Operational Procedures

Chapter 1 – Annex 6

Safety

Before an Operator is granted an air operator's certificate (AOC), it must demonstrate that the operation is not only commercially (financially) viable, but also safe.

Flight time - aeroplanes. This is defined as the total time from the moment an aeroplane first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight.

The State of the Operator is required to establish a safety programme which sets an acceptable level of safety to be achieved by all certified operators. The Operator is required to establish a Safety Management System (SMS) throughout the operation.

The operator shall establish a flight safety documents system for the use and guidance of operational personnel as part of the safety management system. It is a set of interrelated documentation compiling and organizing information necessary for flight and ground operations and comprising (as a minimum) the operations manual and the operator's maintenance control manual.

If the Operator uses aeroplanes with maximum certificated take-off mass (MTOM) > 27 000 kg, a flight data analysis/monitoring programme is required to be established, as part of the safety programme.

The Operator is required to determine that any aircraft used in Commercial Air Transport (CAT) is airworthy.

The operator is responsible to coordinate, develop and maintain an Emergency Response Plan (ERP)/Emergency Response Procedure (ERP) what ensures orderly and safe transition from normal to emergency operations and return to normal operations.

The operator shall establish, implement and maintain a management system that includes clearly defined lines of responsibility and accountability throughout the operator, including a direct safety accountability of the accountable manager.

It should also include a description of the flight safety philosophies and principles.

The safety manager can be identified by the operator between the accountable manager or a person with an operational role with the operator (ex. line captain).

For complex operators the management system of an operator should encompass safety by including a safety manager and a safety review board in the organisational structure.

The safety review board should ensure that appropriate resources are allocated to achieve the established safety performance (commitment to provide relevant resources).

The safety review board should monitor:

- Safety performance against the safety policy and objectives
- The effectiveness of the operator's safety management processes.

The functions of a safety manager in complex operations are:

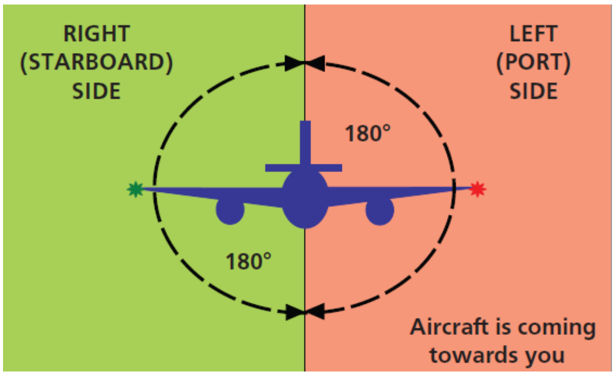
- Facilitate hazard identification, risk analysis and management
- Provide periodic reports on safety performance
- Monitor the implementation of actions taken to mitigate risks, as listed in the safety action plan

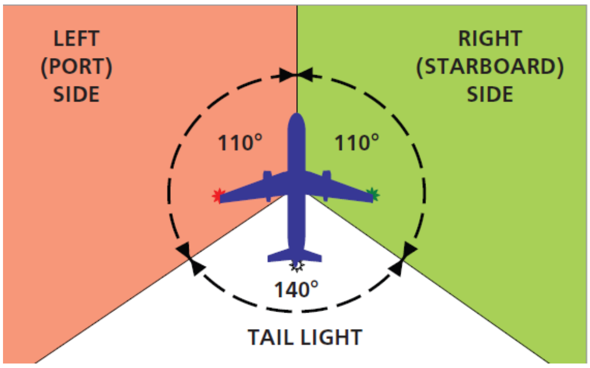
The management system shall correspond to the size of the operator and the nature and complexity of its activities, taking into account the hazards and associated risks inherent in these activities.

Safety manager is responsible for the Flight Data Monitoring system

The Accountable manager is responsible for the compliance monitoring system and feedback needs to be addressed at him.

Lights





Navigation lights must be turned on from sunset to sunrise during all operation in the air and on the ground.

Chapter 2 – OPS General Requirements

Operators are required to ensure that all crew members (flight crew and cabin crew) are able to communicate (with each other) in a common language.

Quality Manager is to be appointed to ensure compliance with the quality system.

Compliance monitoring must include a feedback system to the Accountable Manager who has responsibility to the Authority for compliance with the requirements of the AOC.

The operator shall establish, implement and maintain a management system.

Each Operator is required to establish and maintain an Accident Prevention and Flight Safety programme, which may be integrated with the Quality System.

To minimize the risk from ditching, operators are not to operate aeroplanes with a passenger seating capacity more than 30 at a distance from land greater than 120 minutes flying time at cruising speed, or 400 NM whichever is less, unless the aeroplane complies with the requirements of the applicable airworthiness code.

A crew member must not:

- Consume alcohol less than 8 hours prior to reporting for duty or the commencement of standby duty.
- Report for duty with a blood alcohol level exceeding 0.2 promille.

Aircrafts need to be equipped with fasten seatbelt signs when not all passengers seats are visible from the flight crew seats.

Documents to Be Carried

The following documents are required to be carried on board each flight:

- The Certificate of Registration (original).
- The Certificate of Airworthiness (original).
- The Noise Certificate (original).
- The air operator certificate (copy will suffice).
- The Aircraft radio licence (original).
- Third party insurance certificate (copy will suffice).

Each flight crew member is to carry the valid flight crew licence plus any necessary ratings.

Additional Information and Forms to Be Carried

Information relevant to the flight and appropriate to the type of operation is preserved on the ground for at least the duration of each flight.

The Operator is to ensure that, where relevant, the following are to be carried on all flights: (underlined in fireproof container and a copy on the ground)

- <u>The Operational Flight Plan (OFP)</u>
- <u>The required parts of the Aeroplane Technical Log</u>
- The ATS flight plan.
- <u>Appropriate NOTAM/AIS briefing material</u>
- Appropriate meteorological information
- <u>Mass and Balance documentation</u>
- Details of special categories of passengers (i.e. security personnel if not considered as crew; persons of reduced mobility (PRMs); inadmissible passengers; deportees; persons in custody).
- <u>Special load notification (including dangerous cargo)</u>
- Current maps and charts.
- Any other documentation that may be required by a state (including cargo manifests; passenger manifests; etc.)
- Forms to comply with the reporting requirements of the Authority and the Operator

Production and Preservation of Documents and Recordings

<u>Persons authorized by the Authority</u> are permitted access to any documents and records relating to flight operations.
The Operator is required to produce all such documents and records <u>within a reasonable time</u> when requested to do so by the Authority.

Original documentation is to be kept for the required retention period by the operator, even if during that period, he ceases to be the Operator of the aeroplane.

Following an incident, all <u>FDR and CVR recordings</u> are to be <u>retained</u> for a period of <u>60 days</u> unless a longer period is requested by the Authority.

Leasing of Aeroplanes

Lessor: the one who leases or lets a property to another [landlord =chi da' in affitto]

Lessee: the one holding the lease of the property [tenant = chi prende in affitto]

Dry Lease: This is when the leased aeroplane is operated under the AOC of the lessee (the operator borrowing the aeroplane).

Wet Lease: This is when the leased aeroplane is operated under the AOC of the lessor (the operator lending the aeroplane to the lessee).

Chapter 3 – Operator Supervision and Certification

The AOC will be issued by the Authority of the state in which the operation has its principal place of business.

The applicant operator must also satisfy the Authority that the organization of the operation and the management structure of the company are both suitable and properly matched to the scale (size) and scope (types of operations) of the undertaking.

For the continued validity of an AOC, the operator should comply with the following conditions:

• The operator should remain in compliance with the relevant requirements of regulations

• The competent authority being granted access to the operator to determine continued compliance with the relevant requirements of regulations

• The certificate remains valid and is not surrendered or revoked

If the operator elects to carry out the maintenance 'in-house', the operator must be approved in accordance with EASA part 145 for the approval of maintenance operations.

The Accountable Manager is responsible for ensuring that all the operations and maintenance activities can be financed and carried out to the standard required by the Authority. Nominated by the operator and acceptable to the Authority, is responsible to the Authority for compliance with all the requirements of the Authority for the AOC.

Operations Manual (OM)

It consists of 4 parts:

- Part A - General and Basic Information
- Part B - Aeroplane Operating Matters
- Part C - Route and Aerodrome Instructions and Information
- Part D - Training

Chapter 4 – Operational Procedures

Only authorized aerodromes are to be used as destinations or destination alternates. All the aerodromes used for flight operations in the context of the operation, are to be approved by the operator.

Planning stage → Planning minima ± 1 hour

Dispatch stage → Planning minima [from taxi this stage applies]

In flight stage → Operating minima [from after take-off]

Take-off alternate

The weather reports/forecasts must indicate that during the period 1 hour before until 1 hour after the ETA at the (alternate) aerodrome the met conditions will be at or above the applicable aerodrome operating minima.

The ceiling must be taken into account when non-precision or circling approaches are the only available instrument approach option. Additionally, any limitations related to one engine inoperative must also be considered.

Two Engines Aeroplane: The take-off alternate must be located within either 1 hour flight time at the one-engine inoperative cruise speed or, where approved (ETOPS), up to a maximum of 2 hours at the one-engine-inoperative cruise speed.

Three or More Engines: 2 hours flight time at the one-engine-inoperative cruise speed specified in the AFM in still air standard conditions based on the actual take off mass for three- and four-engine aeroplanes

Destination

The weather reports/forecasts must indicate that during the period 1 hour before until 1 hour after the ETA at the aerodrome, the met conditions will be at or above the following:

• The RVR/visibility must be as required for the aerodrome operating minima.

• For a non-precision or circling approach, the ceiling must be at or above MDH.

or

Two destination alternates must be selected.

Alternate

A take-off aerodrome can also be used as an enroute and landing alternate.

The defined in the table below are applicable to destination alternate, isolated destination and 3% ERA.

[3% ERA: An en-route alternate aerodrome selected for the purposes of reducing contingency fuel to 3%]

Type of Approach	**Planning Minima**
CAT II and CAT III	CAT I RVR
CAT I	Non-precision RVR and the ceiling must be above MDH (See note)
Non-precision	Non-precision RVR and the ceiling must be above MDH (See note) plus 200 ft and 1000 m
Circling	Circling (Vis/RVR/MDH(VM(C))

Note. *Non-precision means the next highest minimum that is available at the aerodrome. So, for CAT I ILS this could be ILS no GP or, for example, a VOR/DME. The same is applicable to non-precision approaches.*

Destination alternate(s)

The selected destination alternate (diversion) aerodromes are to be detailed in the OFP.

At least one destination alternate (diversion) aerodrome must be selected for each IFR flight unless:

• Both, the duration of the planned flight from take-off to landing (or in the event of a replan), the remaining flight time does not exceed 6 hours, and two separate runways are available and useable at the destination aerodrome and the met reports/forecasts indicate that from 1 hour before until 1 hour after ETA at the destination, the ceiling will be at least 2000 ft or circling height +500 ft (whichever is greater) and the visibility will be not less than 5 km.

• The destination is so isolated that no useable diversion aerodrome exists.

Planning Minima – ETOPS En-Route Alternate

An operator shall only select an aerodrome as an ETOPS en-route alternate aerodrome when the appropriate weather reports or forecasts, or any combination thereof, indicate that between the anticipated time of landing until one hour after the latest possible time of landing, conditions calculated by adding the additional limits from the table below.

Approach facility	Alternate airfield ceiling	Weather minima Visibility/RVR
Precision approach procedure.	Authorized DH/DA plus an increment of 200 ft	Authorized visibility plus an increment of 800 metres
Non-precision approach or circling approach	Authorized MDH/MDA plus an increment of 400 ft	Authorized visibility plus an increment of 1500 metres

Prior to conducting an ETOPS flight, the operator shall ensure that an ETOPS en-route alternate aerodrome is available, within either the operator's approved diversion time, or a diversion time based on the MEL generated serviceability status of the aeroplane, whichever is shorter.

