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## No. S 445

### AIR NAVIGATION ACT (CHAPTER 6)

#### AIR NAVIGATION (135 — COMMERCIAL AIR TRANSPORT BY HELICOPTERS AND SMALL AEROPLANES) REGULATIONS 2018

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In exercise of the powers conferred by section 3A of the Air Navigation Act, the Civil Aviation Authority of Singapore, with the approval of the Minister for Transport, makes the following Regulations:

## PART 1

### PRELIMINARY

#### **Citation and commencement**

1. These Regulations are the Air Navigation (135 — Commercial Air Transport by Helicopters and Small Aeroplanes) Regulations 2018 and come into operation on 1 October 2018.

#### **Definitions, etc.**

2.—(1) Any term in these Regulations that is defined in the First Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018 (G.N. No. S 441/2018) has the meaning given to that term in that Schedule unless the term is otherwise defined in the First Schedule to these Regulations.

(2) Every standard in these Regulations for which a value is prescribed in the International System of Units (SI) and an alternative value is prescribed in a non-SI alternative unit of measurement in parentheses, the relevant standard is to be regarded as reached when either value is obtained.

#### **Application of these Regulations**

3.—(1) These Regulations apply to every flight carried out by an AOC holder that involves an aircraft of either of the following descriptions (called in these Regulations a relevant aircraft) that may be operated by the AOC holder for the purposes of commercial air transport:

(a) a helicopter; or

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- (b) an aeroplane that has an MAPSC not exceeding 19 and an MCTOM not exceeding 27,000 kg (called in these Regulations a small aeroplane).
- (2) To avoid doubt, these Regulations apply —
- (a) in addition to the Air Navigation (119 — Air Operator Certification) Regulations 2018 (G.N. No. S 443/2018) and the Air Navigation (91 — General Operating Rules) Regulations 2018 unless expressly stated otherwise; and
- (b) even if the flight carried out by the AOC holder is not operated for the purposes of commercial air transport.

## PART 2

### *Division 1 — General*

#### **Aircraft airworthiness**

4.—(1) An AOC holder may operate a relevant aircraft that does not have a valid Certificate of Airworthiness if all the following conditions are met:

- (a) the purpose of a flight is to transport the aircraft to a location where the necessary maintenance or repairs can be performed to that aircraft;
- (b) the AOC holder has a ferry flight authorisation;
- (c) the flight is conducted in accordance with the ferry flight authorisation, including any conditions or limitations imposed in the authorisation.

(2) An AOC holder must inform the Director-General of Civil Aviation in writing of any flight operated under a ferry flight authorisation no later than 2 days after the end of the flight.

(3) Regulation 5 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply when an aircraft is operated in accordance with paragraph (1).



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**Documents to be carried on board**

5.—(1) An AOC holder must ensure that all the following documents are carried on board a flight of a relevant aircraft:

- (a) its Certificate of Registration;
- (b) its Certificate of Airworthiness;
- (c) the appropriate licence for each flight crew member;
- (d) the aircraft radio station licence;
- (e) the journey log book or equivalent record;
- (f) a noise certificate, if applicable;
- (g) a certified true copy of the AOC holder's air operator certificate and the associated operations specifications;
- (h) a certified true copy of any transfer agreement under Article 83 *bis* of the Chicago Convention, if applicable;
- (i) a certified true copy of the agreement for the lease, charter, or interchange or other similar arrangement for the aircraft, if applicable;
- (j) in the case of a Singapore registered aircraft, a copy of each certificate of maintenance review in force in respect of the aircraft;
- (k) the English translation of any document required in sub-paragraph (a), (b) or (f) that is written in a language other than English.

(2) Before commencing any flight of a relevant aircraft, the pilot-in-command must ensure that the documents listed in paragraph (1) are in force and remain in force for the duration of the flight.

(3) Despite paragraph (1), the documents listed in that paragraph may be kept at the aerodrome of departure if it is a flight —

- (a) that is intended to begin and end at the same aerodrome located in Singapore; and
- (b) that does not include passage over the territory of any other State in its planned flight path.

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**Manuals to be carried**

6. An AOC holder must ensure that the following manuals are carried on board every flight of a relevant aircraft:

- (a) the aircraft's flight manual or equivalent;
- (b) the AOC holder's Operations Manual, or those parts of the Operations Manual that pertain to flight operations.

**Operational Information and forms to be carried on board**

7. An AOC holder must ensure that all the following documents are carried on board for every flight of a relevant aircraft:

- (a) the technical log;
- (b) the operational flight plan;
- (c) a copy of the ATS flight plan;
- (d) the route-specific NOTAM and AIS briefing documentation;
- (e) the meteorological information appropriate to the flight;
- (f) the current and suitable aeronautical charts to cover the route of the proposed flight and any route along which it is reasonable to expect that the flight may be diverted;
- (g) any information on search and rescue services covering the route of the proposed flight;
- (h) the load sheet;
- (i) the passenger and cargo manifests;
- (j) the information concerning any dangerous goods that are on board the aircraft;
- (k) a copy of the procedures to be followed by the pilot-in-command of an intercepted aircraft, as published in an official publication by the AIS provider (such as an AIC, AIP or NOTAM);
- (l) a copy of the visual signals for use by intercepting and intercepted aircraft, as published in an official publication by the AIS provider (such as an AIC, AIP or NOTAM);

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- (m) the aircraft bomb search procedure checklist.

### **Common language**

8. An AOC holder must ensure that every person to be assigned duty as a crew member, or a member of its operations personnel, for a flight involving a relevant aircraft is able to communicate effectively in the English language.

### **Stowage of baggage**

9.—(1) An AOC holder must establish procedures for the pilot-in-command of a relevant aircraft to comply with regulation 16 of the Air Navigation (91 — General Operating Rules) Regulations 2018.

(2) An AOC holder must establish procedures to ensure that —

- (a) any item of baggage or cabin equipment carried onto a relevant aircraft, and taken into the passenger cabin of the aircraft, is adequately and securely stowed; and
- (b) during any critical phase of flight, or whenever an emergency evacuation of the aircraft may be required, the egress and escape path of a passenger from the passenger's seat to an emergency exit is not obstructed by any item of baggage or cabin equipment.

### **Use of portable electronic device (PED)**

10.—(1) Subject to paragraphs (2), (3) and (4), an AOC holder must not permit the use of any portable electronic device on board a relevant aircraft.

(2) An AOC holder may permit the following types of portable electronic devices to be used when a relevant aircraft is operating at an altitude above 10,000 ft:

- (a) an unintentionally transmitting PED;
- (b) an intentionally transmitting PED with its transmitting function disabled.

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(3) An AOC holder may permit any portable electronic device to be used on board a relevant aircraft after the aircraft has exited the runway or helipad (as the case may be) upon landing.

(4) Where an AOC holder has obtained prior approval from the Director-General of Civil Aviation under regulation 12, the AOC holder may permit —

- (a) the use of an intentionally transmitting PED, with the transmitting functions in active mode, on a relevant aircraft when the aircraft is operating at any altitude; or
- (b) the use of an unintentionally transmitting PED, or an intentionally transmitting PED with the transmitting function disabled, on a relevant aircraft when the aircraft is operating at an altitude of 10,000 ft or lower.

(5) Despite paragraphs (2), (3) and (4), an AOC holder —

- (a) must not permit the use of any portable electronic device for voice communications on board a relevant aircraft except after the aircraft has exited the runway or helipad (as the case may be) upon landing;
- (b) must not permit the use, or must terminate any permitted use, of a portable electronic device on board a relevant aircraft if use of the portable electronic device may interfere, or is suspected of interfering, with the performance of the navigation and communication systems of the aircraft; and
- (c) must ensure that a person assigned as a flight crew member of a relevant aircraft does not use a portable electronic device on the flight deck unless the portable electronic device is being used for operational purposes, as approved by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 (G.N. No. S 442/2018).

(6) Nothing in this regulation prohibits the pilot-in-command of a relevant aircraft from doing either or both of the following:

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- (a) overriding the AOC holder's permitted use of a portable electronic device on the aircraft under paragraph (2), (3) or (4);
  - (b) requiring the cessation of use of any portable electronic device on board the aircraft.

### **PED as in-flight entertainment**

**11.**—(1) An AOC holder must not provide a portable electronic device as part of the AOC holder's in-flight entertainment or other service on a relevant aircraft except in accordance with an approval from the Director-General of Civil Aviation.

(2) Regulation 10(3), (5) and (6) applies to any portable electronic device provided in accordance with paragraph (1).

### **Approval for use of PED**

**12.**—(1) Upon application by an AOC holder for an approval for the purposes of regulation 10(4)(a) or (b), the Director-General of Civil Aviation may —

- (a) refuse the application; or
  - (b) grant the approval sought, subject to such conditions as the Director-General of Civil Aviation considers necessary.
- (2) The application under paragraph (1) must contain —
- (a) a report of the safety risk assessment, and required certification tests as necessary, conducted on the tolerance of the aircraft to radio frequency interference by portable electronic devices to ascertain that the use of the portable electronic device in the required modes will not interfere with the performance of the navigation or communications systems of the aircraft; and
  - (b) the appropriate manuals, which contain written procedures of the following:
    - (i) the assignment of responsibilities to crew members for ensuring the safe use of any portable electronic device;

- (ii) the procedures to isolate, or prohibit, the use of a portable electronic device should interference from the portable electronic device be suspected or ascertained;
- (iii) the training required for the crew members.

### **Procedures in relation to use of PED**

**13.**—(1) An AOC holder must ensure that, before any portable electronic device is used on board a relevant aircraft —

- (a) there are established procedures for ensuring that the use of the portable electronic device complies with regulation 10; and
- (b) each crew member responsible for ensuring the safe use of portable electronic devices on board the aircraft is trained in the procedures required under sub-paragraph (a).

(2) An AOC holder must inform the passengers of the circumstances under which a portable electronic device may be used on board a relevant aircraft, including —

- (a) the type of portable electronic device that may be used;
- (b) the point in time when a portable electronic device may be used; and
- (c) the conditions or limitations of such use.

### **Authorisation for carriage of dangerous goods**

**14.**—(1) An AOC holder must not carry any dangerous goods as cargo on a relevant aircraft except in accordance with an authorisation granted by the Director-General of Civil Aviation.

(2) The Director-General of Civil Aviation may grant an AOC holder an authorisation for the carriage of dangerous goods as cargo, upon the Director-General of Civil Aviation being satisfied that the AOC holder has established, for the proper handling of dangerous goods —

- (a) the procedures required under regulation 66; and
- (b) the training programme required under regulation 149.

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(3) To avoid doubt, an AOC holder who transports dangerous goods on a relevant aircraft must also comply with Part VB of the Air Navigation Order (O 2).

### **Electronic navigation data management**

**15.**—(1) An AOC holder must not use any electronic navigation data product when operating a relevant aircraft unless the Director-General of Civil Aviation has approved the AOC holder's procedures for ensuring that —

- (a) the process applied and the data product delivered meet acceptable standards of integrity; and
- (b) the data product is compatible with, and meets the specifications of, the intended function of the equipment that will use the data product.

(2) An AOC holder must ensure that the process, and the electronic navigation data product, mentioned in paragraph (1)(a) is continuously monitored to ensure that they meet the standards of integrity.

(3) An AOC holder that uses electronic navigation data product must implement procedures to ensure the timely distribution and insertion of current and unaltered navigation data to each aircraft requiring the insertion of such data.

### **Responsibilities of AOC holder**

**16.**—(1) Before permitting a relevant aircraft to be flown, the AOC holder —

- (a) must ensure that every person assigned as a crew member for the flight is competent for the safe operation of the flight;
- (b) must ensure that the aircraft is airworthy and appropriately equipped for the flight in accordance with Division 6;
- (c) must be satisfied by every reasonable means that —
  - (i) the aeronautical radio stations and navigation aids serving the intended route, or any planned diversion

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from the intended route, are adequate for the safe navigation of the aircraft; and

- (ii) the aerodrome at which the aircraft is intended to take off or land, and any alternate aerodrome at which a landing may be made, is suitable for its intended use.

(2) For the purposes of paragraph (1)(c)(ii), an aerodrome is suitable for its intended use if the aerodrome is adequately manned and equipped to ensure the safety of a relevant aircraft and its passengers.

### **Passenger safety**

17.—(1) For every flight involving the carriage of at least one passenger on a relevant aircraft, the AOC holder must ensure that —

- (a) no passenger is seated so as to hinder evacuation from the aircraft in the event of an emergency evacuation;
- (b) any passenger who appears to be under the influence of alcohol or drugs, or exhibits behavioural characteristics to the extent where the safety of the aircraft or its occupants is likely to be endangered, is refused embarkation or removed from the aircraft, as appropriate;
- (c) any disabled passenger carried on board is appropriately cared for, which includes allocating appropriate seating positions and providing handling assistance in the event of an emergency;
- (d) an escorted passenger does not constitute a safety hazard to other passengers or to the aircraft, and that prior arrangements for the carriage of the escorted passenger have been made in accordance with procedures specified in the Operations Manual; and
- (e) in the event of an emergency occurring in flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.

(2) Despite paragraph (1), a relevant aircraft may carry any person on board if —



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- (a) the aircraft is being operated for the purpose of search and rescue or as an air ambulance; and
  - (b) the AOC holder has taken reasonable action to minimise the risk to the aircraft and its occupants.
- (3) When a relevant aircraft carries, or is to carry, at least one passenger, the AOC holder must ensure that —
- (a) every exit and every internal working door of the aircraft is in working order; and
  - (b) during take-off, landing, and any emergency, every exit and every internal working door of the aircraft —
    - (i) is kept free of obstruction apart from an exit which, in accordance with an approved configuration, is not required for use by any passenger; and
    - (ii) is not fastened by locking or otherwise so as to prevent, hinder or delay its use by any passenger.
- (4) Despite paragraph (3)(b)(ii), the pilot-in-command of a relevant aircraft may prevent access to the flight deck by locking or bolting any internal working door between the flight deck and an adjacent compartment to which any passenger has access.
- (5) Paragraph (3) does not apply to an internal door that does not prevent, hinder or delay the exit of passengers from a relevant aircraft during an emergency even if the door is not in working order.

### **Passenger briefing**

- 18.**—(1) For every flight involving the carriage of at least one passenger on a relevant aircraft, the AOC holder must ensure that —
- (a) the requirements specified in regulation 20 of the Air Navigation (91 — General Operating Rules) Regulations 2018 are complied with;
  - (b) the passengers are instructed to fasten their seat belts at the following times:
    - (i) when the aircraft is moving on the ground;
    - (ii) in preparation for and during each take-off;

- (iii) in preparation for and during each landing;
  - (iv) if the aircraft is a helicopter, at any time that the rotor is turning whilst on the ground;
  - (v) at any other time considered necessary by the pilot-in-command of the aircraft; and
- (c) the passengers are informed by illuminated “No Smoking” signs or by approved “No Smoking” placards or both, when smoking is prohibited in the aircraft.

(2) For the purposes of paragraph (1)(c), if “No Smoking” signs are installed in a relevant aircraft, the signs must be illuminated when smoking is prohibited.

### **Flight deck compartment**

**19.**—(1) An AOC holder must ensure that every person present in the flight deck of a relevant aircraft that is in flight is an assigned flight crew member.

(2) Despite paragraph (1), the pilot-in-command of a relevant aircraft may permit the following persons to be admitted to or be carried in the flight deck compartment, or to occupy a pilot seat, when the aircraft is in flight:

- (a) an authorised representative of the Authority;
- (b) any other person permitted by the AOC holder in accordance with the procedures specified in its Operations Manual.

(3) An AOC holder must ensure that any person that is permitted to be admitted to or carried in the flight deck pursuant to paragraph (2) is familiarised with the relevant safety procedures, as specified in its Operations Manual.

### **Use and preservation of flight records and records**

**20.** An AOC holder must establish appropriate procedures to ensure that the requirements of regulation 21 of the Air Navigation (91 — General Operating Rules) Regulations 2018 are complied with.

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*Division 2 — Operational procedures*

**Use of Operations Manual**

**21.**—(1) An AOC holder must carry out every operation of a relevant aircraft in accordance with the procedures and limitations specified in an Operations Manual that has been approved by the Director-General of Civil Aviation under the Air Navigation (119 — Air Operator Certification) Regulations 2018.

(2) Before an amendment to the approved Operations Manual may be relied on for any operation of a relevant aircraft, the AOC holder must obtain the approval of the Director-General of Civil Aviation, under the Air Navigation (119 — Air Operator Certification) Regulations 2018, for the amendment.

(3) An AOC holder must —

- (a) provide every member of its operations personnel with a copy of the approved Operations Manual containing all the instructions and information necessary for the performance of that member's duties; and
- (b) ensure that every member of its operations personnel has ready access to a copy of the approved Operations Manual, or those parts of the Operations Manual that relate to that member's duties.

**Operational control**

**22.**—(1) An AOC holder must establish and maintain a system of operational control.

(2) An AOC holder must describe the system in its Operations Manual.

