



COMMERCIAL AIR TRANSPORT FLIGHT OPERATION

1. Introduction

The commercial air transport flight operation is the flight operation involving the transport of passengers, cargo or mail for remuneration or hire.

1.1. Duties of pilot-in-command

The pilot-in-command shall be responsible for the operation, safety and security of the aeroplane and the safety of all crew members, passengers and cargo on board.

2. Flight operation

The pilot-in-command shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground (or water), including radio communication or navigation aids available are adequate for the type of operation under which the flight is to be conducted.

2.1. Operational instruction

2.1.1. Checklists

Checklists shall be used by flight crews during all phases of operations, and in emergencies, to ensure compliance with the operating procedures contained in the aircraft operating manual.

2.1.2. Minimum flight altitudes

The flight crew shall not operate flights on routes at altitudes lower than the minimum flight altitude established by the responsible state flown over (found on charts publications).

2.1.3. Aerodrome operating minima

The flight crew shall not operate to or from an aerodrome using operating minima lower than those which may be established for that aerodrome by the state in which it is located (except specific approval).

Category II and category III instrument approach and landing operations shall be not authorized unless RVR information is provided.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 1
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2.2. Flight preparation

A flight shall not be commenced until flight preparation forms have been completed certifying that the pilot-in-command is satisfied that:

- The aeroplane is airworthy
- The instruments and equipment for the particular type of operation to be undertaken, are installed and sufficient for the flight
- The mass of the aeroplane and the centre of gravity are such that the flight can be conducted safely, taking into account the flight conditions expected
- A check has been completed indicating that the operating limitation can be complied with for the flight to be undertaken.
- The operational flight planning is in compliance with the standards

2.2.1. Operational flight planning

An operational flight plan shall be completed for every intended flight.

2.2.2. Alternate aerodrome

2.2.2.1. Take-off alternate aerodrome

A take-off alternate aerodrome shall be selected and specified in the operational flight plan if either the meteorological conditions at the aerodrome are below the operator's established aerodrome landing minima for that operation.

The take-off alternate aerodrome shall be located within the following flight time from the aerodrome of departure:

- For 2 engines aeroplanes, 1 hour of flight time at an all engines operating cruising speed determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass.
- For 3 or more engines aeroplanes, 2 hours of flight time at an all engines operating cruising speed determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass.
- For aeroplanes engaged in extended diversion time operation (EDTO) where both previous distance criteria are not available, the first available alternate aerodrome located within the distance of the operator's approved maximum diversion time considering the actual take-off mass.

2.2.2.2. En-route alternate aerodrome

An en-route alternate aerodrome, required by extended diversion time operation by aeroplanes with 2 turbine engines, shall be selected and specified in the operational flight plans.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 2
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2.2.2.3. Destination alternate aerodrome

For a flight to be conducted in accordance with the instrument flight rules, at least one destination alternate aerodrome shall be selected and specified in the operational flight plan unless:

- The duration of the flight from departure aerodrome or from the point of in-flight re-planning, to the destination is such that, taking into account all meteorological conditions and operational information relevant to the flight at the estimated time of use, a reasonable certainty exists that the approach and landing may be under visual meteorological conditions and separate runways are usable at the estimated time of use of the destination aerodrome with at least one runway having an operational instrument approach procedure.
- The aerodrome is isolated and for each flight into an isolated aerodrome a point of no return shall be determined and the flight shall not be continued past this point of no return unless a current assessment of meteorological conditions, traffic and other operational conditions indicate that a safe landing can be made at the estimated time of use.

Operations into isolated aerodromes do not require the selection of destination alternate aerodromes.

2 destination alternate aerodromes shall be selected and specified in the operational flight plan when, for the destination aerodrome:

- Meteorological conditions at the estimated time of use will be below the operator's established aerodrome operating minima for that operation or
- Meteorological information is not available

The specific safety risk assessment to select an alternate aerodrome shall include at least the:

- Overall capability of the aeroplane and its systems
- Available aerodrome technology, capabilities and infrastructures
- Quality and reliability of the meteorological information
- Identified hazards and safety risks associated with each alternate aerodrome variation
- Specific mitigation measures

2.2.3. Meteorological conditions

A flight to be conducted in accordance with the visual flight rules (VFR) shall not be commenced unless current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown under visual flight rules will, at the appropriate time, be such as to enable compliance with these rules.