Meteorological Conditions

For an IFR flight, the commander shall only commence take-off or continue beyond the point from which a revised flight plan applies in the event of in-flight re-planning, when information is available indicating that the expected weather conditions at ETA at the destination and/or required alternate aerodromes, are at or above the planning minima.

The commander shall continue towards the planned destination aerodrome when the latest information available indicates that at ETA the weather conditions at the destination or at least one destination alternate are at or above the applicable aerodrome operating minima.

For a VFR flight, the commander will only commence the flight when the weather reports or forecasts indicate that the meteorological conditions along the route (or the part of the route to be flown under VFR) will permit flight under VFR.

Aerodrome Operating Minima (AOM)

For all aerodromes the operator is required to define the applicable aerodrome operating minima (AOM):

- For take-off, the minimum acceptable met visibility or, where available, the minimum acceptable RVR or IRVR.

- For instrument approaches, the AOM consists of DA/H or MDA/H and the minimum applicable met visibility or RVR/IRVR.

- Additionally for non-precision approaches, ICAO Annex 6 also mentions 'cloud consideration'.

The commander or the pilot to whom conduct of the flight has been delegated may commence an instrument approach regardless of the reported RVR/visibility, but the approach shall not be continued beyond the outer marker (or equivalent position) on a precision approach, or below 1000 ft on a non-precision approach, if the reported RVR/visibility is less than the applicable minima. If, after passing the outer marker or equivalent position in accordance with above, the reported RVR/visibility falls below the applicable minimum, the approach may be continued to DA/H or MDA/H. The approach may be continued below DA/H or MDA/H and the landing may be completed provided that the required visual reference is established at the DA/H or MDA/H and is maintained.

When establishing aerodrome operating minima, the operator shall take the following into account:

(1) the type, performance and handling characteristics of the aircraft

(2) the composition, competence and experience of the flight crew

(3) the dimensions and characteristics of the runways/ FATO that may be selected for use

(4) the adequacy and performance of the available visual and non-visual ground aids

(5) the equipment available on the aircraft for the purpose of navigation and/or control of the flight path during the take-off, the approach, the flare, the landing, rollout and the missed approach

(6) for the determination of obstacle clearance, the obstacles in the approach, missed approach and the climb-out areas necessary for the execution of contingency procedures

(7) the obstacle clearance altitude/height for the instrument approach procedures

(8) the means to determine and report meteorological conditions

(9) the flight technique to be used during the final approach

Circling Operations

	Aeroplane category			
	A	B	C	D
MDH (ft)	400	500	600	700
Minimum meteorological visibility (m)	1 500	1 600	2 400	3 600

Maximum Distance from an Adequate Aerodrome for Two-engine Aeroplanes without an ETOPS Approval

Class A aircraft with seats ≥ 20 + MTOM ≥ 45360 kg → 1 hour one engine inoperative cruise speed

≤ 19 + MTOM ≤ 45360 kg → 2 hours one engine inoperative cruise speed

Class B or C → 2 hours one engine inoperative cruise speed or 300 NM, whichever is less

Fuel policy

The operator is required to establish a fuel policy for flight planning and re-planning purposes.

The pre-flight calculation of fuel required is to include taxi fuel, trip fuel, and reserve fuel consisting of:

• Contingency fuel

• Alternate fuel

• Final reserve fuel [reciprocating engines 45 min | turbine engines 30 min holding speed at 1500 ft]

• Additional fuel if required by the type of operation (i.e. ETOPS)

• Any extra fuel required by the commander.

The basis for fuel-policy planning is provided by:

• Procedures contained in the Operations Manual

• Fuel-consumption data

• Anticipated masses

Passenger definitions

Inadmissible Passenger: A passenger carried in an aeroplane from a destination state to which the passenger did not have right of access (i.e. no visa, excluded from a visa waiver scheme, or no right of residence).

Deportee: A person subject to judicial deportation (legally expelled) from a state to a state to which that person has right of access/residence.

Person In custody: A person in the charge of a law enforcement officer being escorted from one state to another for judicial reasons.

Operators are required to establish procedures for the carriage and the commander is to be notified when such persons are carried on board.

Where a passenger is found to be inadmissible, the operator will be required to return the person to the state of departure or to another state to which that person has right of access. Initially the operator will be required to bear the cost of transportation but recover the cost from the person through a civil legal action.

Crew member duty station

Each member of the flight crew is to be at the designated duty station for take-off and landing. During all other phases of flight, each crew member is to remain alert and at the duty station, unless the duty in connection with the operation requires absence, or for physiological needs. All cabin crew are to be seated at their assigned stations during critical phases of flight.

De-icing/anti-icing

The commander is not permitted to commence the take-off run unless all the surfaces of the aeroplane are clear of all deposits which might adversely affect the performance of the aeroplane. The operator is to establish procedures for the de-icing and anti-icing of aeroplanes.

Occurrence reporting

A commander shall notify the operator of any accident or serious incident occurring while he/she was responsible for the flight.

An operator shall ensure that the Authority in the state of the operator, the nearest appropriate Authority (if not the Authority in the state of the operator), and any other organization required by the state of the operator to be informed, are notified by the quickest means available of any accident or serious incident.

The commander or the operator of an aeroplane shall submit a report to the Authority in the state of the operator within 72 hours of the time when the accident or serious incident occurred.

Specific reports

• Air traffic incidents→ notify without delay the ATSU + Authority

• Resolution Advisory (RA) → notify without delay

• Bird hazards and strikes → notify immediately the local ATS (bird strike report after landing to the Authority)

• Dangerous goods incidents and accidents → Operators shall report to the Authority and the Authority of the state where it occurred

• Unlawful interference → as soon as practicable to the local Authority and Authority of the state of operator

• Encountering potentially hazardous conditions → notify ATSU as soon as practicable

Chapter 5 – All Weather Operations

Aerodrome operating minima – operator responsability

An operator shall establish, for each aerodrome planned to be used, aerodrome operating minima that are not lower than the values given in OPS 1. The method of determination of the minima must be acceptable to the Authority.

In establishing the aerodrome operating minima which will apply to any particular operation, an operator must take full account of:

• The type, performance and handling characteristics of the aeroplane.

• The composition of the flight crew, their competence and experience.

• The dimensions and characteristics of the runways which may be selected for use.

• The adequacy and performance of the available visual and non-visual ground aids.

• The obstacles in the approach, missed approach and the climb-out areas required for the execution of contingency procedures and necessary clearance.

• The obstacle clearance altitude/height for the instrument approach procedures.

All approaches shall be flown as stabilized approaches (SAp).

All non-precision approaches shall be flown using the continuous descent final approach (CDFA) technique

Non precision approach (NPA) without CDFA technique includes: RVR – MDH - Visibility

Non precision approach (NPA) with CDFA technique includes: RVR – DH - Visibility

Planning minima: ceiling is limiting factor for NPAs

Classification of aeroplanes

Criteria used for the classification is the Indicated airspeed at threshold V_{AT}.

$V_{AT} = 1.3*V_S$ at MLM

Aeroplane Category	V_{AT}
A	Less than 91 kt
B	From 91 to 120 kt
C	From 121 to 140 kt
D	From 141 to 165 kt
E	From 166 to 210 kt

An operator shall not conduct low visibility take-offs in less than:

Category A, B and C aeroplanes → 150 m RVR

Category D → 200 m RVR

unless approved by the Authority.

Terminology

Circling: The visual phase of an instrument approach to bring an aeroplane into a position for landing on a runway which is not suitably located for a straight-in approach.

Low Visibility Procedures (LVP): Procedures applied at an aerodrome for the purpose of ensuring safe operations during Lower than Standard Category I, Other than Standard Category II, Category II and III approaches and low visibility take-offs.

The operator shall not use an aerodrome for LVOs below a visibility of 800 m unless: the aerodrome has been approved by the state of the aerodrome and Low Visibility Procedures have been established.

Low Visibility Take-off (LVTO): A take-off where the RVR is less than 400 m.

Take-off minima

- The take-off minima established by the operator must be expressed as visibility or RVR limits, taking into account all relevant factors for each aerodrome planned to be used and the aeroplane characteristics. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions (e.g. ceiling) must be specified.

- The Commander shall not commence take-off unless the weather conditions at the aerodrome of departure are equal to or better than applicable minima for landing at that aerodrome unless a suitable take-off alternate aerodrome is available.

- When the reported meteorological visibility is below that required for take-off and RVR is not reported, a take-off may only be commenced if the Commander can determine that the RVR/visibility along the take- off runway is equal to or better than the required minimum.

- When no reported meteorological visibility or RVR is available, a take-off may only be commenced if the Commander can determine that the RVR/visibility along the take-off runway is equal to or better than the required minimum.

Required RVR/Visibility

For multi-engine aeroplanes, whose performance is such that, in the event of a critical power unit failure at any point during take-off, the aeroplane can either stop or continue the take-off to a height of 1500 ft above the aerodrome while clearing obstacles by the required margins.

For multi-engine aeroplanes whose performance is such that they cannot comply with the above performance conditions in the event of a critical power unit failure may be operated to the following take-off minima provided they are able to comply with the applicable obstacle clearance criteria, assuming engine failure at the height specified.

The RVR minima used may not be lower than either of the values given in these tables.

When approved by the Authority, an operator may reduce the take-off minima to 125 m RVR for Cat A, B and C aeroplanes, or 150 m for cat D providing certain conditions. They can be further reduced, but not below 75 m.

Take-off RVR/Visibility	
Facilities	**RVR/Visibility (note 3)**
Nil (day only)	500 m
Runway edge lighting and/or centre line marking	250/300 m (notes 1 and 2)
Runway edge and centre line lighting	200/250 m (note 1)
Runway edge and centre line lighting and multiple RVR information	150/200 m (notes 1 and 4)

Take-off RVR/Visibility - flight path	
Assumed engine failure height above the runway	**RVR/Visibility (note 2)**
< 50 ft	200 m
51 - 100 ft	300 m
101 - 150 ft	400 m
151 - 200 ft	500 m
201 - 300 ft	1000 m
> 300 ft	1500 m (note 1)

If the reported Visibility/RVR is less than the applicable minimum, the approach shall not be continued:

- Below 1000 ft above the aerodrome or
- Into the final approach segment in the case where the DA/H or MDA/H is more than 1000 ft above the aerodrome.

System Minima Definition

Height derived for the lowest permitted DH or MDH taking into account the characteristics of the ground and airborne equipment. System minima are related to the type of approach and are standard figures for precision and non-precision approaches.

Non-precision approach

An operator must ensure that the minimum descent height for a non-precision approach is not lower than either the OCH/OCL for the category of aeroplane or the system minimum.

If the threshold elevation is 2 metres or more BELOW the elevation of the airfield, MDH is measured from the threshold rather than the airfield.

A pilot may not continue an approach below MDA/MDH unless at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:

- Elements of the approach light system
- The threshold
- The threshold markings
- The threshold identification lights
- The threshold lights
- The touchdown zone or markings
- The touchdown zone lights
- The visual glide slope indicator
- Runway edge lights, or other visual references accepted by the Authority.

Facility	Lowest DH/MDH (ft)
ILS/MLS/GLS	200
GNSS/SBAS (LPV)	200
GNSS (LNAV)	250
GNSS/Baro-VNAV (LNAV/ VNAV)	250
LOC with or without DME	250
SRA (terminating at ½ NM)	250
SRA (terminating at 1 NM)	300
SRA (terminating at 2 NM or more)	350
VOR	300
VOR/DME	250
NDB	350
NDB/DME	300
VDF	350
ILS (no glide path - LLZ)	250

Precision approach

Categories	Decision Height	RVR/Visibility
Category I	not lower than 60m (200 ft)	not less than 550m (visibility) and 800m (RVR)
Category II	lower than 60m (200 ft) but not lower than 30m (100 ft)	RVR not less than 300m
Category III – A	lower than 30m (100 ft) or no decision height	RVR not less than 175m
Category III – B	lower than 15m (50 ft) or no decision height	RVR less than 175 m but not less than 50m
Category III – C	no decision height limitations	no RVR limitations

An operator is only permitted to conduct:

- CAT I operations if the DH is determined by means of a barometric altimeter
- CAT II and CAT III operations if the DH is determined by means of a radio altimeter

Circling

An option will always be available to make an instrument approach to one runway and then carry out a circling manoeuvre to land on another runway more suitably into wind or to meet ATC requirements. This is called Visual Manoeuvring Circling (VM(C)). The instrument approach will terminate at the defined MDH for (VM(C)) and this will be maintained throughout the circling manoeuvre until established on visual final for the landing runway.