(3) An AOC holder must exercise operational control over every flight of a relevant aircraft and ensure that operational control is only delegated to —

- (a) a flight dispatcher;
- (b) the pilot-in-command; or

(c) a designated member of its operations personnel that is accepted by the Director-General of Civil Aviation.

(4) Regulation 22 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to any flight of a relevant aircraft unless operational control for the flight is delegated to the pilot-in-command pursuant to paragraph (3)(b).

### **Duties of a flight dispatcher**

**23.**—(1) For every flight of a relevant aircraft, the AOC holder must ensure that the pilot-in-command of the aircraft is assisted by at least one flight dispatcher in conjunction with a method of operational control and supervision of flight operations.

(2) The assistance to be rendered by a flight dispatcher under paragraph (1) includes —

(a) during pre-flight preparation —

- (i) providing the pilot-in-command with information relevant to flight preparation;
- (ii) preparing the operational and ATS flight plans; and
- (iii) submitting the ATS flight plan to every appropriate air traffic service unit;

(b) during flight, providing the pilot-in-command, by appropriate means, information that may be necessary for the safe conduct of the flight; and

(c) in the event of an emergency —

- (i) initiating the emergency procedures, as outlined in the AOC holder's Operations Manual, without taking any action that would contradict with the air traffic control procedures;
- (ii) conveying to the pilot-in-command safety-related information that may be necessary for the safe conduct of the flight, including information related to an amendment to the flight plan that becomes necessary in the course of the flight; and

- (iii) notifying the appropriate authorities without delay, and requesting for assistance from such authorities if required.

### **Competence of operations personnel**

**24.—**(1) An AOC holder must ensure that every person assigned to, or directly involved in, the ground or flight operations of a relevant aircraft as a member of its operations personnel —

- (a) is properly instructed;
- (b) has demonstrated the person's abilities in the person's assigned duties; and
- (c) is aware of the person's responsibilities and the relationship of the person's duties to the operation as a whole.

(2) Where the member of its operations personnel that is carrying out functions relating to the safety of a relevant aircraft is an employee of an organisation that the AOC holder has contracted or sub-contracted the functions to, the AOC holder must —

- (a) clearly define in the contract, or agreement, with the contracted or sub-contracted organisation the responsibilities of the organisation and its employees that will be deployed under the contract or agreement; and
- (b) clearly define the relevant duties and accountabilities of every such employee.

(3) Where a member of its operations personnel is required to prepare an operational flight plan for any flight of a relevant aircraft, the AOC holder must ensure that the member —

- (a) is trained and competent to perform the task;
- (b) is informed as soon as practicable of relevant changes in —
  - (i) equipment;
  - (ii) operating procedures or facilities; and
  - (iii) known hazards to flight; and

(c) is provided, where necessary, with an aircraft operating manual for each aircraft type operated.

(4) An AOC holder must ensure that a person does not perform any duty or function as a member of its operations personnel if the person is under the influence of any psychoactive substance that may render the person unable to perform such duty or function in a safe and proper manner.

### **Procedure compliance**

**25.** An AOC holder must ensure that every member of its operations personnel complies with the procedures relevant to the member's duties, as specified in its Operations Manual and other relevant documents.

### **Meteorological information**

**26.—(1)** An AOC holder must plan, operate, and control every flight of a relevant aircraft using meteorological information provided for aviation purposes.

(2) An AOC holder must assess that every source of meteorological information mentioned in paragraph (1) is accurate and reliable.

(3) An AOC holder must ensure that the use of the meteorological information mentioned in paragraph (1) is appropriate for the purpose of the flight.

### **Flight planning**

**27.** Before the commencement of any flight of a relevant aircraft, the AOC holder must ensure the pilot-in-command is provided with the necessary information —

(a) to complete the preparation for the intended flight; and

(b) to ensure the adequacy of facilities at any aerodrome or heliport that may be used for the flight.

### **Flight preparation**

**28.—(1)** Before the commencement of any flight of a relevant aircraft, the AOC holder must ensure that the pilot-in-command

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completes a statement to certify that the requirements of regulation 24 of the Air Navigation (91 — General Operating Rules) Regulations 2018 have been satisfied.

(2) An AOC holder must ensure that the pilot-in-command is provided with the information required to comply with paragraph (1).

### **Operational flight plan**

**29.**—(1) Before the commencement of any flight of a relevant aircraft, the AOC holder must ensure that —

- (a) the operational flight plan for the flight has been prepared;
- (b) the pilot-in-command has approved the content of the operational flight plan and has signed the document; and
- (c) a certified copy of the operational flight plan —
  - (i) is filed with the AOC holder or the AOC holder's designated agent; or
  - (ii) is left with the appropriate authority at the point of departure.

(2) Where the operational flight plan is prepared by a person other than the pilot-in-command, the AOC holder must ensure that —

- (a) the person who prepared the operational flight plan has signed the document; and
- (b) the pilot-in-command is advised of the contents of the operational flight plan.

(3) An AOC holder must ensure that its Operations Manual describes the operational flight plan and its use.

### **ATS flight plan**

**30.** Before the commencement of any flight of a relevant aircraft, the AOC holder must ensure that the ATS flight plan for that flight is submitted to all appropriate air traffic services units, in accordance with the Rules of the Air.

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**Operational changes in flight**

**31.** An AOC holder must ensure that, where there is a need to alter the operational flight plan of a relevant aircraft in flight and this alteration will require a change in the ATS flight plan —

- (a) the appropriate air traffic services unit has agreed to the proposed change before the proposed change is transmitted to the pilot-in-command of the aircraft; and
- (b) the pilot-in-command has obtained all necessary air traffic control clearances before making operational changes to the aircraft's ATS flight plan.

**Operating in icing conditions — ground procedures**

**32.—**(1) Where the flight of a relevant aircraft is planned, or is expected, to operate in conditions where ground icing is known or suspected, the AOC holder must ensure that the flight is not commenced unless the aircraft —

- (a) has been inspected for icing;
- (b) has been given appropriate de-icing or anti-icing treatment as may be required upon inspection.

(2) An AOC holder must record in the technical log the details of any treatment given under paragraph (1)(b).

**Operating in icing conditions — flight procedures**

**33.—**(1) An AOC holder must establish procedures for flight of a relevant aircraft in expected or actual icing conditions.

(2) An AOC holder must ensure that no flight of a relevant aircraft is made in expected or actual icing conditions unless the aircraft to be used for such a flight is certificated and equipped to cope with such conditions.

**Operating into areas with known or forecasted volcanic ash contamination**

**34.—**(1) An AOC holder must establish procedures in its Operations Manual for use by a pilot of a relevant aircraft when the aircraft inadvertently encounters a volcanic ash cloud.



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(2) Despite paragraph (1), an AOC holder must not operate a relevant aircraft into an area with known or forecasted volcanic ash contamination unless the AOC holder —

- (a) has established appropriate procedures in its Operations Manual for flight dispatch, operational control and in-flight management for such a flight;
- (b) has established appropriate safety risk assessment processes as part of the safety management system for such a flight; and
- (c) has conducted the safety risk assessment mentioned in sub-paragraph (b) and ascertained that the risks to such a flight are within the acceptable level.

### **Use of aerodromes and landing sites**

**35.**—(1) Before authorising the use of an aerodrome or landing site for any flight of a relevant aircraft, an AOC holder must ensure that the aerodrome or landing site is adequate for the aircraft type and for the type of operation concerned.

(2) Before the commencement of any flight of a small aeroplane, the AOC holder must, as part of the AOC holder's safety management system, assess the level of rescue and firefighting service protection (called in this regulation RFFS protection) available at every aerodrome specified in the operational flight plan for the flight to ensure that an acceptable level of protection is available for the aeroplane.

(3) An AOC holder must ensure that no helicopter is operated at night to a landing site other than an aerodrome unless the landing site is illuminated to enable the pilot of the helicopter —

- (a) to take off safely; and
- (b) to identify the landing area while in flight, determine the landing direction, and thereafter make a safe approach and landing.

(4) An AOC holder must ensure that the following matters are specified in its Operations Manual:

- (a) every aerodrome to be used in its operations;
- (b) for any operation of a helicopter, the methodology to be used for the selection of a landing site;
- (c) for any operation of a small aeroplane, information that relates to the level of RFFS protection that is acceptable to the AOC holder.

### **Requirement to use certified aerodromes**

**36.** An AOC holder must ensure that a relevant aircraft does not take off or land at any place in Singapore other than —

- (a) an aerodrome certified in accordance with paragraph 67 of the Air Navigation Order; or
- (b) a government aerodrome listed in an official publication issued by the AIS provider (such as an AIP or a NOTAM).

### **Aerodrome operating minima — general requirements**

**37.—(1)** An AOC holder must ensure that an aerodrome is not nominated as a departure, destination or alternate aerodrome for any flight of a relevant aircraft unless the aerodrome operating minima of that aerodrome can be complied with.

(2) Despite regulation 38(1), an AOC holder may use the aerodrome operating minima established by the appropriate authority of the State of the Aerodrome for the purposes of paragraph (1).

### **Aerodrome operating minima — determination**

**38.—(1)** An AOC holder must establish aerodrome operating minima for every aerodrome that is selected as a departure, destination or alternate aerodrome for a flight of a relevant aircraft.

(2) Subject to paragraph (4), an AOC holder must specify in its Operations Manual —

- (a) the aerodrome operating minima for every aerodrome mentioned in paragraph (1); and

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- (b) the method used to determine the aerodrome operating minima.
- (3) The method of determination mentioned in paragraph (2)(b) must involve the consideration of the following matters:
- (a) the type, performance and handling characteristics of the aircraft to be used for an operation and any relevant conditions in the aircraft's Certificate of Airworthiness;
  - (b) the composition of the flight crew, their competence and experience;
  - (c) the dimensions and characteristics of every runway or helipad that may be selected for use;
  - (d) the adequacy and performance of the available visual and non-visual ground aids;
  - (e) the equipment available on the aircraft for the purpose of navigation, acquisition of visual references or control of the flight path during the approach to landing and the missed approach;
  - (f) the obstacles in the approach and missed approach areas and the obstacle clearance altitude or height for every instrument approach procedure that may be proceeded with at an aerodrome;
  - (g) the means used to determine and report meteorological conditions;
  - (h) any obstacles in the climb-out areas and necessary clearance margins.
- (4) If the flight of a relevant aircraft is not a scheduled journey or any part of such a journey, and is not an extended diversion time operation, an AOC holder may, in lieu of the details required under paragraph (2), specify in its Operations Manual —
- (a) the method of determining the appropriate aerodrome operating minima, for use by a pilot-in-command, in respect of an aerodrome that may be selected for the flight; and

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- (b) when an aerodrome selected for the flight is an aerodrome where meteorological observations cannot be communicated to the pilot-in-command of an aircraft in flight, the general directions to the AOC holder's pilots concerning aerodrome operating minima for safe operation.
- (5) For every flight of a helicopter, the AOC holder must ensure that the operating minima for each heliport or landing site selected for the operation includes sufficient guidance for the flight crew to control the helicopter during —
- (a) a discontinued take-off in adverse conditions; and
  - (b) a continued take-off after failure of a critical engine.
- (6) The aerodrome operating minima determined in accordance with the method specified in paragraph (3) for a selected aerodrome must not be lower than the aerodrome operating minima that may be established for that aerodrome by the State of the Aerodrome except in any particular case where the State of the Aerodrome has specifically approved the AOC holder's use of a lower aerodrome operating minima.
- (7) An AOC holder must not use any head-up display, enhanced vision system, synthetic vision display, or combined vision system, where equipped, to gain operational credits for operations in conditions of lower visibilities than normally associated with the aerodrome operating minima, except under and in accordance with an approval granted by the Director-General of Civil Aviation to the AOC holder under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.
- (8) An AOC holder must not use aerodrome operating minima lower than Category I except under and in accordance with an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.
- (9) In this regulation —
- “aerodrome operating minima” includes the minimum weather conditions appropriate to each set of circumstances which

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can be reasonably expected at every runway or helipad that may be selected for use;

“scheduled journey” has the meaning given by the Air Navigation (Licensing of Air Services) Regulations (Rg 2).

### **Noise abatement procedures**

**39.**—(1) Unless the Director-General of Civil Aviation otherwise approves, an AOC holder must specify, in its Operations Manual, the same noise abatement procedures for every aerodrome that may be selected for an operation involving any type of small aeroplane operated by the AOC holder.

(2) The pilot-in-command of a small aeroplane must follow the noise abatement procedures specified for that aeroplane type in the AOC holder’s Operations Manual unless doing so is not in the interests of the safety of the aeroplane and its passengers.

### **Alternate aerodromes — general requirements**

**40.**—(1) An AOC holder must ensure that an aerodrome is not nominated as an alternate for a flight of any small aeroplane unless —

- (a) where the aerodrome has a specified instrument approach procedure, the weather forecasts indicate that, at the estimated time of use, the cloud ceiling and visibility at that aerodrome will be at or above the minima specified in the Operations Manual; or
- (b) where the aerodrome has no specified instrument approach procedure, weather forecasts indicate that, at the estimated time of use, the cloud ceiling and visibility at that aerodrome will be at or above the Visual Flight Rules minima prescribed in the Rules of the Air.

(2) An AOC holder must ensure that a heliport is not nominated as an alternate for a flight of any helicopter unless —

- (a) the heliport is adequate for the type of helicopter and operation concerned; and

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- (b) the available information indicate that, at the estimated time of use, the conditions at the heliport are at or above the heliport operating minima for that operation.
- (3) For every flight mentioned in paragraph (1), an AOC holder must establish, and specify in its Operations Manual —
- (a) appropriate incremental values for the height of cloud base and visibility to be added to the AOC holder's established aerodrome operating minima to ensure that an adequate margin of safety is observed in determining whether an approach and landing can be safely carried out at each alternate aerodrome; and
- (b) the margin of time for the estimated time of use of an aerodrome.
- (4) Despite regulations 41, 42 and 43, the Director-General of Civil Aviation may, based on the results of a specific safety risk assessment conducted by an AOC holder, approve operational variations to alternate aerodrome selection criteria.
- (5) The safety risk assessment mentioned in paragraph (4) is conducted to demonstrate how an AOC holder maintains an equivalent level of safety and must include an assessment of the following matters:
- (a) the capabilities of the AOC holder;
- (b) the overall capability of the aircraft and its systems;
- (c) the available aerodrome technologies, capabilities and infrastructure;
- (d) the quality and reliability of meteorological information;
- (e) any identified hazards and safety risks associated with each alternate aerodrome variation;
- (f) the specific mitigation measures.

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**Take-off alternate**

**41.**—(1) An AOC holder must select, and specify in the operational and ATS flight plans, a take-off alternate for a flight of a small aeroplane if —

- (a) the meteorological conditions at the aerodrome of departure are below the AOC holder's established aerodrome landing minima for that operation; or
- (b) it would not be possible for the aeroplane to return to the aerodrome of departure for other reasons.

(2) Except in accordance with an approval granted under the Air Navigation (98 — Special Operations) Regulations 2018 for EDTO operations, the AOC holder must ensure that the take-off alternate aerodrome selected in accordance with paragraph (1) is located —

- (a) within one hour of flight time of the aerodrome of departure at a one-engine inoperative cruise speed, if the small aeroplane has 2 engines; or
- (b) within 2 hours of flight time of the aerodrome of departure at an all-engine operating cruise speed, if the small aeroplane has 3 or more engines.

(3) An AOC holder must select, and specify in the operational flight plan, a take-off alternate heliport for a flight of a helicopter if the weather conditions at the heliport of departure are at or below the applicable heliport operating minima.

(4) For the purposes of paragraph (2), flight time is calculated in International Standard Atmosphere and still air conditions using the relevant cruise speed as determined from the AOC holder's Operations Manual and the aeroplane's actual take-off mass.

**Destination alternate**

**42.**—(1) Subject to paragraph (2), an AOC holder must select, and specify in the operational and ATS flight plans, at least one destination alternate aerodrome for every flight of a small aeroplane that is operated in accordance with the Instrument Flight Rules.

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(2) A destination alternate aerodrome is not required for a flight of a small aeroplane that is operated in accordance with the Instrument Flight Rules —

- (a) when the duration of the flight from the departure aerodrome, or from the point of in-flight re-planning, to the destination aerodrome is such that, taking into account all meteorological conditions and operational information relevant to the flight, at the estimated time of use of the destination aerodrome, a reasonable certainty exists that —
  - (i) the approach and landing may be made under visual meteorological conditions; and
  - (ii) the destination aerodrome has separate runways that are usable, with at least one runway having an operational instrument approach procedure; or
- (b) when all of the following conditions are met:
  - (i) the aerodrome of intended landing is isolated with no suitable alternate aerodrome;
  - (ii) a standard instrument approach procedure is prescribed for the aerodrome of intended landing;
  - (iii) the flight has been planned in accordance with regulation 46(6);
  - (iv) a point of no return is determined;
  - (v) the flight is continued past the point of no return only when a current assessment of meteorological conditions, traffic and other operational conditions at the aerodrome of intended landing indicate that a safe landing can be made at the estimated time of use.