A flight to be conducted in accordance with the instrument flight rules (IFR) shall not:

- Take-off from the departure aerodrome unless the meteorological conditions, at the time of use, are at or above the operator's established aerodrome operating minima for that operation.
- Take-off or continue beyond the point of in-flight re-planning unless at the aerodrome of intended landing or at each alternate aerodrome selected, current meteorological reports or a combination of current reports and forecasts indicates that the meteorological conditions will be, at the estimated time, at or above the operator's established aerodrome operating minima for that operation.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 3
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2.2.4. Fuel requirements

An aeroplane shall carry a sufficient amount of usable fuel to complete the planned flight safely and to allow for deviation from the planned operation.

The amount of usable fuel carried shall, as a minimum, be based on:

- Aeroplane specific data from a fuel consumption monitoring system or aeroplane manufacturer data
- Operating conditions for the planned flight (mass, weather reports, air traffic services procedures and restrictions, NOTAM ...)

The pre-flight calculation of usable fuel required shall include:

- Taxi fuel
- Trip fuel
- Contingency fuel
- Destination alternate fuel
- Final reserve fuel
- Additional fuel
- Discretionary fuel

2.2.4.1. Taxi fuel

It is the amount of fuel expected to be consumed before take-off during start-up and taxi operation.

2.2.4.2. Trip fuel

It is the amount of fuel required to enable the aeroplane to fly from take-off, or the point of in-flight re-planning, until landing at the destination aerodrome taking the operating conditions into account.

2.2.4.3. Contingency fuel

It is the amount of fuel required to compensate for unforeseen factors.

It shall be **5% of the planned trip fuel** based on the consumption rate used to plan the trip fuel, and it shall not be lower than the amount required to fly for 5 minutes at holding speed at 450m (or 1500ft) above the destination aerodrome in standard condition.

Unforeseen factors could have an influence on the fuel consumption or could be in deviation of the expected fuel consumption like deviations from forecast meteorological conditions, extended taxi time, extra holding procedures, deviation from planned routing or different cruising levels.

2.2.4.4. Destination alternate fuel

It is the amount of fuel required, where a destination alternate aerodrome is required or planned:

- To perform a **missed approach** at the destination aerodrome
- To **climb** to the expected cruising altitude between destination aerodrome and alternate aerodrome
- To **fly the expected route** between destination aerodrome and alternate aerodrome
- To **descend** to the point where the expected approach is initiated
- To **conduct the approach and landing** at destination alternate aerodrome

Where two destination alternate aerodromes are required, the amount of fuel calculated shall take into account the aerodrome which requires the greater amount of alternate fuel.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 4
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Where a flight is operated without a destination alternate aerodrome, the amount of fuel required to enable the aeroplane to fly for **15 minutes at holding speed at 1500ft or 450m above destination aerodrome elevation in standard conditions**.

Where the destination aerodrome is an isolated aerodrome: (rare cases)

- For a reciprocating engine aeroplane, the amount of fuel required to fly for **45 minutes plus 15% of the flight time planned to be spent at cruising level** including the final reserve fuel or 2 hours, whichever is less
- For a turbine-engined aeroplane, the amount of fuel required to fly **2 hours at normal cruise consumption** above the destination aerodrome, including the final reserve fuel.

2.2.4.5. Final reserve fuel

It is the amount of fuel calculated using the estimated mass on arrival at the destination alternate aerodrome, or destination aerodrome when no destination alternate aerodrome is required

- For a reciprocating engine aeroplane, the amount of fuel required to **fly for 45 minutes** under speed and altitude specified by the operator of the aircraft
- For a turbine-engined aeroplane, the amount of fuel required to **fly 30 minutes at holding speed at 1500ft or 450m above destination aerodrome elevation in standard conditions**.

2.2.4.6. Additional fuel

It is the amount of fuel required if the minimum fuel calculated in Trip+Contingency+ Destination alternate+ Final reserve fuel is not sufficient to:

- Allow the aeroplane to descend as necessary and proceed to an alternate aerodrome in the event of engine failure or loss of pressurization on the assumption that such a failure occurs at the most critical point along the route
- Fly 15 minutes at holding speed at 1500ft or 450m above destination aerodrome elevation in standard conditions
- Allow EDTO (extended diversion time operations) critical fuel scenario
- Allow other restrictions not covered by previous requirements

2.2.4.7. Discretionary fuel

It is the **extra amount of fuel to be carried at the discretion of the pilot-in-command**.

This fuel can be extra fuel you may carry to perform a pilot exam in order to cover all planned exercises, or it can be the extra fuel, you may carry to perform a flight during an ATC exam covering extra holding patterns due to traffic flow.