	Aeroplane Category			
	A	B	C	D
MDH	400 ft	500 ft	600 ft	700 ft
Minimum Met Visibility	1500 m	1600 m	2400 m	3600 m

Visual approach

A visual approach is defined as an IFR approach completed with visual reference to terrain. There is no requirement for the pilot to see the aerodrome of the landing runway at the commencement of the approach, however, the pilot must be capable of navigating the aeroplane with reference to the underlying terrain.

VFR Operating Minima

Airspace Class	A B C D E (Note 1)	F G	
		Above 900 m (3000 ft) AMSL or above 300 m (1000 ft) AGL whichever is the higher	At and below 900 m (3000 ft) AMSL or 300 m (1000 ft) AGL whichever is the higher
Distance from cloud	1500 m horizontally 300 m (1000 ft) vertically		Clear of cloud and in sight of the surface (CCISG)
Flight visibility	8 km at and above 3050 m (10 000 ft) AMSL (note 2) 5 km below 3050 m (10 000 ft) AMSL		5 km (note 3)

Special VFR flights are not to be commenced when the visibility (flight or ground) is less than 3 km and not otherwise conducted when the flight visibility is less than 1.5 km.

Low Visibility Operations

The operator shall establish procedures and instructions to be used for LVO, describing the duties of flight crew members for:

•Taxiing • Take-off •Approach •Flare •Landing •Rollout •Missed approach operations

Prior to commencing a LVO, the PIC/commander shall be satisfied that:

- the status of visual and non-visual facilities is sufficient
- appropriate LVPs are in force according to information received from ATS
- flight crew members are properly qualified.

The operator shall conduct the following LVO when approved by the authority:

- LV take-off operations
- lower than standard (LTS) CAT I
- standard CAT II and CAT III
- approach using enchanted vision systems (EVS)

Chapter 6 – Aeroplane Equipment and Instruments

Cockpit door

All aeroplanes with more than 19 passenger seats are required to have a lockable door between the passenger compartment and the flight deck. The door is to have a notice on it stating that entry is only permitted to crew members.

First Aid Kits

Emergency medical kit are to be carried in aeroplanes authorized to carry more than 30 passengers if the flight is 60 minutes or more based on the number of passengers.

First Aid kit instead are to be carried as follow:

Passengers	First Aid Kits
0 - 100	1
101 - 200	2
201 - 300	3
301 - 400	4
401 - 500	5
501 or more	6

First Aid Oxygen

An operator shall not operate a pressurized aeroplane at altitudes above 25 000 ft, when a cabin crew member is required to be carried, unless it is equipped with a supply of undiluted oxygen for passengers who, for physiological reasons, might require oxygen following a cabin depressurization.

When the cabin altitude exceeds 8000 ft but does not exceed 15 000 ft, for at least 2% of the passengers carried.

Shall be capable of generating a mass flow to each user of at least 4 litres per minute, STPD.

There shall be a sufficient number of dispensing units, but in no case less than 2 and for at least 1 passenger.

Cockpit Voice Recorder

Flight recorders must meet the prescribed crashworthiness and fire protection specifications and are required to have a device fitted to assist underwater location. CVRs are required to switch on automatically prior to the aeroplane first moving under its own power and continue to record until the termination of the flight.

It is required for:

Case 1: Multi-engine turbine aircraft issued with a CofA on or after 1 April 1998 and a max passenger seating capacity of more than 9, the CVR must record at least the last 30 minutes.
For any aircraft (turbine or piston) registered after this date with MTOM in excess of 5700 kg, the recording limit is extended to 2 hours.

Case 2: Multi-engine turbine aircraft with a CofA issued between 1 Jan 1990 and 31 Mar 1998 and a max passenger seating capacity of more than 9. The recorder must record at least the last 30 minutes.

Case 3: Any aircraft with a CofA issued before 1 April 1998 with a MTOM greater than 5700 kg, the recorder must record for at least the last 30 minutes.

Summary

All aeroplanes > 5700 kg MTOM at least the last 30 minutes. (Case 3)

From 1 Jan 1990 rule expanded to include multi-engine turbine powered aeroplanes, MTOM < 5700 kg but > 9 passenger seats. (Case 2)

From 1 April 1998 recording time increase to 2 hours for aeroplanes over 5700 kg MTOM.

Flight Data Recorder

They are usually painted a Day-Glo colour (either red or yellow) and required to be capable of recording data pertaining to the operation of the aeroplane systems, control positions, and performance parameters.

The flight data recorder shall be capable of retaining the data recorded during at least the last 25 hours of operation.

It is to be retain for minimum 60 days.

It is required for:

Turbine powered aeroplanes MTOM>5700 kg (Case 3)

After 1 June 1990 this was expanded to include all aeroplanes MTOM > 5700 kg (Case 2)

After 1 April 1998 rule was further extended to include turbine powered aeroplanes MTOM < 5700 kg, but with seats > 9. However, on these aircraft the recording time can be reduced to 10 hours.

Equipment for VFR rules

- Magnetic compass
- An accurate timepiece showing the time in hours, minutes and seconds
- An operator shall not conduct day VFR operations unless the aeroplane is equipped with a headset with boom microphone or equivalent for each flight crew member on flight deck duty

Compliance with IFR, or VFR at Night

All the same as per VFR plus:

• a standby altimeter

• Two independent static pressure systems

• An airspeed indicating system with heated pitot tube or equivalent means including a warning indication of pitot heater failure.

An aeroplane operated under IFR or VFR over routes not navigated by reference to visual landmarks, it is to be fitted with at least:

• VOR • DME

An aeroplane operated under IFR or VFR at night, it is to be fitted with at least:

• VOR • ADF • DME

Additionally, if flying in airspace which requires it • Area Navigation System • Altitude alerting SSR

and, if required for the intended approach • ILS • MLS • Marker receiver

The requirement for VOR/DME/ADF is to be **x2** where navigation is based on that aid alone.

Aeroplanes operated under IFR with a single-pilot crew are required to have an autopilot with at least an altitude hold and heading mode.

Aeroplanes operated under VFR over routes navigated by reference to visual landmark should have the following communication requirements:

- Ground station radio communication
- ATC radio communication in controlled airspace
- Meteorological info to be obtained by radio communication
- Transponder

Single pilot operation under IFR and at night need 50 h IFR experience and 15 h night on relevant type or class

Altitude Alerting System

An operator shall not operate a turbine propeller powered aeroplane with a MTOM > 5700 kg or having seats > 9 or a turbojet powered aeroplane unless it is equipped with an altitude alerting system capable of:

• Alerting the flight crew upon approaching a preselected altitude.

• Alerting the flight crew by at least an aural signal, when deviating from a preselected altitude.

Standby Horizon

An aeroplane with a MTOM > 5700 kg or having seats > 9 must be equipped with an additional, standby, attitude indicator (artificial horizon), capable of being used from either pilot's station and providing reliable operation for a minimum of 30 minutes after total failure of the normal electrical generating system.

Flight over Water

This is considered to be more than 50 NM from shore, or when take-off or approach path is over water. Aeroplanes flying over water are required to be fitted with one life jacket with a location light or equivalent individual floatation device for each person on board with.

On overwater flights, an operator shall not operate an aeroplane at a distance away from land, which is suitable for making an emergency landing, greater than that corresponding to:

- 120 minutes at cruising speed or 400 NM, whichever is the lesser, for aeroplanes capable of continuing the flight to an aerodrome with the critical power unit(s) becoming inoperative at any point along the route or planned diversions; or

- 30 minutes at cruising speed or 100 NM, whichever is the lesser, for all other aeroplanes, unless the equipment below is carried.

- Sufficient life-rafts to carry all persons on board. Unless excess rafts of enough capacity are provided, the buoyancy and seating capacity beyond the rated capacity of the rafts must accommodate all occupants of the aeroplane in the event of a loss of one raft of the largest rated capacity.

The life-rafts shall be equipped with a survivor locator light and lifesaving equipment including means of sustaining life as appropriate to the flight to be undertaken.

- At least two survival emergency locator transmitters (ELT) capable of transmitting on 121.5 MHz and 406 kHz.

Weather Radar

When carrying passengers in pressurized aircraft, the aeroplane is to be fitted with serviceable weather radar whenever the aeroplane is being operated in areas where thunderstorms or other potentially hazardous weather conditions, which can be detected with airborne weather radar, are expected to exist along the route.

It has to be equipped in unpressurized aeroplanes with MTOM > 5700 kg and seats > 9

EGPWS

An Enhanced GPWS (EGPWS or TAWS) includes a predictive terrain hazard warning function and is required to be fitted to all turbine powered CAT aeroplanes with MTOM > 5700 kg and seats > 9. The GPWS is required to provide automatic warnings by aural and visual indications:

- Sink rate
- Ground proximity
- Altitude loss after take-off or go-around
- Incorrect landing configuration
- Downward glide slope deviation.

Airborne Collision Avoidance System [ACAS]

All turbine powered aeroplanes > 5700 kg MTOM or having >19 passenger seats must be equipped with ACAS II.

Communication Equipment

2 VHF transceivers for domestic airspace and at least 1 VHF and 1 HF for Oceanic flight.

In addition, if there are more than 1 flight crew members, they must have a flight crew interphone, utilizing headsets and boom microphones.

An IFR flight shall operate if equipped with an audio selector panel accessible to each required flight crew member.

Electrical Circuit Fusing [circuit breakers/fuse]

There must be at least 10% of each type and fuse rating with the proviso that there are not less than 3 of each.

Windshield Wipers

They are required to be fitted at each pilot station if the MTOM > 5700 kg.

Carriage and Use of Supplemental Oxygen

The total number of dispensing units and outlets shall exceed the number of seats by at least 10 % (110% of number of seats).

For the purpose of this table 'passengers' means passengers actually carried and includes infants under the age of 2.

Check concerning oxygen equipment to be done during taxi and demonstrated before take-off.

For the flight crew, in normal mode the regulator supply to the mask become pure oxygen only at or above 32000 ft.

Pressurized airplane

① All occupant of Flight deck seat on duty
- cabin pressure > 13000 ft → entire flight time
- cabin pressure 10000-13000 ft → entire flight time after first 30 min but no less than:

30 min for airplane certified for altitudes < 25000 ft
2 hrs for airplane certified > 25000 ft (quick-don masks)

② All required cabin crew
- cabin pressure > 13000 ft → entire flight time but no less than 30 min
- cabin pressure 10000-13000 ft → entire flight time after first 30 min

③ 100% of passengers
cabin pressure > 15000 ft → entire flight time but no less than 10 min

④ 30% of passengers
cabin pressure 14000-15000 ft → entire flight time

⑤ 10% of passengers
cabin pressure 10000-14000 ft → entire flight time after first 30 min

	Supply For:	Duration and Cabin Pressure Altitude
1.	All occupants of flight deck seats on duty	Entire flight time when the cabin pressure exceeds 13 000 ft and entire flight time when cabin pressure exceeds 10 000 ft but does not exceed 13 000 ft after the first 30 minutes at those altitudes, but in no case less than: (i) 30 minutes for aeroplanes certificated to fly at altitudes not exceeding 25 000 ft (note 2) (ii) 2 hours for aeroplanes certificated to fly at altitudes more than 25 000 ft (note 3) The masks fitted to these aircraft must be "quick-don" style
2.	All required cabin crew members	Entire flight time when cabin pressure altitude exceeds 13 000 ft but not less than 30 minutes (note 2), and entire flight time when cabin pressure altitude is greater than 10 000 ft but does not exceed 13 000 ft after the first 30 minutes at these altitudes
3.	100% of passengers (note 5)	Entire flight time when the cabin pressure altitude exceeds 15 000 ft but in no case less than 10 minutes (note 4).
4.	30% of passengers (note 5)	Entire flight time when the cabin pressure altitude exceeds 14 000 ft but does not exceed 15 000 ft
5.	10% of passengers (note 5)	Entire flight time when the cabin pressure altitude exceeds 10 000 ft but does not exceed 14 000 ft after the first 30 minutes at these altitudes.