(3) An AOC holder must select, and specify in the operational and ATS flight plans, 2 destination alternate aerodromes for every flight of a small aeroplane —

- (a) where the available meteorological aerodrome reports and forecasts for the destination aerodrome indicate that the meteorological conditions at the estimated time of use will



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be below the AOC holder's established aerodrome operating minima for that operation; or

- (b) where there is no available meteorological information for the destination aerodrome.

(4) Subject to paragraph (5), an AOC holder must select, and specify in the operational and ATS flight plans, at least one destination alternate heliport for every flight of a helicopter operated in accordance with the Instrument Flight Rules.

(5) A destination alternate heliport is not required for a flight that is operated in accordance with the Instrument Flight Rules —

- (a) where the duration of the flight and the meteorological conditions prevailing are such that there is reasonable certainty that, at the estimated time of use of the heliport of intended landing and for a reasonable period before and after that time, the approach and landing may be made under visual meteorological conditions; or

- (b) where the heliport of intended landing is isolated, no alternate heliport is available and a point of no return is determined.

(6) An AOC holder must select, and specify in the operational and ATS flight plans, 2 destination alternate heliports for every flight of a helicopter departing to a destination heliport where the meteorological conditions at the estimated time of use of the destination heliport is forecast to be below the heliport operating minima.

(7) The meteorological conditions at the estimated time of use of a destination alternate heliport selected in accordance with paragraph (6) —

- (a) in the case of the first destination alternate, must be at or above the heliport operating minima for destination heliport; and

- (b) in the case of the second destination alternate, must be at or above the heliport operating minima for an alternate heliport.

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(8) Regulation 36 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to any flight of a relevant aircraft.

### **Offshore alternate**

**43.—**(1) An AOC holder may select, and specify in the operational and ATS flight plans, an offshore alternate heliport for a flight of a helicopter that is subject to all of the following conditions:

- (a) an offshore alternate heliport must not be used when the helicopter is able to carry enough fuel for an on-shore alternate heliport to be selected;
- (b) the use of an offshore alternate heliport must be exceptional and must not be used for the purposes of payload enhancement during adverse weather conditions;
- (c) the dimensions, configuration and obstacle clearance of individual helidecks or other sites at the offshore heliport have been assessed in order to establish operational suitability for use as an offshore alternate heliport by the helicopter type proposed to be used by the AOC holder;
- (d) the procedures used to select an offshore alternate heliport have been included in its Operations Manual.

*[S 771/2018 wef 24/11/2018]*

(2) If an offshore heliport is selected in accordance with paragraph (1), the AOC holder must comply with all of the following additional conditions:

- (a) the offshore destination alternate heliport must not be used if fog is forecast or observed within 100 km of the destination alternate heliport;
- (b) the offshore destination alternate heliport may be used only beyond a point of no return, prior to which an on-shore destination alternate heliport must be used;
- (c) the AOC holder must have considered and taken into account mechanical reliability of critical systems and critical components of the offshore heliport in determining its suitability as a destination alternate heliport;

- (d) the helicopter must be capable of attaining one-engine inoperative hover performance capability before arriving at the destination alternate;
- (e) helideck availability must be guaranteed at the offshore destination alternate heliport to the extent possible;
- (f) before any decision to go beyond the point of no return is made, the AOC holder must provide the pilot-in-command of the helicopter with a landing forecast indicating the likelihood of visual meteorological conditions at the intended offshore destination and the offshore destination alternate heliport, based upon accredited meteorological information conforming to the standards in Annex 3 to the Chicago Convention.

### **Operations beyond 60 minutes to en-route alternate aerodrome**

**44.—**(1) Subject to regulation 45, an AOC holder must ensure that, for every flight of a small aeroplane that is intended to operate beyond 60 minutes from a point on a route to an en-route alternate aerodrome —

- (a) the en-route alternate aerodromes are identified;
- (b) the flight crew is provided with the most up-to-date information on identified en-route alternate aerodromes, including operational status and meteorological conditions; and
- (c) where the aeroplane is powered with 2 turbine engines, information provided to the flight crew pursuant to sub-paragraph (b) indicate that the conditions at the identified en-route alternate aerodromes at the estimated time of use will be at or above the AOC holder's established aerodrome operating minima for the operation.

(2) An AOC holder must not conduct a flight of the description in paragraph (1) unless —

- (a) the operational control is exercised by the AOC holder;
- (b) the relevant operating procedures are specified in its Operations Manual;

- (c) the aeroplane is dispatched in accordance with the flight dispatch procedures specified in its Operations Manual; and
- (d) the flight crew for that flight are appropriately trained.

### **Extended diversion time operations**

**45.**—(1) An AOC holder must not operate a small aeroplane with 2 or more turbine engines on a route where the diversion time from any point on the route to an en-route alternate aerodrome exceeds the threshold time applicable to that aeroplane except under and in accordance with an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

(2) For the purpose of paragraph (1) —

- (a) if the aeroplane has 2 turbine engines, the diversion time is calculated in International Standard Atmosphere and still-air conditions at the one-engine inoperative cruise speed and the threshold time is 60 minutes; or
- (b) if the aeroplane has more than 2 turbine engines, the diversion time is calculated in International Standard Atmosphere and still-air conditions at the all-engines operating cruise speed and the threshold time is 180 minutes.

### **Fuel requirements — aeroplanes**

**46.**—(1) An AOC holder must establish a fuel policy for every flight of a small aeroplane for the purposes of flight planning and en-route re-planning, and to ensure that the aeroplane carries an amount of fuel that is sufficient for the aeroplane to complete a planned flight under these Regulations safely (this includes allowances for deviations from any planned operations).

(2) A fuel policy established under paragraph (1) must be based on the following planning requirements:

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- (a) either of the following sets of data:
- (i) current aeroplane-specific data derived from a fuel consumption monitoring system, if such data is available;
  - (ii) fuel consumption data provided by the aeroplane manufacturer, if current aeroplane-specific data is not available;
- (b) the operating conditions under which a planned flight is to be conducted, including but not limited to —
- (i) the anticipated aeroplane mass;
  - (ii) the route-specific NOTAM;
  - (iii) the current meteorological reports or a combination of current reports and forecasts;
  - (iv) the procedures, restrictions and any anticipated delays as informed by the appropriate air traffic services units; and
  - (v) the effects of deferred maintenance items or configuration deviations, or both.

(3) Subject to paragraphs (4), (5), (6) and (8), an AOC holder must ensure that the pre-flight calculation of usable fuel for a flight of a small aeroplane includes all of the following:

- (a) start-up and taxi fuel, which is an amount of fuel not less than the amount expected to be consumed before take-off, taking into account local conditions at the departure aerodrome and fuel consumption of the auxiliary power unit;
- (b) trip fuel, which is the amount of fuel required to enable the aeroplane to take off, climb, cruise, descend, approach and land at the destination aerodrome, taking into account the operating conditions listed in paragraph (2)(b);
- (c) contingency fuel, which is an amount of fuel sufficient to compensate for unforeseen factors and is equivalent to —

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- (i) 5% of the planned trip fuel calculated in accordance with sub-paragraph (b); or
  - (ii) 5% of the fuel required from the point of re-planning, but not less than an amount of fuel required for the aeroplane to fly for 5 minutes at holding speed at 450 m (1,500 ft) above the destination aerodrome in standard conditions;
- (d) destination alternate fuel, which is —
- (i) for a flight requiring the nomination of a single destination alternate aerodrome under these Regulations, the amount of fuel required for the aeroplane to —
    - (A) perform a missed approach at the destination aerodrome;
    - (B) climb to the expected cruise altitude;
    - (C) fly the expected routing;
    - (D) descend to the point where the expected approach is initiated; and
    - (E) conduct the approach and landing at the destination alternate aerodrome;
  - (ii) for a flight requiring the nomination of 2 destination alternate aerodromes under these Regulations, the amount of fuel required for the aeroplane to proceed to the destination alternate aerodrome that requires the greater amount of fuel, using the calculation in sub-paragraph (i);
- (e) destination alternate contingency fuel, which is 5% of the amount of fuel required under sub-paragraph (d)(i) or (ii), as applicable;
- (f) final reserve fuel, which is calculated using the estimated mass of the aeroplane on arrival at the destination alternate aerodrome (or the estimated mass of the aeroplane on

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arrival at the destination aerodrome for a flight where no destination alternate aerodrome is required) and —

- (i) in the case of a reciprocating engine aeroplane, is an amount of fuel sufficient for the aeroplane to fly for 45 minutes at an appropriate speed and altitude conditions; or
  - (ii) in the case of a turbine engine aeroplane, is an amount of fuel sufficient for the aeroplane to fly for 30 minutes at holding speed at 450 m (1,500 ft) above aerodrome elevation in standard conditions;
- (g) additional fuel, which is a supplementary amount of fuel required for the aeroplane —
- (i) in the event of engine failure or loss of pressurisation, whichever requires the greater amount of fuel, on the assumption that such a failure occurs at the most critical point of the route —
    - (A) to descend as necessary and proceed to an alternate aerodrome;
    - (B) to fly for 15 minutes at holding speed at 450 m (1,500 ft) above aerodrome elevation in standard conditions; and
    - (C) to make an approach and landing at the alternate aerodrome;
  - (ii) to comply with any EDTO critical fuel scenario when engaging in EDTO under an approval granted under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose; and
  - (iii) to meet any other situation that may require additional fuel;
- (h) discretionary fuel, which is an extra amount of fuel carried on the aeroplane at the pilot-in-command's discretion.
- (4) Additional fuel is not required for the pre-flight calculation under paragraph (3) if the minimum amount of fuel from the total of

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paragraph (3)(b), (c), (d), (e) and (f) is sufficient to address all the situations that may require additional fuel.

(5) When a small aeroplane is operated under the conditions specified in regulation 42(2)(a), the AOC holder may replace the fuel components in paragraph (3)(d), (e) and (f) with a minimum fuel reserve which comprises the higher of —

- (a) the amount of fuel required for the aeroplane to fly from decision height at the destination aerodrome to landing at the destination alternate aerodrome, including an additional 5% of such amount of fuel for contingency situations;
- (b) the amount of fuel required for the aeroplane to hold for 60 minutes, in standard conditions, at 450 m (1,500 ft) above destination aerodrome elevation.

(6) Where the aerodrome of intended landing for a flight of any small aeroplane is an isolated aerodrome, the AOC holder may replace the fuel components in paragraph (3)(d), (e) and (f) with an island hold reserve, which is —

- (a) for a reciprocating engine aeroplane, the lesser of the amount of fuel required by the aeroplane —
  - (i) to hold at cruise level for 45 minutes and an additional 15% of the flight time planned to be spent at cruising level, which includes the amount for the final reserve fuel; or
  - (ii) to hold for 2 hours; and
- (b) for a turbine engine aeroplane, an amount of fuel sufficient to enable the aeroplane to hold for 120 minutes at normal cruise consumption above destination aerodrome elevation, which includes the amount for the final reserve fuel.

(7) An AOC holder must ensure that the pilot-in-command of any small aeroplane —

- (a) does not commence flight unless the usable fuel on board meets the applicable requirements in —



- (i) paragraph (3)(a), (b), (c), (d), (e), (f) and (g);
  - (ii) paragraphs (3)(a), (b), (c) and (g) and (6); or
  - (iii) paragraphs (3)(a), (b), (c) and (g) and (5); and
- (b) does not continue the flight beyond the point of in-flight re-planning, which is planned in accordance with regulation 48, unless the usable fuel on board meets the applicable requirements in —
- (i) paragraph (3)(b), (c), (d), (e), (f) and (g);
  - (ii) paragraphs (3)(b), (c) and (g) and (5); or
  - (iii) paragraphs (3)(b), (c) and (g) and (6).

(8) The Director-General of Civil Aviation may approve variations to the pre-flight fuel calculations specified in paragraph (3) for taxi fuel, trip fuel, contingency fuel, destination alternate fuel and additional fuel if the results of a specific risk assessment conducted by an AOC holder show that an equivalent level of safety is maintained for such a flight.

(9) The specific risk assessment mentioned in paragraph (8) must include —

- (a) the fuel calculations for the flight;
- (b) the capability of the AOC holder to include —
  - (i) a data-driven method of fuel calculations that includes a fuel consumption monitoring programme; and
  - (ii) the advanced use of alternate aerodromes; and
- (c) the specific mitigation measures taken by the AOC holder.

(10) An AOC holder must ensure that, when fuel is used for any purpose other than the originally intended purpose (as decided during pre-flight planning) after the commencement of a flight of a small aeroplane, a re-analysis of the fuel required is performed and, if necessary, adjustment of the planned operation is made.

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(11) Regulation 37 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to a flight of any small aeroplane under these Regulations.

### **Fuel and oil requirements — Helicopters**

47.—(1) An AOC holder must not commence any flight of a helicopter unless, taking into account both the meteorological conditions and any delays that are expected in flight, the helicopter carries an amount of fuel (which includes fuel reserves to provide for contingencies) and oil that is sufficient to ensure that the helicopter completes the flight safely.

(2) An AOC holder must set down a minimum in-flight indicated fuel state for each type of helicopter, and each type of operation involving that type of helicopter, as operated under these Regulations.

(3) Where a helicopter is equipped for cross-feeding or balancing of fuel in flight, the AOC holder must ensure that cross-feeding or fuel balancing procedures are contained in its Operations Manual.

(4) For every flight of a helicopter to be operated in accordance with the Visual Flight Rules by day or over non-hostile terrain by day, the AOC holder must ensure that the total fuel carried on the helicopter includes —

- (a) the amount of fuel required for the helicopter —
  - (i) to start up and taxi;
  - (ii) to fly the intended route from departure point to destination;
  - (iii) to hold at the destination for at least 20 minutes at best-range speed (also known as the “final reserve fuel”); and
  - (iv) to compensate for unforeseen factors, which is a contingency reserve amounting to 5% of fuel required under sub-paragraph (a)(ii); and
- (b) any extra fuel that is carried on the helicopter at the pilot-in-command’s discretion.

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(5) Where a helicopter is fuelled in accordance with paragraph (4), the AOC holder must ensure that the helicopter does not commence or continue its flight in accordance with the Instrument Flight Rules unless all the fuel requirements outlined in paragraph (6) are met before the portion of the flight that is flown in accordance with the Instrument Flight Rules starts.

(6) Subject to paragraph (7), for every flight, or portion of a flight, of a helicopter to be operated in accordance with the Instrument Flight Rules, offshore or over hostile terrain, the AOC holder must ensure that the total fuel carried on the helicopter includes —

- (a) the amount of fuel required for the helicopter —
  - (i) to start up and taxi;
  - (ii) to fly the intended route from departure point to the intended destination;
  - (iii) to make one missed approach at the intended destination;
  - (iv) to re-route to an alternate, including diversion to a suitable alternate using a suitable altitude determined by the AOC holder and cleared by the appropriate air traffic control unit (which must be at least the minimum safe altitude);
  - (v) to hold for 30 minutes at endurance speed at 450 m (1,500 ft) above the alternate under standard temperature conditions, with additional fuel for areas where air traffic delays are likely to occur (also known as the “final reserve fuel”); and
  - (vi) to compensate for unforeseen factors, which is a contingency reserve amounting to at least 10% of the total fuel required under sub-paragraphs (ii), (iii) and (iv); and
- (b) any extra fuel that is carried on the helicopter at the pilot-in-command’s discretion.

(7) Where no alternate heliport or landing location is available (such as when the destination is isolated) —

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- (a) paragraph (6)(a)(iv) does not apply; and
  - (b) the AOC holder must ensure that the helicopter is carrying sufficient fuel for the helicopter to fly for a period of time that will enable a safe landing to be made, based on geographical and environment considerations of the landing site.
- (8) In this regulation —
- “hostile terrain” means a place where forced landings are not possible or which present a consequential survival problem;
- “non-hostile terrain” means a place where a forced landing may be carried out with a high degree of confidence that there is not likely to be a consequential survival problem.
- (9) Regulation 38 of the Air Navigation (91— General Operating Rules) Regulations 2018 does not apply to any flight of a helicopter made under these Regulations.

### **Alternate destination with in-flight re-dispatch**

- 48.**—(1) An AOC holder may plan for a flight of a small aeroplane to have an alternate destination with in-flight re-dispatch only if —
- (a) the alternate destination is available for landing at an appropriate time; and
  - (b) the weather forecast at the alternate destination indicates that a landing can be made.
- (2) Subject to paragraph (3), when planning for a flight involving an alternate destination with in-flight re-dispatch under paragraph (1), the AOC holder —
- (a) must ensure that the trip fuel as required under regulation 46(3)(b) comprises the fuel required by the aeroplane to fly —
    - (i) from take-off, including climb and cruise, to the in-flight re-dispatch point; and
    - (ii) from the in-flight re-dispatch point to landing at the final destination; and

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(b) may reduce the contingency fuel as required under regulation 46(3)(c) to the higher of —

- (i) 5% of the planned fuel burn from the in-flight re-dispatch point to the final destination;
- (ii) the AOC holder's minimum contingency fuel that has been stated as part of its fuel policy.