2.2.5. In flight fuel management

In-flight fuel checks and fuel management shall be performed. The pilot-in-command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

The pilot-in-command shall advise ATC of a minimum fuel state by declaring **MINIMUM FUEL**, when the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 5
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MINIMUM FUEL declaration informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than the planned final reserve fuel.

MINIMUM FUEL is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

The words “MAYDAY FUEL” describe the nature of the distress conditions.

2.3. In flight procedures

A flight shall not be continued towards the aerodrome of intended landing if the latest available information indicates that at the expected time of arrival, a landing cannot be made in compliance with the operating minima.

2.3.1. Aerodrome operating minima

An instrument approach shall not be continued below 1000ft (or 300m) above the aerodrome elevation or into the final approach segment when the reported visibility or controlling RVR is below the aerodrome operating minima.

If, after entering the final approach segment or after descending below 1000ft or 300m above the aerodrome elevation, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H.

Hazardous flight conditions encountered, other than those associated with meteorological conditions, shall be reported to the appropriate air traffic controller as soon as possible.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 6
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2.3.2. In-flight operational instructions

Any change in the ATS flight plan shall be coordinated with the air traffic controller unit.

2.3.3. Instrument flight procedures

All aeroplanes operated in accordance with instrument flight rules (IFR) shall comply with the instrument flight procedures applicable for their flights.

2.4. Non applicable subjects for IVAO

The documentation will not present the following items as they are not used in the IVAO network:

- Re-fuelling with passengers on board
- Oxygen supply
- Passenger safety equipment
- Incapacitate flight crew members or passenger injury.
- Additional requirement for single pilot under IFR or at night
- Flight crew duties
- Requirements for single pilot operations under IFR or at night
- Fatigue risk management
- Flight data recorders

3. Aeroplane performance operating limitations

An aeroplane shall be operated in compliance with the terms of its certificate of airworthiness and within the approved limitations contained in its flight manual.

3.1. Mass limitations

In no case, the mass at the start of take-off will exceed the maximum take-off mass specified in the flight manual for the pressure-altitude appropriate to the elevation of the aerodrome.

In no case, the estimated mass for expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome will exceed the maximum landing mass specified in the flight manual for the pressure-altitude appropriate to the elevation of the aerodrome.

3.2. Take-off

The aeroplane shall be able, in the event of a critical engine failing, or for other reasons, at any point in the take-off and stop with the accelerate-stop distance available, or to continue the take-off and clear all obstacles along the flight path.

The length of the runway available shall be taken of the loss of runway length due to alignment of the aeroplane prior to take-off.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 7
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3.3. En-route

The aeroplane shall be able, in the event of the critical engine becoming inoperative at any point along the route or planned diversions therefrom, to continue the flight to an aerodrome at which the standard landing can be met without flying below the minimum flight altitude at any point.

In the case of aeroplanes having 3 and more engines, the aeroplane shall be able, in the event of any 2 engines becoming inoperative, to continue the flight to an en-route alternate aerodrome and land.

3.4. Landing

The aeroplane shall, at the landing aerodrome (destination or any alternate), after clearing all obstacles in the approach path by a safe margin, be able to land, with assurance that it can come to a stop within the landing distance available.

Allowance shall be made for expected variations in the approach and landing techniques.

4. Aeroplane equipment

This chapter will not present the items non applicable for a daily use in the IVAO network like medical supplies, fire extinguishers, seat belt, flight recorder, voice recorder, data link recorder, life jacket, oxygen.

4.1. Aeroplanes operated in accordance with visual flight rules (VFR)

All aeroplanes when operated as VFR flights shall be equipped with:

- A magnetic compass
- An accurate timepiece indicating the time in hours, minutes and seconds
- A sensitive pressure altimeter
- An airspeed indicator
- Additional instruments or equipment as may be prescribed by the appropriate authority

VFR flights which are operated as controlled flights shall be equipped like aeroplanes operated in accordance with instrument flight rules.

4.2. Icing conditions

All aeroplanes shall be equipped with suitable de-icing and/or anti-icing devices when operated in circumstances in which icing conditions are reported to exist or are expected to be encountered.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 8
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4.3. Aeroplanes operated in accordance with instrument flight rules (IFR)

All aeroplanes when operated in accordance with the instrument flight rules shall be equipped with:

- A magnetic compass
- An accurate timepiece indicating the time in hours, minutes and seconds
- Two sensitive pressure altimeters with counter drum-pointer or equivalent presentation
- An airspeed indicating system with means of preventing malfunctioning due to either condensation or icing
- A turn and slip indicator
- An attitude indicator (artificial horizon)
- A heading indicator (directional gyroscope)
- A means of indicating whether the power supply to the gyroscopic instrument is adequate
- A means of indicating the outside air temperature in the flight crew compartment
- A rate-of-climb and descent indicator
- Additional instruments or equipment as may be prescribed by the appropriate authority

4.4. Emergency power supply

All aeroplanes of a maximum certificated take-off mass of over 5 700 kg newly introduced into service after 1 January 1975 shall be fitted with an emergency power supply, independent of the main electrical generating system, for the purpose of operating and illuminating, for a minimum period of 30 minutes, an attitude indicating instrument (artificial horizon), clearly visible to the pilot-in-command.

