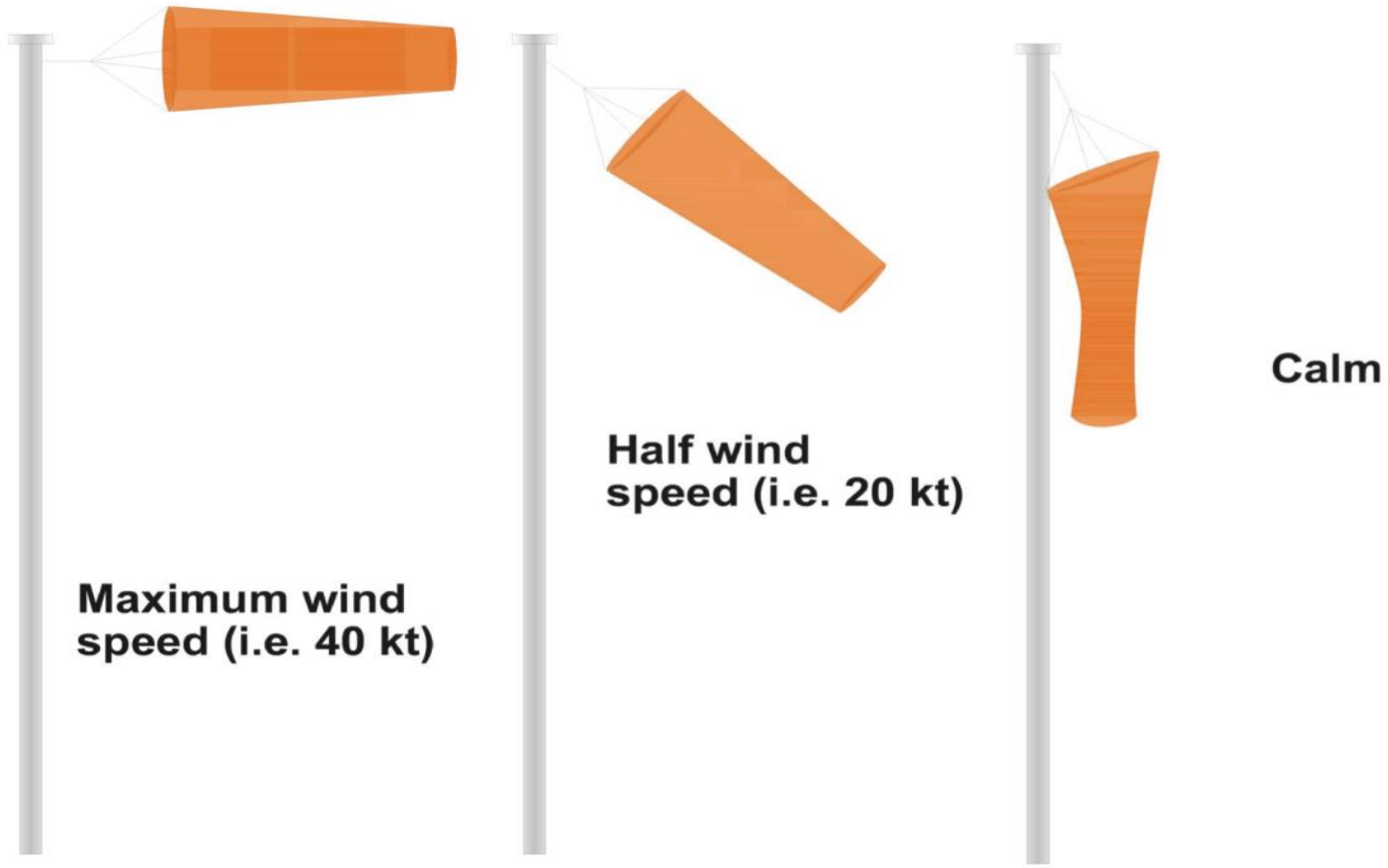
Right hand circuit in force

6.90 QDM Boards. A yellow board with two black numbers on is situated on the tower, and indicates the runway direction in use (QDM).



6.91 Boundary Markers. Orange and white striped markers indicate the boundary of the manoeuvring area where it is not clearly defined.

6.92 Wind Sleeve. A wind sleeve (windsock) indicates the wind direction and speed. (Large = 40 kt; medium = 30 kt; small = 20 kt) Max wind speed (i.e. 40 kt) Half wind speed (i.e. 20 kt) Calm



Emergency & Urgency Signals

Module objectives

At the end of this module you will be able to analyze the **roll of pilot to handle emergency and urgency signal in aviation** based on standard ICAO regulations.

Time 00:30

ANNEX 2/11

Distress signals

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

- ***a signal made by radiotelegraphy or by any other signaling method consisting of the group SOS (. . . — — — . . . in the Morse Code);***
- ***a radiotelephony distress signal consisting of the spoken word MAYDAY;***
- ***a distress message sent via data link which transmits the intent of the word MAYDAY;***
- ***rockets or shells throwing red lights, fired one at a time at short intervals***
- ***a parachute flare showing a red light.***

Pedram shirazi

ANNEX 2/11

With respect to survival craft stations the following emergency / distress frequencies are provided:

- ***VHF — 121.5 MHz;***
- ***UHF — 243.0 MHz;***
- ***HF — 500 kHz, 2182 kHz, 8364 kHz.***

Action by the Aircraft in Distress

In addition to being preceded by the radiotelephony distress signal MAYDAY, ***preferably spoken*** three times, the distress message to be sent by an aircraft in distress shall:

- **be on the air-ground frequency in use at the time;**
- **name of the station addressed (time and circumstances permitting);**
- **the identification of the aircraft;**
- **the nature of the distress condition;**
- **intention of the person in command;**
- **present position, level (i.e., flight level, altitude, etc., as appropriate) and heading.**

ANNEX 2/11

Imposition of Silence

The station in distress, or the station in control of distress traffic, shall be permitted to impose silence, either on all stations of the mobile service in the area or on any station which interferes with the distress traffic. It shall address these instructions "to all stations", or to one station only, according to circumstances. In either case, it shall use

- ***STOP TRANSMITTING;***

- ***the radiotelephony distress signal MAYDAY.***

The distress communication and silence conditions shall be terminated by transmitting a message, including the words **"DISTRESS TRAFFIC ENDED"**, on the frequency or frequencies being used for the distress traffic. This message shall be originated only by the station controlling the communications.

Non-emergency Situation

If an aircraft has a communications failure or a malfunction that makes it imperative that the aircraft is landed but the pilot does not require any other assistance, the pilot shall indicate the fact by repeatedly switching the landing lights (or any other light) on and off.

Urgency signals

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:

- ***the repeated switching on and off of the landing lights; or***

- ***the repeated switching on and off of the navigation lights in such manner as to be distinct from flashing navigation lights.***

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 signal made by radiotelegraphy or by any other signalling method consisting of the group XXX;***
- ***a radiotelephony urgency signal consisting of the spoken words PAN, PAN;***
- ***an urgency message sent via data link which transmits the intent of the words PAN, PAN.***

ANNEX 2/11

In addition to being preceded by the radiotelephony urgency signal PAN PAN, ***preferably spoken three*** times and each word of the group pronounced as the French word "panne", the urgency message to be sent by an aircraft reporting an urgency condition shall:

- ***be on the air-ground frequency in use at the time***
- ***the name of the station addressed;***
- ***the identification of the aircraft;***
- ***the nature of the urgency condition;***
- ***the intention of the person in command;***
- ***present position, level (i.e., flight level, altitude, etc., as appropriate) and heading;***
- ***any other useful information.***

ANNEX 2/11

For the purpose of announcing and identifying aircraft used for medical transports, a transmission of the radiotelephony urgency signal ***PAN PAN***, preferably spoken three times, and each word of the group pronounced as the French word "***panne***", shall be followed by the radio telephony signal for medical transports ***MAY-DEE-CAL***, pronounced as in the ***French*** "***medical***". The use of the signals described above indicates that the message which follows concerns a protected medical transport.

The reserved transponder codes are:

- ***Mode A code 7700***.This is the civil ***emergency*** code and is used unless a specific identification code has been allocated by a radar controller and the aircraft has been identified.

- ***Mode A code 7600***.This is the squawk to indicate ***radio failure*** and should be used at all times when a failure occurs regardless of the ATC service being provided.

- ***Mode A code 7500***.This code indicates ***unlawful interference***. Its use does not imply that the fact is being generally advertised. Discretion and confidentiality will be preserved by the ATC authority until the pilot mentions the fact by RTF. A pilot may prefer to use the **7700 squawk to indicate the severity of the situation.**

- ***Mode A code 7000***.This code indicates that the aircraft is operating in an area where a radar service is available from an ATCU but the aircraft is not in receipt of the service. It implies that the aircraft is operating under VFR.

- ***Mode A code 2000.***This code is used to indicate that an aircraft is entering an area where a radar service is available and will be requesting that service. Usually used by aircraft entering a domestic FIR from an Oceanic control area.

- ***Mode A code 0000***.This code is reserved to indicate that the aircraft transponder is in some manner unserviceable or inaccurate.

NO # 4 ***Time = 00:04***

398

An aircraft squawking 7700 indicates to the ground station that:

a) The aircraft's transceiver is unserviceable.

b) The aircraft is being hijacked.

c) The aircraft is in distress.

d) There is a sick passenger on board.

399

An aircraft squawking 7700 indicates to the ground station that:

a) The aircraft's transceiver is unserviceable.

b) The aircraft is being hijacked.

c) The aircraft is in distress.

d) There is a sick passenger on board.

Distress is defined as:

A condition concerning the attitude of an aircraft when intercepting the localizer during an ILS approach.

A condition concerning the safety of an aircraft or of a person on board, but which does not require immediate assistance.

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

A condition concerning the safety of a person on board or within sight and requiring immediate assistance.

Distress is defined as:

a) A condition concerning the attitude of an aircraft when intercepting the localizer during an ILS approach.

b) A condition concerning the safety of an aircraft or of a person on board, but which does not require immediate assistance.

c) A condition of being threatened by serious and/or imminent danger and requiring immediate assistance.

d) A condition concerning the safety of a person on board or within sight and requiring immediate assistance.

402

An aircraft in distress shall send the following signal by radiotelephony:

PAN PAN, PAN PAN, PAN PAN

DETRESFA,DETRESFA,DETRESFA

MAYDAY, MAYDAY, MAYDAY

URGENCY, URGENCY, URGENCY

403

An aircraft in distress shall send the following signal by radiotelephony:

a) PAN PAN, PAN PAN, PAN PAN

b) DETRESFA,DETRESFA,DETRESFA

C) MAYDAY, MAYDAY, MAYDAY

d) URGENCY, URGENCY, URGENCY

404

The frequency used for the first transmission of a MAYDAY call shall be:

a) The distress frequency 121,5 MHz.

b) The frequency currently in use.

c) Any other international emergency frequency.

d) Any frequency at pilot's discretion.

405

The frequency used for the first transmission of a MAYDAY call shall be:

a) The distress frequency 121,5 MHz.

b) The frequency currently in use.

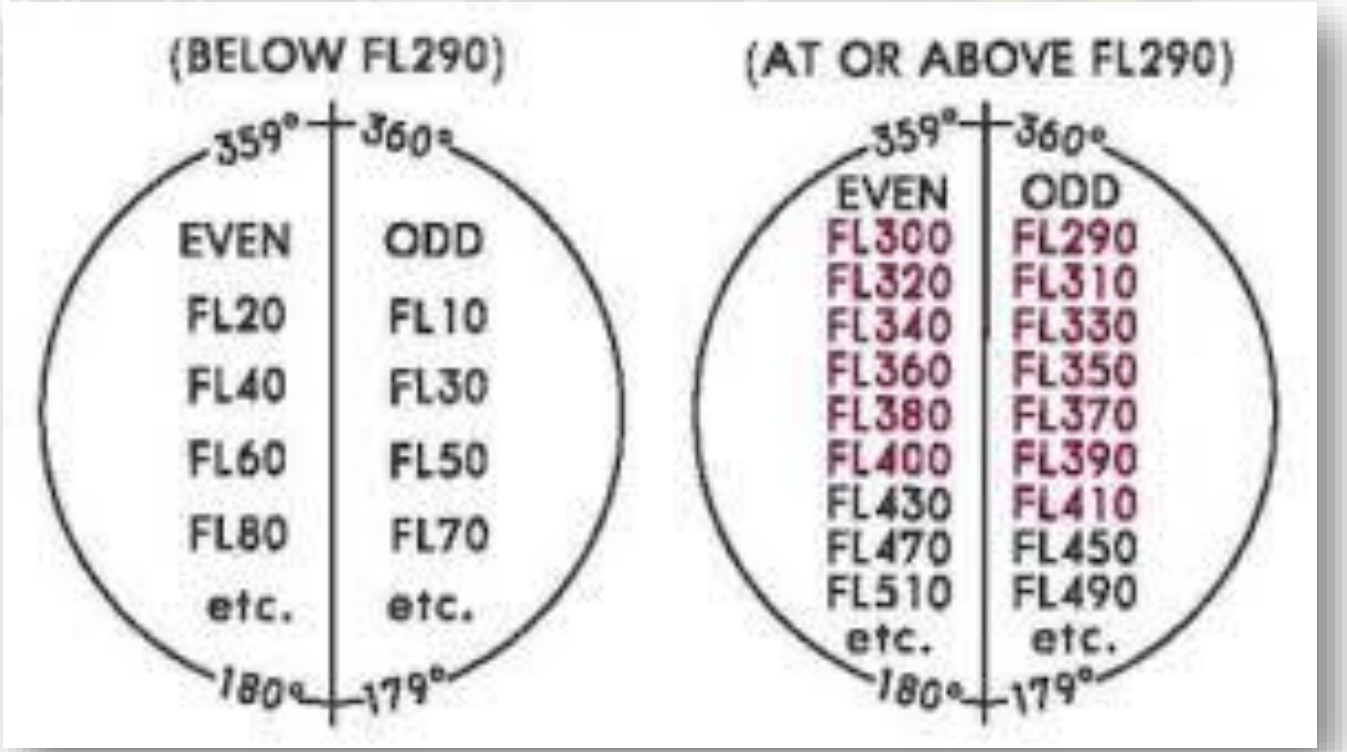
c) Any other international emergency frequency.

d) Any frequency at pilot's discretion.

Semi-circular Flight Level Rules and RVSM

Module objectives

At the end of this module you will be able to analyze the **RVSM/VSM area in aviation** based on standard ICAO regulations.



Time 00:30

ANNEX 2/11

Semi-circular Flight Level Rules and RVSM

In order to apply vertical separation inside CAS, ATC will allocate specific FLs to individual aircraft which may, or may not, comply with the semi-circular rule. However, for planning purposes and outside of CAS, pilots should select the required cruising level (IFR or VFR) from the ICAO table of FLs.From the tables, the semi-circular rules can be derived, which permit the selection of FLs in accordance with aircraft magnetic track. Tracks are specified as being either ‘eastbound' or ‘westbound'. Eastbound tracks are 000°M - 179°M inclusive, and westbound, 180°M - 359°M inclusive. Specific FLs are allocated to VFR and IFR traffic. IFR FLs are whole thousands of feet whereas VFR levels are whole thousands plus 500 ft up to FL285.

ANNEX 2/11

Eastbound levels are defined as ‘odd' and westbound as ‘even' from the first two digits of the FL number.Above 30 000 ft, generally, the vertical separation is doubled and IFR levels are all odd, and VFR levels are even.A special system of FL allocation is applied where reduced vertical separation (RVSM) minima is applied