(3) For any flight of a small aeroplane that includes an alternate destination with in-flight re-dispatch, the AOC holder must, where necessary, increase the total fuel load of the aeroplane to not less than the fuel load needed for the aeroplane to fly to the alternate destination, as calculated in accordance with regulation 46(3) and (4).

(4) An AOC holder must ensure that a small aeroplane is re-dispatched only if the amount of fuel on board the aeroplane at the time of re-dispatch is sufficient for the aeroplane to reach the final destination and satisfies —

- (a) regulation 46(3)(b), (c), (g) and (5) when operating under the conditions in regulation 46(5); or
- (b) regulation 46(3)(b), (c), (d), (e) and (f) in all other cases.

### **In-flight fuel management**

**49.**—(1) An AOC holder must establish policies and procedures in its Operations Manual to ensure that in-flight fuel checks and fuel management are carried out for every flight of a relevant aircraft.

(2) The pilot-in-command of a relevant aircraft must request delay information from the appropriate air traffic control unit when the aircraft encounters unanticipated circumstances that may result in the aircraft landing at the destination aerodrome or landing site with less than —

- (a) the final reserve fuel plus the fuel required to proceed to an alternate aerodrome; or
- (b) the final reserve fuel plus the fuel required to operate to an isolated aerodrome.

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### **Checklists for flight crew**

**50.**—(1) An AOC holder must ensure that every person assigned duty as a flight crew member for a flight of a relevant aircraft is provided with the checklists of aircraft procedures for normal, abnormal and emergency situations.

(2) An AOC holder must ensure that every checklist provided in accordance with paragraph (1) is designed in accordance with human factors principles and contains sufficient information to enable a flight crew member to comply with the requirements of —

- (a) the aircraft's flight manual;
- (b) the Operations Manual; and
- (c) such other documents as may be associated with the Certificate of Airworthiness.

(3) An AOC holder must ensure that flight crew operating procedures incorporate the use of appropriate checklists for normal, abnormal and emergency situations in all phases of aircraft operations.

(4) An AOC holder must ensure that every flight crew member for a flight of a relevant aircraft uses the appropriate checklists before, during and after all phases of aircraft operation.

### **In-flight simulation of emergency situations**

**51.** For any flight of a relevant aircraft involving the carriage of cargo, mail or at least one passenger, the AOC holder must ensure that —

- (a) no emergency or abnormal situations are simulated; and
- (b) no simulated instrument flight is conducted.

### **Use of oxygen**

**52.** An AOC holder must ensure that every flight crew member performing in-flight duties that are essential to the safe operation of any relevant aircraft uses supplemental oxygen continuously whenever the cabin pressure altitude exceeds 10,000 ft.

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### **Cosmic radiation**

**53.**—(1) An AOC holder must establish procedures in its Operations Manual for the operation of any relevant aircraft at an altitude above 49,000 ft.

(2) The procedures established in accordance with paragraph (1) must include —

- (a) procedures for the use of equipment to monitor cosmic radiation on a flight which is operated at an altitude above 49,000 ft; and
- (b) procedures for recording the total cosmic radiation dose received over a period of 12 consecutive months by any person who is assigned duty as a crew member for a flight of a relevant aircraft which was operated at an altitude above 49,000 ft.

### **Manipulation of controls**

**54.**—(1) An AOC holder must ensure that only the following persons are permitted to manipulate the flight controls of any relevant aircraft that is in flight for any purpose:

- (a) a flight crew member qualified in accordance with Division 10 and authorised by the AOC holder;
- (b) an authorised representative of the Authority —
  - (i) who has the permission of the AOC holder and the pilot-in-command; and
  - (ii) who is performing a duty for which the representative was authorised by the Authority.

(2) Where any passenger occupies a seat that has access to flight controls in a relevant aircraft, the pilot-in-command of the aircraft must brief the passenger to ensure no intentional or inadvertent manipulation of the flight controls or instruments occurs.

### **Flight crew communication**

**55.** An AOC holder must ensure that every person assigned duty as a flight crew member on a relevant aircraft, and who is required to be

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on flight deck duty for the aircraft, communicates through a boom or throat microphone —

- (a) if the aircraft is a small aeroplane, whenever the aeroplane is flying at an altitude that is below the higher of —
  - (i) 15,000 ft; or
  - (ii) the transition level or altitude; or
- (b) if the aircraft is a helicopter, at all times.

### **Locking of flight deck door**

**56.**—(1) An AOC holder must ensure that, for a flight of any small aeroplane that is equipped with a flight deck door, the flight deck door is closed and locked from the time all external doors are closed following embarkation until the moment any such door is opened for disembarkation, except when the opening of the flight deck door is necessary to permit access and egress by an authorised person.

(2) An AOC holder must establish procedures for a cabin crew member of a small aeroplane described in paragraph (1) to discreetly inform the flight crew of any security situation which may arise in the aircraft cabin.

### **Fuelling operations**

**57.**—(1) An AOC holder must ensure that a small aeroplane is not refuelled or defuelled when a passenger is embarking, disembarking or on board the aeroplane unless —

- (a) the aeroplane is properly attended by qualified personnel ready to initiate and direct an evacuation by the most practical and expeditious means available; and
- (b) two-way communication is maintained by use of the aeroplane inter-communication system or other suitable means between the ground crew supervising the refuelling or defuelling and the qualified personnel on board the aeroplane.



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(2) An AOC holder must ensure that a helicopter (regardless of whether any of its rotors are turning or stationary) is not refuelled or defueled —

- (a) when a passenger is embarking, disembarking or on board the helicopter; or
- (b) when the oxygen supply for the helicopter is being replenished,

except under and in accordance with a specific authorisation granted to the AOC holder by the Director-General of Civil Aviation that specifies the conditions under which such refuelling or defuelling may be carried out.

*[S 771/2018 wef 24/11/2018]*

(3) Nothing in this regulation requires the deployment of integral airstairs or the opening of emergency exits as a prerequisite to refuelling or defuelling of a relevant aircraft.

(4) Regulation 45 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to a relevant aircraft.

### **Occupation of seats and wearing of restraints**

**58.**—(1) For every flight of a small aeroplane, the AOC holder must ensure that —

- (a) every person on board the aeroplane is seated and restrained in accordance with regulation 51 of the Air Navigation (91 — General Operating Rules) Regulations 2018;
- (b) for a flight where cabin crew is required in accordance with regulation 137, every person acting as a cabin crew member on the flight is seated with the person's seat belt, or safety harness when provided, fastened during take-off, landing and such other times as the pilot-in-command may require; and
- (c) where a cabin crew seat is provided, the seat is occupied, during take-off, landing and such other times as the pilot-in-command may direct, by a cabin crew member assigned to emergency evacuation duties.

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(2) An AOC holder must not permit a cabin crew seat to be occupied by a person other than a cabin crew member unless the relevant aircraft is landing in the following circumstances:

- (a) where unexpected crew incapacitation results in an insufficient number of cabin crew members who are able to operate the emergency exits;
- (b) where an emergency is declared and the person is displaced from a passenger seat to a cabin crew seat to enhance evacuation management.

(3) An AOC holder must ensure that a person who is not a cabin crew member does not occupy a cabin crew seat in the circumstances described in paragraph (2)(a) or (b) unless —

- (a) the person is able-bodied and has been briefed on the necessary safety procedures, including the activation of the exit door, before being permitted to occupy a cabin crew seat and to assist in evacuation management; and
- (b) the AOC holder has established relevant procedures in the Operations Manual.

(4) In this regulation, “cabin crew seat” means a seat provided in accordance with regulation 88(4).

### **Control of infectious diseases**

**59.**—(1) An AOC holder must establish procedures, and provide the necessary equipment, for the handling of an outbreak of any infectious disease, as informed by the World Health Organization, at any destination which the AOC holder operates to.

(2) An AOC holder must ensure that every person assigned to be a member of its operations personnel for any flight of a relevant aircraft is familiar with the procedures and equipment mentioned in paragraph (1).

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*Division 3 — Operating limitations*

**Meteorological conditions — VFR flight**

**60.** An AOC holder must ensure that no flight of a relevant aircraft is carried out in accordance with the Visual Flight Rules 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 in accordance with the Visual Flight Rules will be such as to enable compliance with the Visual Flight Rules at the appropriate time.

**Meteorological conditions — IFR flight**

**61.** An AOC holder must ensure that a flight of a relevant aircraft that is to be carried out in accordance with the Instrument Flight Rules —

- (a) does not take off from the departure aerodrome unless the meteorological conditions at the departure aerodrome are at or above the aerodrome operating minima for that operation at the time of use; and
- (b) does not take off or continue beyond the point of in-flight re-planning unless at the aerodrome of intended landing, or at every alternate aerodrome selected in accordance with these Regulations, current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions will be, at the estimated time of use, at or above the AOC holder's established aerodrome operating minima for that operation.

**Departure limitations — IFR flight**

**62.—(1)** An AOC holder must ensure a relevant aircraft does not commence an IFR flight when weather conditions at the departure aerodrome are below prescribed IFR landing minima unless meteorological reports and forecasts indicate that a successful approach and landing can be made at the take-off alternate.

(2) An AOC holder must not conduct any low visibility operation with a relevant aircraft except under and in accordance with an approval granted by the Director-General of Civil Aviation under the

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Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

- (3) In this regulation, “low visibility operation” means —
- (a) a Category II or III approach and landing; or
  - (b) a take-off with RVR of less than 400 m, or such higher value specified by the competent authority of the State of the Aerodrome.

### **Minimum flight altitudes**

**63.**—(1) An AOC holder must ensure that, when establishing the minimum flight altitude for a route of any flight of a relevant aircraft, all of the following factors are taken into account:

- (a) the accuracy and reliability with which the position of the aircraft can be determined;
- (b) the inaccuracies in the indications of the altimeters used;
- (c) the characteristics of the terrain;
- (d) the probability of encountering unfavourable meteorological conditions such as severe turbulence and descending air currents;
- (e) any possible inaccuracies in aeronautical charts;
- (f) all relevant airspace restrictions;
- (g) any minimum flight altitude established by the State in which the operation takes place.

(2) An AOC holder must specify in its Operations Manual the method used to establish a minimum flight altitude under paragraph (1), including any conditions that the Director-General of Civil Aviation may have specified when approving that method.

### **Instrument flight procedures**

**64.**—(1) An AOC holder must ensure that a relevant aircraft that is being operated in accordance with the Instrument Flight Rules complies with the instrument flight procedures approved by —

- (a) the State of the Aerodrome; or

(b) the State responsible for the heliport that is located outside the territory of any State, if the aircraft is a helicopter.

(2) An AOC holder must specify in its Operations Manual the instrument approach procedures as part of the standard operating procedures.

### **Single-engine aeroplane**

**65.**—(1) An AOC holder must ensure that a small aeroplane with a single engine is only operated in such conditions and over such routes (including any diversions from those routes) that permit a safe forced landing to be executed in the event of engine failure.

(2) Despite paragraph (1), an AOC holder may operate a single-engine turbine-powered aeroplane at night or in Instrument Meteorological Conditions in accordance with an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

### **Dangerous goods**

**66.**—(1) An AOC holder must establish and maintain procedures in its Operations Manual for the proper handling of dangerous goods by its agents and personnel, as applicable.

(2) Where an AOC holder does not have an authorisation granted under regulation 14 for the carriage of dangerous goods as cargo, the procedures to be established under paragraph (1) include the procedures to prevent the unauthorised carriage of dangerous goods.

## *Division 4 — Mass and balance*

### **Loading of aircraft**

**67.**—(1) An AOC holder must ensure that a relevant aircraft is only loaded —

- (a) under the supervision of a person who is qualified in loading operations; and
- (b) in accordance with the loading instructions.

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(2) An AOC holder must prepare the loading instructions to ensure that —

- (a) the load is safely carried on the flight; and
- (b) the conditions relating to the loading of an aircraft that as specified in the Certificate of Airworthiness, or the aircraft's flight manual, are complied with.

(3) In this regulation, "loading instructions" means written instructions in respect of the distribution and securing of the load on an aircraft.

### **Load sheet**

**68.**—(1) For every flight of a relevant aircraft, the AOC holder must ensure that the load sheet enables the pilot-in-command to determine that the load of the aircraft and the distribution of the load are such that all the operational limitations of the aircraft are not exceeded.

(2) Before any flight or sector of a multi-sector flight of a relevant aircraft commences, the AOC holder must ensure that —

- (a) the load sheet is completed;
- (b) the person preparing the load sheet is identified and the person confirms the accuracy of the data on the load sheet; and
- (c) the pilot-in-command accepts the load sheet by signing on it.

(3) For every flight or sector of a multi-sector flight of a relevant aircraft, the AOC holder must ensure that the load sheet for that flight or sector contains the following information:

- (a) the date of the operation;
- (b) the aircraft registration;
- (c) the flight number;
- (d) the departure aerodrome and the destination aerodrome;
- (e) the total number of crew members;

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- (f) evidence that the centre of gravity of the aircraft is within specified limits, except when the AOC holder records this information in another document;
  - (g) the actual mass of the aircraft for the operation, including the aircraft's actual zero fuel mass, take-off mass and landing mass for the operation;
  - (h) the maximum allowable mass for the operation, including the maximum allowable zero fuel mass, take-off mass and landing mass for the operation;
  - (i) the actual mass of take-off fuel and trip fuel;
  - (j) the difference between the allowed traffic load mass and the actual traffic load mass;
  - (k) the total number of seats in each class occupied by passengers;
  - (l) the total number of passengers on board the aircraft;
  - (m) the edition of the load sheet used for that flight, if the load sheet is in an electronic format.

*[S 771/2018 wef 24/11/2018]*

(4) An AOC holder must establish procedures and limitations to deal with last minute changes to the load, and describe these procedures in its Operations Manual.

(5) An AOC holder must retain a copy of the load sheet for at least the period specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

(6) This regulation does not apply to the following flights operated by an AOC holder:

- (a) any flight of an aircraft with an MCTOM not exceeding 1,150 kg;
- (b) any flight of an aircraft with an MCTOM not exceeding 2,730 kg that is not intended to exceed 60 minutes in duration and —
  - (i) is a flight solely for the purpose of training a person to perform duties in the aircraft; or

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- (ii) is a flight intended to begin and end at the same aerodrome.

### **Goods, passenger and baggage mass**

**69.**—(1) For every flight of a relevant aircraft, the AOC holder must establish the actual mass of goods, and checked baggage, to be carried on board.

(2) For every flight of a relevant aircraft, the AOC holder must establish the total mass of passengers, crew members and their hand baggage using —

- (a) the actual mass of such persons or items; or
- (b) the standard mass for such persons and items established in accordance with a programme specified in the AOC holder's Operations Manual.

### **Loading procedures to be in Operations Manual**

**70.**—(1) An AOC holder must specify in its Operations Manual —

- (a) the principles, methods and processes involved in complying with the requirements in this Division for all types of intended operations involving a relevant aircraft; and
- (b) the procedures established in accordance with paragraph (2).

(2) An AOC holder must establish procedures to ensure that —

- (a) the AOC holder is notified of any incident or damage to a relevant aircraft that occurs during loading; and
- (b) after any incident or damage mentioned in sub-paragraph (a), the flight does not proceed unless the airworthiness of the aircraft to be used has been assessed to be satisfactory.



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*Division 5 — Performance***Performance planning — aeroplanes**

71.—(1) An AOC holder must take into account the following factors when developing procedures for a small aeroplane to perform its intended operations safely:

- (a) the mass of the aeroplane;
- (b) the aeroplane configuration;
- (c) the aeroplane operating techniques;
- (d) the operation of aeroplane systems which may have an adverse effect on performance;
- (e) the runway gradient;
- (f) the condition of runway;
- (g) the water surface state, where relevant;
- (h) the pressure altitude and temperature;
- (i) any wind;
- (j) any other environmental conditions which may have an adverse effect on performance;
- (k) the accuracy of the charts and other data used.

(2) When developing procedures for obstacle avoidance during take-off, landing and bailed landing, of a small aeroplane, the AOC holder must take into account aerodrome obstacle data.

**Performance planning — helicopters**

72.—(1) An AOC holder must take into account the following factors when developing procedures for a helicopter to perform its intended operations safely:

- (a) the mass limitations prescribed in regulation 79;
- (b) the helicopter configuration;
- (c) the helicopter operating technique;
- (d) the operation of helicopter systems which may have an adverse effect on performance;

- (e) the pressure altitude and temperature;
- (f) any wind;
- (g) any environmental conditions which may have an adverse effect on performance;
- (h) the accuracy of the charts and other data used.

(2) When developing procedures for obstacle avoidance during take-off, landing and balked landing of a helicopter, the AOC holder must take into account surrounding obstacle data.

### **Performance data**

73. An AOC holder must ensure that the performance data for a relevant aircraft —

- (a) is contained in the aircraft's flight manual or, where provided by the aircraft manufacturer or other source, an equivalent document; and
- (b) is available to every person who is a flight crew member, or who is responsible for flight planning or aircraft dispatch.

### **Runway friction coefficient**

74. An AOC holder must ensure that, where performance data for a small aeroplane is determined using measured coefficient of runway friction, the pilot-in-command complies with a procedure that correlates the measured coefficient of runway friction and the effective braking coefficient of friction for that aeroplane type, over the required speed range for the existing runway conditions.