The emergency power supply shall be automatically operative after the total failure of the main electrical generating system and clear indication shall be given on the instrument panel that the attitude indicator(s) is being operated by emergency power.

4.5. Aeroplanes operated at night

All aeroplanes when operated at night shall be equipped with:

- All equipment in accordance with instrument flight rules presented in chapter 4.3.
- Navigation lights for aircraft in flight or operating on the movement area of an aerodrome
- Two landing lights
- Illumination for all instruments and equipment that is essential for the safe operation of the aeroplane that is used by the flight crew.
- Lights in all passenger compartments and electric torch for each crew member

4.6. Mach number indicator

All aeroplanes with speed limitations expressed in terms of Mach number shall be equipped with a Mach number indicator.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 9
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4.7. Ground proximity warning systems (GPWS)

All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system.

All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

From 1 January 2007, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

From 1 January 2007, all piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings excessive descent rate and excessive altitude loss after take-off, warning of unsafe terrain clearance and a forward looking terrain avoidance function.

A ground proximity warning system shall provide automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface.

A ground proximity warning system shall provide, unless otherwise specified herein, warnings of the following circumstances:

- Excessive descent rate
- Excessive terrain closure rate;
- Excessive altitude loss after take-off or go-around;
- Unsafe terrain clearance while not in landing configuration: gear not locked down; flaps not in a landing position
- Excessive descent below the instrument glide path.

4.8. Airborne collision avoidance system (ACAS II)

From 1 January 2003, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

From 1 January 2005, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than 19 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

The TCAS instrument available with IvAp can be considered as ACASII instrument.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 10
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4.9. Pressure-altitude reporting transponders

All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2009 shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25ft), or better.

After 1 January 2012, all aeroplanes shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25ft), or better.

5. Aeroplane communication and navigation equipment

5.1. Communication equipment

An aeroplane shall be provided with radio communication equipment capable of:

- Conducting two-way communication for aerodrome control purposes;
- Receiving meteorological information at any time during flight; and
- Conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

The radio communication equipment shall provide for communications on the aeronautical emergency frequency 121.5MHz.

5.2. Navigation equipment

An aeroplane shall be provided with navigation equipment which will enable it to proceed:

- In accordance with its operational flight plan and,
- In accordance with the requirements of air traffic services and,
- Except when navigation for flights under the visual flight rules is accomplished by visual reference to landmarks.

The aeroplane shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the aeroplane to navigate in accordance with the previous requirement.

5.2.1. Performance based navigation operation (PBN)

For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, an aeroplane shall, in addition to the previous requirements be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specifications.

5.2.2. Minimum navigation performance specification operation (MNPS)

For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance specifications (MNPS) are prescribed, an aeroplane shall be provided with navigation equipment which continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track.

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 11
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5.2.3. Reduced vertical separation minimum operation (RVSM)

For flights in defined portions of airspace where a reduced vertical separation minimum (RVSM) of 300m or 1000ft is applied between FL 290 and FL 410 inclusive, an aeroplane shall be provided with equipment which is capable of:

- Indicating to the flight crew the flight level being flown
- Automatically maintaining a selected flight level
- Providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed $\pm 90\text{m}$ or $\pm 300\text{ft}$)
- Automatically reporting pressure-altitude

The vertical navigation performance capability of the aeroplane shall satisfy the requirements and the operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

Each IVAO division, which is responsible of airspace where RVSM has been implemented, shall establish procedures which ensure that appropriate action will be taken in respect of aircraft and operators found to be operating in RVSM airspace without a valid RVSM approval.

6. Other requirements

The documentation will not present the followings items as they are not used in the IVAO network:

- Aeroplane maintenance
- Aeroplane flight crew
- Flight officer and flight dispatcher
- Manuals, logs and records
- Cabin crew
- Security
- Medical supplies

Commercial air transport flight operation	Version 1.1	25 December 2015	Page 12
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