Un-pressurized aeroplanes

① All occupant of Flight deck seat on duty

Pressure altitude > 10000 ft → entire flight time

② All required cabin crew

Pressure altitude > 13000 ft → entire flight time

Pressure altitude 10000-13000 ft → entire flight time after first 30 min

③ 100% of passengers

Pressure altitude > 13000 ft → entire flight time

	Supply For:	Duration and Pressure Altitude
1.	All occupants of flight deck seats on duty	Entire flight time at pressure altitudes above 10 000 ft
2.	All required cabin crew members	Entire flight time at pressure altitudes above 13 000 ft and for any period exceeding 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft
3.	100% of passengers (see note)	Entire flight time at pressure altitudes above 13 000 ft
4.	10% of passengers (see note)	Entire flight time after 30 minutes at pressure altitudes greater than 10 000 ft but not exceeding 13 000 ft

④ 10% of passengers

Pressure altitude 10000-13000 ft → entire flight time after first 30 min

Crew Protecting Breathing Equipment (PBE)

Flight crew → quick don [provide oxygen for no less than 15 min]

Cabin crew → PBE adjacent to each duty station

Additional PBE → adjacent to the required handheld fire extinguisher in galleys, class A or B cargo compartments

Crash Axes and Crowbars

Required for MTOM > 5700 kg + seats > 9 → in the flight deck (1 axe or crowbar)

If seats > 200 → additional crash axe or crowbar in the rearmost galley area [not visible to passengers]

Megaphone

Passenger Seating Configuration	Number of Megaphones Required
61 - 99	1
100 or more	2

Emergency Locator Transmitter (ELT)

Frequency of transmission: 121.5 MHz / 406 MHz (SARSAT data uplink)

Airplane seats > 19

• 1 automatic ELT or 2 ELTs of any type or

• 2 ELTs, one of which shall be automatic for aeroplanes first issued with an individual CofA after 1 July 2008.

Airplane seats < 19

• 1 ELT of any type or

• 1 automatic ELT for aeroplanes first issued with an individual CofA after 1 July 2008.

Chapter 7 – Crew, Logs and Records

The operator is to ensure that inexperienced flight crew members are not crewed together.

There shall not be more than one inexperienced crew member per flight crew.

The minimum flight crew for a turboprop aeroplane with seats > 9 and all turbojet aeroplanes, is 2 pilots (also for operations under IFR or at night)

Type rating: Successful completion of the course will involve passing a skill test which will have a period of validity of 12 months. Ground and refresh trainings follow the same rules.

Conversion training: is required before commencing unsupervised line flying when changing to an aeroplane for which a new type or class rating is required or when changing operator.

Difference training: to operate a variant of a type of aeroplane or another type of the same class currently operated or equipment is changed for types or variants. Difference = Theory + Sim.

Familiarization training: acquisition of additional knowledge when operating another type or variant, or when procedures or equipment is changed. Familiarization = Theory only. It occurs also for major changes in the equipment are introduced in the aircraft flown.

Operator proficiency check: This requires a pilot to demonstrate proficiency and competence in carrying out normal, abnormal and emergency procedures. Period of validity: 6 months (3 months rule). This includes: RTO, take-off with engine failure, 3D approach with OEI, 2D approach (at least one 3D or 2D approach should be an RNP APCH or RNP AR APCH), missed approach with OEI, landing with OEI. The validity periods shall be counted from the end of the month when the check was taken.

Line check: to demonstrate competence in carrying out normal line operations as described in the OM. Line flying under supervision must be no later than 21 days after a successful completion of a skills test or after training deemed appropriate. Validity: 12 months (3 months rule).

Emergency and Safety Equipment Training and Checking: location and use of all emergency and safety equipment carried on the aeroplane. Validity: 12 months (3 months rule).

Pilot Qualifications to Operate in Either Pilot Seat: The additional training must include the following: An engine failure after take-off, a 1 engine inoperative approach and missed approach and a one engine inoperative landing.

Recent Experience: To act as PF and PNF 3 take-offs and landings in the last 90 days in an aeroplane, or in a flight simulator, of the same type/class. To act as a commander one landing at night in the preceding 90 days as PF in an aeroplane or in a flight simulator, of the same type or class if IR not valid. The 90-day period may be extended to 120 days under the supervision of a TRI or TRE.

Route and Aerodrome qualification: Validity 12 months (3 months rule) from last operation on the aerodrome. Revalidation occurs by operating the route/aerodrome within the period of validity.

Operation of Aeroplanes and Helicopters: operator to ensure 1 type of each is flown as limitation.

Cabin Crew

If seats > 19 with with at least 1 pax → at least 1 cabin crew

For every 50 seats (or fractions) → additional 1 cabin crew

Senior Cabin Crew → at least 1 year of experience + appropriate course

Number of airplane types ≤ 3

Journey Log

An operator shall retain the following information for each flight in the form of a journey log:

- Aeroplane registration
- Date
- Place of departure
- Place of arrival
- Time of departure (off blocks)
- Time of arrival (on blocks)
- Flight hours
- Nature of flight
- Name(s) of crew members(s)
- Crew member(s) duty
- Incidents, observations (if any)
- Commander’s signature

A journey log can be replaced if relevant information is available in other documentation. All entries are to be made concurrently and are to be permanent in nature.

Storage Periods

Operators are to ensure that all records and relevant operational and technical information for each individual flight are stored in an acceptable form, accessible to the Authority.

Information used for the preparation and execution of flights	
Operational Flight Plan	3 months
Aeroplane Technical Log	36 months after the last date of entry
Route specific NOTAM briefing information if edited by the operator	3 months
Mass and balance documentation	3 months
Special load notification	3 months

Reports	
Journey Log	3 months
Flight reports for recording details of any occurrence, as prescribed in OPS or any event which the Commander deems necessary to report/record	3 months
Reports on exceedances of duty and/or reducing rest periods	3 months

Flight Crew Records	
Flight duty and rest time	15 months
Licence	As long as the flight crew member is exercising the privileges of the licence for the operator
Conversion training and checking	3 years
Command course (including checking)	3 years
Recurrent training and checking	3 years
Training and checking to operate in either pilot seat	3 years
Recent experience	15 months
Route and aerodrome competence	3 years
Training and qualification for specific operations (e.g. ETOPS CATII/III etc.)	3 years
Dangerous goods training	3 years

Cabin Crew Records	
Flight, duty and rest time	15 months
Initial training, conversion and difference training (including checking)	As long as the cabin crew member is employed by the operator
Recurrent training and refresher (including checking)	Until 12 months after the cabin crew member has left the employ of the operator
Dangerous goods training	3 years

Records for other Operations Personnel	
Training/qualification records of other personnel for whom an approved training programme is required by OPS	Last 2 training records

Other Records	
Cosmic and solar radiation dosage	Until 12 months after the cabin crew member has left the employ of the operator
Quality system records	5 years
Dangerous goods transport documentation	3 months after the completion of the flight
Dangerous goods acceptance checklist	3 months after the completion of the flight

Flight and Duty Time Limitations

• Augmented flight crew: A flight crew which comprises more than the minimum number required for the operation of the aeroplane and in which each flight crew member can leave his/her post and be replaced by another appropriately qualified flight crew member.

• Flight duty period: A flight duty period (FDP) is any time during which a person operates in an aircraft as a member of its crew. The FDP starts when the crew member is required by an operator to report for a flight or a series of flights; it finishes at the end of the last flight on which he/she is an operating crew member.

• Block time (Flight time): The time between an aeroplane first moving from its parking place for the purpose of taking off until it comes to rest on the designated parking position and all engines or propellers are stopped.

• Window of Circadian Low (WOCL): The Window of Circadian Low (WOCL) is the period between 02.00 and 05.59 AM

• Night Duty: 02:00 – 05:00 AM

Cumulative **duty hours**: An operator shall ensure that the total duty periods to which a crew member is assigned do not exceed (spread as evenly as practicable throughout this period):

- 60 duty hours in any 7 consecutive days
- 110 duty hours in any 14 consecutive days
- 190 duty hours in any 28 consecutive days

Limit on total **block times**: An operator shall ensure that the total block times of the flights on which an individual crew member is assigned as an operating crew member does not exceed:

- 900 block hours in a calendar year
- 100 block hours in any 28 consecutive days

Maximum Daily Flight Duty Period → 13 hours

3 sectors	→	12.5 hours	5 sectors	→	11.5 hours
4 sectors	→	12 hours	≥ 6 sectors	→	11 hours

The FDP is further reduced if the flight commences or ends in the WOCL.

The FDP by the operator can be extended by up to 1 hour, but no more than twice in any 7-day period, and not if the FDP encroaches on the WOCL.

The FDP can be extended by the commander in unforeseen circumstances by up to 2 hours, becoming 3 hours if the crew is augmented. He shall consult all crew members on their alertness levels before deciding the modifications of the FDP

The minimum rest period working home base is 12 hours, or the length of the preceding FDP whichever is greater.

When away from home base it is 10 hours or the duration of the preceding FDP, whichever is greater.

Command course

It shall include:

- Line training as commander under supervision for a minimum of 10 flight sectors + line check
- Command responsibilities training
- CRM training

Chapter 8 – Long Range Flight and Polar Navigation

Course and INS Cross-checking

• In a 3-set system, the output of each system should be compared (a voting system) from which inaccuracy in any one system should be quickly detected.

• In a 2-set system, the failure of one system would not be readily detected unless the system captions malfunction codes. If it is possible to obtain a fix, comparing with the system positions should reveal the inaccurate system.

If uncertainty still exists more basic methods include contacting another aeroplane in the vicinity and cross-checking spot winds, ground speed and drift.

Unable to continue the flight as per the ATC clearance

If an aeroplane is unable to continue the flight as per the ATC clearance, a revised clearance shall, whenever possible, be obtained prior to initiating any action. This shall also apply to aircraft which are unable to maintain the specified navigation accuracy.

Polar Navigation

Polar tracks defined as North/South routes involve navigation at high latitudes (above 65°N).

In this situation, navigation is achieved by reference to a grid navigation process or reliance on inertial systems and satellite based global positioning (GPS).

In areas where the rate of change of magnetic variation becomes excessive (in close proximity to the North Magnetic Pole), VOR beacons are orientated to true north to assist grid navigation.

Minimum Time Routes

The track flown between two points which results in the shortest time adhering to all ATC and airspace restrictions.

Geographically, the shortest distance between any two points is the minor arc of the great circle joining both those points.

It in fact is defined at a certain time, which takes wind into consideration. For such reason, it may not coincide with the great circle track.

Before computer minimum time routes have been 'manually' calculated by taking 3, 4 or 5 alternative track options from a point and taking wind into account, determining the route that achieves the greatest track distance in a given time period (usually 1 hour).

Chapter 9 – Minimum Navigation Performance Specification Airspace [MNPS]

The Airspace

Within the NAT region, the area over the ocean and northwards towards the North Pole is designated as airspace in which a minimum standard for air navigation has been specified.