ANNEX 2/11

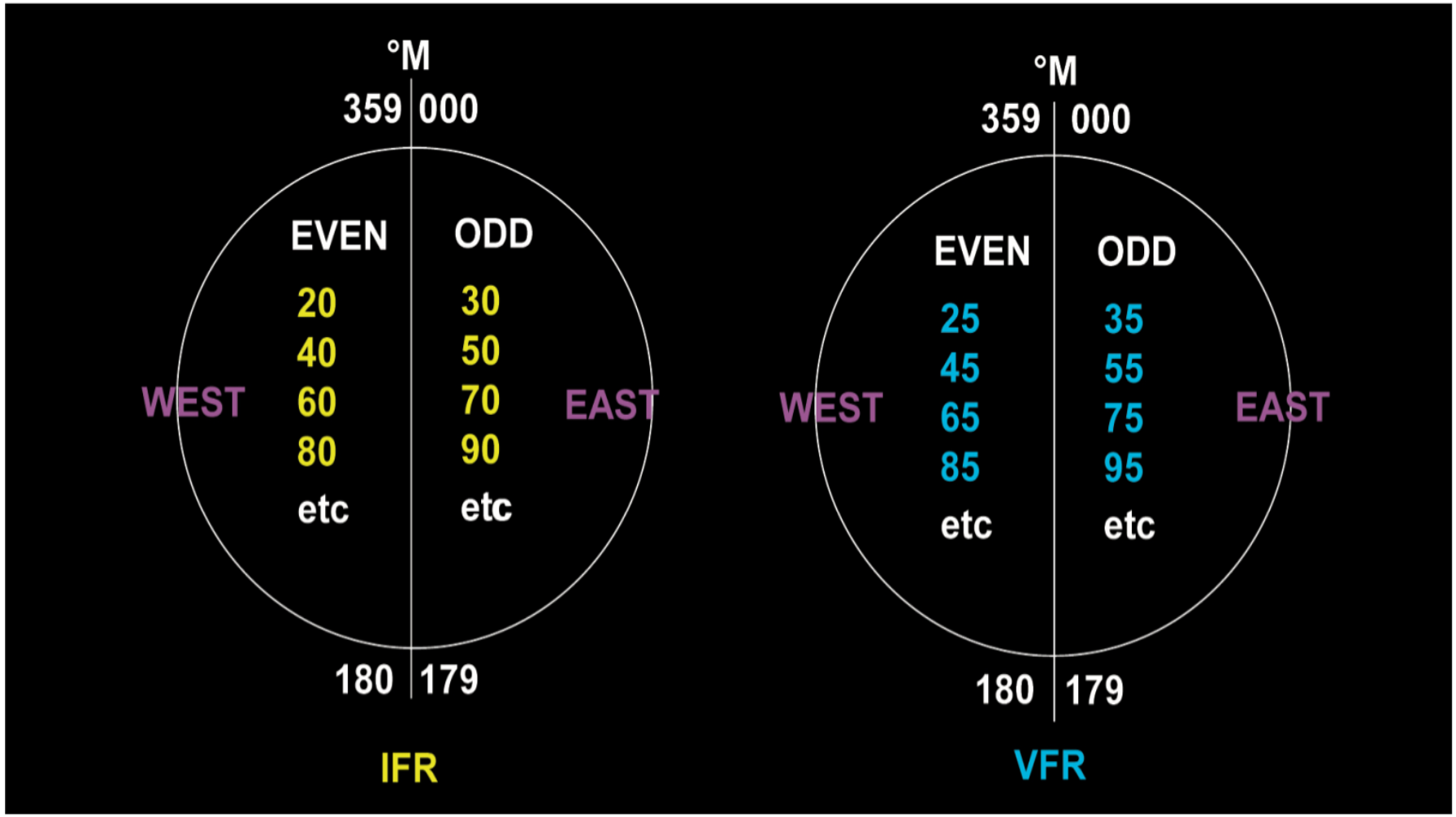


Figure 6.12 IFR and VFR flight levels up to and including FL290

ANNEX 2/11

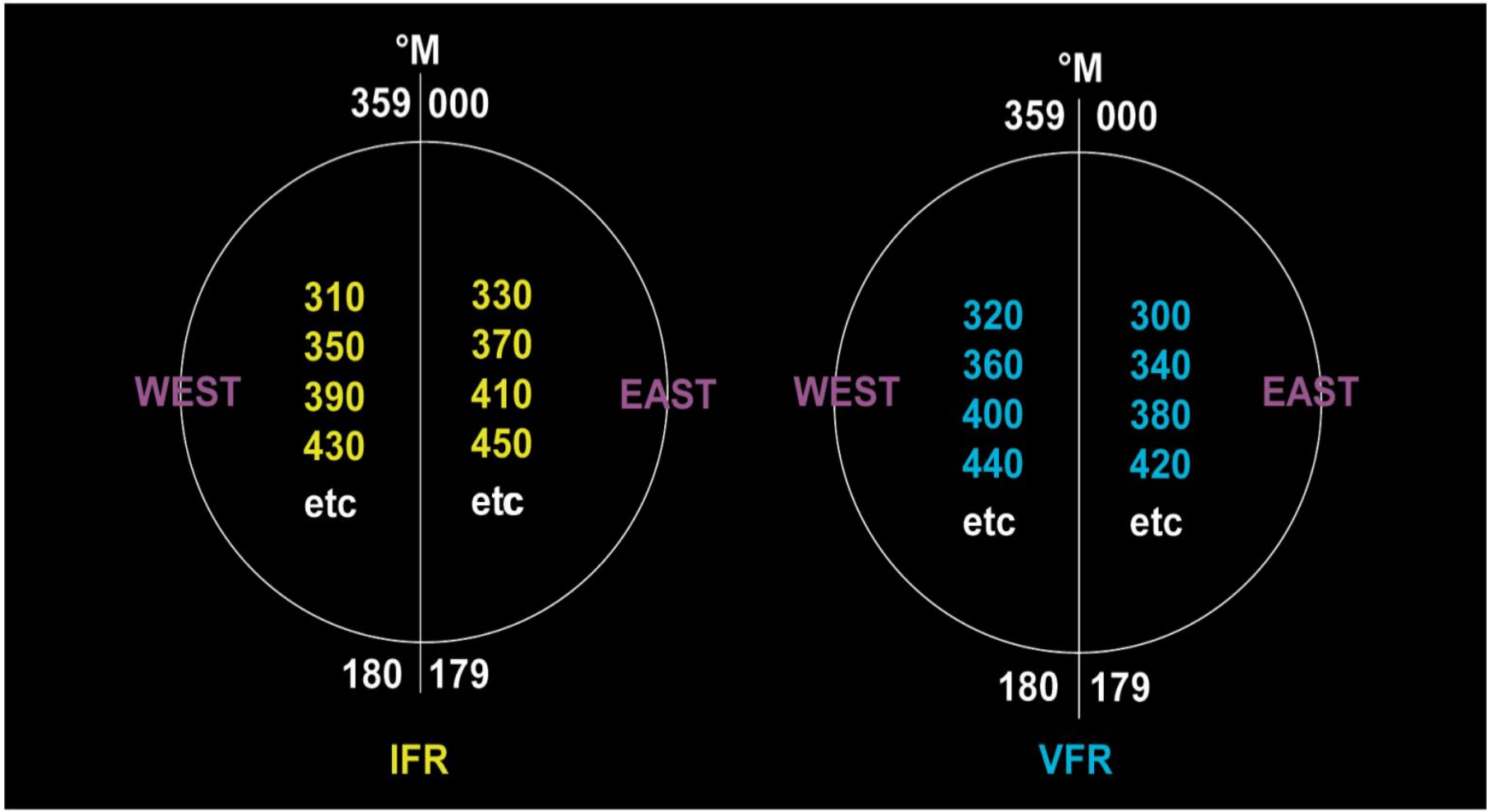


Figure 6.13 IFR and VFR flight levels above FL290

ANNEX 2/11

In order to make more FLs available to turbojet traffic in the cruise, a system has been adopted which prohibits VFR flight (thus making VFR levels available to IFR traffic). In order to achieve this, the separation between IFR levels between FL290 and FL410 inclusive is reduced from 2000 ft to 1000 ft. It is a requirement of aircraft using the RVSM system that they be fitted with A/TCAS and be approved by the airspace authority.Above FL410 the altimeter errors are considered too great to continue the 1000 ft separation.

ANNEX 2/11

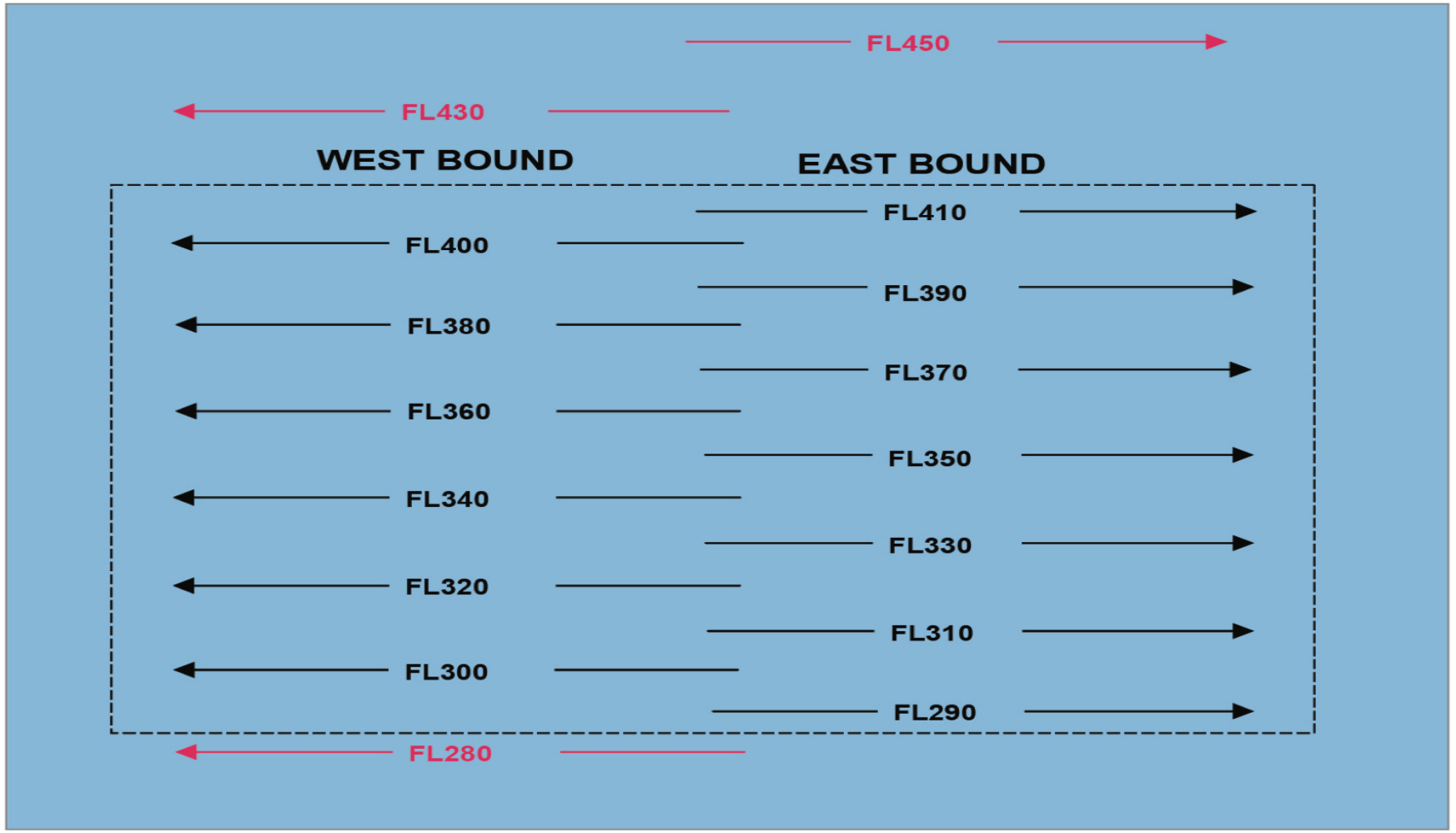


Figure 6.14 Reduced vertical separation minima

DOC 4444

12.3.1.13	***Reduced Vertical Separation Minimum (RVSM) Operations***	
	. . . to ascertain RVSM approval status of an aircraft	a. CONFIRM RVSM APPROVED;
	. . . to report RVSM approved status	b. **AFFIRM RVSM;**
	. . . to report RVSM non-approved status followed by supplementary information	c. **NEGATIVE RVSM** [(*supplementary information, e.g. State Aircraft*)];
	NOTE: See 12.2.4 and 12.2.5 for procedures relating to operations in RVSM airspace by aircraft with non-approved status.	
	. . . to deny ATC clearance into RVSM airspace	d. UNABLE ISSUE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [*or* DESCEND TO, *or* CLIMB TO] (*level*);
	. . . to report when severe turbulence affects the capability of an aircraft to maintain height-keeping requirements for RVSM	e. **UNABLE RVSM DUE TURBULENCE;**
	. . . to report that the equipment of an aircraft has degraded below minimum aviation system performance standards	f. **UNABLE RVSM DUE EQUIPMENT;**

DOC 4444

CIRCUMSTANCES	PHRASEOLOGIES (Pilot Transmissions in Bold Type)
. . . to request an aircraft to provide information as soon as RVSM-approved status has been regained or the pilot is ready to resume RVSM operations	g. REPORT WHEN ABLE TO RESUME RVSM;
. . . to request confirmation that an aircraft has regained RVSM-approved status or a pilot is ready to resume RVSM operations	h. CONFIRM ABLE TO RESUME RVSM;
. . . to report ability to resume RVSM operations after an equipment or weather-related contingency	i. **READY TO RESUME RVSM.**

NO # 4

Time = 00:04

When an aircraft flying on an advisory route with magnetic track of 315 what shall be its assign flight level (non RVSM airspace)?

a) 310

b) 320

c) 330

d) 340

When an aircraft flying on an advisory route with magnetic track of 315 what shall be its assign flight level (non RVSM airspace)?

a) 310

b) 320

c) 330

d) 340

What is the next IFR, flight level above flight level 290, if magnetic track is 105 (RVSM airspace)?

a) 300

b) 310

c) 320

d) 330

What is the next IFR, flight level above flight level 290, if magnetic track is 105 (RVSM airspace)?

a) 300

b) 310

c) 320

d) 330

The first IFR FL above FL 290 on a 020 magnetic track is (RVSM airspace)?

a) 330

b) 310

c) 300

d) 320

The first IFR FL above FL 290 on a 020 magnetic track is (RVSM airspace)?

a) 330

b) 310

c) 300

d) 320

The first west bound FL above FL 280 is (RVSM airspace)?

a) 300

b) 320

c) 290

d) 310

The first west bound FL above FL 280 is (RVSM airspace)?

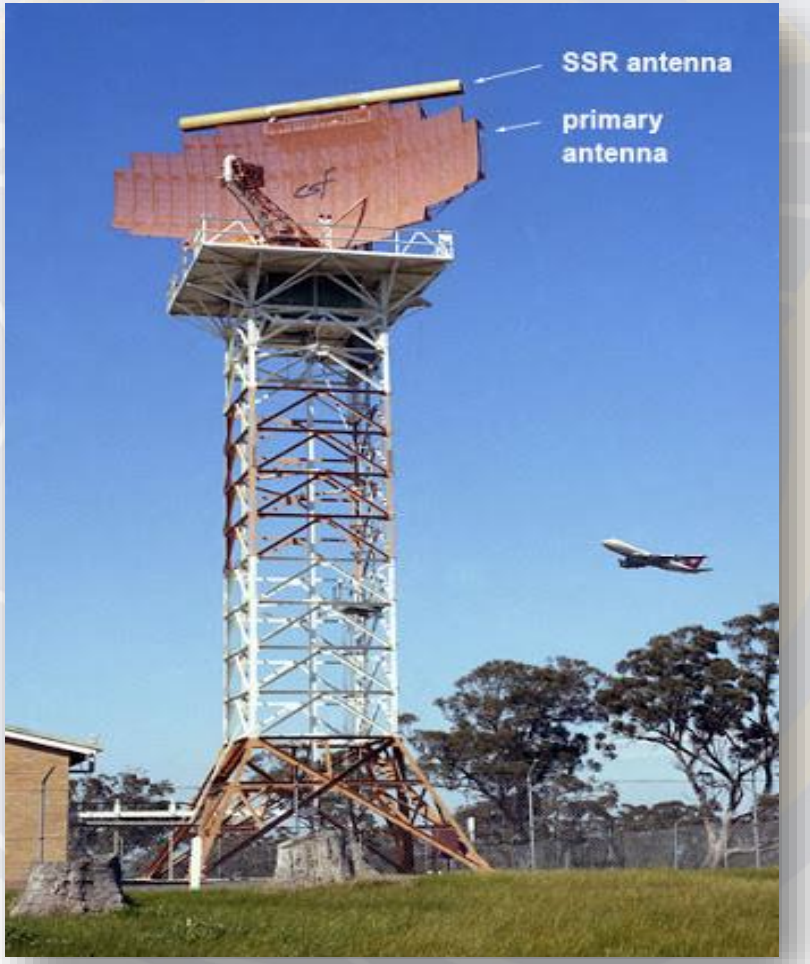
a) 300

b) 320

c) 290

d) 310

Secondary Surveillance Radar



Module objectives

At the end of this module you will be able to explain the **SSR function in aviation** based on ICAO standard regulations.

Time 00:30

ANNEX 2/11

SSR and ACAS

Secondary Surveillance Radar (SSR)

The modern SSR systems have been developed from the equipment used in WWII as a means of identifying ‘friend' from ‘foe' (IFF).The basic system was rather crude effectively giving the ground station a response from the aircraft indicating that the aircraft was fitted with the then highly secret equipment.As only ‘friendly' aircraft had the equipment the radar operator could easily distinguish a friendly aircraft radar response from an enemy response.

ANNEX 2/11

Carriage of Transponders

The airborne equipment is called a transponder (because it transmits a response to an interrogation). PANS OPS requires that where a serviceable transponder is carried in an aircraft, unless ATC instructs otherwise, it will be used at all times. Individual states may specify certain conditions where the carriage and operation of a transponder is mandatory. In either case, the operation of the equipment will be regardless of the provision of an ATC service.

ANNEX 2/11

Mode of Operation

The output codes of the SSR system consist of groups of 4 numbers in the range 0 - 7. The ground station (the interrogator) transmits a coded signal that prompts the aircraft transponder to reply. The overall SSR system has several different 'modes' of operation. ***The response will be mode Alpha with addition of mode Charlie***. In addition, the military have other modes of operation of SSR which overlap with civilian usage. In order to correctly indicate the required response code, the mode as well as code should always be specified. The pilot is to respond with the mode and code.

ANNEX 2/11

Squawk Ident

The transponder has a facility to enable the radar controller to automatically identify the specific radar contact using SSR other than by reliance on the specific code transmission.This facility may be activated by selection of the ‘Ident' feature on the transponder controller in response to a request to “squawk Ident.”Pilots are not to squawk Ident except on instruction from the radar controller.

ANNEX 2/11

Special Codes

Because the airborne equipment can transmit any of ***4096 individual coded responses,*** certain individual responses have been allocated specific meanings. The following special codes indicate:

- ***Emergency*** ***A/7700***
- ***Radio failure*** ***A/7600***
- ***Unlawful interference*** ***A/7500***

ANNEX 2/11

In addition, the following reserved codes have the specific meanings:

- ***A/7000 Conspicuity. This is set when the aircraft is in an area where radar is used to provide ATS, but the pilot is not in receipt of a service (VFR outside CAS)***

- ***A/2000 In the absence of any ATC direction or regional air navigation agreement (or when outside of a radar control/service area). This code is set when eastbound in the NAT region.***

- ***A/0000 Unserviceable transponder. Set as directed by ATC.***

ANNEX 2/11

Altitude Reporting Function (Mode Charlie)

Mode Charlie encodes and transmits the aircraft altitude with reference to SPS (1013 hPa). Whenever the transponder is operating, mode Charlie should also be selected. At some point during the initial communications with ATC, the pilot will be requested to "say aircraft level for Charlie." The pilot should report the aircraft level information accurate to the nearest full 100 ft. From this, the ATCO will determine the accuracy of mode Charlie data. If the mode Charlie data is ***within +/-300 ft of the stated level,*** mode Charlie is deemed to be accurate.

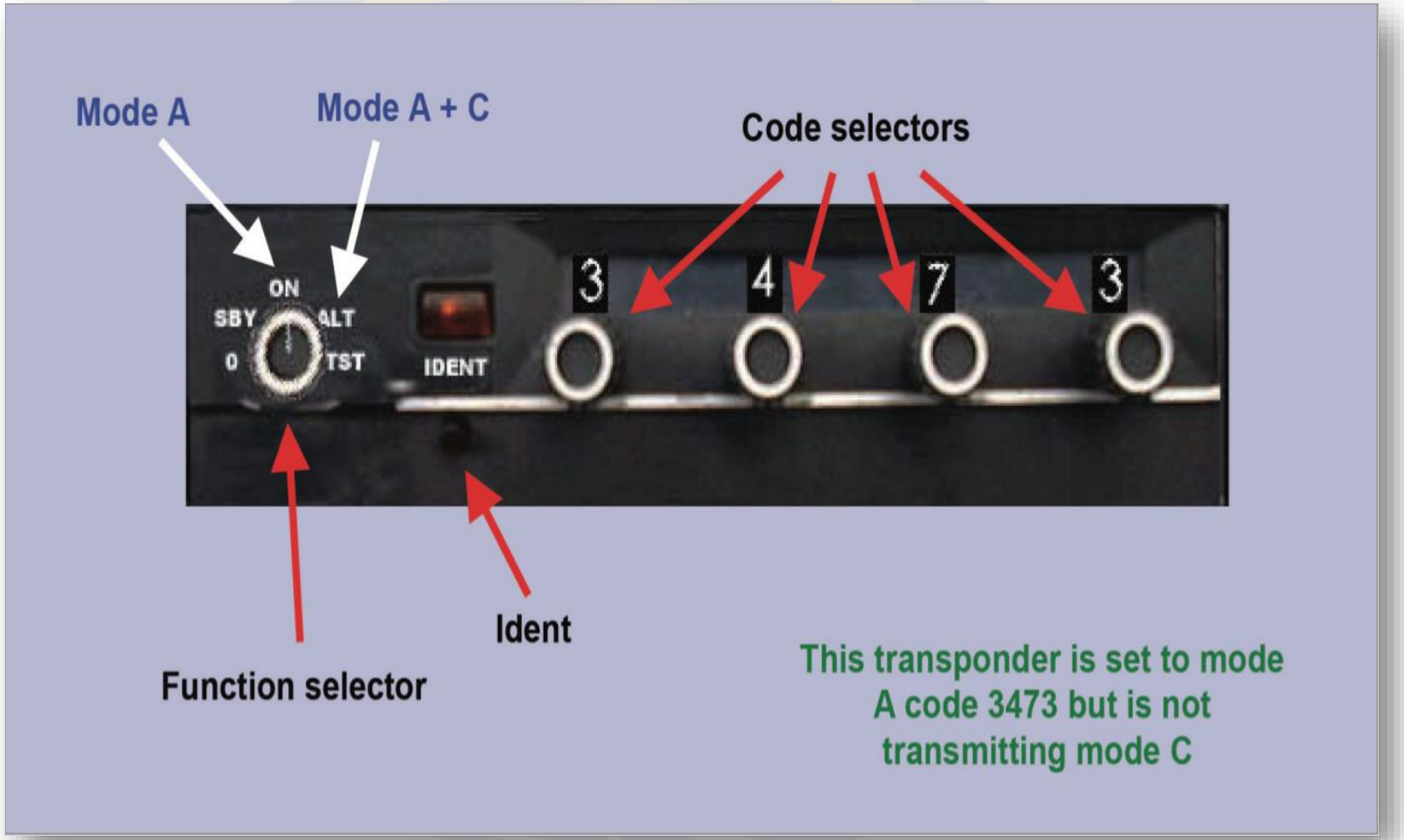
ANNEX 2/11

For aircraft to be visible to a TCAS equipped aircraft they must have a minimum of a Mode "A" Transponder. ***If the transponder is switched off, or is unserviceable, the intruding aircraft are invisible to the TCAS equipment and a collision risk exists.*** Mode A transponders transmit no height information and therefore the information available to the TCAS equipment is two dimensional only and therefore can only give TAs.

Mode "C" Transponder equipped intruders broadcast height information to the TCAS equipment and the system becomes three dimensional and can now give both TAs and RAs.

Mode "S" Transponder TCAS equipped intruders as well as broadcasting height information allow a discrete data link to be established between them. This data link will allow avoidance maneuvers to be mutually resolved.

ANNEX 2/11



Pedram shirazi

ANNEX 2/11

Transponder Failure

The failure of a transponder in the air will adversely affect the quality of the ATC service provided.Whilst every effort will be made to permit the flight to continue to the destination in accordance with the filed FP, it may be that ATC clearances may be restricted. If a transponder fails before departure and it cannot be rectified, the pilot is to:

ANNEX 2/11

Inform ATS as soon as possible, preferably before the submission of the FP.