### **Runway surface conditions**

75. For every flight of a small aeroplane, the AOC holder must ensure that —

- (a) all performance calculations take into account runway surface conditions; and
- (b) before a runway is used for take-off, the surface conditions of the runway would allow the aeroplane to take off safely.

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**Wet and contaminated runway surfaces**

**76.** When it is necessary for a small aeroplane to take off from a contaminated or wet runway, the AOC holder must take into account —

- (a) the runway overrun area;
- (b) the local wind conditions, including any element of tailwind or crosswind; and
- (c) the height of any snow banks adjacent to the runway.

**Runway factors**

**77.** When calculating the distance required for a small aeroplane to take off or land from a runway that is not a paved, dry and flat surface, the AOC holder must take into account all factors that would affect the performance of the aeroplane.

**Runway length**

**78.** When calculating the distance of a runway that is available for take-off by a small aeroplane, the AOC holder must take into account any length of the runway which will necessarily be used to line up the aeroplane in the direction of take-off.

**Performance — mass limitation**

**79.—(1)** An AOC holder must ensure that the mass of a relevant aircraft at the start of its take-off does not exceed any of the following limits:

- (a) the mass at which the requirements of the applicable Performance Class can be complied with for the planned flight;
- (b) the maximum take-off mass specified in the aircraft's flight manual for the pressure altitude appropriate to the aerodrome elevation and any other local atmospheric condition that is used as a parameter to determine the maximum take-off mass;
- (c) the maximum mass specified in the applicable noise certificate granted in respect of the aircraft, unless

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otherwise authorised by the competent authority of the State of the Aerodrome.

(2) In the event of in-flight re-planning for any flight of a relevant aircraft, the AOC holder must ensure that the mass of the aircraft at the point from which the revised operational flight plan applies does not exceed the mass at which the requirements of the applicable Performance Class can be complied with for the planned flight.

(3) For every flight of a relevant aircraft, the AOC holder must ensure that the estimated mass of the aircraft at the expected time of landing at the planned destination aerodrome, and at any planned destination alternate aerodrome, does not exceed any of the following limits:

- (a) the maximum landing mass specified in the aircraft flight manual for the pressure altitude appropriate to the aerodrome elevation and any other local atmospheric condition that is used as a parameter to determine the maximum landing mass;
- (b) the maximum mass specified in the applicable noise certificate granted in respect of the aircraft, unless otherwise authorised by the competent authority of the State of the Aerodrome.

### **Performance applicability — aeroplanes**

**80.**—(1) An AOC holder must ensure that any small aeroplane that corresponds to one of the following descriptions is operated in accordance with the specified circumstances:

- (a) a multi-engine aeroplane that is powered by at least one turbo-propeller engine, and has an MAPSC exceeding 9 but not exceeding 19, must be operated in accordance with Performance Class A;
- (b) a multi-engine turbine-powered aeroplane must be operated in accordance with Performance Class A;
- (c) a propeller-driven aeroplane with an MAPSC not exceeding 9 and an MCTOM not exceeding 5,700 kg must be operated in accordance with Performance Class B;

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- (d) a single-engine aeroplane must not be operated in Instrument Meteorological Conditions or at night;
  - (e) a two-engine aeroplane which does not meet the climb performance specified in Performance Class B must not be operated in Instrument Meteorological Conditions or at night.
- (2) Despite paragraph (1) —
- (a) where full compliance with the requirements in paragraph (1) cannot be shown due to specific design characteristics of the aeroplane, an AOC holder may apply performance standards —
    - (i) that ensure a level of safety equivalent to the appropriate Performance Class; and
    - (ii) that are approved by the Director-General of Civil Aviation; and
  - (b) an AOC holder may operate —
    - (i) a single-engine aeroplane that is not turbine-powered, and an aeroplane described in paragraph (1)(e) on a special VFR flight in a control zone; and
    - (ii) a single-engine turbine-powered aeroplane in accordance with regulation 65(2).

### **Performance applicability — helicopters**

**81.—**(1) An AOC holder must ensure that any helicopter that corresponds to one of the following descriptions is operated in accordance with the specified Performance Class:

- (a) a helicopter with an MAPSC exceeding 19 must be operated in Performance Class 1;
- (b) a helicopter operating to or from a heliport in a congested hostile environment must be operated in Performance Class 1;

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- (c) a helicopter with an MAPSC exceeding 9 but not exceeding 19 may be operated in Performance Class 1 or 2;
  - (d) a helicopter with an MAPSC not exceeding 9 may be operated in Performance Class 1, 2 or 3.
- (2) Before operating a helicopter described in paragraph (1)(a) in Performance Class 1, the AOC holder must ensure that the helicopter is certificated in Category A.
- (3) Where a helicopter described in paragraph (1)(c) or (d) is to be operated in Performance Class 2, the AOC holder must ensure that —
- (a) the helicopter is certificated in Category A; and
  - (b) if the helicopter is to be operated in a flight phase when an engine failure may cause the helicopter to make a forced landing, the surface below the intended flight path is conducive for a safe forced landing.
- (4) Where a helicopter described in paragraph (1)(d) is to be operated in Performance Class 3, the AOC holder must ensure that —
- (a) the helicopter is certificated in Category B;
  - (b) the helicopter is not operated under the following circumstances:
    - (i) when the surface is not in sight;
    - (ii) at night;
    - (iii) when the cloud ceiling is less than 180 m (600 ft) or the visibility is less than 1,500 m;
    - (iv) over an open sea area —
      - (A) North of 45°N or South of 45°S;
      - (B) between 45°N or 45°S, when it is a hostile environment; or
      - (C) between 45°N or 45°S for more than 10 minutes on any one flight; and
  - (c) if the helicopter is to be operated in a flight phase when an engine failure may cause the helicopter to make a forced

landing, the surface below the intended flight path is conducive for a safe forced landing.

(5) Despite paragraph (4)(b)(iv), an AOC holder may operate a helicopter described in paragraph (1)(d) in Performance Class 3 over an open sea area if its Operations Manual contains procedures addressing such overwater flights.

### *Division 6 — Instrument and equipment*

#### **General**

**82.—**(1) An AOC holder must ensure that a relevant aircraft does not commence a flight unless —

- (a) the aircraft is equipped with the type and number of instruments and equipment that the aircraft is required to be equipped with under the provisions of this Division; and
- (b) the prescribed instruments and equipment, and the manner of their installation, are approved or accepted by the aircraft's State of Registry.

(2) Where a relevant aircraft is registered in Singapore, the AOC holder must ensure that —

- (a) a prescribed instrument or item of equipment (other than a prescribed instrument or item of equipment listed in the Second Schedule) that is installed on the aircraft; and
- (b) the manner of installation of the instrument or item of equipment described in sub-paragraph (a),

is approved or accepted by the Director-General of Civil Aviation in accordance with the Air Navigation Order (O 2).

(3) The Director-General of Civil Aviation may, in any particular case, direct an AOC holder to carry, on a relevant aircraft, such additional, or special, equipment or supplies as the Director-General may specify —

- (a) to facilitate the navigation of the aircraft;
- (b) to carry out search and rescue operations; or
- (c) for the survival of any person carried on board the aircraft.

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### **Inoperative instruments and equipment**

**83.**—(1) Subject to paragraphs (2) and (3), an AOC holder must not commence any flight of a relevant aircraft if any instrument or item of equipment that the aircraft is required under these Regulations to carry on the aircraft in the circumstances of the intended flight is not carried or is not in a fit condition for use.

(2) The Director-General of Civil Aviation may, subject to such conditions as the Director-General of Civil Aviation considers appropriate, permit an AOC holder to operate a particular relevant aircraft in specific circumstances even if the aircraft does not carry any required instrument or item of equipment or that instrument or item of equipment is not in a fit condition for use.

(3) When a permission is granted under paragraph (2), the AOC holder may operate the specified aircraft under the specified circumstances if —

- (a) the AOC holder has provided the particulars of the permission to the pilot-in-command of the aircraft;
- (b) the pilot-in-command has reviewed the particulars of the permission and determined that compliance with regulation 24 of the Air Navigation (91 — General Operating Rules) Regulations 2018 is possible; and
- (c) every inoperative instrument or item of equipment is conspicuously marked “Inoperative” and the details of its required maintenance is recorded in the technical log.

(4) To avoid doubt, a permission granted under paragraph (2) in respect of a foreign registered aircraft does not affect the AOC holder’s responsibility to comply with the airworthiness requirements of the State of Registry.

(5) Where an exit door of any relevant aircraft becomes inoperative at a place where repairing or replacing the exit door is not reasonably practicable, the AOC holder may permit the aircraft to continue carrying passengers until the aircraft lands at a place where the exit door can be repaired if all the following conditions are met:



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- (a) the total number of inoperative exit doors does not exceed one, or such number approved by the Director-General of Civil Aviation;
  - (b) the conditions of flight are in accordance with arrangements approved by the Director-General of Civil Aviation either in relation to the particular aircraft, or to the class of aircraft to which the aircraft belongs to, in respect of —
    - (i) the number of passengers carried;
    - (ii) the position of the seats which the passengers occupy;
    - (iii) the fastening of the inoperative exit door by locking or otherwise;
    - (iv) the covering of the words “Exit” or “Emergency Exit” or an equivalent symbol above the inoperative exit door; and
    - (v) the conspicuous marking of the inoperative exit door by appropriate means to indicate that it is inoperative.

### **Minimum equipment list**

**84.**—(1) For every relevant aircraft in its fleet, the AOC holder must establish a minimum equipment list —

- (a) that is approved by the Director-General of Civil Aviation;
- (b) that is based upon, but no less restrictive than, the relevant master minimum equipment list; and
- (c) that includes any permission granted by the Director-General of Civil Aviation in regulation 83.

(2) The minimum equipment list established under paragraph (1) must be described in the AOC holder’s Operations Manual.

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**Marking of exits and break-in areas**

**85.**—(1) An AOC holder must ensure that —

- (a) every exit from a relevant aircraft is marked with —
  - (i) a universal symbolic exit sign approved by the Director-General of Civil Aviation or the words “EXIT” or “EMERGENCY EXIT”; and
  - (ii) instructions in English and diagrams to indicate the correct method of opening the exit;
- (b) the markings required under sub-paragraph (a) —
  - (i) are red or green in colour;
  - (ii) are placed on or near the inside surface of the door or other closure of the exit; and
  - (iii) if the exit can be opened from the outside of the aircraft, are also placed on or near the exterior surface.

(2) An AOC holder must ensure that every exit from a relevant aircraft that is intended to be used by passengers in an emergency is marked on the exterior of the aircraft by a band outlining the exit that —

- (a) is not less than 5 cm in width; and
- (b) is in a colour that clearly contrasts with the background on which the marking appears.

(3) An AOC holder must ensure that every area of the aircraft fuselage of a relevant aircraft that is suitable for break-in by rescue crews in the event of an emergency (called in this regulation a break-in area) —

- (a) is rectangular in shape;
- (b) is marked on the exterior surface of the aircraft’s fuselage by right-angled corner markings, each arm of which is 10 cm in length along the outer edge and 3 cm in width; and
- (c) is marked across the centre with the words “CUT HERE IN EMERGENCY”.

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(4) When a break-in area marked in accordance with paragraph (3) has corner markings that are more than 2 m apart, the AOC holder for that aircraft must ensure that the break-in area is marked with intermediate lines 10 cm in length and 3 cm in width such that the distance between adjacent markings does not exceed 2 m.

(5) An AOC holder must ensure that, apart from a marking required under paragraph (1) or (2), every marking required under this regulation —

(a) is red in colour; and

(b) in any case where the colour of the adjacent background renders the red marking not readily visible, is outlined in white or some other contrasting colour in such a manner as to render the marking readily visible.

(6) An AOC holder must ensure that every marking required under this regulation —

(a) is painted or affixed by other equally permanent means; and

(b) is kept clean and unobscured at all times.

### **Location of instruments and equipment**

**86.** An AOC holder must ensure that —

(a) any instrument or item of equipment, installed on a relevant aircraft, that is to be operated or used by a single pilot is installed so that the instrument or item of equipment can be readily seen and operated from that pilot's normal seating position with minimum practicable deviation from the pilot's normal line of sight when the aircraft is in flight; and

(b) any single instrument or item of equipment, installed on a relevant aircraft, that is to be operated or used by 2 pilots is installed so that the instrument or item of equipment can be readily seen and operated from each pilot's normal seating position.

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**Markings and placards**

- 87.** An AOC holder must ensure that, for every relevant aircraft —
- (a) any placard, listing or instrument marking containing the operating limitations of the aircraft is displayed —
    - (i) in a conspicuous place in the aircraft; and
    - (ii) in such a manner to minimise the risk of erasure, disfigurement, obscuring or removal;
  - (b) each unit of measure used on a placard, listing or instrument marking is the same as that on any related instrument or in the related flight manual;
  - (c) each fuel contents gauge is clearly marked to indicate the units to which the gauge is calibrated;
  - (d) a placard or marking is displayed in the immediate vicinity of each fuel and oil filler with the specification or grade, or both, of fuel or oil, as appropriate;
  - (e) for every door (other than a flight deck door, if installed) in the aircraft that separates a passenger compartment from another compartment that has emergency exit provisions, a placard is displayed to indicate that the door must be open during take-off and landing; and
  - (f) any placard or marking required under any certificate issued in respect of the aircraft is present at the designated location and remains legible.

**Seating and restraints**

- 88.—**(1) Subject to paragraph (3), an AOC holder must ensure that every relevant aircraft is equipped with —
- (a) a seat or berth for each person on board; and
  - (b) a safety belt for each seat and a restraining belt for each berth.
- (2) An AOC holder must ensure that each seat provided in a relevant aircraft for a flight crew member —

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- (a) is equipped with a safety harness or, if the aircraft type certificate allows, a seat belt with a diagonal shoulder strap; and
  - (b) incorporates a means —
    - (i) to automatically restrain the occupant in the event of rapid deceleration; and
    - (ii) to prevent an incapacitated occupant from interfering with the controls, where practicable.

(3) An AOC holder must ensure that every passenger under 2 years of age on board a relevant aircraft is provided with a child restraint device.

(4) For every relevant aircraft with a Certificate of Airworthiness that is issued on or after 1 January 1981, the AOC holder must ensure that the aircraft is equipped with a forward or rearward facing seat for each cabin crew member that —

- (a) is fitted with a safety harness;
- (b) is within 15 degrees of the longitudinal axis of the aircraft;
- (c) is located near floor level; and
- (d) is close to emergency exits.

### **Aircraft operating under VFR**

**89.** An AOC holder must ensure that a relevant aircraft that is to be flown in accordance with the Visual Flight Rules is equipped with a means of measuring and displaying —

- (a) magnetic heading;
- (b) the time in hours, minutes and seconds;
- (c) barometric altitude;
- (d) indicated airspeed;
- (e) mach number, if the speed limitation prescribed by the aircraft flight manual is expressed in terms of mach number; and
- (f) turn direction and rate of turn, if the aircraft is a helicopter.

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**VFR flights operated as controlled flights**

**90.** An AOC holder must ensure that a relevant aircraft that is to be flown as a controlled flight in accordance with the Visual Flight Rules is equipped in accordance with regulation 92.

**Equipment for flight in icing conditions**

**91.** An AOC holder must ensure that a relevant aircraft that is to be flown in circumstances in which icing conditions are reported to exist or are expected to be encountered is certificated and equipped to operate in icing conditions for flight.

**Aircraft operating at night or under IFR**

**92.—(1)** An AOC holder must ensure that a relevant aircraft that is to be flown at night, in accordance with the Instrument Flight Rules, or when the surface is not in sight, is equipped with a means of measuring and displaying —

- (a) magnetic heading;
- (b) the time in hours, minutes and seconds;
- (c) barometric altitude from 2 independent altimetry sources;
- (d) airspeed calibrated in knots, with a means of preventing malfunctioning due to either condensation or icing;
- (e) mach number, if the speed limitation specified in the aircraft's flight manual is expressed in terms of mach number;
- (f) aircraft attitude for each pilot required for that operation;
- (g) stabilised aircraft heading;
- (h) the adequacy of the power supply to any gyroscopic instruments;
- (i) outside air temperature; and
- (j) rate of climb and descent.

(2) An AOC holder must ensure each attitude indicator required under paragraph (1)(f) —

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- (a) is powered by a separate power source that is capable of automatically continuing to power the indicator for at least 30 minutes after total failure of the main electrical generating system; and
    - (b) has an indicator on the instrument panel of the aircraft to inform the pilot when the attitude indicator is being operated by emergency power.
  - (3) When a relevant aircraft is to be flown at night, the AOC holder must ensure the aircraft is equipped with the following lights:
    - (a) lights as required by the Rules of the Air;
    - (b) illumination for all flight instruments and equipment that are essential for the safe operation of the aircraft;
    - (c) lights in all passenger compartments;
    - (d) an independent portable light for each crew member station;
    - (e) a landing light, which must be trainable in the vertical plane if the aircraft is a helicopter.
  - (4) When the aircraft mentioned in paragraph (1) is a small aeroplane, the AOC holder —
    - (a) must ensure that the aeroplane is equipped with a means of measuring and displaying turn and slip (called a turn and slip indicator);
    - (b) must ensure that equipment used to measure barometric altitude (as required under paragraph (1)(c)) —
      - (i) comprise at least one sensitive pressure altimeter; and
      - (ii) have counter-drum pointer or equivalent presentation, if the aeroplane is a pressurised aeroplane; and
    - (c) may equip the aeroplane with an additional turn and slip indicator in lieu of one of the aircraft attitude indicators required under paragraph (1)(f).