The NAT region is regulated, among other, according to the ICAO document 7030 (regional supplementary procedures).

This is known as the NAT Minimum Navigation Performance Specification Airspace (MNPSA).

All traffic flying across the North Atlantic is required to fly IFR.

To this extent, all the airspace is classified as class A between FL55 and FL660.

Class A is controlled airspace (CAS) in which ATC is provided to IFR traffic therefore the airspace must, by definition, be a control area (CTA). The airspace is defined as an Oceanic Control Area (OCA).

There are 5 NAT OCAs encompassing the MNPSA (Shanwick, Santa Maria, Gander, New York, Reykjavik) with 5 corresponding Oceanic Area Control Centres (OACCs) at Prestwick, Lisbon, Gander, New York and Reykjavik respectively.

Operators of aircraft flying within the MNPSA are required to have authority approval (stated on the AOC) requiring the aircraft to be able to navigate in accordance with the relevant RNP. Approval for MNPS will be indicated to Air Traffic by inserting the letters SX in item 10 of the flight plan.

Pilots should maintain their last assigned Mach number during step-climbs in oceanic airspace. If due to aircraft performance this is not feasible ATC should be advised at the time of the request for the step climb.

RVSM

MNPS Airspace extends from Flight Level (FL) 285-420, incorporating the RVSM FLs 290-410 from 27°-90° N

Aircraft flying in MNPSA must also be authorized to fly RVSM and must comply with the altimetry Minimum Aircraft System Performance Specification (MASPS). All FL are available in both directions. Outside the OTS standard RVSM FL apply.

The minimum equipment requirement for RVSM flight is as follows:

- 2 independent barometric altimeters agreeing to within ± 200 ft
- Autopilot with height hold capability
- Altitude deviation alerting system (minimum of an aural alert if the aircraft deviates by ± 300 ft)
- SSR with altitude alerting mode (mode C)
- The altimeters must be checked prior to entering the NAT OCA. Pilots must report when reaching any new cruising level, and if a deviation of more than 300 ft occurs it must be reported to ATS, with a subsequent written report post flight.

Navigation System Requirements

2 independent Long Range Navigation Systems (LRNS) to cater for failure of one system (1 LRNS for special routes)

Approved systems may be: • GNSS (GPS) • INS • IRS

Each system must be capable of providing continuous position, track and speed information and each must have a failure warning indication.

Minimum Navigation Specification approved by state of registry and of the operator: RNP4 or RNP 10

In addition, all turbine powered aeroplanes with MTOM > 5700 kg, or having seats > 19 are required to carry and operate ACAS II in the NAT region.

NAT Tracks

Europe → North America = Early departure [morning] → Daytime

North America → Europe = Late departure [evening] → Night-time

A set of roughly parallel tracks is established with lateral separation based on the MNPS RNP. The FLs allocated to these tracks are RVSM levels and the tracks are made effectively 'one way only' and both the eastbound and the westbound semi-circular RVSM levels are allocated to the track direction.

These tracks are called organized tracks and the overall concept is called the organized track system (OTS).

The use of the tracks is not mandatory and a route that does not comply with the existing OTS is called a 'random route'.

OTS Track Designation

2 OTS are established: Daytime → Westbound Night-time → Eastbound

Each track in the OTS is given an individual identifier or designator.

For the daytime OTS the tracks are lettered from "A" for the most northerly at the start point and then sequentially lettered in a southerly direction.

In the flight plan is used the abbreviation "NAT" followed by the code letter assigned to the track.

OTS Changeover

At some time of the day the eastbound OTS will be replaced with the westbound OTS and vice versa.

An aircraft flying the OTS must plan to cross 30W during the period of the OTS to be able to fly the entire route as a NAT track.

The standard OTS periods of validity are:

Daytime (Westbound) → OTS 1130-1900UTC at 30W

Night-time (Eastbound) → OTS 0100-0800UTC at 30W.

The changeover periods are 0801Z to 1129Z and 1901Z to 0059Z.

OTS Message (Track Message - TM)

The airspace managers of the 5 OCAs together with Met advisers hold a conference to decide the following day's OTS.

The OTS is then distributed to interested parties in the form of an OTS message which specifies the date, period of validity,

The routes (Lat/Long positions and named positions) by designator, and remarks including the track message identifier (TMI) and notices regarding airspace reservations and navigational data.

Track Message Identifier (TMI)

The TMI is a method of identifying the OTS promulgated by the OACC. It consists of the name of the OACC, the abbreviation TMI followed by the Julian date of the OTS. The Julian calendar starts at 001 for 1 January and ends at 365 for 31 December (366 for a leap year). [ex. eastbound OTS for 28 February is Gander TMI 059].

Track Routing

After the track identifier, the first position in a NAT track is the entry point. This can be either a Lat/Long or a named position (the ICAO standard for position names is used - 5 letters). The rest of the route, in the 5-character Lat/Long form and named positions if applicable, follows.

Example

A 59/10 61/20 61/30 61/40 61/50 60/60 CIMAT

A → OTS route identificatory (the most northerly of that OTS)

59/10 = 59N10W → Entry point

61/20 61/30 61/40 61/50 60/60 → Route

CIMAT → Exit point

Allocation of FLs

In theory, all the RVSM FLs (290 - 410 inclusive) should be available for allocation. In practice FLs are allocated to also support random routes and non-NAT traffic.

Example

EAST LVLS NIL; WEST LVLS 310 320 330 340 350 360 390

The inclusion of EAST LVLS NIL implies that for the period of the OTS all other direction traffic along this route would be random route traffic.

Domestic Routes

The TM also includes details of specific routing from domestic airspace to the entry point for the route and also from the exit point into domestic airspace.

Random routes

Operators are required to consider the implications of planning such routes and the OACCs will apply whatever restrictions are necessary to random routes to protect the OTS traffic. The use of the unrestricted FLs (those not included in the TM for each route) would be appropriate.

Other Routes within NAT MNPS Airspace

- (*) 'Blue Spruce' Routes, established as special routes for aircraft equipped with only one serviceable LRNS. State approval for MNPS operations is required in order to fly along these routes.
- Routes between Northern Europe and Spain/Canaries/Lisbon FIR. (T9*, T13 and T16)
- (*) Routing between the Azores and the Portuguese mainland and between the Azores and the Madeira Archipelago
- (*) Routings between Iceland and Constable Pynt on the east coast of Greenland and between Kook Islands on the west coast of Greenland and Canada
- Special routes of short stage lengths where aircraft equipped with normal short-range navigation equipment can meet the MNPS track-keeping criteria (G3 and G11). State approval for MNPS operations is required in order to fly along these routes.

(*) Route can be planned by aircraft equipped with normal short-range navigation equipment (VOR, DME, ADF) and at least one approved fully operational LRNS.

Route Structures Adjacent to NAT MNPS Airspace

- North American Routes (NARs) → Routes between NAT oceanic and North American domestic airspace
- Canadian Domestic Track Systems
- North Atlantic European Routing Scheme (NERS)
- Shannon Oceanic Transition Area (SOTA) and Northern Oceanic Transition Area (NOTA)
- Part of the Shanwick OCA is designated as the Brest Oceanic Transition Area (BOTA).

Communications

Primary method of communication is HF SSB voice.

Long range VHF is available to aircraft when within 250 NM of land, and VHF is also used for the delivery of oceanic clearances to aircraft prior to entering the OCAs.

VHF air-to- air frequency (123.45 MHz) is used to allow an aircraft experiencing any communications or navigation problems to talk to another aircraft. All aircraft flying on NAT routes are also required to monitor 121.5 MHz.

The general rule for HF frequencies is that to talk to a station 1 000 NM away you will need a higher frequency during the day than at night ("the higher the Sun, the higher the frequency"). There are 24 HF frequencies allocated in bands ranging from 2.8 to 18 MHz.

SELCAL use

- Provide SELCAL code in the flight plan

- Check the operation of the SELCAL equipment at or prior to entry into oceanic airspace with the station.
- Maintain thereafter a SELCAL watch (even if SATCOM Voice or ADS/CPDLC are used)

Position Reports

Likewise, whenever specified, north/ south routes cross whole 10° of latitude at whole degrees of longitude. At these points pilots are required to make position reports. For an east/west route this is going to be at approximately every 500 NM.

North of 70° → each 20° of longitude

South of 70° → each 10° of longitude

This meets the ICAO requirement for position reports to be made at intervals not greater than 1 hour.

If estimated time for the position is in error of ≥ 3 minutes, a revised estimated time is to be transmitted asap to the ATS

Data link communications are gradually being introduced into the NAT environment for position reporting. On first contact with the initial radio stations crews of participating aircraft should expect to receive the instruction “VOICE POSITION REPORTS NOT REQUIRED”.

The requirements for position plotting are:

- Draw the intended route on a chart and check for gross errors
- Regularly plot the aircraft’s position during the sortie as a navigational cross check

Radio Failure in the North Atlantic Area

In the case of radio failure prior to exiting the NAT region, the pilot shall maintain the last received and acknowledged oceanic clearance, including level and speed, to the last specified oceanic route point, normally landfall, then:

Cleared On Filed Flight Plan Route: Continue on the filed flight plan route and after passing the last specified oceanic route point (landfall) the pilot shall conform to the relevant state procedures/regulations.

Cleared Other Than Filed Flight Plan Route: After passing this point, the pilot shall conform to the relevant state procedures/regulations and re-join the filed plan route by proceeding via the published ATC route structure where possible to the next significant point ahead as contained in the filed flight plan.

Initial Clearance

At least 40 minutes before entering the NAT airspace (above FL55) pilots are required to obtain an oceanic clearance directly from the initial OACC. The clearance request should include requested FL, and maximum acceptable FL at the entry to the OCA. The clearance will include the limit of clearance (normally the destination), the track identifier, the entry point, the initial FL, the Mach number required and any specific instructions

If the aerodrome of departure is less than 40 minutes flying time from the entry point to the OTS, the oceanic clearance will have to be obtained on the ground.

If an aircraft encounters, whilst enroute to the NAT Oceanic Airspace, a critical in-flight equipment failure, or at dispatch is unable to meet the MEL requirements for RVSM or MNPS approval on the flight, then the pilot must advise ATC at initial contact when requesting oceanic clearance. Changes by 3 minutes or more require a revised estimate to ATC.

Transition

Because the OTS uses all the available FLs as ‘one-way streets’ when an aircraft leaves the OTS and joins the domestic route system an adjustment in FL may be required. Special areas known as “transition areas” ensure this is only conducted where there is no loss of separation.

SSR

When flying in the NAT region, the last assigned SSR code by a domestic ATCU is to be maintained for a period of 30 minutes after entering the OCA. After that, mode A2000 plus C is to be set and maintained.

Meteorological Report

They are no longer required, but turbulence or other significant meteorological conditions encountered are to be reported.

Special contingencies

The inability to maintain level, navigate accurately or communicate are serious problems.

At the first indication that things are 'not normal' pilots are advised to communicate the problem to the OACC. Loss of HF communications may be overcome by asking an adjacent aircraft on VHF to relay. Remember all aircraft flying in the MNPSA are required to monitor 123.45 MHz and 121.5 MHz. Pressurization failure will require the aircraft to descend rapidly to a safe level and pilots are required to broadcast safety information (altitude passing) on 121.5.

Strategic Lateral Offset Procedure (SLOP)

If an aeroplane flying in the NAT MNPSA encounters wake turbulence and the pilot considers it necessary, a procedure has been established (SLOP) to allow the aeroplane track to be offset from that of the aeroplane causing the turbulence.

3 options: fly along the cleared track centreline, offset by 1 NM right, offset 2 NM to the right.

If wake turbulence is encountered whilst flying in the NAT MNPS airspace, a report is to be submitted to the NAT Central Monitoring Agency.

It is not required to inform ATC about the SLOP deviation, but the route has to be joined again before the exit point.