- ***Put 'N' in item 10 for the FP form.***
- ***Comply with the published procedures for seeking exemption from the requirements for the mandatory carriage of a transponders.***
- ***If required by the ATS authority, proceed directly to the nearest suitable aerodrome where the transponder can be repaired.***

ANNEX 2/11

Airborne Collision Avoidance System (ACAS)

Basically, the system uses the redundant capacity of the SSR system to determine the proximity of another aircraft which is operating its SSR transponder. ***In areas where RVSM is applied, the use of ACAS is mandatory and operators are required to ensure compliance with the requirement.***

ACAS is to be used by pilots in the avoidance of potential collisions, the enhancement of situational awareness, and the active search for (and visual acquisition of) conflicting traffic. It must be understood by pilots that the use of and the exploitation of ACAS alerts and the procedures applicable, do not relieve the pilot of the basic responsibility for the safety of the aeroplane. In all cases, the pilot will be expected to exercise his/her best judgment and full authority in choosing the best course of action to be taken.

ANNEX 2/11

Response to ACAS Alerts

ACAS generated alerts consist of ***Traffic Advisories (TAs) and Resolution Advisories (RAs)***. A TA is intended to alert the pilot to the possibility of an RA being generated. As such, pilots are not to maneuver the aircraft in response to a TA only. ***If an RA is generated, the pilot is to respond immediately unless in doing so the safety of the aeroplane would be jeopardized.***

In ***any case, stall warning, wind shear and GPWS alerts will have priority over ACAS***.Pilots must be aware that visually acquired traffic may not be the cause of an RA and visual perception of an encounter may be misleading especially at night.

ANNEX 2/11

Conflict

Should there be a conflict of Resolution Advisories between the aircraft, ***pilots must follow the RA and the equipment should offer a Reversal Advisory.***

As soon as would be permitted by the workload of the flight deck crew, ATC should be notified of the RA and the direction of any deviation from the current flight plan. Once the conflict is resolved, the aircraft should be promptly returned to the requirements of the current FP and again, ATC informed. Under some circumstance, it is possible that ATC issues instructions that are unknowingly contrary to ACAS RAs. It is ***vitally important that ATC is notified when an ATC instruction or clearance is not being followed because it conflicts with an ACAS RA.***

ANNEX 2/11

Disregarding RA

RAs may be disregarded only when the pilot visually identifies the potentially conflicting traffic and decides no deviation from the current flight path is needed. Nevertheless ATC must be informed in these circumstances.

Determination of Aircraft Level using Mode C

- ***ICAO defines the standards for level determination using Mode C (altitude reporting function) as generally +/- 300 ft. However, most contracting states employ a higher standard, +/- 200 ft. The specific ICAO standards are:***

ANNEX 2/11

1 OPERATION OF TRANSPONDERS

1.1 GENERAL

1.1.1 When an aircraft carries a serviceable transponder, the pilot shall operate the transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where secondary surveillance radar (SSR) is used for ATS purposes.

1.1.3 When the aircraft carries serviceable Mode C equipment, the pilot shall continuously operate this mode, unless otherwise directed by ATC.

1.1.5 When requested by ATC to "CONFIRM SQUAWK [code]" the pilot shall:

a. verify the Mode A code setting on the transponder;

b. reselect the assigned code if necessary; and

c. confirm to ATC the setting displayed on the controls of the transponder.

1.1.6 Pilots shall not SQUAWK IDENT unless requested by ATC.

1.2 USE OF MODE C

Whenever Mode C is operated, pilots shall, in air-ground voice communications where level information is required, give such information by stating their level to the nearest full 30 m or 100 ft as indicated on the pilot's altimeter.

1.3 USE OF MODE S

Pilots of aircraft equipped with Mode S having an aircraft identification feature shall set the aircraft identification in the transponder. This setting shall correspond to the aircraft identification specified in item 7 of the ICAO flight plan, or, if no flight plan has been filed, the aircraft registration.

1.7 TRANSPONDER FAILURE PROCEDURES WHEN THE CARRIAGE OF A FUNCTIONING TRANSPONDER IS MANDATORY

1.7.1 In case of a transponder failure after departure, ATC units shall attempt to provide for continuation of the flight to the destination aerodrome in accordance with the flight plan. Pilots may, however, expect to comply with specific restrictions.

2 PHRASEOLOGY

2.2 PHRASEOLOGY USED BY PILOTS

Pilots shall read back the mode and code to be set when they acknowledge mode/code setting instructions.

ANNEX 2/11

Although ICAO named it ACAS, the principle manufacturer in the US referred to its system as Traffic alert and Collision Avoidance System (TCAS), and this name is now a widely accepted alternative. The system is designed to provide an additional margin of safety and keep commercial aircraft clear of conflict, independently of Air Traffic Control. An aircraft must carry a transponder and have the facility to interrogate other aircraft transponders. Presently there are four systems in use, I, II, III and IV, each with increasing levels of protection

ANNEX 2/11

TCAS I

is a first generation collision avoidance system and simply warns the crew of other traffic in the vicinity of their aircraft. It will detect and display range and approximate relative bearing. If the TCAS display aircraft and the intruder are carrying Mode C, relative altitude will also be displayed. It encourages flight crew to look for the conflicting traffic by ***generating visual and aural warnings - TRAFFIC ADVISORIES (TAs):***

"Traffic, Traffic".

It does not give any resolution advisory information, i.e. a course of action to follow.

ANNEX 2/11

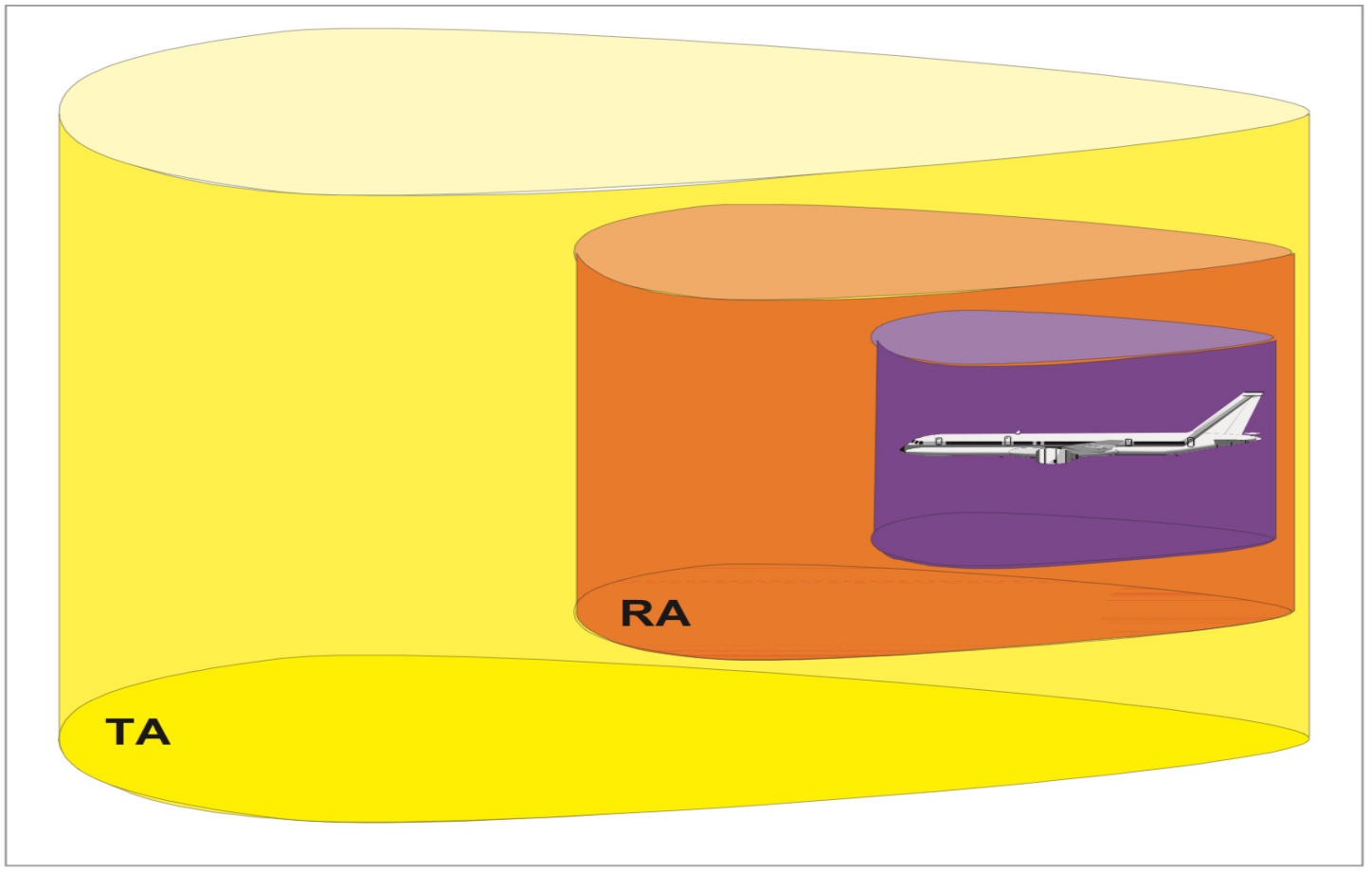
TCAS II

TCAS II detects intruders in the TCAS aircraft's vicinity, assesses the collision risk and presents warnings to the crew in the form of TAs and Resolution Advisories (RAs)

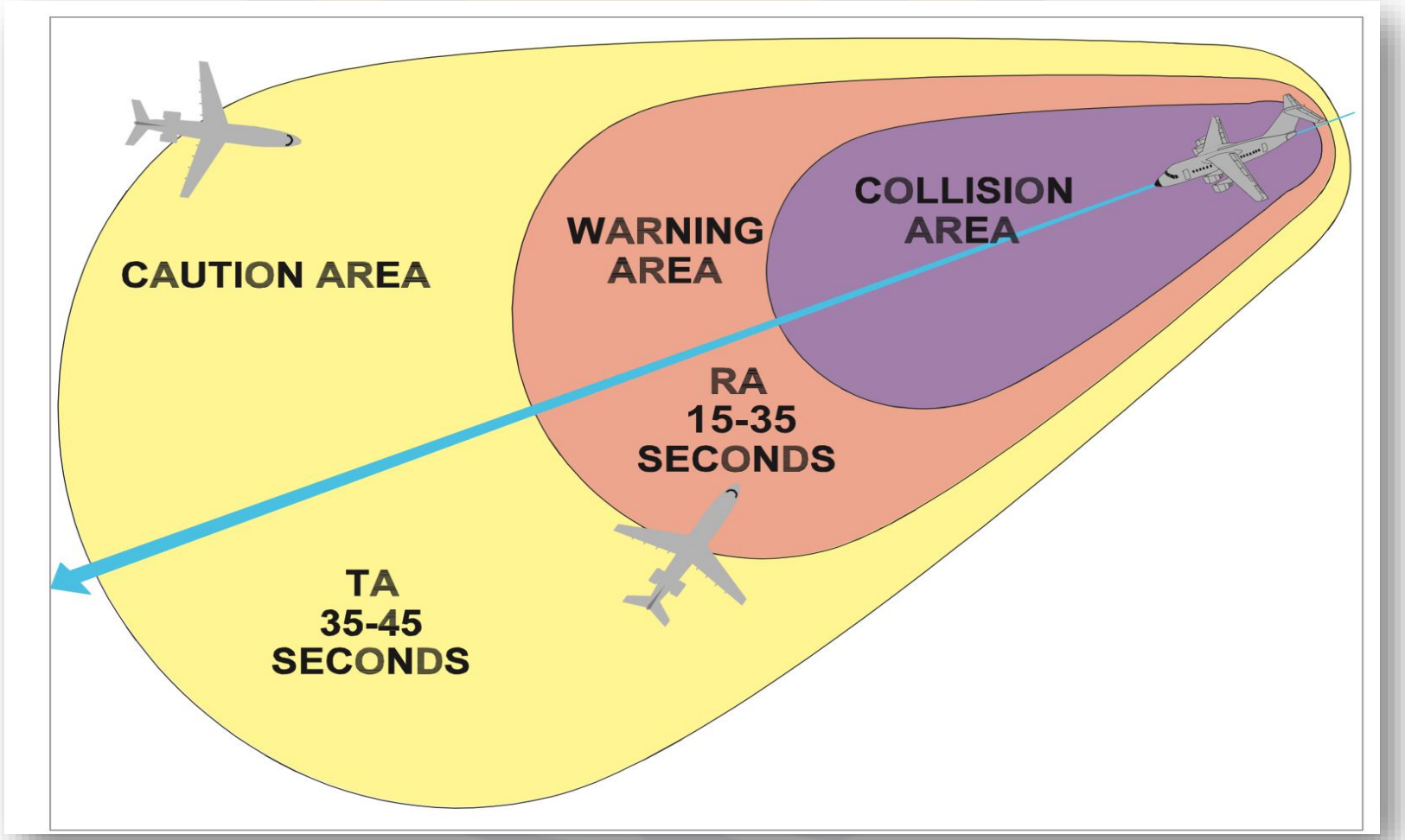
e.g.“Climb” “Increase Climb” “Descend” “Increase Descent” “Monitor Vertical Speed” “Decrease Climb” “Decrease Descent”Thus,

RAs offer maneuvering advice in the vertical plane to resolve conflict. If your aircraft and the intruder **both have Mode S data link transponders** the system will coordinate the RAs to provide complementary vertical avoidance instructions.

ANNEX 2/11



ANNEX 2/11


CAUTION AREA
WARNING AREA
COLLISION AREA
RA
15-35
SECONDS
TA
35-45
SECONDS

ANNEX 2/11

Synthetic Voice Prioritization

Modern aircraft use a synthetic voice to give warning advice to the crew. The voice is used for various systems including windshear detection, ground proximity warnings, including height call-outs, and TCAS. The synthetic voice is prioritized as follows:

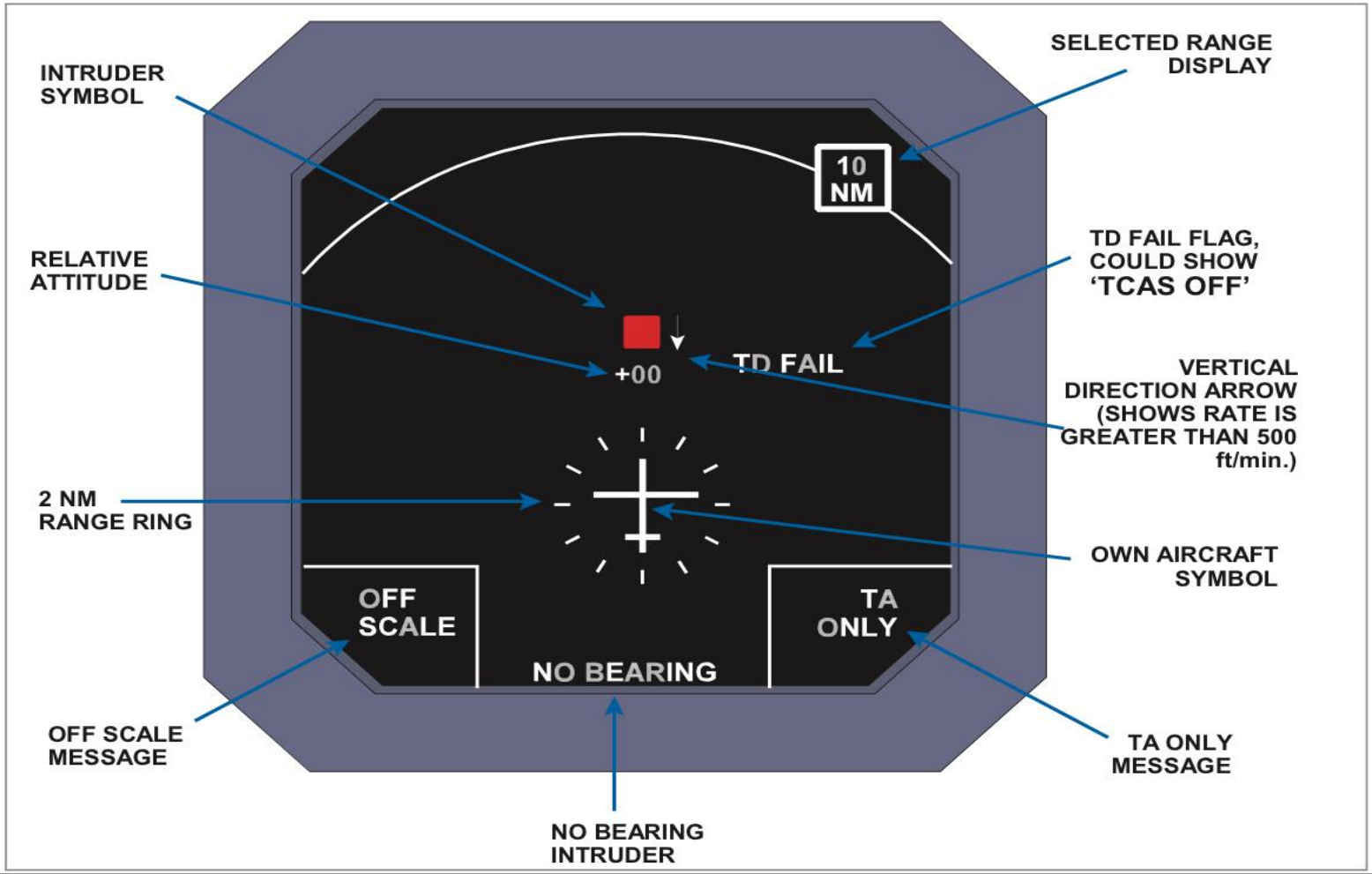
- ***Stall*** Identification/Stall Prevention. (Stick-shake/Stick-push). The synthetic voice is inhibited during stick shake/stick push operation.

- ***Windshear*** ,The detection of performance decreasing windshear takes first priority with the synthetic voice, inhibiting both GPWS and TCAS warnings.

- ***Ground Proximity Warning System (GPWS),*** Detection of approach to terrain takes priority over TCAS announcements.

ANNEX 2/11

Dedicated Plan Position Indicator



ANNEX 2/11

Electronic Vertical Speed Indicator

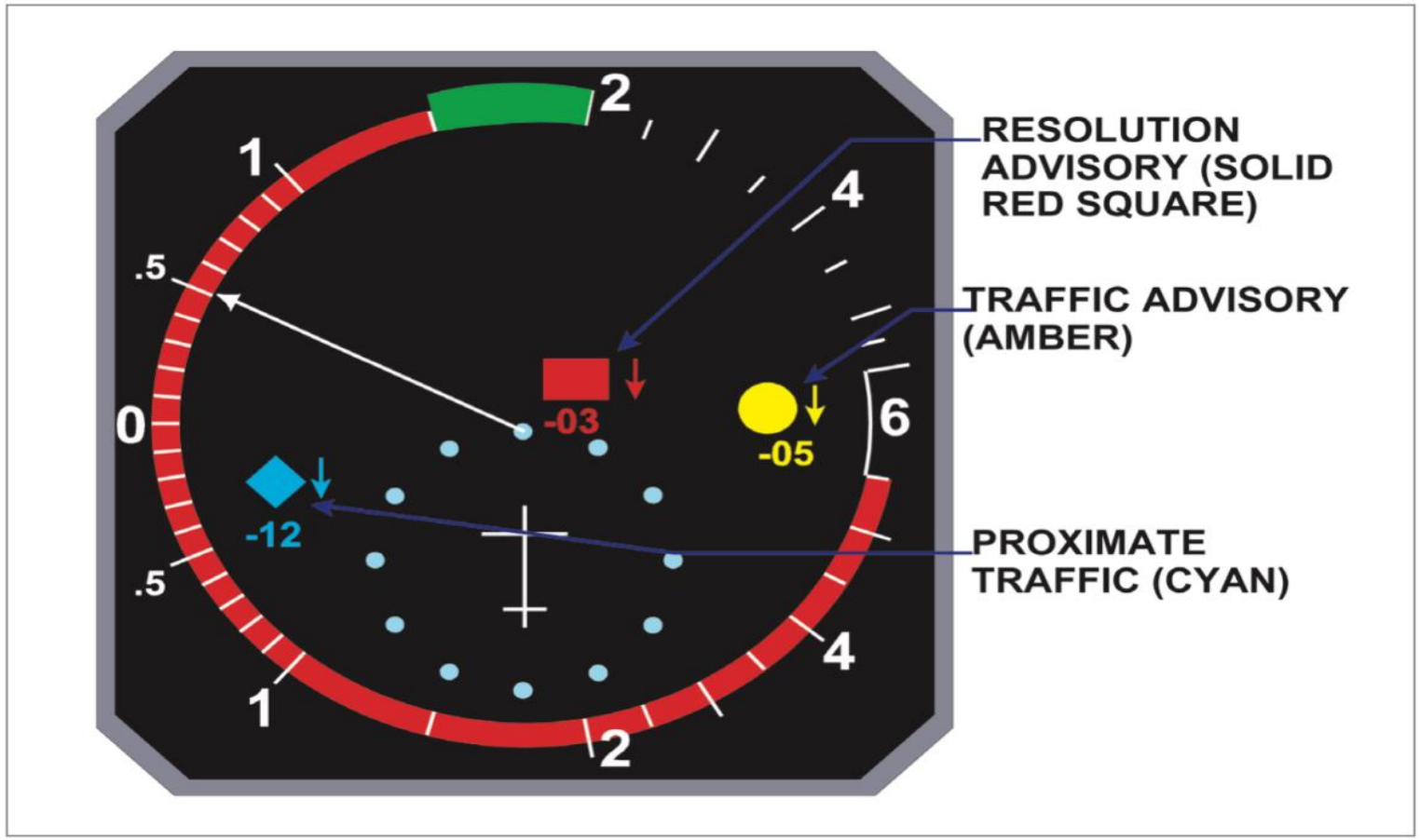


Figure 35.7 Electronic VSI

DOC 4444

. . . after a flight crew starts to deviate from any ATC clearance or instruction to comply with an ACAS resolution advisory (pilot and controller interchange)	r. **TCAS RA** s. ROGER;
. . . after the response to an ACAS RA is completed and a return to the ATC clearance or instruction is initiated (pilot and controller interchange)	t. **CLEAR OF CONFLICT, RETURNING TO** (*assigned clearance*); u. ROGER (*or alternative instructions*);
. . . after the response to an ACAS RA is completed and the assigned ATC clearance or instruction has been resumed (Pilot and controller interchange)	v. **CLEAR OF CONFLICT** (*assigned clearance*), **RESUMED;** w. ROGER (*or alternative instructions*);

NO # 4

Time = 00:04

Based on what facility the ACAS operate:

a) NAVAIDS

b) SSR

c) SSR transponder

d) Communication

Based on what facility the ACAS operate:

a) NAVAIDS

b) SSR

c) SSR transponder

d) Communication

What SSR code shall be selected by hijacked airplane?

a) 7700

b) 7600

c) 7500

d) 7400

What SSR code shall be selected by hijacked airplane?

a) 7700

b) 7600

c) 7500

d) 7400

When SSR must be switch on?

a) Prior takeoff

b) After takeoff.

c) After landing

d) Assign by ATSU.