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(5) When the aircraft mentioned in paragraph (1) is a helicopter, the AOC holder must ensure that —

- (a) the helicopter is equipped with —
  - (i) a means of indicating aircraft attitude in addition to the requirements in paragraph (1)(f); and
  - (ii) a stabilisation system, unless the helicopter has been certified as having adequate stability without such a system; and
- (b) the equipment used to measure barometric altitude indicators (as required under paragraph (1)(c)) are both sensitive pressure altimeters.

(6) Where an aeroplane to be flown at night, or in accordance with the Instrument Flight Rules, is to be operated by a single pilot pursuant to regulation 129(2), the AOC holder must ensure that the aeroplane is equipped with —

- (a) a serviceable autopilot with at least altitude and heading modes; and
- (b) a means of displaying charts that enables the charts to be readable in the available lighting.

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(7) In this regulation, “the surface is not in sight” means that —

- (a) the flight crew is not able to see sufficient surface features;  
or
- (b) the surface illumination is insufficient to enable the flight crew to maintain the aircraft in a desired attitude without reference to any flight instrument.

### **Spare fuses**

**93.**—(1) An AOC holder must ensure that every relevant aircraft carries on board a quantity of spare fuses mentioned in paragraph (2) for every fuse of an electrical circuit that is accessible for replacement while the aircraft is in flight.



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(2) The quantity of spare fuses required under paragraph (1) is the higher of —

- (a) 10% of the total number of fuses in each rating of fuses that are accessible for replacement while the aircraft is in flight; or
- (b) 3 fuses of such description.

### **Altitude alerting system**

**94.**—(1) An AOC holder must ensure that a small aeroplane that is powered by at least one turbine engine is equipped with an altitude alerting system or device.

(2) The altitude alerting system or device provided in accordance with paragraph (1) must be capable of —

- (a) alerting the pilot to an approaching pre-selected altitude by means of visual and aural signals, such that the pilot may establish level flight from climb or descent without exceeding the pre-selected altitude;
- (b) being tested without special equipment to determine proper operation of alerting signals;
- (c) enabling the use of pre-selected altitudes in increments commensurate with the altitudes at which the aeroplane is approved for use; and
- (d) accepting barometric pressure settings if the system or device operates on barometric pressure.

(3) An AOC holder must ensure that a small aeroplane that —

- (a) is to be operated in accordance with the Instrument Flight Rules; and
- (b) is not required to carry an altitude alerting system or device under paragraph (1),

is equipped with a means of indicating an altitude assigned by an appropriate air traffic control unit.

(4) The means of indicating assigned altitude required under paragraph (3) —

- (a) must be located so that adjustment of the assigned altitude information may be readily made from each pilot seat;
- (b) must display assigned altitude information such that the information is clearly visible to all flight crew members whose duties involve monitoring altitude assignment; and
- (c) must enable the use of pre-selected altitudes in increments commensurate with the altitudes at which the aeroplane is operated.

### **Communication equipment**

**95.**—(1) An AOC holder must ensure that every relevant aircraft is equipped with —

- (a) radio communication equipment that is capable of providing continuous two-way communication with an appropriate air traffic services unit or aeronautical telecommunication facility, and for receiving meteorological information, at any time during flight; and
- (b) a headset with a boom or throat microphone.

(2) The radio communication equipment required under paragraph (1) must provide for communication on the emergency frequency 121.5 MHz when necessary.

(3) An AOC holder must not operate a relevant aircraft in defined portions of airspace or on a route where the appropriate air traffic services authority has specified a required communication performance for performance-based communication unless —

- (a) the aircraft is equipped to operate in accordance with the specified required communications performance; and
- (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

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## Navigation equipment

**96.**—(1) An AOC holder must ensure that every relevant aircraft is equipped with a navigation system that enables the aircraft to proceed in accordance with —

- (a) the operational flight plan; and
- (b) the requirements of an appropriate air traffic services authority.

(2) An AOC holder must not carry out a specified navigation performance operation with any relevant aircraft unless —

- (a) the aircraft is equipped with the capability of operating in accordance with the specified navigation performance; and
- (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

(3) An AOC holder must not operate a small aeroplane in RVSM airspace unless —

- (a) the aeroplane is equipped with the capability —
  - (i) to indicate to the flight crew the flight level being flown;
  - (ii) to automatically maintain a selected flight level;
  - (iii) to provide an alert to the flight crew when the altitude of the aeroplane deviates from the selected flight level by more than 300 ft (90 m); and
  - (iv) to automatically report pressure altitude; and
- (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

(4) In this regulation, “specified navigation performance operation” has the meaning given by the Air Navigation (98 — Special Operations) Regulations 2018.

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### **Surveillance equipment**

**97.**—(1) An AOC holder must equip every relevant aircraft with surveillance equipment that enables the aircraft to operate in accordance with the requirements of the appropriate air traffic services authority.

(2) An AOC holder must not operate a relevant aircraft in an area where the appropriate air traffic services authority has specified a required surveillance performance for performance-based surveillance unless —

- (a) the aircraft is equipped with the capability of operating in accordance with the required surveillance performance specification; and
- (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

### **Installation of communication, navigation and surveillance equipment**

**98.** An AOC holder must ensure that the installation on a relevant aircraft of any equipment required for communication, navigation or surveillance purposes is such that the failure of any single unit of such equipment, or any combination of such equipment, will not result in the failure or another unit of equipment required for communications, navigation or surveillance purposes.

### **Landing in Instrument Meteorological Conditions**

**99.**—(1) An AOC holder must ensure that every relevant aircraft that may be required to land in Instrument Meteorological Conditions is provided with appropriate navigation equipment.

(2) The navigation equipment provided in accordance with paragraph (1) must be capable of receiving signals to provide guidance to a point from which a visual landing can be made at any aerodrome of intended landing and any designated alternate aerodrome.

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**Category II or III precision approach equipment**

**100.** An AOC holder must not conduct a Category II or III precision approach procedure with a relevant aircraft unless —

- (a) the aircraft is equipped with the capability to conduct such operations; and
- (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

**Crew intercom and public address system**

**101.** An AOC holder must ensure that every relevant aircraft that is not an aircraft certified for single pilot operations is equipped with —

- (a) a suitable means to conduct passenger briefings; and
- (b) a crew member intercom system.

**Emergency lighting**

**102.—**(1) Before operating an aeroplane with an MCTOM exceeding 5,700 kg at night, the AOC holder must ensure that, to facilitate evacuation in the event of an emergency, the aeroplane is equipped with —

- (a) an emergency lighting system that provides illumination in the passenger compartment and at the location of each emergency exit;
- (b) an emergency floor path lighting system in the passenger compartment that leads to every emergency exit; and
- (c) an emergency lighting system that provides illumination outside the aeroplane.

(2) Before operating a helicopter at night, the AOC holder must ensure that the helicopter is equipped with an emergency lighting system in the passenger compartment to facilitate evacuation in the event of an emergency.

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**Medical and emergency equipment**

**103.**—(1) An AOC holder must ensure that every relevant aircraft is equipped with at least one first-aid kit.

(2) An AOC holder must ensure that the first-aid kit provided in accordance with paragraph (1) —

- (a) is stowed in an accessible place in the aircraft;
- (b) contains items which are appropriate to the nature of the flight and is adequate to treat minor injuries;
- (c) if the aircraft is required to carry cabin crew, is suitable for the use by the cabin crew to manage any incident of ill health.

(3) An AOC holder must ensure that every relevant aircraft that is required to carry cabin crew carries a universal precaution kit suitable for the use by cabin crew members to manage —

- (a) any incident of ill health associated with a case of suspected communicable disease; or
- (b) any incident of illness involving contact with body fluids.

(4) An AOC holder must ensure that every relevant aircraft is equipped with —

- (a) at least one fire extinguisher, accessible to a flight crew member, on or near the flight deck; and
- (b) at least one fire extinguisher in each compartment that is separate from the flight deck.

(5) An AOC holder must ensure that every fire extinguisher provided in accordance with paragraph (4) —

- (a) is of a type that will not cause dangerous contamination of the air within the aircraft; and
- (b) is filled with extinguishing agent that is not a type listed in Annex A, Group II of the Montreal Protocol on Substances That Deplete the Ozone Layer (8th Edition, 2009) if the fire extinguisher is —

- (i) a portable fire extinguisher in a relevant aircraft for which the Certificate of Airworthiness is first issued (whether in Singapore or elsewhere) on or after 31 December 2018; or
- (ii) a built-in fire extinguisher in a lavatory disposal receptacle for towels, paper or waste in a relevant aircraft for which the Certificate of Airworthiness is first issued (whether in Singapore or elsewhere) on or after 31 December 2011.

(6) An AOC holder must ensure that every item of equipment provided in accordance with paragraphs (1), (3) and (4) is marked to clearly indicate its method of operation.

(7) If an item of equipment required under paragraph (1), (3) or (4) is stored in a compartment or container, the AOC holder must ensure that the compartment or container is marked to indicate its contents.

### **Emergency locator transmitter**

**104.**—(1) An AOC holder must ensure every small aeroplane that corresponds to one of the following descriptions is equipped with emergency locator transmitters of the quantity and type specified for that aeroplane:

- (a) an aeroplane for which the Certificate of Airworthiness was first issued (whether in Singapore or elsewhere) before 1 July 2008 must be equipped with at least one emergency locator transmitter of any type;
- (b) an aeroplane for which the Certificate of Airworthiness was first issued (whether in Singapore or elsewhere) on or after 1 July 2008 must be equipped with at least one automatic ELT.

(2) An AOC holder must ensure that every helicopter is equipped with —

- (a) at least one automatic ELT; and
- (b) if the helicopter is to be operated over water as described in regulation 106, at least one survival ELT which is stowed in a life raft or with a life jacket.

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(3) An AOC holder must ensure that every emergency locator transmitter that is provided in accordance with paragraph (1) or (2) —

(a) operates in accordance with the requirements of Volume III of Annex 10 to the Chicago Convention; and

(b) is capable of transmitting on 121.5 MHz and 406 MHz.

(4) An AOC holder must ensure that every emergency locator transmitter that is capable of transmitting on 406 MHz —

(a) is coded in accordance with Volume III of Annex 10 of the Chicago Convention; and

(b) is registered with the agency responsible for the maintenance of the aircraft register in respect of the aircraft in which the emergency locator transmitter is installed.

### **Survival equipment**

**105.**—(1) Before the commencement of any flight of a relevant aircraft, the AOC holder must ensure that the aircraft carries survival equipment and signalling devices appropriate to the areas to be overflown and to the circumstances of the flight.

(2) The equipment carried on a relevant aircraft for compliance with paragraph (1) may include, as appropriate, the equipment specified in regulation 106 and in the Third Schedule.

### **Flights over water — general requirements**

**106.**—(1) An AOC holder must ensure that a relevant aircraft that is to be flown over water is equipped with a life jacket for every person on board.

(2) Every life jacket provided in accordance with paragraph (1) —

(a) must be equipped with a survivor locator light;

(b) must be equipped with a whistle, except for a life jacket constructed and carried on board solely for use by a child under 4 years of age; and



- (c) must be stowed in a place which is easily accessible from the seat or berth of the person for whom the life jacket is provided.

(3) An AOC holder must ensure that every life jacket, life raft or signalling device provided in accordance with this regulation and regulations 107 and 108 —

- (a) is installed in a conspicuously identified location with the contents clearly indicated; and
- (b) is easily accessible in the event of a ditching.

### **Flights over water — aeroplanes**

**107.**—(1) Before a small aeroplane with a single engine is operated over water at a distance that is more than 30 minutes at cruise speed or 100 NM, whichever is lesser, from land suitable to make an emergency landing, the AOC holder must equip the aeroplane with —

- (a) life rafts in accordance with paragraph (4); and
- (b) equipment for making distress signals, as described in the Rules of the Air.

(2) Before a small aeroplane with more than one engine is operated over water at a distance that is more than 30 minutes at cruise speed or 100 NM, whichever is lesser, from land suitable to make an emergency landing, and if the aeroplane would be unable to maintain level flight above minimum altitude in the event of engine failure, the AOC holder must equip the aeroplane with —

- (a) life rafts in accordance with paragraph (4); and
- (b) equipment for making distress signals, as described in the Rules of the Air.

(3) Before a small aeroplane with more than one engine is operated over water at a distance that is more than 120 minutes at cruise speed or 400 NM, whichever is lesser, from land suitable to make an emergency landing, the AOC holder must equip the aeroplane with life rafts in accordance with paragraph (4).

(4) The life rafts provided in accordance with paragraph (1)(a), (2)(a) or (3) —

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- (a) must be of sufficient numbers to carry all persons on board the aeroplane;
  - (b) must be stowed on the aeroplane so as to facilitate ready use in the event of an emergency; and
  - (c) must be equipped with —
    - (i) equipment in accordance with the Third Schedule; and
    - (ii) such life-saving equipment, including means of sustaining life, as is appropriate to the flight to be undertaken.
- (5) Before a small aeroplane that is a seaplane or an amphibian aeroplane is operated on water, the AOC holder must equip the aeroplane with —
- (a) equipment for making sound signals, as specified in rule 33 of the Schedule to the Merchant Shipping (Prevention of Collisions at Sea) Regulations (Cap. 179, Rg 10);
  - (b) equipment necessary for mooring, anchoring or manoeuvring the aeroplane on water, appropriate to the size, mass and handling characteristics of the specific seaplane or amphibian aeroplane; and
  - (c) one sea anchor.

### **Flights over water — helicopters**

**108.**—(1) An AOC holder must ensure that every person on board a helicopter wears a life jacket, or an integrated survival suit that includes the functionality of the life jacket, during the following periods:

- (a) if the helicopter is operating in Performance Class 1 or 2, when the helicopter —
  - (i) is flying over water in a hostile environment; or
  - (ii) is flying over water at a distance from land that is more than 10 minutes at normal cruise speed;

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- (b) if the helicopter is operating in Performance Class 3, when the helicopter is flying at a distance from land that is beyond auto-rotational range or safe forced landing distance;
- (c) at any other time the pilot-in-command of the helicopter so decides, based on the pilot-in-command's determination of the risk to survival of the occupants in the event of ditching.
- (2) Before a helicopter is operated over water, the AOC holder must ensure that the helicopter —
- (a) if required under this regulation to carry more than one life raft —
- (i) has at least 50% of the life rafts deployable by remote control; and
- (ii) has equipped any other required raft, with a mass of more than 40 kg and which is not deployable by remote control, with some means of mechanically assisted deployment; or
- (b) if fitted with 2 life rafts, each life raft is able to carry every person on board the helicopter when the life raft is in the overload state.
- (3) Before a helicopter is operated over water in a hostile environment or over water at a distance from land that is more than 10 minutes at normal cruise speed, the AOC holder must equip the helicopter with —
- (a) a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter;
- (b) life rafts of sufficient numbers to carry every person on board, and which are suitably equipped to sustain life in the expected conditions;
- (c) equipment for making the distress signals, as described in the Rules of the Air;
- (d) a survival suit for each crew member; and

(e) any additional equipment decided by reference to a survival risk assessment completed by the AOC holder.

(4) Where a helicopter is operated in the circumstances described in paragraph (3), the AOC holder must ensure that the survival suit mentioned in paragraph (3)(d) is worn by every crew member during the following periods:

- (a) when the sea temperature is less than 10°C;
- (b) when the estimated rescue time exceeds the calculated survival time.

(5) In paragraph (2)(b), “overload state” means a design safety margin of 1.5 times the maximum capacity of the life raft.

### **Pressure-altitude reporting transponder**

**109.**—(1) An AOC holder must ensure that every small aeroplane is equipped with a pressure-altitude reporting transponder —

- (a) which operates in accordance with the provisions of Volume IV of Annex 10 to the Chicago Convention;
- (b) which is capable of operating in Mode S;
- (c) which has a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft) or better; and
- (d) which is provided with an airborne or on-the-ground status of the aeroplane when that aeroplane is equipped with an automatic means of detecting such status.

(2) An AOC holder must ensure that every helicopter is equipped with a pressure-altitude reporting transponder which operates in accordance with the provisions of Volume IV of Annex 10 to the Chicago Convention.

### **Passenger safety instructions**

**110.** An AOC holder must ensure that every relevant aircraft is equipped with a means of conveying the following information and instructions to passengers:

- (a) when seat belts are to be fastened;

- (b) when and how any oxygen equipment that is required to be carried is to be used;
- (c) any restrictions on smoking;
- (d) the location and use of life jackets, and lifecots if carried;
- (e) the location of emergency equipment;
- (f) the location and method of opening emergency exits.