Deviation Around Severe Weather

If the aircraft is required to deviate laterally from track to avoid weather, the pilot should request a revised clearance from ATC and obtain essential traffic information prior to deviating. However, if for any reason such prior revised ATC clearance cannot be obtained: turn on all exterior lights, deviate from OTS, alert nearby aircraft at suitable intervals both on 123.45 and 121.5 MHz, watch TCAS.

For deviations < 10 NM, aircraft should remain at the level assigned by ATC.

For deviations > 10 NM, when the aircraft is approximately 10 NM from track, initiate a level change of +/-300 ft.

The general rule is: if you deviate north, descend 300 ft: if you deviate south, climb 300 ft.

Unable to fly in accordance with clearance

Unable to Obtain Revised Clearance

In the event it is not possible to obtain an <u>immediate revised clearance</u>, the pilot shall use the procedure: turn on all exterior lights, alert nearby aircraft at suitable intervals on 121.5 MHz, watch TCAS and initiate such actions as to ensure their safety.

If a pilot of an aeroplane is unable to obtain a <u>revised ATC clearance</u>, the aeroplane should leave its assigned route or track by <u>turning at least 30° to the right or left</u> whenever this is possible. The direction of the turn should be based on the following factors:

- Aircraft position relative to any OTS or route system
- Direction of flights and FL allocated on adjacent tracks
- Direction to an alternate airport

• Strategic lateral offset being flown

• Terrain clearance

If the deviation is less than 5 NM, the pilot should do all the previous steps + maintain the assigned FL.

When able to maintain assigned flight level:

• Turn to acquire and maintain in either direction a track laterally separated by 5 NM ~~15 NM~~ from its assigned route or track, and

• If above FL410, climb or descend 300 m (1000 ft)

• If below FL410, climb or descend 150 m (500 ft)

• If at FL410, climb 300 m (1000 ft) or descend 150 m (500 ft)

An aeroplane unable to maintain its assigned flight level should:

• Initially minimize its descent rate to the extent that it is operationally feasible.

• Turn while descending to acquire and maintain in either direction a track laterally separated by 15 NM from its assigned route or track, and

• For the subsequent level flight, a level should be selected which differs from those normally used by 300 m (1000 ft) if above FL410 or by 150 m (500 ft) if below FL410.

Navigation System Failure

Remember MNPSA requires 2 LRNSs. (If you have 3 LRNS and 1 fails, you are still allowed in the airspace. If you have 2 LRNS and 1 fails, you cannot enter the airspace).

Before entering MNPSA → try to solve it before entering or land and get it repaired

Under no circumstances should an aircraft enter the MNPSA with unresolved navigation errors.

Alternatively, the pilot may consider obtaining a clearance to remain outside MNPSA.

If an aircraft with only two LRNSs suffers a system failure after entering the MNPSA, the flight is to be continued in accordance with the clearance received. In this case the pilot should:

• Assess the situation

• Prepare a proposal to put to the OACC

• Advise and consult with the OACC

• Obtain appropriate re-clearance prior to deviation from the previous clearance

The pilot should also attempt to establish communications with another aircraft that the pilot can see and cross-check heading information with the other aircraft. If the remaining system fails after entering the MNPSA, the pilot should:

• Notify the OACC immediately

• Make best use of the information obtained from other aircraft

• Keep a good look out for other aircraft

• Make maximum use of exterior lights

• Consider climbing or descending 500 ft

• Revert to manual navigation if the navigation computer has failed

As a precaution in case of IRS/INS failure, plot on a map at intervals (15 min) position and time on a polar stereographic chart.

Errors Associated with Oceanic Clearances

• ATC System Loop Errors: An ATC system loop error is any error caused by a misunderstanding between the pilot and the controller regarding the assigned flight level, Mach number or route to be followed.

• Waypoint Insertion Errors

Longitudinal Separation

Minima → 10 min based on RNP20 [same Mach and Level]

Time

15 min → Same Mach, different track

10 min → if Mach number technique is applied [same Mach and same track]

10 min → at the point where tracks diverge (same speed and track)

5 min → if lateral separation is achieved

Lateral Separation

Minima → 1° of Latitude = 60 NM

Crew training

Flight crew is required to undergo training prior to operating within the NAT. The intended objectives are to highlight the risks of complacency and lack of adherence of SOP due to over-reliance on the prevision and reliability of modern aeroplane systems

Chapter 10 – Special Operational Procedures and Hazards

Minimum Equipment List (MEL) and Master Minimum Equipment List (MMEL)

The MEL is applicable (can be used) up to the commencement of flight

Commencement of flight: The point when an aeroplane begins to move under its own power for the purpose of preparing to take-off.

Operator's Responsibility

The operator is required to establish a MEL for each type of aeroplane used in the operation.

The MEL is to be approved by the Authority. The MEL is to be based on, but must not be less restrictive than, the MMEL which has been accepted by the Authority.

Commander's Responsibility

The commander is required to make a decision whether or not to accept an aeroplane with unserviceability allowed by the Configuration Deviation List (CDL) or the MEL.

The Clean Aircraft Concept

During conditions conducive to aircraft icing, take-off shall not be attempted when ice, snow, slush or frost is present, or adhering to the wings, propellers, control surfaces, engine inlets or other critical surfaces.

De-icing and anti-icing on the ground can be either a one-step or a two-step procedure:

- In the case of a one-step procedure, de-icing and anti-icing are carried out at the same time using a combined de-icing and anti-icing fluid to both remove frozen deposits and to protect the de-iced surfaces for a limited period of time.

- The two-step procedure involves a process of ice removal followed by a process of anti-icing.

Airspeed indicator behaviour when ice blocks either pitot or static port

Pitot blocked → ASI underreads during a descent [PUD]

Static blocked → ASI overread during a descent [SOD]

The Holdover Time

Time (HOT) is the estimated time during which the de-icing/anti-icing fluid will be effective and is started at the beginning of the anti-icing stage either in a one step or two step procedure. The aircraft must commence its take-off roll within the HOT, or the whole process, de-ice followed by anti-ice, must be repeated. The HOT is dependent on the OAT, temperature of the skin, type of precipitant, wind and type and concentration of fluid.

Types of fluid

Currently there are 3 types of fluid in general use for turbojet aircraft, type I, II or IV. (Type III can be diluted type II or IV cleared for use on turboprop aircraft). Aircraft must be treated symmetrically, and the pilot in command must ensure that the critical surfaces of the aeroplane are free of ice, snow, slush or frost just prior to take-off.

Bird Strike Risk and Avoidance

ICAO operates IBIS, the ICAO Bird Strike Information System which is designed to collect and disseminate information on bird strikes to aircraft. Aeronautical charts are annotated with known areas where birds congregate and where wildlife sanctuaries have been established. Similarly, the well-defined migratory routes of birds, together with the times of the year during which such migrations occur, are also published in AIP ENR 5.6.

Where birds are a continual risk to aeroplanes, airport authorities set up bird control units (BCUs) employing trained operatives and techniques to reduce the number of birds visiting an aerodrome.

In the event of an aeroplane suffering a bird strike, the commander is to submit a written report of the incident after landing.

Noise Abatement

OPS requires noise abatement procedures to be established by operators for IFR operations in accordance with ICAO PANS OPS Doc 8168.

Detailed information about noise-abatement procedures is to be found in Part ‘Aerodromes’ (AD), Sections 2 and 3 of the AIP.

An operator shall establish appropriate operating departure and arrival/approach procedures for each aircraft type and for the same type it should be the same for all aerodromes.

For each aeroplane type two departure procedures shall be defined, in accordance with ICAO Doc. 8168 (Procedures for air navigation services, "PANS-OPS"), Volume I:

1. noise abatement departure procedure one (NADP 1), designed to meet the close-in noise abatement objective

2. noise abatement departure procedure two (NADP 2), designed to meet the distant noise abatement objective

3. in addition, each NADP climb profile can only have one sequence of actions.

A runway lead-in lighting system should be provided where it is desired to provide visual guidance along a specific approach path for purposes of noise abatement.

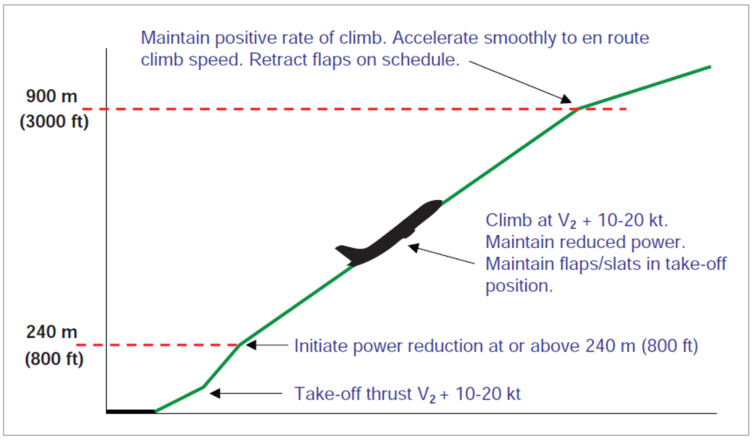
Conditions for establishing noise preferential routes

During take-off and climb should not be required unless:

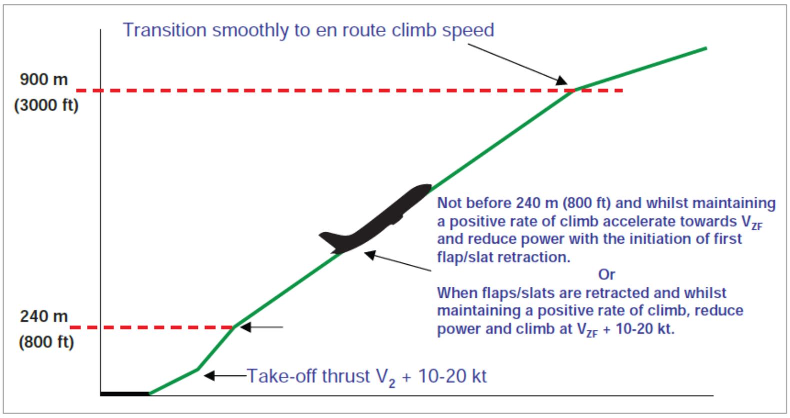
• The bank angle for turns after take-off is limited to 15° except where adequate provision is made for an acceleration phase permitting attainment of safe speeds for bank angles greater than 15°.

• No turns should be required coincident with a reduction of power associated with a noise abatement procedure

• Sufficient navigational guidance should be provided to permit aeroplanes to adhere to the designated route



NADP 1 - close proximity



NADP 2 - more distant areas

Limitations

Noise abatement procedures should not be selected if noise benefits cannot be expected. The pilot in command has the authority to decide not to execute a procedure if conditions preclude the safe execution of the procedure.

In particular it should not be a determining factor for the runway choice when:

- Crosswind > 15 kts
- Tailwind > 5 kts
- Ceiling < 500 ft
- Windshear is reported or adverse meteo conditions
- Runway surface adversely affected

Noise abatement procedures do not prevent the use of thrust reverse on landing

Procedures are not to be used in conditions where windshear warning exists, or the presence of windshear or downburst activity is suspected.

Departure Climb Guidance

The first procedure (NADP 1) is intended to provide noise reduction in close proximity to the departure end of the runway.

The second procedure (NADP 2) provides noise reduction to areas more distant from the runway end.

The two procedures differ in that the acceleration segment for the flap/slat retraction is either initiated prior to reaching the maximum prescribed height or at the maximum prescribed height.

The initial climbing speed to the noise abatement initiation point shall not be less than:

V_2 + 20 km/h to 40 km/h (10 to 20 kt)

The noise abatement procedure is not to be initiated at less than 240 m (800 ft) above the aerodrome elevation.

Constant Descent Final Approach (CDFA)

Non-precision approaches conducted by commercial air transport aeroplanes used by EU operators should be flown on CDFA profiles, to ensure that a Stabilized Approach can be conducted.