When SSR must be switch on?

a) Prior takeoff

b) After takeoff.

c) After landing

d) Assign by ATSU.

Which of the following transponder codes is not a valid SSR mode A squawk?

a) 0000
b) 5678
c) 7700
d) 7777

Which of the following transponder codes is not a valid SSR mode A squawk?

a) 0000

b) 5678

c) 7700

d) 7777

Control of an Aircraft

Module objectives

At the end of this module you will be able to explain the types of control the A/C based on ICAO standard regulations.

Time 00:30

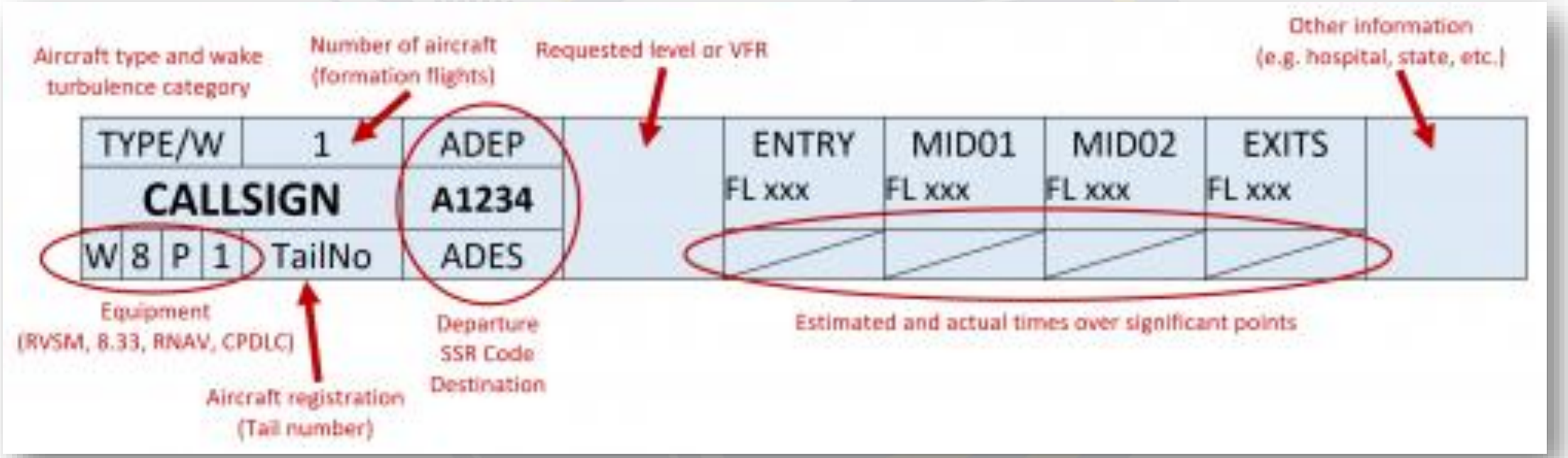
DOC 4444

Control of Aircraft

Flight Strips

Within the ATC centers, the progress of a flight is tracked with a paper system known as a flight strip. The strip is originated from the ATS Flight Plan and in theory, is transferred from ATCO to ATCO and from centre to centre.Clearly, the progress of the flight strips may not actually be ‘physical’ but will require a new strip to be compiled at centre ‘B’ from information passed by telephone from centre ‘A’.

DOC 4444


Aircraft type and wake turbulence category
Number of aircraft (formation flights)
Requested level or VFR
Other information (e.g. hospital, state, etc.)
TYPE/W
1
ADEP
CALLSIGN
A1234
W 8 P 1
TailNo
ADES
ENTRY
MID01
MID02
EXITS
FL xxx
FL xxx
FL xxx
FL xxx
Equipment (RVSM, 8.33, RNAV, CPDLC)
Aircraft registration (Tail number)
Departure SSR Code Destination
Estimated and actual times over significant points

DOC 4444

Communications

Ever since aircraft have been able to carry radios, they have been used for air to ground communications.The present day ATC system relies on VHF two-way communications to make the system work.Over the ocean areas and remote land areas, HF is used together with the ability to maintain a radio watch using the SELCAL system which relieves the pilot of having to actually listen to the radio

DOC 4444

Radar systems cover long range surveillance used in area control (en route traffic), terminal aerodrome radar (TAR) used in the vicinity of an aerodrome or aerodromes to provide a service to arriving and departing traffic, and surface movement radar at an aerodrome to provide the aerodrome controller with information in poor visibility or at night.

Radar systems cover long range surveillance used in area control (en route traffic), terminal aerodrome radar (TAR) used in the vicinity of an aerodrome or aerodromes to provide a service to arriving and departing traffic, and surface movement radar at an aerodrome to provide the aerodrome controller with information in poor visibility or at night.

DOC 4444

Figure 17.1 ATC radar head at Clee Hill, Shropshire

Figure 17.2 ATC radar head at London Heathrow

DOC 4444

Radar Services

At its most basic, radar is used to derive information for the updating of information displayed on the flight strips.In this manner, it is augmenting a procedural system. If, however, the radar response from a specific aircraft can be individually determined (identified) then the provision of separation from other radar contacts (aircraft) can be achieved.In this manner, the radar derived information is used directly to provide separation to a much greater degree of accuracy. ***The types of radar service are:***

DOC 4444

- *Radar Control for controlled en route aircraft*
- *Approach Radar Control for arriving and departing controlled traffic*
- *Radar vectoring: the provision of navigation instructions to an aircraft to achieve a specific aim e.g. positioning to intercept the ILS localizer.*
- *PAR and SRA as instrument approach systems*

DOC 4444

When identifying a radar contact as a specific aircraft, the radar controller must tell the pilot how the identification was achieved. The controller will use the phrase ‘radar contact' to indicate that the aircraft has been identified and that until further advised, a service will be provided - ***“G-CD radar contact 2 NM west of Yazd”.*** This position should agree with the position the pilot thinks the aircraft is at. ***If significantly different, the pilot must inform the controller in the event that the controller has misidentified the aircraft.***

DOC 4444

Radar Service

Commencement

After identification, the pilot is to be told what type of radar service is to be provided and what the objective is - "IZG 4026 radar contact 6 NM south of BOXAM, radar control, expect radar vectors for ILS approach runway 29L"

DOC 4444

Termination

When an aircraft reaches the limit of radar cover or the edge of a radar vectoring area, or the aim of the service has been achieved, the pilot will be advised that the service is terminated, given position information and instructions/advice how to continue.

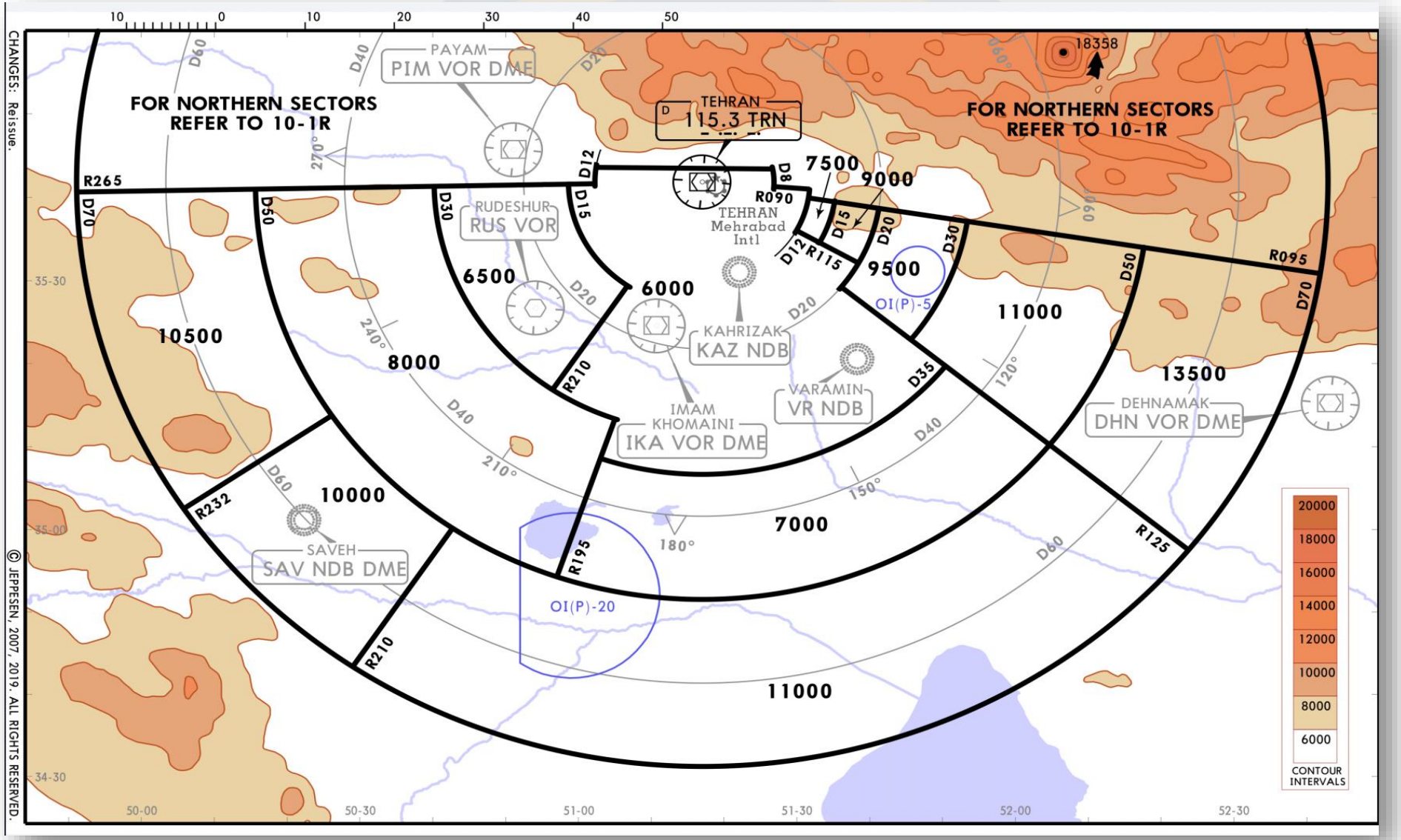
For instance: “IZG 4026 radar service terminated, presently 10 NM east of Mehrabad, contact Mehrabad Tower 118.1”

DOC 4444

Radar Vectoring

Radar vectoring is the passing of navigation information to a pilot by a radar controller to achieve the aircraft flying a required track.This may be simply to avoid weather or maneuver around another aircraft radar contact.Once the aim of the vectoring has been achieved, the pilot will be told to “Resume own navigation” giving the pilot the aircraft's position and any appropriate instructions. This implies that the radar vectoring has ended. It may be provided to position the aircraft such that a straight-in instrument approach can be achieved. In any event, radar vectoring for approach control purposes is only carried out inside a radar vectoring area (RVA). Obstacles are marked on an RVA chart.

DOC 4444


FOR NORTHERN SECTORS
REFER TO 10-1R
FOR NORTHERN SECTORS
REFER TO 10-1R
PAYAM
PIM VOR DME
TEHRAN
115.3 TRN
RUDESHUR
RUS VOR
TEHRAN
Mehrabad
Intl
KAHRIZAK
KAZ NDB
IMAM
KHOMAINI
IKA VOR DME
VARAMIN
VR NDB
DEHNAMAK
DHN VOR DME
SAVEH
SAV NDB DME
OI(P)-5
OI(P)-20
18358
7500
9000
9500
6500
6000
10500
8000
11000
13500
10000
7000
11000
R265
R090
R095
R115
R210
R232
R195
R125
D70
D50
D30
D20
D15
D12
D8
D35
D60
D40
270°
240°
210°
180°
150°
120°
090°
060°
20000
18000
16000
14000
12000
10000
8000
6000
CONTOUR INTERVALS
CHANGES: Reissue.
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Vectoring Procedure

Radar vectoring will not begin until the aircraft radar contact is determined to be within the RVA. The RVA will be displayed on the radar display in the form of a video map electronically generated within the radar display software. Because of possible inaccuracies ('slippage') aircraft will not be radar vectored closer to the edge of the RVA than half the applicable radar separation standard or 2.5 NM whichever is greater. ***Normally, radar vectoring will begin at a fix at MSA.It may, however, begin at any time after the aircraft has been identified on radar and the aircraft altitude is known to the ATCO.*** The RVA chart displays the obstacles in the area together with the elevation of the terrain.

DOC 4444

The radar controller will pass magnetic headings to the pilot to steer to make good a desired track over the ground.The pilot will fly the heading and the controller will adjust the heading for the wind. The aircraft will not be given clearance to descend below the RVA safe altitude (highest obstacle in RVA plus MOC rounded up) until established on the ILS localizer course or on the final approach track, or the pilot reports that he/she is continuing the approach visually.Throughout the procedure, the radar controller must be aware of the elevation of the terrain and the aircraft configuration to avoid spurious GPWS warnings.

DOC 4444

ILS Vectoring Requirements

Where the purpose of vectoring is to position the aircraft at a point where localizer capture is achieved, the closing heading to the ***centre line of the ILS localizer is 45°***

DOC 4444

Radar Controlled Approach

Radar may be used to provide a precision or non-precision approach to a runway. In both cases, the radar controller provides radar derived information to the pilot to permit the aircraft to be flown along a predefined track and, in the case of PAR, a defined glide path.For NPA, a recommended vertical profile (virtual glide path) is published. If radar contact is lost for any significant ***period during the last 2 NM of a radar approach, the pilot will be advised to carry out a missed approach procedure.***

DOC 4444

Use of the Runway

The aerodrome controller will normally decide which runway will be used for take-off and landing operations. ***The 'runway-in-use'*** will determine the direction for instrument approaches and the direction for the visual circuit. Normally, the wind direction will be the deciding factor; however, in calm or light wind conditions, another direction may be preferable for ATC, airspace restriction or noise abatement requirements.

DOC 4444

Departing Aircraft

Aircraft waiting for take-off will be held at a runway holding point on the taxiway at a safe distance from the centre line of the runway.It is normal procedure for aircraft to be given a ‘take-off immediate' clearance.This requires the pilot to taxi the aircraft on to the runway and without stopping, line the aircraft on the centre line and then apply the necessary power to commence the take-off run.A succeeding aircraft may be permitted to enter the runway (given the instruction ‘line up and wait') as soon as the preceding aircraft has commenced the take-off run.A succeeding aircraft will not be given clearance to take off until the preceding aircraft has either crossed the upwind threshold, or has commenced a turn away from the runway direction.

DOC 4444

Arriving Aircraft

When established on final approach, an arriving aircraft will be given clearance to land if the runway is available. For an arriving instrument approach, the ***clearance to land will normally be given at about 4 NM from the threshold and certainly no later than 2 NM from the threshold.*** If the pilot of an arriving instrument approach has not been given a landing clearance, the missed approach procedure is to be flown commencing at 2 NM.Once the landing run is complete and the pilot has turned the aircraft onto the taxiway, he/she is required to make a report to the aerodrome controller to confirm that the aircraft has ***'vacated the runway'***. This is to be made when all of the aircraft has passed the appropriate holding point.

DOC 4444

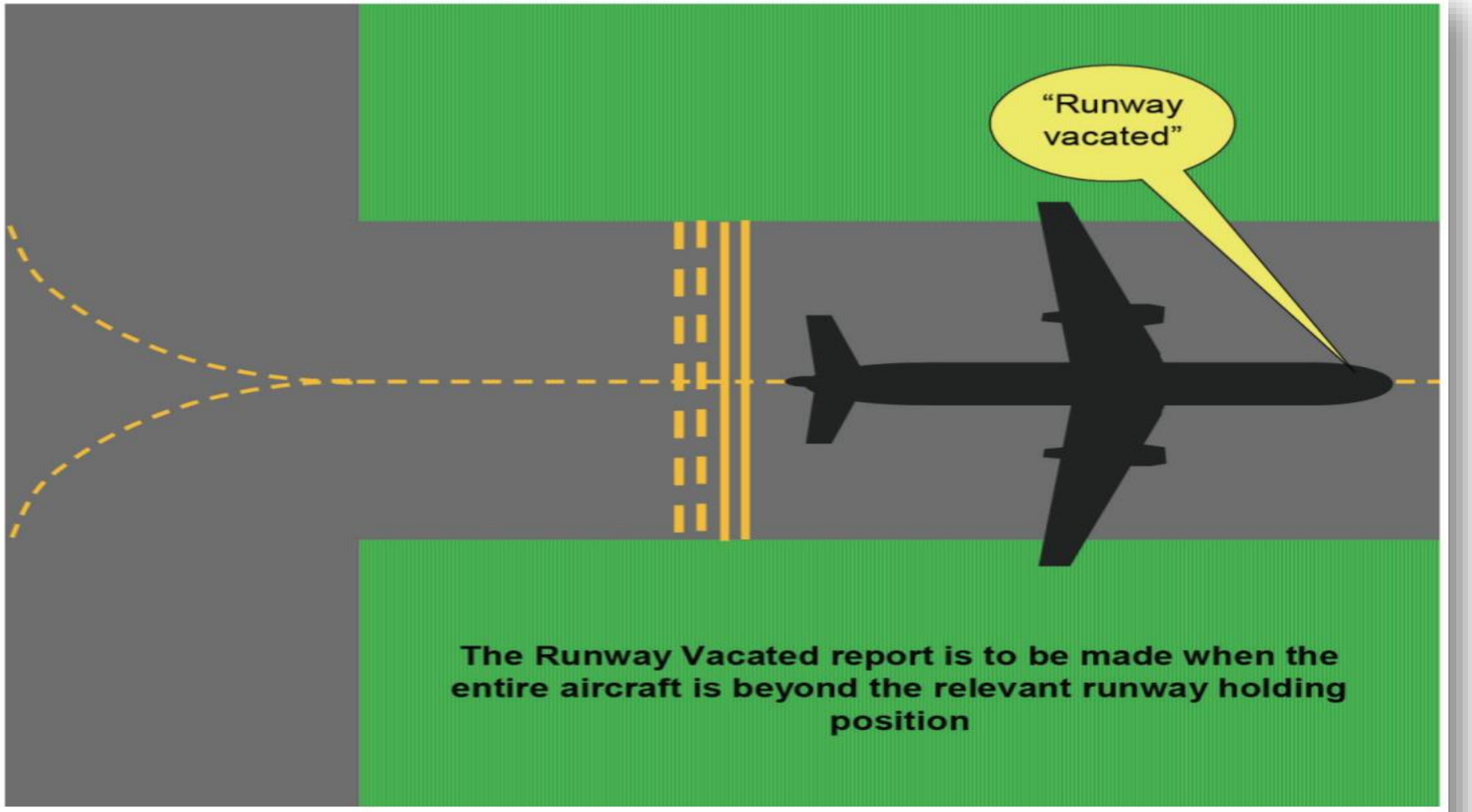


Figure 17.6 Runway vacated report

DOC 4444

"Land After" Clearance

Under certain conditions, a pilot may be given a provisional clearance to "land after the preceding aircraft".This will be done to increase the utilization of the runway at peak times so that aircraft may arrive at 1 minute intervals. In this case, the pilot of the second aircraft will decide if the preceding aircraft will be clear of the runway at the time he/she lands and that there is sufficient separation between the aircraft throughout the maneuver. Throughout the landing, the pilot of the following aircraft must be able to see the previous aircraft and is responsible for maintaining separation.In this case, the pilot of the following aircraft will apply the appropriate visual separation which may be less than the procedural separation.