### **Oxygen indicators**

**111.** An AOC holder must ensure that every relevant aircraft to be operated above flight level 100 —

- (a) is equipped with a means of indicating to the flight crew —
  - (i) whether the passenger oxygen system is activated;
  - (ii) if the oxygen system is supplied by a gaseous system, the amount of breathing oxygen available in each source of supply; and
  - (iii) if the aircraft is a pressurised aircraft, by visual or aural warning, when the cabin pressure altitude exceeds 10,000 feet; and
- (b) is equipped with a means of indicating to each user of an individual dispensing unit whether the oxygen is being delivered to the dispensing unit.

### **Non-pressurised aeroplanes**

**112.** An AOC holder must ensure that a small aeroplane with a non-pressurised cabin is not operated above flight level 100 for any commercial air transport operation except under and in accordance with an approval granted by the Director-General of Civil Aviation.

### **Oxygen equipment and supplies for pressurised aircraft**

**113.—(1)** Subject to paragraphs (3) and (4), an AOC holder must ensure that every relevant aircraft that is a pressurised aircraft, and that is to be operated at an altitude above flight level 100, carries on board a supply of oxygen sufficient for a duration of time that is the greater of —

- (a) the duration of time that is calculated in accordance with the Operations Manual before the commencement of the flight, being the period or periods which it is reasonably anticipated that the aircraft will be flown in the circumstances of the intended flight at an altitude where a supply of oxygen is required, and in calculating that period or those periods of time, the following factors must be taken into account:
- (i) the possibility of depressurisation when the aircraft is flying above flight level 100;
  - (ii) the possibility of failure of one or more of the aircraft engines;
  - (iii) the restrictions due to required minimum safe altitude;
  - (iv) the fuel requirements;
  - (v) the performance of the aircraft; or
- (b) the duration of time that is calculated in accordance with the following Table 1 for the circumstances that the aircraft is to be operated in:

Table 1: Oxygen supply for a pressurised aircraft

<b>Circumstances</b>	<b>Supply for</b>	<b>Duration</b>
(1) When flying above flight level 100 but not exceeding flight level 250	(a) every flight crew member	30 minutes or whenever the cabin pressure altitude exceeds 10,000 ft, whichever is greater.
	(b) every cabin crew member and 10% of passengers	(i) When the aircraft is capable of descending and continuing to its destination as specified in Capability 1, 30 minutes or whenever the cabin pressure altitude exceeds 10,000 ft, whichever is greater.

Circumstances	Supply for	Duration
		(ii) When the aircraft is not capable of descending and continuing to its destination as specified in Capability 1, whenever the cabin pressure altitude is greater than 10,000 ft but does not exceed 12,000 ft.
	(c) every cabin crew member and all passengers	When the aircraft is not capable of descending and continuing to its destination as specified in Capability 1, and the cabin pressure altitude exceeds 12,000 ft, the period when the cabin pressure altitude exceeds 12,000 ft or 10 minutes whichever is greater.
(2) When flying above flight level 250	(a) every flight crew member	2 hours or whenever the cabin pressure altitude exceeds 10,000 ft, whichever is greater.
	(b) every cabin crew member	Whenever the cabin pressure altitude exceeds 10,000 ft and a portable supply for 15 minutes.
	(c) 10% of passengers	Whenever the cabin pressure altitude exceeds 10,000 ft, but does not exceed 12,000 ft.
	(d) 30% of passengers	Whenever the cabin pressure altitude exceeds 12,000 ft, but does not exceed 15,000 ft.
	(e) all passengers	If the cabin pressure altitude exceeds 15,000 ft, the period when the cabin pressure altitude exceeds 15,000 ft or 10 minutes, whichever is greater.

Circumstances	Supply for	Duration
	(f) 2% of passengers or 2 passengers, whichever is greater, being supply of first-aid oxygen which must be available for simultaneous first-aid treatment of 2% or 2 passengers wherever the passengers are seated in the aircraft	Whenever after decompression, if cabin pressure exceeds 8,000 ft.

(2) In Table 1, “Capability 1” means that, at the time a failure to maintain cabin pressure occurs, the aircraft is capable of —

- (a) descending to flight level 130 within 4 minutes, in accordance with the emergency descent procedure specified in the relevant aircraft flight manual and without flying below the minimum altitudes for safe flight specified for the aircraft in the AOC holder’s Operations Manual or equivalent; and
- (b) continuing at or below that flight level to its intended destination or any other place at which a safe landing can be made.

(3) An AOC holder may, in lieu of complying with paragraph (1), comply with paragraph (4) if the relevant aircraft —

- (a) has a Certificate of Airworthiness that was first issued (whether in Singapore or elsewhere) before 1 January 1989; and
- (b) is provided with means for maintaining a pressure greater than 700 hPa throughout the flight in the flight crew compartment and in the compartments in which passengers are carried.



(4) The supply of oxygen to be provided for the purposes of paragraph (3) is —

- (a) in every case where a relevant aircraft is to be flown above flight level 350, a supply of oxygen in a portable container sufficient for the simultaneous first-aid treatment of 2 passengers; and
- (b) in the event of failure to maintain a pressure greater than 700 hPa in accordance with paragraph (3)(b) in the circumstances described in columns 1 and 2 of the following Table 2, a supply of oxygen sufficient for continuous use by the persons specified in column 3 for the period specified in column 4 of the Table:

Table 2: Alternative oxygen supply

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>
<b>Aircraft to operate at altitudes</b>	<b>Capability of aircraft to descend (where relevant)</b>	<b>Persons for whom oxygen is to be provided</b>	<b>Period of supply of oxygen</b>
Above flight level 100		Every crew member and any passenger for whom oxygen is provided as specified below	30 minutes or the period specified at Condition A, whichever is greater.
Above flight level 100 but not above flight level 300	Aircraft is either flying at or below flight level 150 or is capable of descending and continuing to destination as specified at Condition X	10% of passengers	30 minutes or the period specified at Condition A whichever is greater.
	Aircraft is flying above flight level 150 and is not capable of	All passengers	10 minutes or the period specified at Condition B,

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>
<b>Aircraft to operate at altitudes</b>	<b>Capability of aircraft to descend (where relevant)</b>	<b>Persons for whom oxygen is to be provided</b>	<b>Period of supply of oxygen</b>
	descending and continuing to destination as specified at Condition X		whichever is greater.
		10% of passengers	30 minutes or the period specified at Condition C, whichever is greater.
Above flight level 300 but not above flight level 350	Aircraft is capable of descending and continuing to destination as specified at Condition Y	15% of passengers	30 minutes or the period specified at Condition A, whichever is greater.
	Aircraft is not capable of descending and continuing to destination as specified at Condition Y	All passengers	10 minutes or the period specified at Condition B, whichever is greater.
		15% of passengers	30 minutes or the period specified at Condition C, whichever is greater.
Above flight level 350		All passengers	10 minutes or the period specified at Condition B, whichever is greater.

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>
<b>Aircraft to operate at altitudes</b>	<b>Capability of aircraft to descend (where relevant)</b>	<b>Persons for whom oxygen is to be provided</b>	<b>Period of supply of oxygen</b>
		15% of passengers	30 minutes or the period specified at Condition C, whichever is greater.

(5) In Table 2 —

“Condition A” means the whole period during which the aircraft flies above flight level 100 after a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried has occurred;

“Condition B” means the whole period during which the aircraft flies above flight level 150 after a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried has occurred;

“Condition C” means the whole period during which the aircraft flies above flight level 100, but not above flight level 150, after a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried has occurred;

“Condition X” means that, at the time when a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried occurs, the aircraft is capable of —

- (a) descending to flight level 150 within 6 minutes, in accordance with the emergency descent procedure specified in the relevant aircraft flight manual and without flying below the minimum altitudes for safe

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flight specified for the aircraft in the AOC holder's Operations Manual or equivalent; and

- (b) continuing at or below that flight level to its place of intended destination or any other place at which a safe landing can be made;

“Condition Y” means that, at the time when a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried occurs, the aircraft is capable of —

- (a) descending to flight level 150 within 4 minutes, in accordance with the emergency descent procedure specified in the relevant aircraft flight manual and without flying below the minimum altitudes for safe flight specified for the aircraft in the AOC holder's Operations Manual or equivalent; and
- (b) continuing at or below that flight level to its place of intended destination or any other place at which a safe landing can be made.

(6) An AOC holder must ensure that a relevant aircraft that —

- (a) is intended to be operated at flight altitudes above flight level 250; or
- (b) is not capable of descending from an altitude of flight level 250 to flight level 130 within 4 minutes, in accordance with the emergency descent procedure specified in the relevant flight manual and without flying below the minimum altitudes for safe flight specified for the aircraft in the AOC holder's Operations Manual or equivalent,

is equipped with suitable and sufficient apparatus to enable the persons for whom oxygen is supplied to use the oxygen, including automatically deployable oxygen equipment with a quantity of oxygen dispensing units that exceeds the number of passenger and cabin crew seats by at least 10%.

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(7) An AOC holder must ensure that, in every small aeroplane that is a pressurised aeroplane and that is to be operated at any altitude above flight level 250, each flight crew member at the flight duty station has ready access from the crew member's normal seating position to a quick-donning type of oxygen mask that will readily supply oxygen on demand.

### **Device to warn flight crew of loss of pressurisation**

**114.** An AOC holder must ensure that every small aeroplane that —

- (a) is a pressurised aeroplane; and
- (b) is to be operated at any altitude above 25,000 ft,

is equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurisation.

### **Flight recorders — Construction, installation and continued serviceability**

**115.—(1)** An AOC holder must ensure that every flight recorder required to be installed on a relevant aircraft in accordance with regulations 116, 117, 118 and 119 is constructed, located and installed so as to provide maximum practical protection for the recordings such that the recorded information may be preserved, recovered and transcribed.

(2) An AOC holder must ensure that every flight recorder mentioned in paragraph (1) meets the requirements specified by the Director-General of Civil Aviation in Aviation Specifications 2 — Flight Recorders for the respective type of flight recorder in respect of —

- (a) specified crashworthiness and fire protection;
- (b) performance;
- (c) parameters or information to be recorded;
- (d) duration of recording; and
- (e) continued serviceability.

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**Flight recorders — flight data recorders and alternatives**

**116.**—(1) An AOC holder must ensure that every small aeroplane that corresponds to one of the following descriptions is equipped with a flight data recorder of the type specified for an aeroplane of that description:

- (a) for a multi-engine turbine-powered aeroplane with an MCTOM not exceeding 5,700 kg, for which the Certificate of Airworthiness was first issued on or after 1 January 1990 but before 1 January 2016 — an FDR that records at least the first 16 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders issued by the Director-General of Civil Aviation;
- (b) for a turbine-engined aeroplane with an MCTOM not exceeding 5,700 kg, for which the Certificate of Airworthiness was first issued on or after 1 January 2016 — one of the following flight data recorders:
  - (i) an FDR that records at least the first 16 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders;
  - (ii) a Class C airborne image recorder (AIR) or airborne image recording system (AIRS) that records at least the flight path and speed parameters displayed to the pilot, as defined in the Aviation Specifications 2 — Flight Recorders;
  - (iii) an aircraft data recording system (ADRS) that records at least the first 7 parameters specified in Table 1-3 of the Aviation Specifications 2 — Flight Recorders;
- (c) for an aeroplane with an MCTOM exceeding 5,700 kg but not exceeding 27,000 kg, for which the Certificate of Airworthiness was first issued on or before 1 January 2005 — an FDR that records at least the first 16 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders;

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- (d) for an aeroplane with an MCTOM exceeding 5,700 kg, for which the Certificate of Airworthiness was first issued after 1 January 2005 and the application for type certification was submitted to a Contracting State before 1 January 2023 — an FDR that records at least the first 78 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders;
  - (e) for an aeroplane with an MCTOM exceeding 5,700 kg, for which the application for type certification was first submitted to a Contracting State on or after 1 January 2023 — an FDR that records at least the first 82 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders.

(2) An AOC holder must ensure that every helicopter that corresponds to one of the following descriptions is equipped with a flight data recorder of the type specified for a helicopter of that description:

- (a) for a helicopter with an MCTOM exceeding 3,175 kg but not exceeding 7,000 kg, for which the Certificate of Airworthiness is first issued on or after 1 January 1989 but before 1 January 2016 — an FDR that records at least the first 15 parameters specified in Table 2-1 of the Aviation Specifications 2 — Flight Recorders;
- (b) for a helicopter with an MCTOM exceeding 7,000 kg, for which the Certificate of Airworthiness was first issued on or after 1 January 1989 but before 1 January 2016 — an FDR that records at least the first 30 parameters specified in Table 2-1 of the Aviation Specifications 2 — Flight Recorders;
- (c) for a helicopter with an MAPSC exceeding 19, for which the Certificate of Airworthiness was first issued on or after 1 January 1989 — an FDR that records at least the first 30 parameters specified in Table 2-1 of the Aviation Specifications 2 — Flight Recorders;
- (d) for a turbine-engined helicopter with an MCTOM exceeding 2,250 kg but not exceeding 3,175 kg, for

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which the application for type certification was first submitted to a Contracting State on or after 1 January 2018 — one of the following flight data recorders:

- (i) an FDR that records at least the first 48 parameters specified in Table 2-1 of the Aviation Specifications 2 — Flight Recorders;
  - (ii) a Class C AIR or AIRS that records at least the flight path and speed parameters displayed to the pilot, as defined in the Aviation Specifications 2 — Flight Recorders;
  - (iii) an ADRS that records at least the first 7 parameters specified in Table 1-3 of the Aviation Specifications 2 — Flight Recorders;
- (e) for a helicopter with an MCTOM exceeding 3,175 kg, for which the Certificate of Airworthiness was first issued on or after 1 January 2016 and the application for type certification was submitted before 1 January 2023 — an FDR that records at least the first 48 parameters specified in Table 2-1 of the Aviation Specifications 2 — Flight Recorders;
- (f) for a helicopter with an MCTOM exceeding 3,175 kg, for which the application for type certification was first submitted to a Contracting State on or after 1 January 2023 — an FDR that records at least the first 53 parameters specified in Table 2-1 of the Aviation Specifications 2 — Flight Recorders.

(3) Where a relevant aircraft is equipped with any FDR, ADRS, AIR or AIRS, the AOC holder must ensure that the FDR, ADRS, AIR or AIRS (as the case may be) does not use any of the following types of recording technology:

- (a) engraving metal foil;
- (b) frequency modulation;
- (c) photographic film;



(d) magnetic tape.

[S 771/2018 wef 24/11/2018]

**Flight recorders — cockpit voice recorder and cockpit audio recording system**

**117.—(1)** An AOC holder must ensure that every relevant aircraft that corresponds to one of the following descriptions is equipped with a cockpit voice recorder:

- (a) an aeroplane with an MCTOM exceeding 5,700 kg;
- (b) a turbine-engined aeroplane with an MCTOM not exceeding 5,700 kg for which the Certificate of Airworthiness is first issued on or after 1 January 2016, and which requires more than one pilot to operate;
- (c) a helicopter with an MCTOM exceeding 3,175 kg for which the Certificate of Airworthiness was first issued on or after 1 January 1987;
- (d) a helicopter with an MCTOM exceeding 7,000 kg.

[S 771/2018 wef 24/11/2018]

(2) Despite paragraph (1), an AOC holder may equip an aeroplane of the type described in paragraph (1)(b) with a cockpit audio recording system instead of a cockpit voice recorder.

(3) Where a helicopter described in paragraph (1)(c) or (d) is not equipped with a flight data recorder, the AOC holder must ensure that the cockpit voice recorder also records the main rotor speed of the helicopter.

(4) Where a relevant aircraft is equipped with any cockpit voice recorder (CVR) or cockpit audio recording system (CARS), the AOC holder must ensure that the CVR or CARS (as the case may be) does not use any of the following types of recording technology:

- (a) magnetic tape;
- (b) wire.

[S 771/2018 wef 24/11/2018]

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**Flight recorders — data link recorders**

**118.**—(1) An AOC holder must ensure that every relevant aircraft that corresponds to one of the following descriptions records the data link communications messages on a crash-protected flight recorder (called in this regulation a data link recorder):

- (a) any relevant aircraft for which the Certificate of Airworthiness first issued on or after 1 January 2016, that utilises any of the data link communications applications specified by the Director-General of Civil Aviation, and which is required to carry a cockpit voice recorder under regulation 117;
- (b) any relevant aircraft which is modified on or after 1 January 2016 to install and utilise any of the data link communications applications specified by the Director-General of Civil Aviation and which is required to carry a cockpit voice recorder under regulation 117.

*[S 771/2018 wef 24/11/2018]*

(2) An AOC holder must ensure that the minimum recording duration of the data link communications required for an aircraft described in paragraph (1)(a) or (b) is equal to the minimum recording duration of the cockpit voice recorder.

(3) An AOC holder must ensure that the recordings of the data link recorder can be correlated to the recorded cockpit audio.