The aeroplane descends from the lowest holding altitude (LHA) in the arrival stack and adopts a 300 ft/NM rate of descent that is maintained all the way to the runway threshold.

Cold soak effect

It involves wings when they contain very cold fuel as a result of having just landed after a flight at high altitudes or being refuelled with very cold fuel. It may occur in ambient temperature between -2°C and +15°C.

Ice or frost in the presence of visible moisture or high humidity if the aircraft structure remains at or below 0°C.

Chapter 11 – Fire and Smoke

Fire and Smoke

The operator is required to include procedures in the OM for abnormal and emergency operations whilst action specific checklists may either be verbatim extracts from the OM or extracts or annexes from the aircraft manual.

Piston Engines

Fuel selector → OFF or Mixture Control → Idle Cut OFF

Allow the engine to run itself dry of fuel and stop.

Ignition → OFF [affected engine]

Turbojet Engines

Engine Thrust Lever → CLOSED

Engine HP cock → OFF

Engine fire warning switch → PULLED [affected engine]

This will isolate the fuel supply form the engine, but if the warning persists, rotate the engine fire warning switch to operate either of the 2 fire extinguisher systems. Wait 30 seconds. If warning persists, operate the remaining extinguisher.

HP (high-pressure) cock: The cock (s) used to stop the engine by cutting off the fuel supply to the burners. These may be electrically or manually controlled and are usually incorporated into fuel control units to eliminate unnecessary pipe connections.

Turboprop Engines → same as per Turbojet, but propeller feathering will be required in some stage of the procedure.

The Number and Location of Hand-held Fire Extinguishers

Flight Deck Extinguisher

At least 1 extinguisher, Halon 1211 suitable for both flammable fluid and electrical equipment fires.

Where a galley is not located on the main passenger deck, at least 1 extinguisher is to be provided at that location.

Maximum approved passenger seating configuration	Number of Extinguishers
7 - 30	1
31 - 60	2
61 - 200	3
201 - 300	4
301 - 400	5
401 - 500	6
501 - 600	7
601 or more	8

Where the passenger seating is 31-60, at least 1 extinguisher must be Halon 1211

Where the passenger seating > 61, 2 must be Halon 1211.

Only Halon 1211 or water handheld extinguishers are cleared for use on aircraft.

Classes of fire

Class A → Combustibles or fibrous material (wood, paper, …)

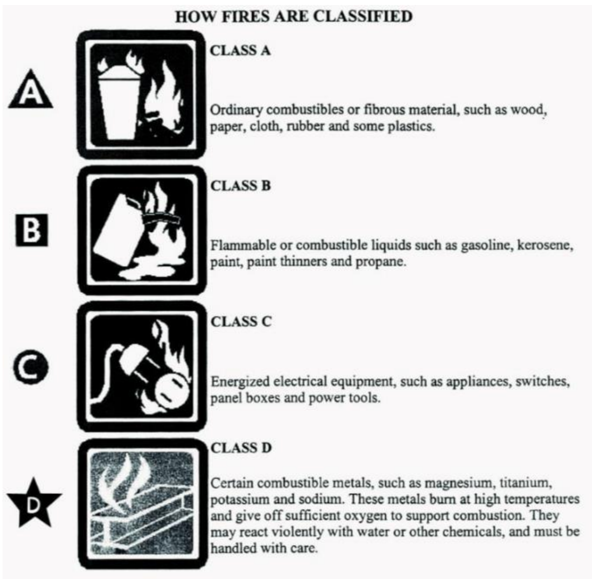
Class B → Flammable liquids

Class C → Flammable gasses

Class D → Combustible metals (magnesium, titanium, …)

Class E → Electrical

Class F → Oil and fats



Type of fire extinguishers

- H_2O → paper, fabric, wood fire [A]
- Foam → solid material, flammable liquids [A, B]
- CO_2 /Halon → solid materials, Flammable liquids and gas [B, C, E]
- Dry Powder (dry chemical) → paper, plastic, hydrocarbon, electrical fire [A, B, C, D, E]
- Wet chemical → cooking oil/fat [F]

In case of fire due to overheating brakes, use Dry Powder and spray atomizer fire extinguishers.

Smoke

The effects of smoke are reduced visibility and physiological changes to people (effects of irritation to the eyes, irritation to the airways, over stimulation of the nasal passages and irritation to the lungs).

In order to combat the effects of smoke in the cockpit, smoke hoods are provided, or the supplementary oxygen mask is designed to provide protection from smoke ingress.

Smoke in the passenger's cabin will cause panic in passengers and the aversion to covering the mouth and nose by a drop out oxygen mask in the untrained, needs to be firmly handled. Reassurance is the best method calming upset passengers.

Overheated Brakes

Where braking is abnormal excessive heating of the brake system (brake units at the wheels) may result in brake fires or inadequate dispersal of generated heat. Brake packs continue to heat, and reach their maximum temperature, up to 30 minutes after their use.

This may cause tyres to ignite or explode, welding of brake components (seizing) and, greatly reduced braking action both during the period of hard braking and during taxiing after reducing to safe speed.

It is essential where hot brakes are concerned, that fire prevention/fighting personnel/equipment are/is in attendance and if taxiing the aircraft that a fire truck follows.

Give consideration to where the aircraft is to be parked (proximity of other aircraft, buildings, refuelling points) and the possibility of an emergency evacuation of the passengers.

Chapter 12 – Pressurization Failure

Decompression of a pressurized cabin under any circumstances requires that the aeroplane is descended to a minimum of 10000 ft or the lowest safe flight level whichever is the highest.

Rapid or explosive decompression is the result of a failure of the airframe to contain the cabin pressure.

The most obvious indication of a rapid or explosive decompression is white-out, where the moisture in the atmosphere vaporizes, causing instantaneous fog.

In extreme cases (rapid and explosive decompression), sinuses and teeth may explode, ear drums rupture, and severe abdominal distension may occur resulting in rupturing of internal organs. The effects especially in the head, may be pronounced where the person is suffering vent blockage due to a build of mucus with a cold. During prolonged periods of reduced oxygen, tunnel vision and sensorial depletion may result.

Slow decompression is the failure of the pressurization system to maintain the cabin pressure where there has not been a failure of the airframe. The crew should notice the loss on gauging systems if fitted, cabin altimeter showing an increase or cabin differential pressure gauge showing a reduction.

During a slow decompression, passengers and crew will be aware of barometric pressure changes on the ears. Other body cavities (teeth, sinuses and gut) may give rise to discomfort.

If it is not possible to equalise the differential pressure by natural venting, serious damage may result.

At night, night vision will be seriously impaired at relatively low cabin altitudes.

Chapter 13 – Windshear and Microburst

Low altitude windshear is a sudden change of wind velocity along the final approach path or along the runway and along the take-off and initial climb-out path.

Vertical windshear is the change of wind vector with height.

Horizontal windshear is the change of wind vector with horizontal distance.

The effect of windshear is an abrupt displacement from the flight path and the need for substantial control action to counter it.

During take-off preparation, windshear can be predicted by observing:

- Lenticular clouds close to the airfield located in a mountainous area
- Precipitation not reaching the surface (virga)
- Wind sock
- Smoke from chimneys divided in different directions instead of moving steadily in one direction

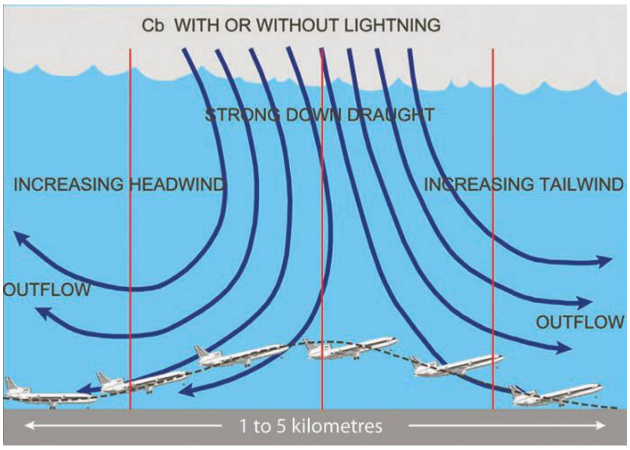
The vital actions to counter the loss of airspeed (and lift) caused by windshear near the ground are:

- Full power

- Raise the nose to check descent. (OPS recommends 15°, unless otherwise stated.)

- Co-ordinate power and pitch.

In a microburst situation, the combination of increasing headwind followed by a downdraught, followed by increasing tailwind will result in a temporary energy gain followed by increasing energy loss. The effect during any approach profile will be to cause the aeroplane to sink below the glide path although the first indication is the 'ballooning' of the energy gain. Any action to counter the energy gain will be potentially disastrous. A successful escape will depend upon an adequate reserve of engine power, height and speed.



Decreasing HW/Increasing TW → reduction of airspeed + below the GS

Increasing HW/Decreasing TW → increasing airspeed + above the GS

Chapter 14 – Wake Turbulence

The term wake turbulence is used to describe the effect of the rotating air masses generated behind the wing tips of jet aircraft.

The characteristics of the vortex are determined by the aircraft gross weight, the wingspan, airspeed and attitude.

The greatest turbulence being produced by heavy aircraft, flying slowly in a clean configuration.

Typically, the 2 vortices are separated by about 3\4 of the aircraft wingspan and in still air tend to drift slowly downwards and, either level off usually not more than 1000 ft below the flight path of the aircraft, or on approaching the ground move tangentially at about 300 ft/sec from the track of the aircraft (in still air). This decays to an average sideways speed of 5 kt.

Wake vortex generation begins when the nose wheel lifts off the runway on take-off and ceases when the nose wheel touches down again.

ICAO wake turbulence categories

Light → MTOM ≤ 7000 kg

Medium → 7000 kg ≤ MTOM ≤ 136000 kg

Heavy → MTOM ≥ 136000 kg

Separation Minima

They shall be applied to an aircraft on approach and departure phase of flight when:

• An aircraft is operating behind another aircraft at the same altitude or less than 300 m (1000 ft) below, or

• Both aircraft are using the same runway or parallel runways separated by less than 760 m, or

• An aircraft is crossing behind another aircraft at the same altitude or less than 300 m (1000 ft) below.

Departure			
Leading Aircraft	**Following Aircraft**		**Spacing**
Heavy	Medium or Light	Departing from the same position	2 minutes
Medium	Light		
Heavy	Medium or Light	Departing from an intermediate point on the runway	3 minutes
Medium	Light		

Landing

Leading Aircraft	Following	Distance (NM)	Time Equivalent
Heavy	Heavy	4	-
Heavy	Medium	5	2 min
Heavy	Light	6	3 min
Medium	Heavy	3	-
Medium	Medium	3	-
Medium	Light	5	3 min

Chapter 15 – Security

• Aircraft Security Check: An inspection of the interior of an aircraft to which passengers may have had access and an inspection of the hold for the purposes of discovering suspicious objects, weapons, explosives or other dangerous devices, articles and substances.

• Screening: The application of technical or other means which are intended to identify and/or detect weapons, explosives or other dangerous devices, articles or substances which may be used to commit an act of unlawful interference.

• Security: Safeguarding civil aviation against acts of unlawful interference. This objective is achieved by a combination of measures and human material resources.

• Security restricted area: Those areas of the airside of an airport which are identified as priority risk areas where, in addition to access control, other security controls are applied.

• Unidentified baggage: Baggage at an airport, with or without a baggage tag, which is not picked up by or identified with a passenger.

Operators are required to operate training programmes to train personnel to minimize opportunities for unlawful interference and the consequences of such events should they occur.

The commander or the operator is to submit a report without delay to the designated local authority and the Authority in the state of the operator.

Wherever possible, an aeroplane subject to unlawful interference shall be flown on the assigned track until ATC can be informed or until within radar surveillance coverage. Where deviation from assigned track is unavoidable and ATC is not informed, the commander is to broadcast warnings on the emergency frequencies unless circumstances on board dictate otherwise.