DOC 4444

The provision of ***'fast turn off lanes' or 'rapid exit taxiways'*** on aerodromes enhances this option. The necessary conditions are:

- ***Only permitted during daylight;***
- ***The pilot of the second aircraft must be able to see the preceding aircraft throughout the maneuver;***
- ***The runway must be dry (braking action good);***
- ***The pilot and operator of the aircraft concerned must be aware that the runway occupancy time is limited to 50 seconds;***
- ***The ATCO must be able to see the entire length of the landing runway.***

DOC 4444

Information to Departing and Arriving Aircraft

The aerodrome controller is required to ensure that pilots have adequate and accurate aerodrome information prior to using the aerodrome. Where wind information is passed, the direction is to be in degrees magnetic so that the pilot can relate this directly to the aircraft compass.

DOC 4444

Prior to Taxi

- *Before taxiing a pilot is to be told:*
- *What runway is in use;*
- *The surface wind direction and speed;*
- *The aerodrome QNH;*
- *The air temperature for the runway to be used (for turbine engine aircraft only);*
- *The visibility in the direction of take-off or the RVR;*
- *The correct time.*

DOC 4444

Prior to Take-off

The following is passed to a pilot prior to take-off:

- ***Any significant changes in wind conditions, air temperature, visibility or RVR***
- ***Significant meteorological conditions in the take-off and climb-out areas (unless the pilot has already been informed)***

DOC 4444

Prior to Entering the Traffic Pattern

Before entering the traffic pattern or commencing an approach to land, a pilot is to be provided with the following information:

The runway to be used;

The surface wind direction and speed;

The aerodrome QNH;

DOC 4444

Departing Aircraft

When the control of traffic is based on an air traffic control clearances, the clearance is to specify:

- ***Direction of take-off and turn after take-off,***
- ***Track to be made good before proceeding on desired heading,***
- ***Level to maintain before continuing climb to assigned cruising level,***
- ***Time, point and/or rate at which level change shall be made,***
- ***Any other necessary maneuver consistent with the safe operation of the aircraft.***

DOC 4444

Delays

In order to avoid excessive holding at the destination, aircraft may be held at the departure aerodrome prior to take-off. ATC is required to advise operators (or their nominated representative) of substantial delays and in any case where the delay is ***expected to exceed 30 minutes.***

Pedram shirazi

DOC 4444

Meteorological information

Information regarding significant changes in the meteorological conditions in the take-off or climb-out area, obtained by the unit providing approach control service is to be transmitted to departing aircraft without delay, except when it is known that the aircraft already has received the information. Significant changes in this context include those relating to ***surface wind direction or speed, visibility, runway visual range, or air temperature (for turbine engined aircraft), and the occurrence of thunderstorm or cumulonimbus, moderate or severe turbulence, windshear, hail, moderate or severe icing, severe squall line, freezing precipitation, severe mountain waves, sand storm, dust storm, blowing snow, tornado or waterspout.***

DOC 4444

INFORMATION FOR ARRIVING AIRCRAFT

As early as practicable after an aircraft has established communication with the unit providing approach control service, the following elements of information, in the order listed, shall be transmitted to the aircraft, with the exception of such elements which it is known the aircraft has already received:

DOC 4444

a. type of approach and runway-in-use

b. meteorological information, as follows:

1. surface wind direction and speed, including significant variations;
2. visibility and, when applicable, runway visual range (RVR);
3. present weather;
4. cloud below 1500m (5000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;
5. air temperature;
6. dew point temperature, inclusion determined on the basis of a regional air navigation agreement;
7. altimeter setting(s);
8. any available information on significant meteorological phenomena in the approach area; and
9. trend-type landing forecast, when available.

c. current runway surface conditions, in case of precipitants or other temporary hazards;

d. changes in the operational status of visual and non visual aids essential for approach and landing.

DOC 4444

6.6.4 At the commencement of final approach, the following information shall be transmitted to aircraft:

a. significant changes in the mean surface wind direction and speed;

NOTE: Significant changes are specified in Annex 3, Chapter 4. However, if the controller possesses wind information in the form of components, the significant changes are:

– *Mean head-wind component: 19km/h (10 kt)*

– *Mean tail-wind component: 4km/h (2 kt)*

– *Mean cross-wind component: 9km/h (5 kt)*

b. the latest information, if any, on wind shear and/or turbulence in the final approach area;

c. the current visibility representative of the direction of approach and landing or, when provided, the current runway visual range value(s) and the trend.

DOC 4444

6.6.5 During final approach, the following information shall be transmitted without delay:

a. the sudden occurrence of hazards (e.g. unauthorized traffic on the runway);

b. significant variations in the current surface wind, expressed in terms of minimum and maximum values;

c. significant changes in runway surface conditions;

d. changes in the operational status of required visual or non-visual aids;

e. changes in observed RVR value(s), in accordance with the reported scale in use, or changes in the visibility representative of the direction of approach and landing.

DOC 4444

Transfer of Aircraft from One ATC Unit to Another

Transfer of the control of aircraft from one ATC Unit to another shall be at such a ***point, level or time*** that information and instructions can be passed to the aircraft in a timely manner.

Strayed and Unidentified Aircraft

A strayed aircraft is one that has ***deviated significantly from its intended track or reports that it is lost, whereas an unidentified aircraft is one of which the ATCU is aware but the identity is not known.***

DOC 4444

Fuel Jettison

In certain circumstances, it may be necessary to reduce the mass of the aircraft to maximum landing mass as soon as possible by dumping as much fuel as is required. ***All aircraft which have a maximum take-off mass greater than the maximum landing mass are required to have a fuel jettison system.*** If the aircraft is flying in CAS, before commencing fuel jettison, the controlling ATCU is to be informed. The route over which the fuel is to be jettisoned should be clear of towns, preferably over water and clear of areas where thunderstorm activity has been reported or is expected. The level at which the jettison takes place is to be not lower than 6000 ft. This will allow the fuel in aerosol form to evaporate before reaching the ground. The ATCU is to be advised of the duration of the operation.

DOC 4444

The need to increase capacity at aerodromes handling IFR traffic in IMC can be met by the use of parallel or near-parallel runways.An aerodrome already having dual/ parallel precision approach (ILS or MLS) runways could increase its capacity if these runways could be safely operated simultaneously and independently in IMC.

NO # 4

Time = 00:04

What is the significant change of cross wind component to be reported to an aircraft on the final approach?

a) 10 kts
b) 5 kts
c) 2 kts
d) None

What is the significant change of cross wind component to be reported to an aircraft on the final approach?

a) 10 kts

b) 5 kts

c) 2 kts

d) None

The cloud information other than "CB" shall be reported to arriving aircraft where the cloud is?

a) Below 5000 Ft.
b) Below the minimum sector altitude
c) Below the highest minimum sector altitude
d) "A" or "C" whichever is higher

The cloud information other than "CB" shall be reported to arriving aircraft where the cloud is?

a) Below 5000 Ft.
b) Below the minimum sector altitude
c) Below the highest minimum sector altitude
d) "A" or "C" whichever is higher

What Significant change of head wind component shall be reported to aircraft during approach?

a) 10 Kts
b) 5 Kts
c) 7 Kts
d) 2 Kts

What Significant change of head wind component shall be reported to aircraft during approach?

a) 10 Kts
b) 5 Kts
c) 7 Kts
d) 2 Kts

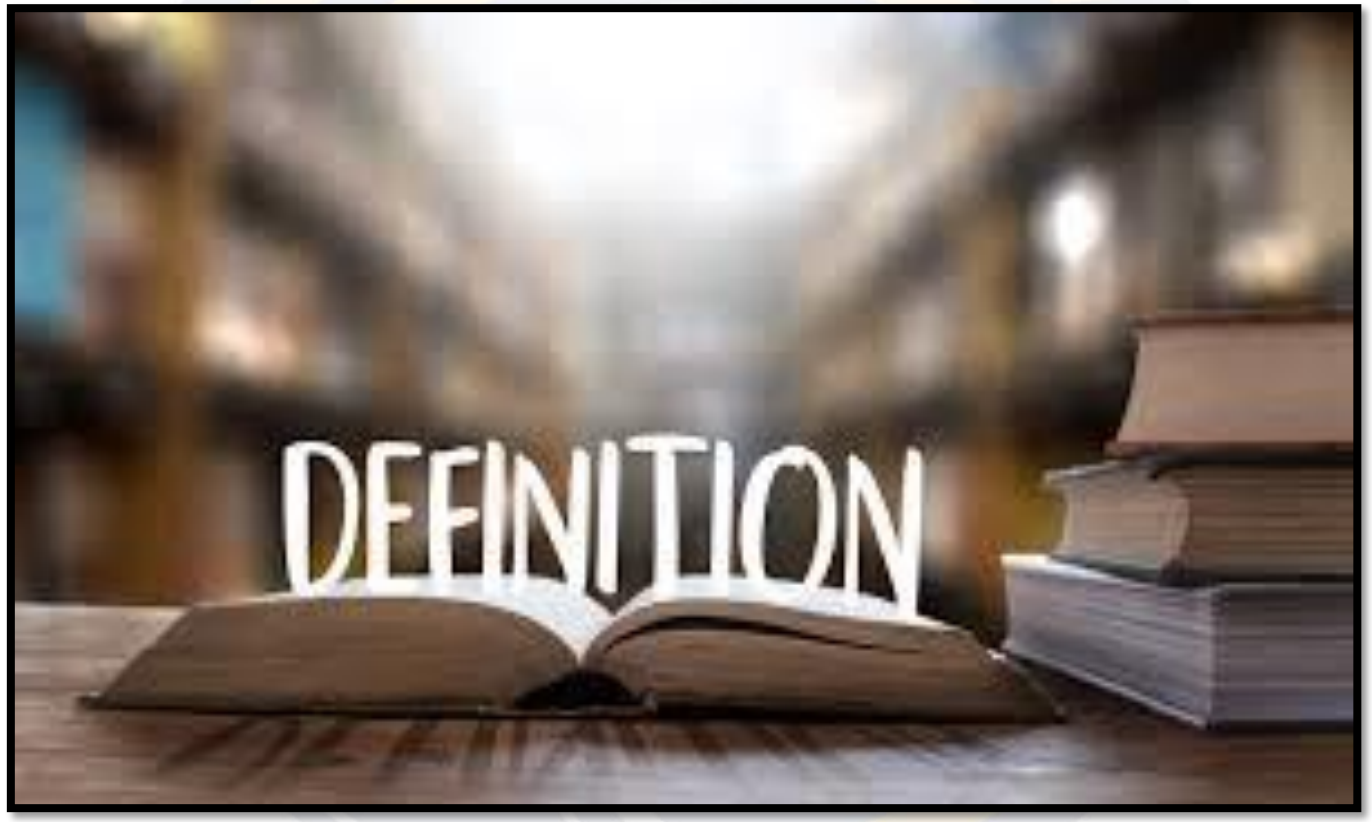
What Significant change of tail wind component shall be reported to aircraft during approach?

a) 2 KTS
b) 5 KTS
c) 8 KTS
d) 10 KTS

What Significant change of tail wind component shall be reported to aircraft during approach?

a) 2 KTS
b) 5 KTS
c) 8 KTS
d) 10 KTS

Definition



Module objectives

At the end of this module you will be able to explain some **air law definition in aviation** based on standard ICAO regulations.

Time 00:15

ANNEX 2/11

DEFINITION

Aerodrome

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.

Apron

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.

ANNEX 2/11

Landing area

That part of a movement area intended for the landing or take-off of aircraft.

Maneuvering area

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

Movement area

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

ANNEX 2/11

Runway

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

Taxiing

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

Taxiway

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:

ANNEX 2/11

Aircraft stand taxi lane

A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only.

Apron taxiway

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

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 minimizing runway occupancy times.

ANNEX 2/11

ADS-C agreement

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).

Automatic dependent surveillance — broadcast (ADS-B)

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)

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.

ANNEX 2/11

Controller-pilot data link communications (CPDLC)

A means of communication between controller and pilot, using data link for ATC communications.

Data link communications

A form of communication intended for the exchange of messages via a data link.

Area navigation (RNAV)

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.

ANNEX 2/11

Acrobatic flight

Maneuvers ***intentionally*** performed by an aircraft involving an abrupt change in its attitude, an abnormal attitude, or an abnormal variation in speed.

Air-taxiing

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).***

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 sling loads.***

ANNEX 2/11

Traffic information

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.

Safety-sensitive personnel

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.

Operator

A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

ANNEX 2/11

Flight crew member

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

Cruise climb

An aeroplane cruising technique resulting in a net increase in altitude as the aeroplane mass decreases.

Cruising level

A level maintained during a significant portion of a flight.

ANNEX 2/11

Aeronautical Information Publication (AIP)

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)

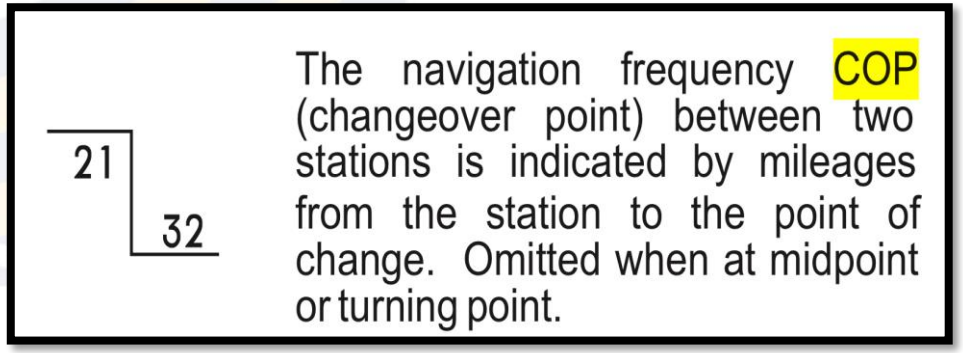
A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

ANNEX 2/11

Changeover point

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.

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.***



ANNEX 2/11

Alternate aerodrome

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.

ANNEX 2/11

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.

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

NO # 4

Time = 00:04

Maneuvering area is not to be used for the purpose of:

a) Take-off

b) Landing

c) Taxing

d) Loading passenger

Maneuvering area is not to be used for the purpose of:

a) Take-off

b) Landing

c) Taxing

d) Loading passenger

All aircraft in flight and operating on the maneuvering area of an aerodrome is.....

a) Controlled traffic
b) Known traffic
c) Aerodrome traffic
d) Air traffic

All aircraft in flight and operating on the maneuvering area of an aerodrome is.....

a) Controlled traffic

b) Known traffic

c) Aerodrome traffic

d) Air traffic

Advice provided by ATC unit specifying maneuvers to assist a pilot to avoid a collision is....

a) Traffic information
b) Traffic resolution
c) Traffic avoidance advice
d) Resolution advisory

Advice provided by ATC unit specifying maneuvers to assist a pilot to avoid a collision is....

a) Traffic information

b) Traffic resolution

c) Traffic avoidance advice

d) Resolution advisory

Taxiing is movement of an aircraft on the surface of an aerodrome under its own power.....

a) Including take-off

b) Excluding take-off

c) Excluding take-off and landing

d) Including take-off and landing

Taxiing is movement of an aircraft on the surface of an aerodrome under its own power.....

a) Including take-off

b) Excluding take-off

c) Excluding take-off and landing

d) Including take-off and landing

ATS route

LATID
N14 28.6
E077 56.9
W475
FL110
69OOT
158°
346°
322°
208°
028°
W485
W121
W121
W121

Module objectives

At the end of this module you will be able to explain some **specification of ATS route in aviation** based on standard ICAO regulations.

Time 01:00

ANNEX 2/11

ATS route

A specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services.

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

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.***

ANNEX 2/11

ATS route designator

According to ICAO Annex 11 basic designators for ATS routes shall consist of a ***maximum of five, in no case exceed six***, alpha/numeric characters in order to be usable by both ground and airborne automation systems. The designator shall indicate the type of the route, that means: high/low altitude, specific airborne navigation equipment requirements (RNAV), aircraft type using the route primarily or exclusively.

ANNEX 2/11

COMPOSITION OF DESIGNATORS

a. The basic designator consists of one letter of the alphabet followed by a number from 1 to 999. The letters may be:

1.	**A, B, G, R**	—	for routes which form part of the regional networks of ATS routes **and** are not area navigation routes;
2.	**L, M, N, P**	—	for area navigation routes which form part of the regional networks of ATS routes;
3.	**H, J, V, W**	—	for routes which do **not** form part of the regional networks of ATS routes **and** are not area navigation routes;
4.	**Q, T, Y, Z**	—	for area navigation routes which do **not** form part of the regional networks of ATS routes.

ANNEX 2/11

b. Where applicable, one supplementary letter **shall** be added as a **prefix** to the basic designator as follows:

1.	**K**	—	to indicate a low level route established for use primarily by **helicopters**;
2.	**U**	—	to indicate that the route or portion thereof is established in the **upper airspace**;
3.	**S**	—	to indicate a route established exclusively for use by **supersonic** aircraft during acceleration/deceleration and while in **supersonic flight**.

ANNEX 2/11

c. Where applicable, a supplementary letter **may** be added after the basic designator of the ATS route as a **suffix** as follows:

1.	**F**	—	to indicate that on the route or portion thereof advisory service **only** is provided;
2.	**G**	—	to indicate that on the route or portion thereof flight information service **only** is provided;
3.	**Y**	—	for RNP1 routes at and above FL200 to indicate that all turns on the route between 30 and 90 degrees shall be made within the tolerance of a tangential arc between the straight leg segments defined with a radius of 22.5 NM;
4.	**Z**	—	for RNP1 routes at and below FL190 to indicate that all turns on the route between 30 and 90 degrees shall be made within the tolerance of a tangential arc between the straight leg segments defined with a radius of 15 NM.

ANNEX 2/11

USE OF DESIGNATORS IN COMMUNICATIONS

In voice communications, the basic letter of a designator should be spoken in accordance with the ICAO spelling alphabet.

Where the prefixes **K**, **U** or **S**, specified above, are used in voice communications, they should be pronounced as:

K = "Kopter" **U = "Upper"** and **S = "Supersonic"**

as in the English language.

Where suffixes "**F**", "**G**", "**Y**" or "**Z**" specified above are used, the flight crew should not be required to use them in voice communications.

Example:	A11	will be spoken Alfa 11
	UR5	will be spoken Upper Romeo 5
	KB34	will be spoken Kopter Bravo 34
	UW456 F	will be spoken Upper Whiskey 456

ANNEX 2/11

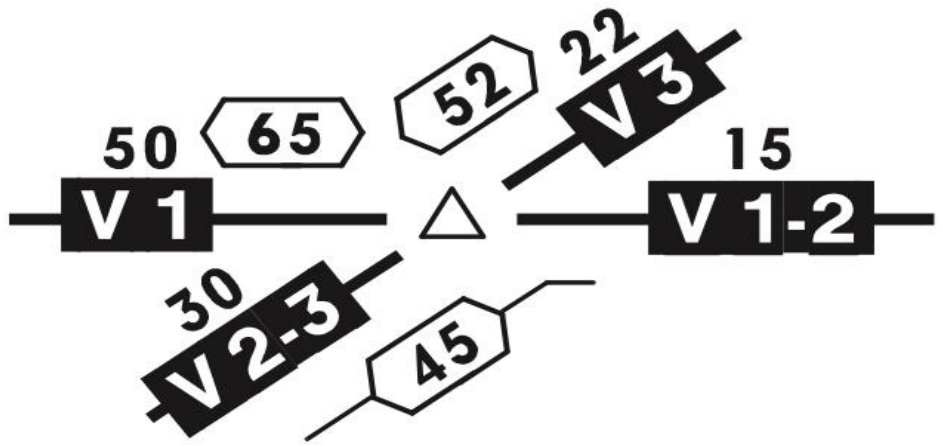
Direction

137°	VOR radial & route bearings (magnetic)
137°T	VOR Radial and route bearings (true)
	ADF Bearings (inbound or out-bound). Bearings are magnetic unless followed by a "T" indicating True.
←279° ←279°T	ADF Bearings include an arrow to indicate the direction of flight or, when used to designate Fixes, direction to the station. In remote or oceanic areas where ground based navigation aids are not available, the arrow indicates the direction of flight.
←266°T 086°T→	ADF bearings (True at track midpoint).

One Way Airway
Suffix 1 or 1, 2 or 1, 2, 3 gives the Conditional Route Category (Europe).

ANNEX 2/11

Distance



Mileages. Total mileage between navaids ⬭ is positioned along respective airway centerline. Total mileage may have directional pointers ⬭⟩ when there are multiple airway designators. The pointers parallel the airway centerlines along which the mileage applies.

ANNEX 2/11

Reporting point

FIXES

▲ ▲	Compulsory Reporting Point
△ △	Non-Compulsory Reporting Point
▲ ▲	Low Altitude Compulsory Reporting Point
△ △	Low Altitude Non-Compulsory Reporting Point.
X	Mileage Break/Turning Point
✦	RNAV Waypoint

ANNEX 2/11

COMPULSORY REPORTING POINTS

Reporting points which must be reported to ATC. They are designated on aeronautical charts by solid triangles or filed in a flight plan as fixes selected to define direct routes. These points are geographical location which are defined by navigation aids/fixes. Pilots should discontinue position reporting over compulsory reporting points when informed by ATC that their aircraft is in “radar contact.”

FLY-BY WAYPOINT

A fly-by waypoint requires the use of turn anticipation to avoid overshoot of the next flight segment.

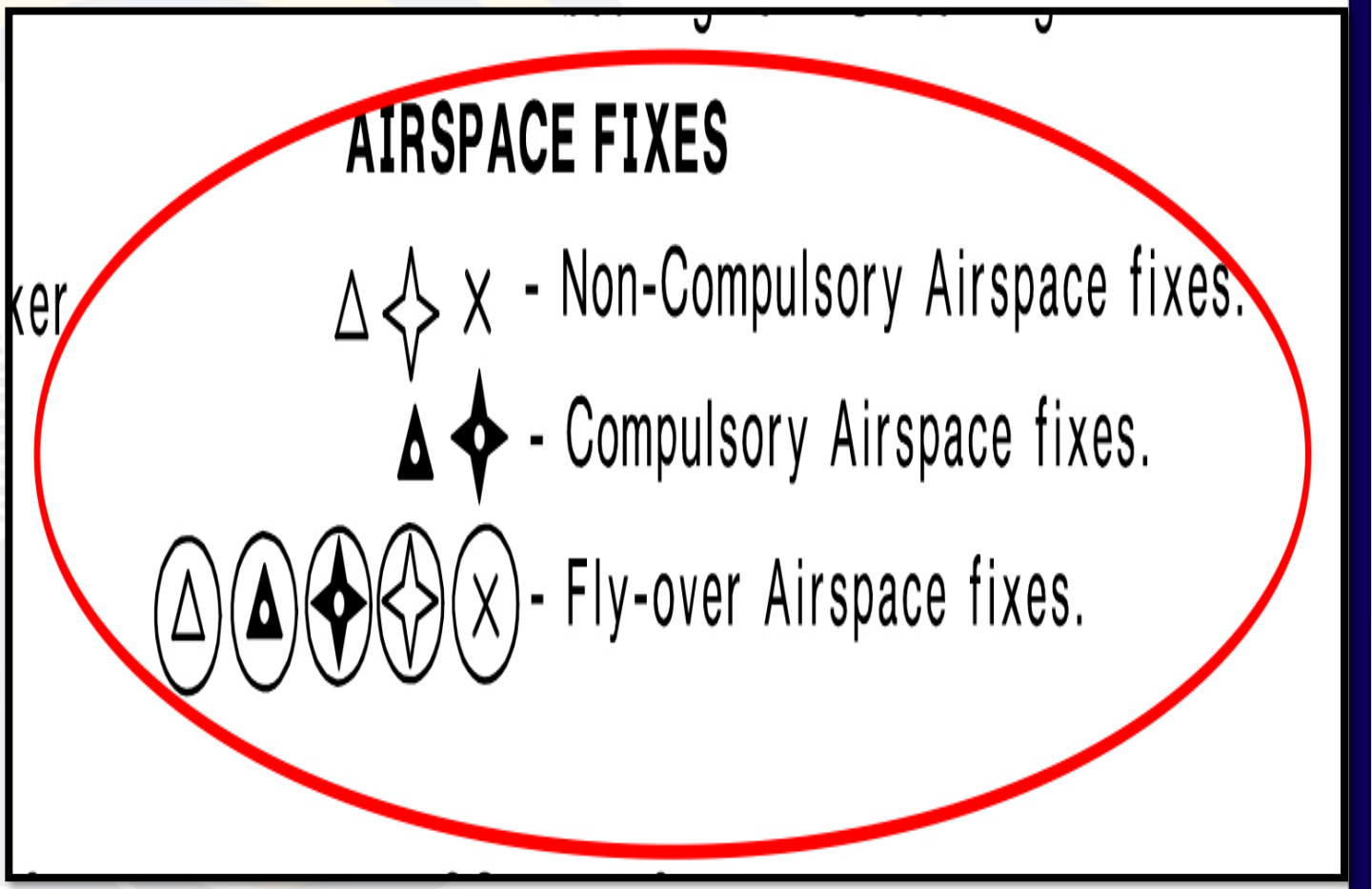
FLY-OVER WAYPOINT

A fly-over waypoint pre-cludes any turn until the waypoint is overflown and is followed by an intercept maneuver of the next flight segment.

ANNEX 2/11

WAYPOINT

specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.



ANNEX 2/11

PITCH POINT

A fix/waypoint that serves as a transition point from a departure procedure or the low altitude ground-based navigation structure into the high altitude waypoint system.

CATCH POINT

A fix/waypoint that serves as a transition point from the high altitude waypoint navigation structure to the low altitude structure or an arrival procedure (STAR).

ANNEX 2/11

Symbol Category: AIRSPACE FIXES

APCH-PL SID/STAR ENRT-A ENRT-L ENRT-H ENRT-H/L	**Non-Compulsory**
ENRT-H/L	
APCH-PL SID/STAR ENRT-A ENRT-L ENRT-H ENRT-H/L	**Compulsory**
ENRT-H/L	

APCH-PL SID/STAR ENRT-A ENRT-L ENRT-H ENRT-H/L	**RNAV** **Non-Compulsory**
APCH-PL SID/STAR ENRT-A ENRT-L ENRT-H ENRT-H/L	**RNAV** **Compulsory**
APCH-PL SID/STAR ENRT-A ENRT-L ENRT-H ENRT-H/L	**Mileage Break/CNF** Non-Compulsory Fix
APCH-PL SID/STAR	**Fly Over Fix** Indicated by circle around fix

ANNEX 2/11

Minimum/Maximum altitude

MINIMUM ENROUTE IFR ALTITUDE (MEA)

The lowest published altitude between radio fixes that meets obstacle clearance requirements between those fixes and in many countries assures acceptable navigational signal coverage. The MEA applies to the entire width of the airway, segment, or route between the radio fixes defining the airway, segment, or route.

ANNEX 2/11

MINIMUM VECTORING ALTITUDE (MVA)

The lowest MSL altitude at which an IFR aircraft will be vectored by a radar controller, except as otherwise authorized for radar approaches, departures and missed approaches. The altitude meets IFR obstacle clearance criteria. It may be lower than the published MEA along an airway of J-route segment. It may be utilized for radar vectoring only upon the controller's determination that an adequate radar return is being received from the aircraft being controlled.

ANNEX 2/11

MINIMUM OBSTRUCTION CLEARANCE ALTITUDE (MOCA)

The lowest published altitude in effect between radio fixes on VOR airways, off airway routes, or route segments which meets obstacle clearance requirements for the entire route segment and in the USA assures acceptable navigational signal coverage only within 22NM of a VOR.

MINIMUM OFF-ROUTE ALTITUDE (MORA)

This is an altitude derived by Jeppesen. The MORA provides known obstruction clearance 10NM either side of the route centerline including a 10NM radius beyond the radio fix reporting or mileage break defining the route segment. For terrain and man-made structure clearance refer to Grid MORA.

ANNEX 2/11

MAXIMUM AUTHORIZED ALTITUDE (MAA)

A published altitude representing the maximum usable altitude or flight level for an airspace structure or route segment.

ANNEX 2/11

2500	MEA (Minimum Enroute Altitude), shown as altitude or flight level.
FL 40	
	MEA is established with a gap in nav-signal coverage.
←6500 9900→	Directional MEAs as indicated.
7500G	GPS MEA
1300T	MOCA (Minimum Obstruction Clearance Altitude).
1300a	Route MORA (Route Minimum Off-Route Altitude). See glossary.
MAA 25000 MAA FL 240	MAA (Maximum Authorized Altitude), shown as altitude or flight level.

ANNEX 2/11

GRID MINIMUM OFF-ROUTE ALTITUDE (Grid MORA)

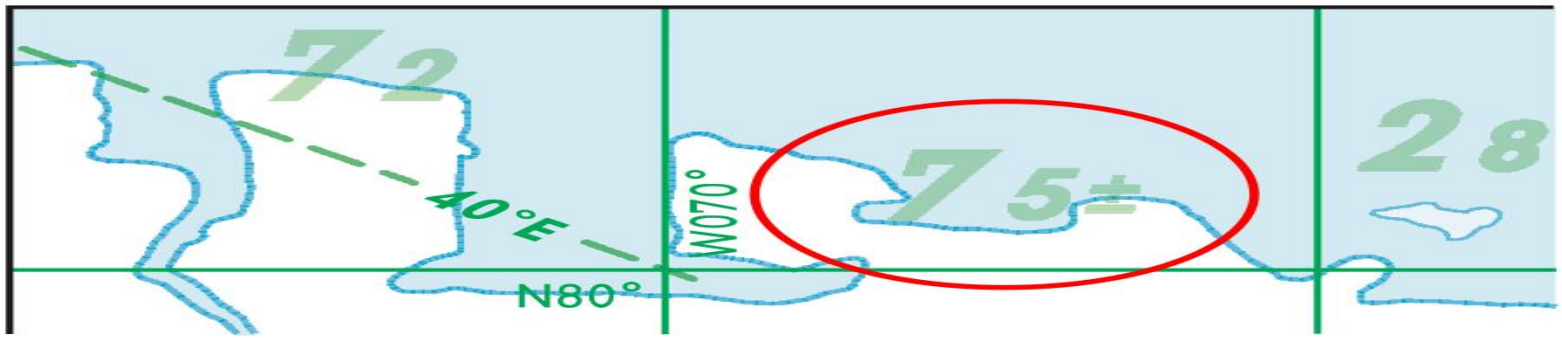
An altitude derived by Jeppesen or provided by State Authorities. The Grid MORA altitude provides terrain and ***man-made structure clearance*** within the section outlined by **latitude and longitude** lines. MORA does not provide for nav aid signal coverage or communication coverage.

Grid MORA values derived by Jeppesen clear all terrain and man-made structures by ***1000ft in areas where the highest elevations are 5000ft MSL or lower. MORA values clear all terrain and man-made structures by 2000ft in areas where the highest elevations are 5001ft MSL or higher.*** When a Grid MORA is shown as "Unsurveyed" it is due to incomplete or insufficient information. Grid MORA values ***followed by a +/- denote doubtful accuracy***, but are believed to provide sufficient reference point clearance.

Grid MORA (State) altitude supplied by the State Authority provides 2000ft clearance in mountainous areas and 1000ft in non-mountainous areas.

ANNEX 2/11

ORIENTATION



Grid shown at the intersection of units of latitude and longitude or by complete line.

Magnetic variation isogonic lines are indicated at the edge of the chart or are extended fully across the chart in a continuous dashed line.

Shorelines and large inland lakes are shown.

Grid Minimum Off-Route Altitude (Grid MORA) in hundreds of feet provides reference point clearance within the section outlined by latitude and longitude lines. Grid MORA values followed by a +/- denote doubtful accuracy, but are believed to provide sufficient reference point clearance.

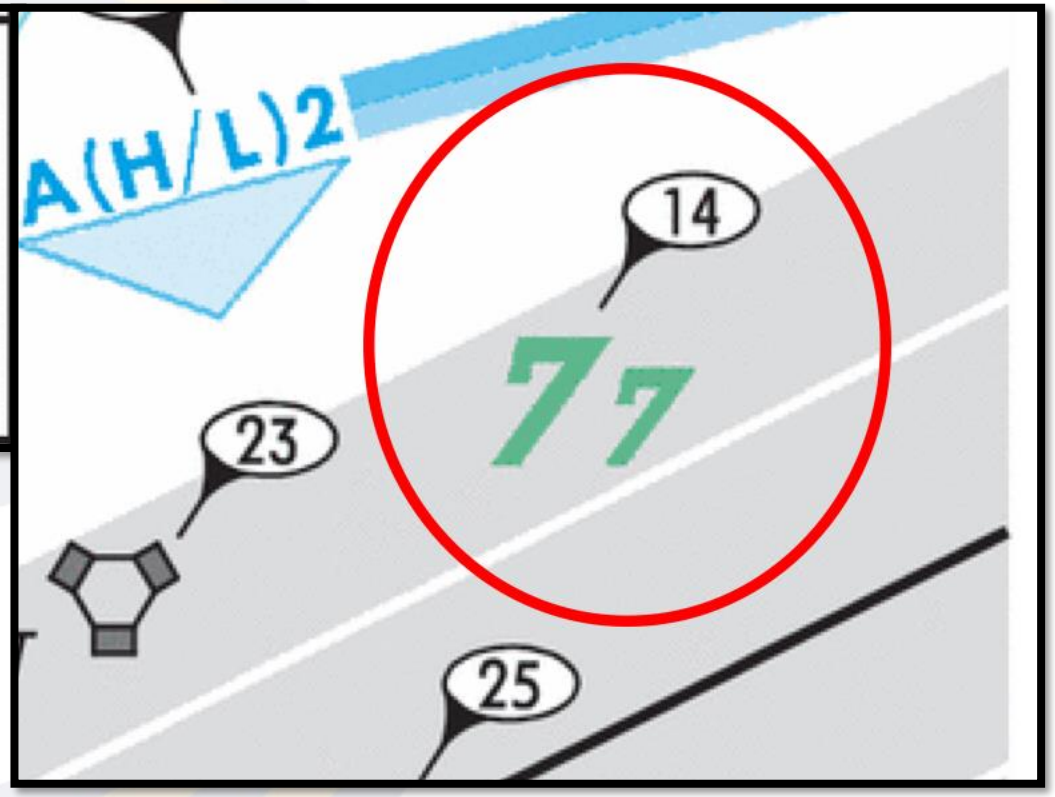
ANNEX 2/11

ENRT-A
ENRT-L
ENRT-H
ENRT-H/L

Grid MORA

90

157



13 — DME.

14 — Grid MORA. Values 10,000 feet and greater are maroon. Values less than 10,000 feet are green. Values are depicted in hundreds of feet.

NO # 4

Time = 00:04

Which of the following prefixes indicate an area navigation route which does not form part of the regional network of ATS routes?

a) G
b) M
c) H
d) Q

Which of the following prefixes indicate an area navigation route which does not form part of the regional network of ATS routes?

a) G
b) M
c) H
d) Q

Which suffixes of route designator does not use in voice communication?

a) F, S, T
b) R, Y, Z
c) F, Y, Z
d) Y, Z, U

Which suffixes of route designator does not use in voice communication?

a) F, S, T
b) R, Y, Z
c) F, Y, Z
d) Y, Z, U

What is the meaning of (F) as a suffix when added after the basic designator of an ATS route?

a) ATC is provided.
b) Advisory service is provided.
c) Flight information is provided.
d) All ATS services are provided.

What is the meaning of (F) as a suffix when added after the basic designator of an ATS route?

a) ATC is provided.

b) Advisory service is provided.

c) Flight information is provided.

d) All ATS services are provided.

How the route designator of ``UL426F`` shall be used in voice communication?

a) Uniform Lima 426 foxtrot.
b) Upper Lima 426.
c) Uniform Lima 426.
d) Upper Lima 426 foxtrot.

How the route designator of ``UL426F`` shall be used in voice communication?

a) Uniform Lima 426 foxtrot.

b) Upper Lima 426.

c) Uniform Lima 426.

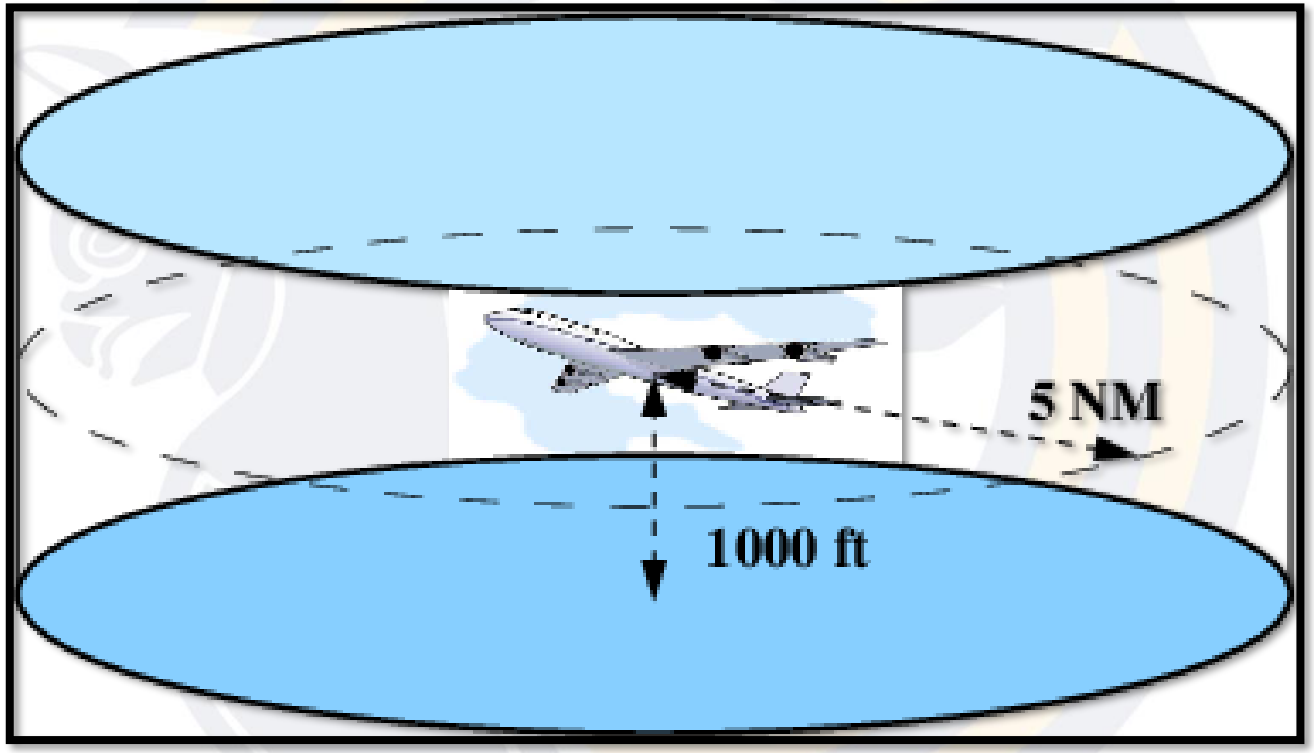
d) Upper Lima 426 foxtrot.