If procedures have been detailed in Regional Supplementary Procedures they should be used if possible.

If no applicable regional procedures exist, proceed at a level which differs from normal IFR cruising levels by 500 ft, if vertical separation minima is 1000 ft or 1000 ft in areas where vertical separation minima is 2000 ft.

ICAO contracting states are obliged to take all adequate measures to protect passengers and crew of any aeroplane subject to unlawful interference until the journey can continue including a fully functional Air Traffic system. Such states will also provide landing clearance as may be necessitated by the circumstances.

When an aircraft subject to interference has landed in a state other than the state of registry, the Authority of the state is to inform the state of registry and the state of the operator by the most expeditious means.

Other states are to be informed where citizens of those states:

- have suffered fatalities or injuries
- have been detained as hostages
- are known to be on board

ICAO is also to be informed.

An operator shall ensure that there is on board a checklist of the procedures to be followed in search of a bomb or improvised explosive device (IED) in case of suspected sabotage and for inspecting aeroplanes for concealed weapons, explosives or other dangerous devices. It shall report the least-risk bomb location specific to the aeroplane.

Seats > 60 or MTOM > 45500 kg → lockable door from inside the cockpit + camera to monitor outside the door

An Operator shall ensure there is an on-board checklist of the procedures to be followed in searching for a bomb (security search procedure) and it shall contain:

- Aircraft specific checklist
- Action in the event of a discovery of a bomb
- Sabotage procedures

Chapter 16 – Emergency and Precautionary Landings

In all aircraft, unless otherwise stated, for an emergency landing on land undercarriage should be down, and for all landings on water the gear must be up.

Ditching

Ditching is a deliberate landing on water, it is not an uncontrolled impact.

The flight deck crew will action ditching checklists (type specific) and make any decisions necessary. It is a recommended (successfully proved) practice to land along the swell direction, on the crest of the swell. This will be where the water reaches its high point, the water will therefore be travelling downwards on initial contact, thereby reducing the impact force.

It is recommended to land the aeroplane at the lowest possible speed (gear up) with an attitude such that the tail will touch first.

Limitation to injuries of passengers will be achieved by adopting a braced posture whilst securely restrained in the seat harness, wearing a life jacket after having been fully briefed about what to expect during the landing and what to do afterwards.

Precautionary Landing

If the nature of the emergency is such that diversion to an enroute (or nearest) aerodrome is elected, then ATC should be informed of the decision to divert, the nature of the emergency and the assistance required.

It will be the responsibility of ATC to alert the ground emergency services (fire/rescue, medical) and to pass necessary information to the commander of the aeroplane in emergency.

Passenger Briefing

The cause of fear is ignorance, and the best way to overcome this is to brief the passengers fully (and also the cabin crew) about what has happened, what is being done and what is likely to happen subsequently.

Any procedure employed before an emergency landing/ditching must include a comprehensive brief to the passengers concerning the evacuation of the aeroplane after the event.

Evacuation

The aircraft must be stopped, and all engines shut down before ordering an evacuation. Aeroplanes seats > 44 must be capable of being evacuated in <u>less than 90 seconds</u> in a simulated emergency.

Megaphones

An aeroplane shall be equipped with portable battery-powered megaphones readily accessible for use based on passenger seats. For each passenger deck, passenger seating configuration number of megaphones required:

61 to 99	1
100 or more	2

For aeroplanes with more than one passenger deck, in all cases when the total seats > 60, at least 1 megaphone is required.

Chapter 17 – Fuel Jettison

Every aeroplane must have a fuel jettison system fitted unless the maximum landing mass exceeds the maximum take-off mass less the mass of the fuel necessary to carry out a 15-minute flight consisting of a take-off, climb to safe height, go-around and landing at the aerodrome of departure (all flown in the landing configuration).

Where a fuel jettison system is required, the system must be <u>capable of jettisoning enough fuel in 15 minutes</u> (starting at MTOM) to reduce the aeroplane mass to enable the aeroplane to meet the climb requirements of CS-25.

A fuel jettison system must be installed in a 2 engines aeroplane according to CS-25 when it is shown that at maximum takeoff weight, less the actual or computed weight of fuel necessary for a 15 minute flight, the steady gradient of climb in the landing configuration with all-engine operating is less than 3.2%. In the event of 1 engine inoperative, this is reduced to 2.7%

If the use of flaps or slats adversely affects the jettisoning of fuel, their use during jettisoning must be prohibited, and a placard stating this must be positioned adjacent to the jettison control.

When an aircraft that operates within controlled airspace needs to jettison fuel, the flight crew shall coordinate with ATC the following:

• route to be flown which, if possible, should be clear of cities and towns, preferably over water and away from areas where thunderstorms have been reported or are expected

• the flight level to be used, which should be > 1 800 m (6 000 ft)

• the duration of fuel jettisoning.

The ATC must be informed about when the jettison is about to commence and once it is complete.

Chapter 18 – Transport of Dangerous Goods by Air

ICAO Annex 18 details the international Standards and Recommended Practices for the carriage of articles or substances which are capable of posing significant risk to health, safety or property when transported by air.

Operators are not permitted to transport dangerous goods (as defined in Annex 18) unless approved by the Authority.

UN Number is the 4-digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods to identify a substance or a particular group of substances.

ICAO publishes Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO document 9284), and all operators are to take all reasonable measures to ensure that dangerous goods are packed as specified in the Technical Instructions.

The Operations Manual shall contain special notification requirements in the event of an accident or occurrence.

Labelling and Packaging

Operators are responsible for ensuring that all dangerous goods are carried and packed and labelled in accordance with the Technical Instructions.

The **shipper** is responsible for checking that dangerous goods offered for transport are not forbidden items and are properly classified, packed marked and labelled and accompanied by the properly executed dangerous goods transport documentation (Annex 18-Technical Instructions).

Operators are required to produce and follow a checklist (the Acceptance Checklist) for the acceptance procedure for dangerous goods.

Loading Restrictions

Where carried in the cargo compartments, goods are to be loaded, segregated, stowed and secured as specified in the Technical Instructions. Where goods are marked 'Cargo Aircraft Only', operators are to ensure that such goods are loaded in accordance with the Technical Instructions in dedicated cargo aeroplanes.

If radioactive material is carried, the radiation exposure of transport and storage personnel must be so controlled that none of them are likely to receive a radiation dose in excess of that permitted for members of the public.

Provision of information

When dangerous goods are carried on an aeroplane, the operator is to provide the commander with the required written information.

If an in-flight emergency occurs, the pilot in command should inform ATC for the information of the airport authorities, of any dangerous goods on board.

The operator is required to inform the State in which the accident/incident has occurred that the aircraft was carrying dangerous goods.

Accident and Incident Report

An operator must report dangerous goods incidents and accidents to the Authority and the appropriate Authority in the State where the accident or incident occurred. The first report should be despatched within 72 hours of the event.

The crew could expect to receive information on the carriage of dangerous goods from:

• Dangerous Goods training programme required by Part-ORO

• Loading documentation provided to the aircraft commander

• Operation Manual Part A

• Acceptance Checklist

• Feedback from Management System reporting scheme

Exceptions to dangerous goods are for:

- Medical aid (medical transport)
- SAR
- Agricultural spraying

Items not classified as dangerous goods that are allowed to be carried onboard by passengers are:

- Spare fuel cell cartridges (used to power electronic devices)
- Alcohol with less than 70% content by volume
- Safety matches

Dangerous goods forbidden for transport by air unless exempted by the states concerned:

- infected live animals
- dangerous goods identified in the Technical Instructions as being forbidden for transport in normal circumstances.

Chapter 19 – Contaminated Runways

Contaminated Runway

A runway is said to be contaminated if more than 25% of the surface area (whether in isolated patches or not) is covered by any of the following:

• Surface water more than 3 mm deep or by slush or loose snow equivalent to 3 mm of water.

• Snow which has been compressed into a solid mass which resists further compression and will hold together or break into lumps if picked up (compacted snow).

• Ice, including wet ice.

When landing on a contaminated or wet runway the LDA shall be ≥ 1,15*LDR (Landing Distance Required) and the Operator must state landing distance data in the Operations Manual.

Ice, frost and snow reduce LIFT by up to 30% and increase DRAG by up to 40%.

Damp Runway

A runway is considered damp when the surface is not dry, but when the moisture on it does not give a shiny appearance.

Wet Runway

A runway is considered wet when the runway is covered with water, or equivalent, less than specified in contaminated runway above, or when there is sufficient moisture on the runway surface to cause it to appear reflective, but without significant areas of standing water.

Dry Runway

A dry runway is one which is neither wet nor contaminated and includes those paved areas which have been specially prepared with grooves or porous pavement and maintained to retain effectively dry braking action even when moisture is present.

Part B of the Ops Manual will contain type specific information on procedures associated with take-off and landing on contaminated runways, together with performance data and any wind limitations.

Contaminant Depth Limitations

It is inevitable that operations from contaminated runways will be required. In such cases, the following depths are quoted, above which take-offs should not be attempted:

- dry snow depth greater than 60 mm (very dry – 80 mm)
- water, slush or wet snow greater than 15 mm

Aquaplaning (Hydroplaning)

During take-off and landing operations from contaminated runways (3 mm or more water), aquaplaning (hydroplaning) is a hazard that must be considered.

The aquaplaning speed is given by the formula: [dynamic = takeoff | spin up = landing]

$V = 9 * \sqrt{P}$ [Spin-down speed |Dynamic| Rotating tyre]

$V = 7.7 \sqrt{P}$ [Spin up | Nonrotating tyre]

- V = ground speed [kts]
- P = tyre pressure [psi]

$V = 34 * \sqrt{P}$ [Spin-down speed |Dynamic| Rotating tyre]

$V = 29 \sqrt{P}$ [Spin up | Nonrotating tyre]

- V = ground speed [kts]
- P = tyre pressure [bar]

1 bar = 14.5 psi

Braking action

Measured Coefficient	Estimated Braking Action	Code
0.40 and above	Good	5
0.39 - 0.36	Medium to good	4
0.35 - 0.30	Medium	3
0.29 - 0.26	Medium to poor	2
0.25 and below	Poor	1
unreliable	UNRELIABLE	9

Snowtam

Important items are:

- D → cleared length runway in meters reported by a 4 figures group added to the item D if the reported length is less than the published

- F → Type of contaminant,

- G → Depth of contaminant over each third of the runway in mm,

- H → Braking action on each $\frac{1}{3}$ of the runway [2 figure number to indicate measured coefficient, or a 1 figure number to indicate braking action]

- T → operational info in plain language and report on length of uncleared runway (Item D) and extent of runway contamination (Item F)

The validity of a SNOWTAM is up to 24 hours.

The codes for types of contaminants are:

- NIL → CLEAR AND DRY

- 1 → DAMP
- 2 → WET [or water patches]
- 3 → RIME OR FROST COVERED
- 4 → DRY SNOW
- 5 → WET SNOW
- 6 → SLUSH
- 7 → ICE
- 8 → COMPACTED OR ROLLED SNOW
- 9 → FROZEN RUTS OR RIDGES

Example

SWED0072 EDDM 12110810

(SNOWTAM0072)

(A) EDDM (B) 12110810 (C) 08L (F) 6/6/6 (G) 01/01/01H (H) 35/26/26

(N) 2,6 (R) 2,6 (T) RWY 08l PLANNED TO BE CLOSED DUE TO SLUSH REMOVAL

This decode is as follows:

A → Munich

B → 11 Dec 0810Z

C → Rwy 08L

N → Taxiway is contaminated with wet slush

R → Apron is contaminated with wet slush

T → Remarks (self-explanatory)

F → Over the whole of the runway there is slush reported

G → The mean depth of the slush is 1 mm over the entire length

H → The friction measurements are: [1/3] 0.35 (medium) – [2/3] 0.26 (medium/poor) – [3/3] 0.26 (medium/poor)