DOC 8168

Shape and Terminology

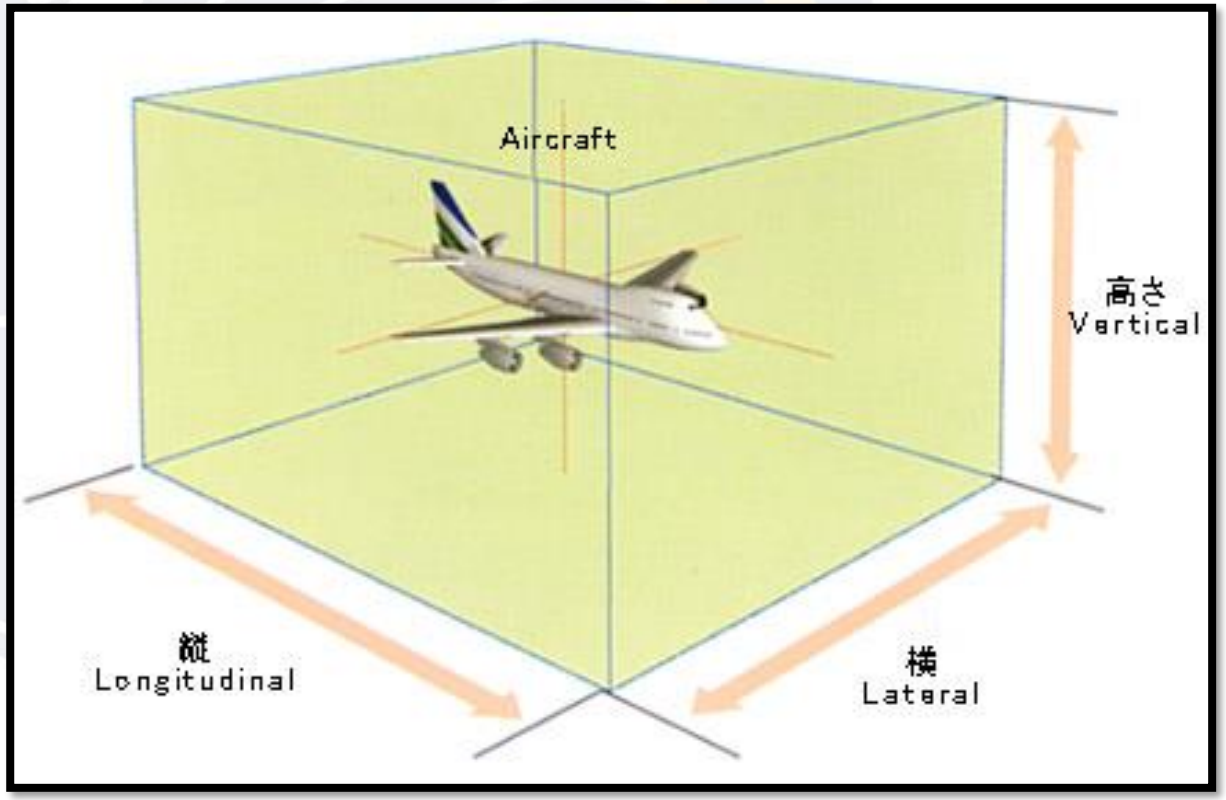
The shape of holding patterns and the associated terminology are shown below. A standard holding pattern has starboard (right) turns. If port turns are required, the approach plate will be annotated to indicate the fact.A left hand pattern is a mirror image of the standard pattern.

Separation



Module objectives

At the end of this module you will be able to explain the types of separation between traffic during flight based on standard ICAO regulations.



Time 01:00

DOC 4444

Separation

Within CAS the ATC service will make sure that all controlled flights (flights provided with ATC) are separated from each other to comply with the first requirement of the service to prevent collisions between aircraft.

Separation can be either:

- ***Vertical or***
- ***Horizontal or***
- ***Composite***

DOC 4444

Essential Traffic Information

Essential Traffic is defined as that controlled traffic to which ATC separation is applicable but to which in relation to another controlled flight is not, or will not, be separated by the required minimum. '***Essential traffic information' will be passed to the controlled flights concerned when they constitute essential traffic to each other.***

DOC 4444

Vertical Separation

Wherever possible, ATC will arrange vertical separation to maximize the use of airspace and minimize horizontal use of airspace.Vertical separation is obtained by requiring aircraft using the same altimeter setting to fly at different levels expressed in terms of flight levels or altitudes dependent upon the magnetic track of the aircraft. The vertical separation minimum (VSM) is:

DOC 4444

- ***Within designated airspace (RVSM) a nominal 300 m (1000 ft) below FL410 or a higher level where so prescribed for use under specified conditions, and a nominal 600 m (2000 ft) at or above this level; and***

- ***Within all other airspace: a nominal 300 m (1000 ft) below FL290 and a nominal 600 m (2000 ft) at or above this level.***

DOC 4444

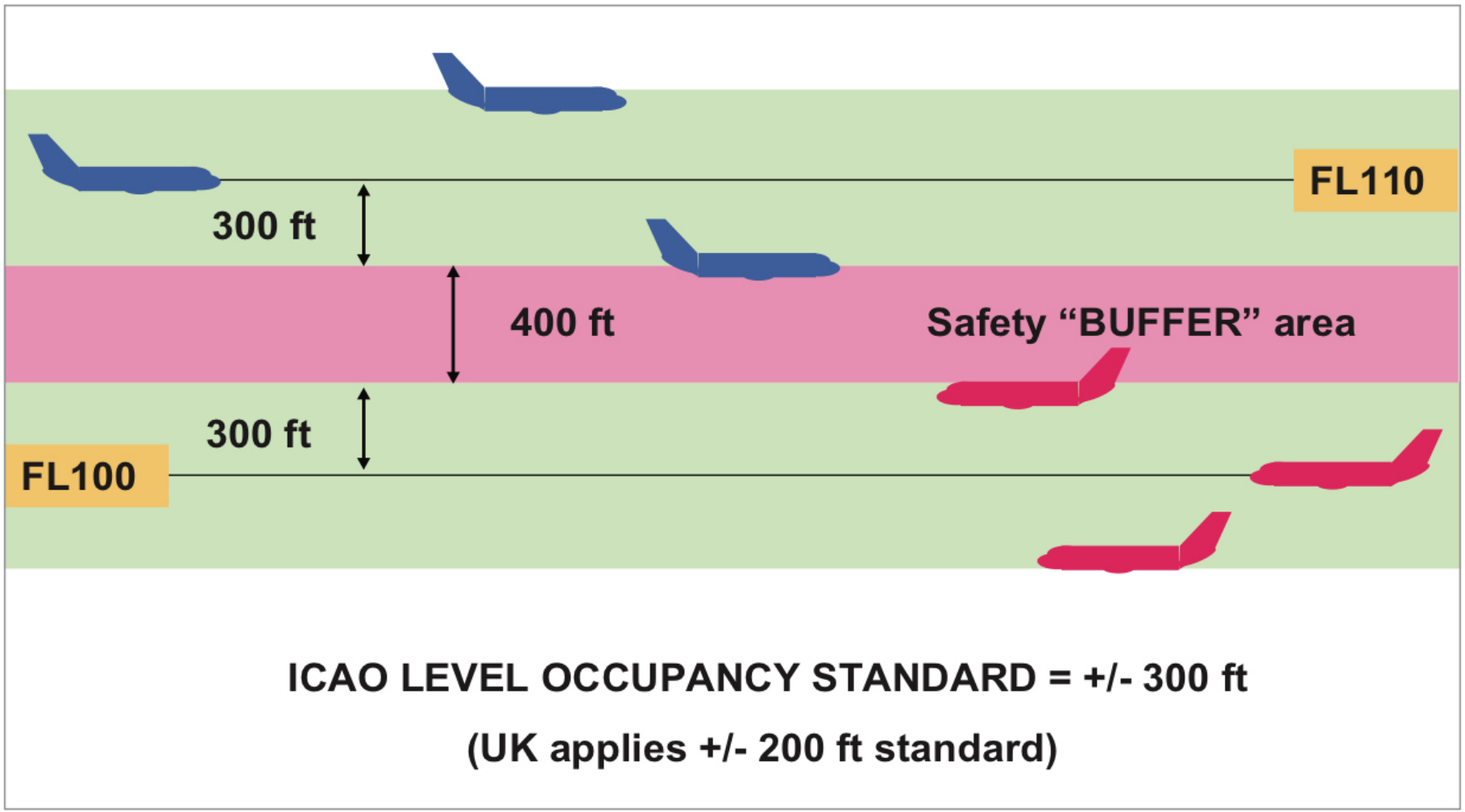


Figure 16.1 ICAO level occupancy standard

DOC 4444

- ***An aircraft at a cruising level will have priority over aircraft requesting that level. When two or more aircraft are at the same level, the preceding aircraft will have priority***

- An aircraft may be assigned a level previously occupied by another aircraft after the latter has reported vacating it. In the case of severe turbulence or cruise climb, the assignment will be withheld until the other aircraft has reported at another level separated by the required minimum.

DOC 4444

Clearance to Maintain Own Separation in VMC

If requested by the pilot of an aircraft and it is agreed by the pilot of the other aircraft and authorized by ATC, a flight ***operating in classes D and E airspace*** in VMC during daylight, may be cleared to climb or descend maintaining own separation from one other aircraft providing:

- ***The clearance is specifically for the portion of flight below 10 000 ft;***
- ***Alternative instructions are passed to the pilot to cover loss of VMC;***
- ***If conditions deteriorate to the limits of VMC, the pilot is to inform ATC that he/she is complying with the alternative instructions.***

DOC 4444

Horizontal Separation

Horizontal separation relates to the distance between aircraft in the horizontal plane.

This may be:

- ***Longitudinal (aircraft following the same route), where the separation standard is based on time (or distance) along track between aircraft, or***

- ***Lateral.***

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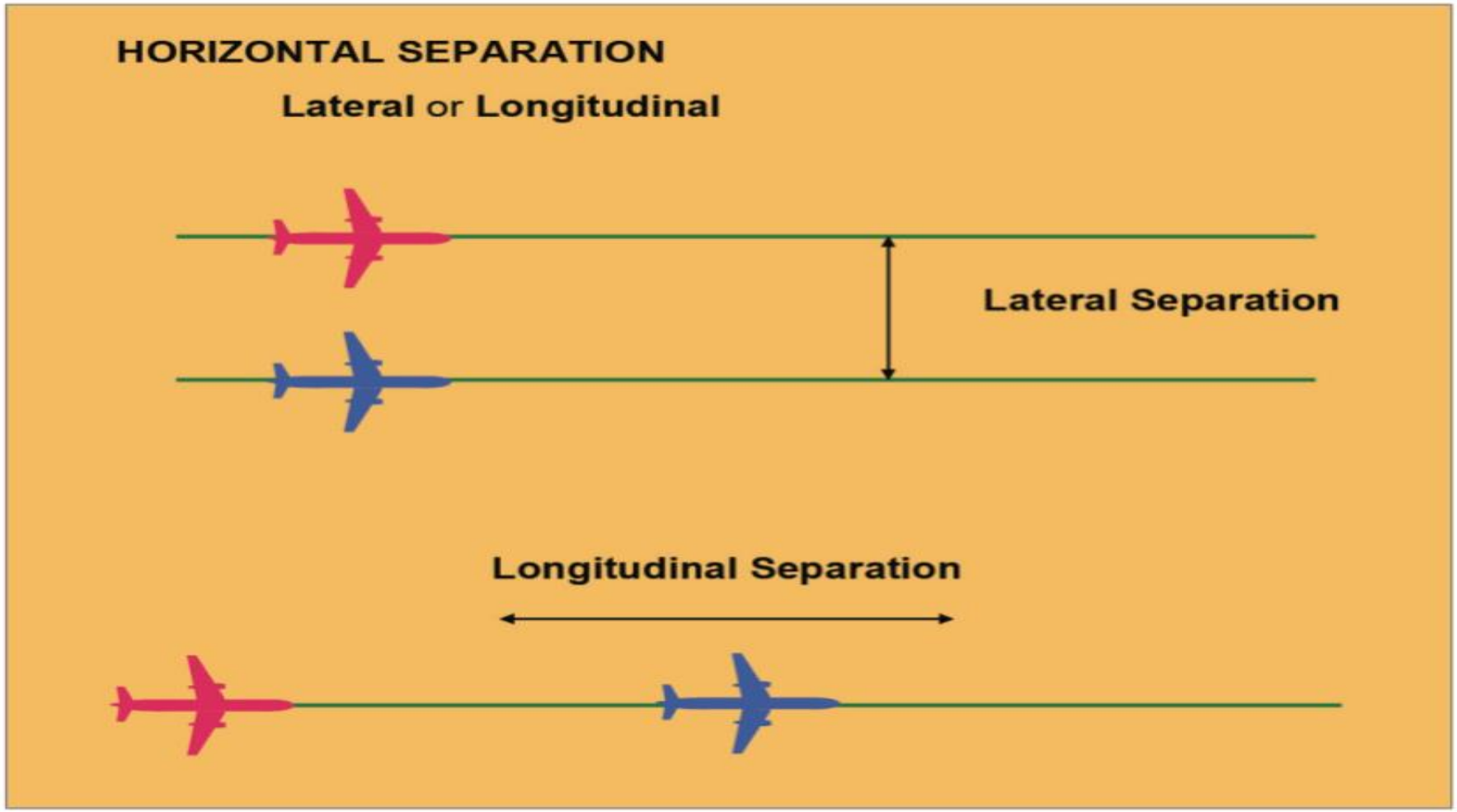

Figure 16.2

DOC 4444

Lateral Separation

Lateral separation shall be applied so that the distance between those portions of the intended routes for which the aircraft are to be laterally separated is never less than an established distance to account for navigational inaccuracies plus a specified buffer.This buffer shall be determined by the appropriate authority and included in the lateral separation minima. Lateral separation of aircraft at the same level is obtained by requiring operation on different routes or in different geographical locations as determined by visual observation, by use of navigation aids or by use of area navigation (RNAV) equipment. The ‘buffer' concept is applied to all methods of separation.

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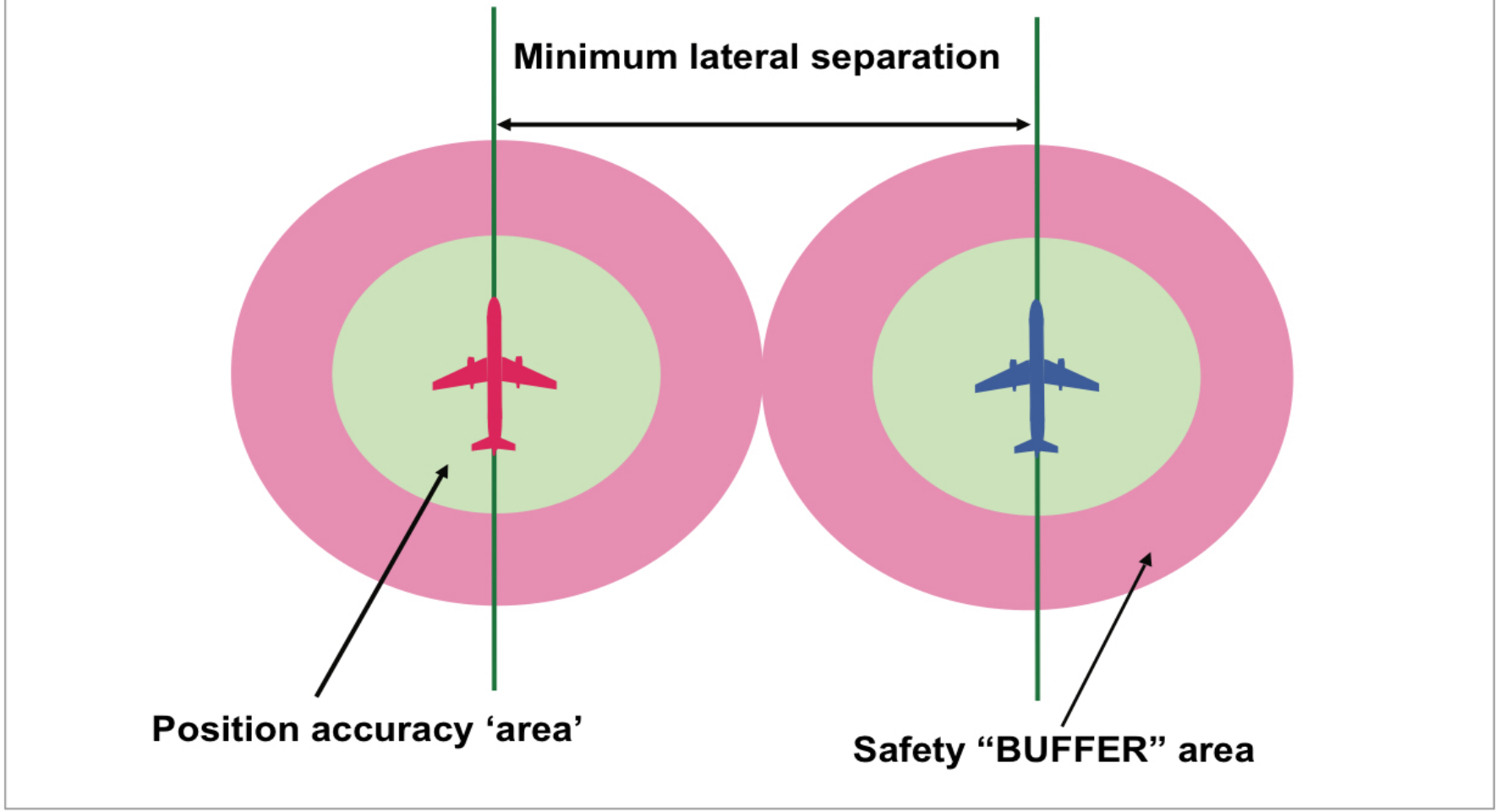

Figure 16.3

AIP

1.4.3.1 *En-route Separation except 1.4.3.2*

Horizontal Separation: The minimum horizontal radar separation shall be 10NM except:

a) The minimum radar longitudinal separation of 20NM shall be applied between aircraft cruising at the same flight level on the same route (on trail) ;

b) The minimum radar separation for descending or climbing aircraft on the same tracks shall be 10 NM.

1.4.3.2 *Esfahan, Mashhad, Shiraz and Tehran TMA/CTR Separation.*

Horizontal Separation: The minimum horizontal separation within 30 NM from TMA reference point (within "Tehran TMA/CTR" 40 NM) shall be 5 NM and beyond that up to TMA boundary shall be 10 NM.

DOC 4444

Longitudinal Separation

Longitudinal separation is the most complex application of separation standards.In procedural ATC (not radar control) the position of the aircraft is that which is reported by the pilot. The positions reported are usually specified reporting points, radio navigation facilities, or geographic points for routes not specified by navigation aids. In any event, the position known to the ATCO is only as good as that reported by the pilot.In applying procedural separation, all possible errors must be allowed for and then a safety margin (buffer) applied.

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The only situation in which the safety margins may be relaxed is where the pilots of aircraft to which separation should be applied have (and confirmed) that they have visual contact with each other and that they can maintain visual contact during the necessary maneuver to which separation would otherwise be applied.Clearly, the separation standards assume operations in IMC.The accuracy of pilot position reporting relies on the accuracy of the navigation system in use. In remote areas (over the oceans and desert regions) where RNAV procedures may be used, greater protection needs to be applied. Longitudinal separation applied is either in terms of time or distance.

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Longitudinal separation is applied so that the spacing between the estimated positions of the aircraft being separated is never less than a prescribed minimum. Longitudinal separation between aircraft following the same or diverging tracks may be maintained by application of the Mach number technique, when so prescribed on the basis of RAN agreement. Longitudinal separation is established by requiring aircraft to depart at a specific time, to lose time, to arrive over a geographical location at a specified time, or to hold over a geographical location until a specified time. For the purpose of the application of longitudinal separation, the following terms are defined:

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- ***Same track.*** The same track case applies when the tracks of two aircraft that require separation, converge or diverge by an angular difference less than 45°, or more than 315° and whose protection areas overlap.

- ***Reciprocal track.*** The reciprocal track case applies when the tracks of two aircraft that require separation, converge or diverge by an angular difference more than 135° but less than 225° and whose protection areas overlap.

- ***Crossing tracks.*** When there is an angular difference between tracks of 45° or more but not exceeding 315° (ie : 045 to 135 degrees or 225 to 315 degrees).

DOC 4444

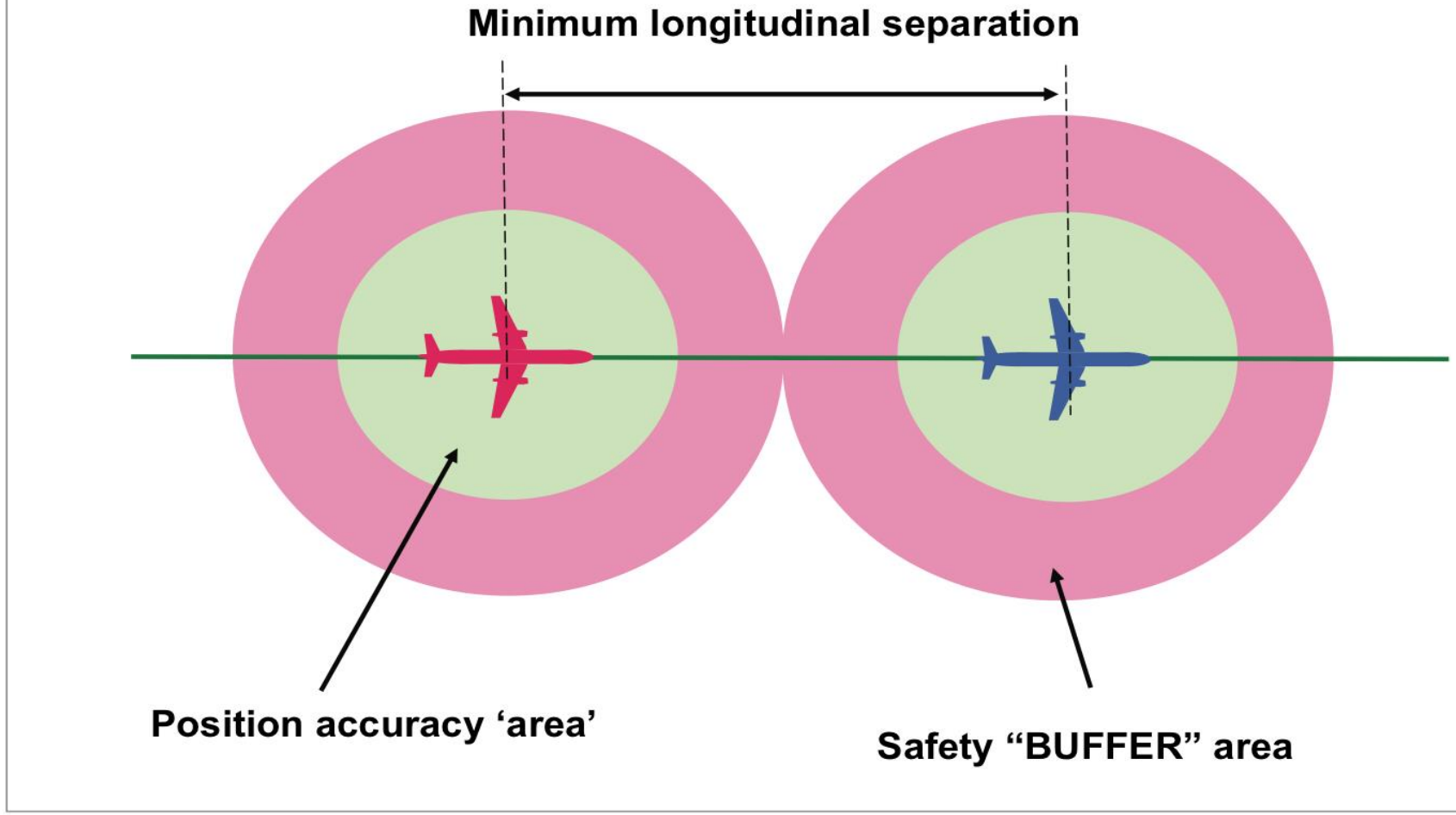

Figure 16.5 Longitudinal separation

DOC 4444

Time Based Longitudinal Separation.

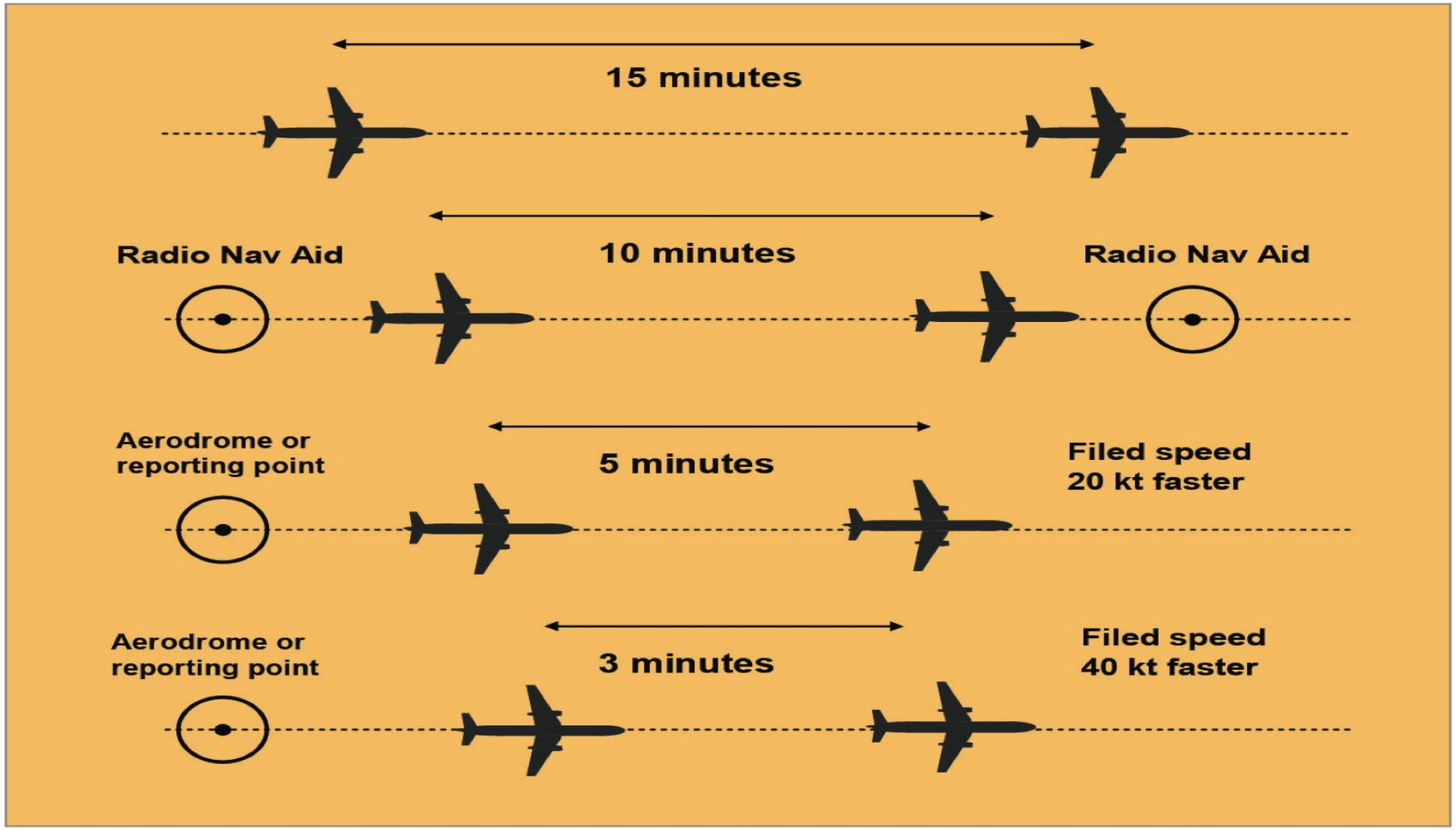

Figure 16.6

DOC 4444

- **Crossing tracks case.** The basic standard is 15 minutes. If, however, the frequent determination of position and speed caveat applies, the standard may be reduced to 10 minutes.

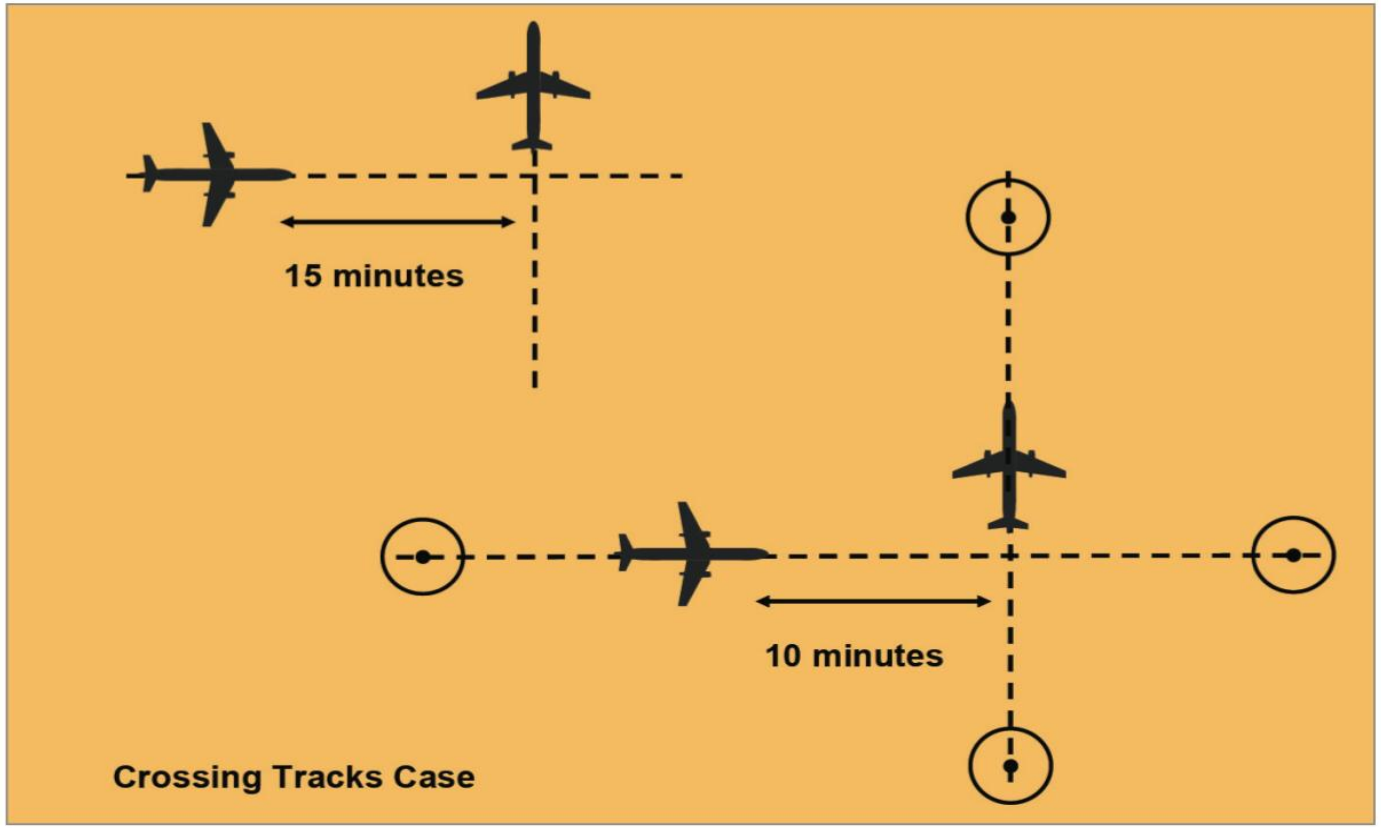

Figure 16.7

DOC 4444

- **Reciprocal tracks.** Where lateral separation is not provided, vertical separation shall be provided for at least 10 minutes prior to and after the time the aircraft are estimated to have passed. Once it has been established (usually visually) that the aircraft have indeed passed, this minimum need not then further apply.

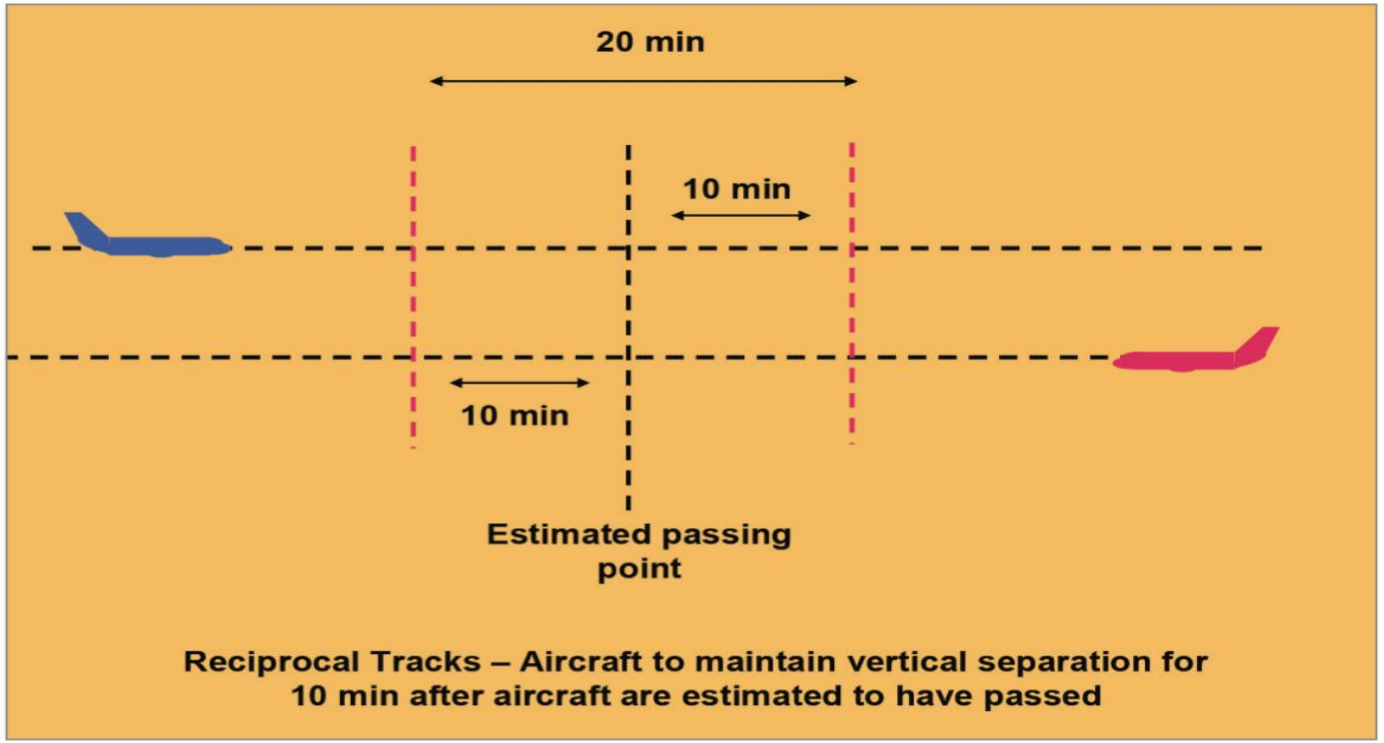

Figure 16.11

DOC 4444

Mach No. difference between preceding and following	Longitudinal Separation standard
0	10 minutes
0.01	10 minutes
0.02	9 minutes
0.03	8 minutes
0.04	7 minutes
0.05	6 minutes
0.06	5 minutes

Figure 16.12 Mach number separation

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16.30 Longitudinal Separation Based on RNAV where RNP is Specified. For aircraft cruising, climbing or descending on the same track in an RNP RNAV environment, the separation standards detailed in the table below may be used. During the application of the 50 NM minimum, if an aircraft fails to report its position, the controller is to take action within 3 minutes to establish communications. If communication has not been established within 8 minutes, alternative separation is to be applied. An aircraft may climb or descend through an occupied level once it has been established that the aircraft concerned have passed.

RNP Type	Communication Requirement	Surveillance Requirement	Distance Verification Requirement	Separation
20	Direct pilot/controller communications	Procedural Position Reports	At least every 60 minutes	80 NM
10	Direct pilot/controller communications	Procedural Position Reports	At least every 30 minutes	50 NM

Figure 16.13 RNP RNAV separation

DOC 4444

Radar Separation

Separation Minima

Radar provides the ATCO with fairly accurate position information for an aircraft under his/her control. Problems associated with radar include:
slant range display, target discrimination and loss of contact close to the radar overhead.These ‘errors' must be handled in the same manner that other positional errors are: by the addition of ‘buffer' allowances. The errors are worse for long range radars used in area control but must still be considered for terminal radars covering a much smaller area. ***The basic radar separation standard is 5 NM***.This means that where two aircraft identified on radar are at the same level, they are not permitted to approach closer than 5 NM to each other on the radar display.

DOC 4444

Reduced Radar Separation

When approved by the authority and in specific circumstances, the radar separation **standard (5 NM)** may be reduced. The following describe these specific occasions:

- ***Radar capabilities***

When radar capabilities so permit at a given location, the radar separation standard may be ***reduced to 3 NM.***

DOC 4444

➢ *ILS Localizer*

Where two (or more) aircraft are established on the same ILS localizer course and within 10 NM of the threshold of the landing runway, the separation standard may be ***reduced to 2.5 NM between*** contacts on the radar display.

➢ *Simultaneous Parallel Approaches (Mode 2 - Dependent)*

During Mode 2 parallel runway operations radar separation is applied. Between aircraft on adjacent localizer courses the separation standard may be reduced ***to 2 NM between contacts on the radar display.***

DOC 4444

Wake Turbulence Categories of Aircraft

Wake turbulence separation minima shall be based on a grouping of aircraft types into three categories according to the maximum certificated take-off mass as follows:

- ***HEAVY (H) – all aircraft types of 136,000kg or more;***
- ***MEDIUM (M) – aircraft types less than 136,000kg but more than 7000kg; and***
- ***LIGHT (L) – aircraft types of 7000kg or less.***

For aircraft in the heavy wake turbulence category the word "***Heavy***" shall be included ***immediately after the aircraft call sign in the initial radiotelephony contact between such aircraft and ATS units.***

DOC 4444

Procedural Wake Turbulence Separation

Figure 16.14

DOC 4444

When the wings are creating lift (from ‘rotate' to ‘touchdown'), wake vortices are created behind the aircraft. This is apparent in the form of turbulence, the severity of which is a function of aircraft mass, the worst case being a heavy aircraft at low speed. Where an aircraft is following another aircraft, allowance must be made for the ‘wake turbulence effect' which under certain circumstance can be so severe as to cause structural damage (even catastrophic damage) to an airframe.

DOC 4444

The nature of the wake vortex is that it emanates from the wing tip in the form of spiraling air from the high pressure area below the wing to the low pressure area above the wing. It spirals ‘in board' towards the fuselage. The vortex exists at the level of the generating aircraft and to an altitude not exceeding 1000 ft below the generating aircraft. Where the following aircraft is within this airspace, wake turbulence separation must be applied.

DOC 4444

Radar Wake Turbulence Separation

Aircraft Wake Turbulence Category		
Leading Aircraft	**Following Aircraft**	**Separation**
Heavy	Heavy	4 NM
Heavy	Medium	5 NM
Heavy	Light	6 NM
Medium	Light	5 NM

Figure 16.20 Radar wake turbulence separation criteria

DOC 4444

WAKE TURBULENCE SEPARATION - RADAR SUMMARY:

PRECEDING Aircraft	FOLLOWING Aircraft: Heavy	Medium	Light
Heavy	4 NM	5 NM	6 NM
Medium	3 NM	3 NM	5 NM
Light	3 NM	3 NM	3 NM

WAKE TURBULENCE SEPARATION - NON-RADAR SUMMARY:

Doc 4444 - 5.8.2 Arriving Aircraft:

PRECEDING Aircraft	FOLLOWING Aircraft: Heavy	Medium	Light
Heavy	2 min	2 min	3 min
Medium			3 min

Doc 4444 - 5.8.5 Opposite Direction:

PRECEDING Aircraft	FOLLOWING Aircraft: Heavy	Medium	Light
Heavy		2 min	2 min
Medium			2 min

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Doc 4444 - 5.8.3 Departing Aircraft
- same runway (Doc 4444: 5.8.3.1):

PRECEDING Aircraft	FOLLOWING Aircraft: Heavy	Medium	Light
Heavy		2 min	2 min
Medium			2 min

Doc 4444 - 5.8.3 Departing Aircraft
- intermediate part of same runway (Doc 4444: 5.8.3.2):

PRECEDING Aircraft	FOLLOWING Aircraft: Heavy	Medium	Light
Heavy		3 min	3 min
Medium			3 min

Doc 4444 - 5.8.4 Displaced Threshold:

PRECEDING Aircraft	FOLLOWING Aircraft: Heavy	Medium	Light
Heavy		2 min	2 min
Medium			2 min

DOC 4444

Essential Local Traffic

Information on essential local traffic known to the Controller, shall be also transmitted to departing and arriving aircraft. Essential local traffic consists of any aircraft, vehicle or personnel on or near the runway to be used, or traffic in the take-off, climb-out or final approach areas, which may constitute a collision hazard to a departing or arriving aircraft.

Good luck

AMIR AHMAD TOOPHI