**Combination recorders**

**119.**—(1) Subject to paragraph (2), an AOC holder may, in lieu of complying with the requirements of regulations 116 and 117, equip every relevant aircraft that corresponds to one of the following descriptions with the flight recorder system specified for that aircraft:

- (a) an aeroplane with an MCTOM exceeding 5,700 kg, that is required to be equipped with a flight data recorder and a cockpit voice recorder, may be equipped with 2 combination recorders (one forward and one aft);
- (b) a multi-engine turbine-powered aeroplane with an MCTOM not exceeding 5,700 kg, that is required to be

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equipped with a flight data recorder or a cockpit voice recorder, or both, may be equipped with one combination recorder;

- (c) a helicopter that is required to be equipped with any flight recorder may be equipped with a combination recorder.

(2) An AOC holder may, in lieu of complying with the requirements of regulations 116 and 117, equip an aeroplane with an MCTOM exceeding 15,000 kg with 2 combination recorders if —

- (a) the application for type certification of the aeroplane is submitted to a Contracting State on or after 1 January 2016; and
- (b) the aeroplane is required to be equipped with both a flight data recorder and a cockpit voice recorder under these Regulations.

(3) The combination recorders provided in accordance with paragraph (2) must be located at different parts of the aeroplane, with one located as close to the cockpit as practicable and the other located as far away as practicable.

(4) In this regulation, “combination recorder” means a flight recorder with the functions of both a cockpit voice recorder and a flight data recorder.

### **Ground proximity warning system**

**120.**—(1) An AOC holder must ensure that every relevant aircraft that corresponds to one of the following descriptions is equipped with a ground proximity warning system which has a forward looking terrain avoidance function:

- (a) a turbine-powered aeroplane with an MCTOM exceeding 5,700 kg, or with an MAPSC exceeding 9;
- (b) a turbine-powered aeroplane with an MCTOM not exceeding 5,700 kg and an MAPSC exceeding 5 but not exceeding 9;
- (c) a piston-engined aeroplane with an MCTOM exceeding 5,700 kg, or with an MAPSC exceeding 9;

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- (d) a helicopter with an MCTOM exceeding 3,175 kg, or with an MAPSC exceeding 9, and which is to be operated in accordance with the Instrument Flight Rules.
- (2) The ground proximity warning system required to be installed in an aeroplane described in paragraph (1)(a) —
- (a) must provide an automatic and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface; and
  - (b) must provide warnings for all of the following circumstances:
    - (i) excessive descent rate;
    - (ii) excessive terrain closure rate;
    - (iii) excessive altitude loss after take-off or go-around;
    - (iv) unsafe terrain clearance while not in the landing configuration:
      - (A) gear not locked down;
      - (B) flaps not in a landing position;
    - (v) excessive descent below the instrument glide path.
- (3) The ground proximity warning system required to be installed in an aeroplane described in paragraph (1)(b) or (c) —
- (a) must provide an automatic and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface; and
  - (b) must provide warnings for all of the following circumstances:
    - (i) excessive descent rate;
    - (ii) excessive altitude loss after take-off or go-around;
    - (iii) unsafe terrain clearance.

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**Significant weather detection**

**121.** An AOC holder must ensure that every relevant aircraft that is used to carry passengers and is not a non-pressurised aeroplane is equipped with an operative weather radar or other equipment capable of detecting thunderstorms or other potentially hazardous weather conditions whenever the aircraft is to be or is being operated —

- (a) in areas where such conditions may be expected to exist along the route in instrument meteorological conditions; or
- (b) at night.

**Forward-looking wind shear warning system**

**122.—(1)** An AOC holder must ensure every small aeroplane that —

- (a) is turbine-powered; and
- (b) has an MCTOM exceeding 5,700 kg or an MAPSC exceeding 9,

is equipped with a forward-looking wind shear warning system.

(2) The forward-looking wind shear warning system provided in accordance with paragraph (1) —

- (a) must be capable of providing the pilot with a timely aural and visual warning of wind shear ahead of the aircraft, and the information required for the pilot —
  - (i) to safely commence and continue a missed approach or go-around; or
  - (ii) to safely execute an escape manoeuvre if necessary; and
- (b) must provide an indication to the pilot when the limits specified for the certification of automatic landing equipment are being approached, when such equipment is in use.

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**Airborne Collision Avoidance System (ACAS II)**

**123.**—(1) An AOC holder must ensure that every small aeroplane that —

- (a) is turbine-powered; and
- (b) has an MCTOM exceeding 5,700 kg,

is equipped with ACAS II.

(2) The ACAS II provided in accordance with paragraph (1) must operate in accordance with the relevant provisions of Volume IV of Annex 10 to the Chicago Convention.

**Automatic Dependent Surveillance — Broadcast (out) (ADS-B (out))**

**124.**—(1) An AOC holder must ensure that every small aeroplane with an MCTOM exceeding 5,700 kg is equipped with ADS-B (out) capability.

(2) In this regulation, “ADS-B (out) capability” means the function by which an aeroplane is capable of automatically transmitting data (such as aircraft identification, aircraft position and other information, as appropriate) in a broadcast mode via a data link.

**Cosmic radiation detection equipment**

**125.**—(1) An AOC holder must ensure that every small aeroplane that is to be flown at an altitude above 49,000 ft carries equipment to measure and continuously indicate the dose rate of total cosmic radiation being received and the cumulative dose for every such flight.

(2) The display unit of the equipment provided for the purposes of paragraph (1) must be readily visible to a flight crew member.

*Division 7 — Maintenance***Maintenance responsibilities**

**126.**—(1) An AOC holder must ensure that every relevant aircraft that is registered in Singapore is maintained by —

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- (a) its own maintenance organisation that is approved by the Director-General of Civil Aviation in accordance with the Air Navigation Order (O 2); or
  - (b) an external organisation contracted under a formal maintenance support contract acceptable to the Director-General of Civil Aviation.

(2) Despite paragraph (1), the line maintenance for a Singapore registered aircraft may be carried out by a member of the AOC holder's operations personnel if —

- (a) the line maintenance does not require the use of complex tools or equipment that requires extensive setting up, or specialised training; and
- (b) the scope of such line maintenance is specified in the Maintenance Control Manual.

(3) An AOC holder that, as described in paragraph (1)(b), contracts an external organisation to perform all or part of the maintenance of its Singapore registered aircraft must ensure that the contracted external organisation complies with maintenance requirements of the Air Navigation Order.

(4) An AOC holder must ensure that every relevant aircraft that is not registered in Singapore is maintained under an arrangement acceptable to both the Director-General of Civil Aviation and the aircraft's State of Registry.

(5) An AOC holder must not operate a foreign registered aircraft unless the aircraft has been maintained and released to service under a system acceptable to the aircraft's State of Registry.

### **Continuing airworthiness information**

**127.** For every aeroplane with an MCTOM exceeding 5,700 kg or helicopter with an MCTOM exceeding 3,175 kg, the AOC holder must —

- (a) obtain and assess airworthiness information from the organisation responsible for the type design of the aeroplane or helicopter; and

- (b) implement such measures or actions arising from the information as considered necessary.

### **Use of Maintenance Control Manual**

**128.**—(1) An AOC holder must ensure that no Maintenance Control Manual, or any proposed amendment to the Maintenance Control Manual, is used for the maintenance of a relevant aircraft unless the Maintenance Control Manual or proposed amendment is approved by the Director-General of Civil Aviation under regulation 22 of the Air Navigation (119 — Air Operator Certification) Regulations 2018.

(2) An AOC holder must —

- (a) provide to every member of the maintenance and operations personnel concerned with the maintenance of a relevant aircraft with the approved Maintenance Control Manual containing all the instructions and information necessary for such personnel to perform their duties; and
- (b) ensure that the approved Maintenance Control Manual is readily available to all personnel concerned with the maintenance or operation of a relevant aircraft.

### *Division 8 — Crew requirements*

#### **Composition of flight crew**

**129.**—(1) Subject to paragraph (2), for every flight of a relevant aircraft, the AOC holder must ensure that —

- (a) the number and composition of the assigned flight crew is not less than the requirements specified in the AOC holder's Operations Manual; and
- (b) the assigned flight crew includes flight crew members in addition to the minimum number specified in the aircraft flight manual or other documents associated with the aircraft's Certificate of Airworthiness, when necessitated by considerations related to —
  - (i) the aircraft type used;



- (ii) the type of operation involved; and
- (iii) the duration of flight between points where flight crews are changed.

(2) An AOC holder must not operate any relevant aircraft with a single pilot for a flight in accordance with the Instrument Flight Rules or at night unless the use of a single pilot is approved by the Director-General of Civil Aviation.

### **Flight crew qualification**

**130.** An AOC holder must ensure that every person assigned to flight crew duty on a relevant aircraft —

- (a) meets all requirements for the assigned flight crew duty;
- (b) meets all competency requirements in accordance to Division 10, including route and aerodrome qualification requirements for the intended operation; and
- (c) is currently qualified in accordance with the requirements of Division 9.

### **Flight crew recency**

**131.**—(1) An AOC holder must not assign any person to flight crew member duty as a pilot operating the flight controls of a relevant aircraft during take-off and landing unless the person has, in the 90 days immediately preceding the flight —

- (a) operated the flight controls during at least 3 take-offs and 3 landings of an aircraft of the same aircraft type to be used for the flight or in an approved flight simulation training device that is representative of that aircraft type; and  
*[S 681/2018 wef 09/10/2018]*
- (b) if the aircraft is to be flown in accordance with the Instrument Flight Rules, flown a minimum of 3 instrument approaches, or otherwise demonstrated competence through a flight check with a check pilot.

(2) An AOC holder must not assign any person to flight crew member duty as a pilot-in-command of a relevant aircraft unless the person has, in the 35 days immediately preceding the flight, carried

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out at least one take off and one landing using an aircraft of the same type to be used for the flight, or an approved flight simulation training device that is representative of that aircraft type.

*[S 681/2018 wef 09/10/2018]*

### **Flight crew duty assignment**

**132.**—(1) For every flight of a relevant aircraft, the AOC holder must designate —

- (a) a flight crew member as the pilot-in-command;
- (b) the number of persons required as additional flight crew members to augment the minimum crew specified in the aircraft's flight manual due to —
  - (i) the type of aircraft operated;
  - (ii) the type of operation to be performed; and
  - (iii) the duration of the flight.

(2) An AOC holder must assign each flight crew member to the functions that the flight crew member is required to carry out in the event of an aircraft emergency.

(3) For every flight of a relevant aircraft, the AOC holder must ensure that the assigned flight crew includes —

- (a) if the aircraft has a separate flight engineer's station, at least one flight engineer who is especially assigned to that station; and
- (b) if the aircraft is likely to perform an operation where navigation necessary for the safe conduct of the flight cannot be adequately accomplished by the pilots from the pilot station, at least one flight crew member who holds a flight navigator licence.

(4) Paragraph (3)(a) does not apply when the duties associated with the separate flight engineer's station can be adequately performed by another flight crew member holding a flight engineer licence without interference with that flight crew member's regular duties.

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### **Experience requirements for pilot-in-command training**

**133.** An AOC holder must ensure that every flight crew member to be designated as a pilot-in-command for a flight of a relevant aircraft has acquired at least the minimum flight time specified in the AOC holder's Operations Manual before commencing the training specified in Division 9 for a pilot-in-command.

### **Pilot experience**

**134.—(1)** An AOC holder must ensure that every person assigned to flight crew member duty on a relevant aircraft as a pilot —

- (a) is suitably trained and qualified as a pilot on the aircraft type to be used; and
- (b) in the event the pilot-in-command becomes incapacitated, is capable of —
  - (i) operating the aircraft safely under the prevailing and anticipated forecast weather conditions; and
  - (ii) landing the aircraft at the intended destination or a suitable alternate.

(2) Before an AOC holder assigns a person to flight crew member duty as the pilot-in-command of a relevant aircraft that is to be used for a single pilot operation in accordance with the Instrument Flight Rules or at night, the AOC holder must ensure that the person has accumulated the following experience:

- (a) for a single pilot operation flown in accordance with the Instrument Flight Rules —
  - (i) at least 50 hours' flight time on the class of aircraft to be flown for the operation, of which at least 10 hours are flown as pilot-in-command;
  - (ii) at least 25 hours' flight time under IFR on such class of aircraft (which may form part of the 50 hours flight time mentioned in sub-paragraph (i)); and
  - (iii) in the 90 days immediately preceding the operation, the following experience in the capacity of a pilot

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engaged in a single pilot operation under the IFR on the class of aircraft to be flown —

- (A) at least 5 IFR flights, including 3 instrument approaches carried out in the single pilot role on the class of aircraft; or
- (B) an IFR instrument approach check;

(b) for a single pilot operation at night —

- (i) at least 50 hours' flight time on the class of aircraft to be flown for the operation, of which at least 10 hours are flown as pilot-in-command;
- (ii) at least 15 hours' flight time at night (which may form part of the 50 hours flight time mentioned in sub-paragraph (i)); and
- (iii) in 90 days immediately preceding such operation, at least 3 take-offs and 3 landings at night on the class of aircraft to be flown for the operation in the single pilot role, including one such take-off and one such landing within the 35 days immediately preceding the operation.

### **Experience requirements for helicopter pilot operating to offshore sites**

**135.**—(1) Before an AOC holder assigns a person to flight crew member duty as a pilot of a helicopter that is to be flown by day to and from an offshore site, the AOC holder must ensure that the person has completed at least one day deck landing in the 12 months immediately preceding the flight.

(2) Despite paragraph (1), an AOC holder may assign a person who does not meet the requirement in that paragraph to flight crew member duty as a pilot of a helicopter that is to be flown by day to and from an offshore site and to carry out such a landing if the person —

- (a) is not the pilot-in-command for the flight; and

(b) is accompanied by an experienced supervising pilot-in-command who is qualified to carry out a day deck landing in accordance with paragraph (1).

(3) Before an AOC holder assigns a person to flight crew member duty as a pilot of a helicopter that is to be flown by night to and from an offshore site, the AOC holder must ensure that the person has completed at least one day deck landing and one night deck landing in the 12 months immediately preceding the flight.

(4) Despite paragraph (3), an AOC holder may assign a person who does not meet the requirement in that paragraph to flight crew member duty as a pilot of a helicopter that is to be flown by night to and from an offshore site and to carry out such a landing if the person —

(a) is not the pilot-in-command for that flight;

(b) is qualified to carry out a day deck landing in accordance with paragraph (1); and

(c) is accompanied by an experienced supervising pilot-in-command who is qualified to carry out a night deck landing in accordance with paragraph (3).

(5) In this regulation —

“day deck landing” means a landing by day on the deck of an offshore site;

“night deck landing” means a landing by night on the deck of an offshore site;

“offshore site” includes a vessel.

### **Pilot operating limitations**

**136.** An AOC holder must specify in its Operations Manual the flight crew operating limitations for a flight crew member on each relevant aircraft.

### **Composition of cabin crew**

**137.—**(1) Unless otherwise authorised by the Director-General of Civil Aviation, an AOC holder must not carry any passengers on a

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relevant aircraft unless the number of cabin crew members on board is not less than the higher of either —

- (a) the number of cabin crew members specified in the aircraft manufacturer's recommended emergency evacuation procedures for the aircraft configuration being used; and
- (b) the number of cabin crew members specified in the certified design criteria for the aircraft.

(2) An AOC holder must ensure that a person is not assigned as a cabin crew member for any flight of a relevant aircraft unless the person —

- (a) is at least 18 years of age;
- (b) is medically fit to discharge the duties specified in the Operations Manual; and
- (c) meets the competency requirements in Division 10.

(3) Despite paragraph (1), if it appears to be expedient to do so in the interests of safety, the Director-General of Civil Aviation may direct an AOC holder not to fly a relevant aircraft, or any such aircraft in such circumstances as the Director-General of Civil Aviation may specify, unless that aircraft carries such additional persons as cabin crew members as the Director-General of Civil Aviation may specify in the direction.

### **Task specialists**

**138.** An AOC holder may assign to a task specialist the functions to be carried out in the event of an aircraft emergency if the task specialist —

- (a) is assigned duty on the flight of a relevant aircraft; and
- (b) has been appropriately trained to undertake the assigned functions.

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*Division 9 — Training*

**Training programmes — general**

**139.**—(1) An AOC holder must have a ground and flight training programme for its operations personnel that is approved by the Director-General of Civil Aviation.

(2) The ground and flight training programme established for the purposes of paragraph (1) —

(a) must ensure that every person that is assigned to be a member of an AOC holder's operations personnel is adequately trained and competent to perform the person's assigned duties; and

(b) must include —

(i) recurrent training that takes place at least annually;

(ii) assessments of competence in the person's assigned duties as a member of the operations personnel; and

(iii) the syllabus for each type of training to be conducted.

(3) An AOC holder must ensure that every person that is to be assigned duty as a crew member for a flight of a relevant aircraft is trained in accordance with its approved training programme.

(4) An AOC holder must ensure that the details of its approved training programme form Part D of the Operations Manual.

(5) An AOC holder must ensure that every person responsible for providing training —

(a) is appropriately qualified to do so; and

(b) is provided with a copy of the current training manual or equivalent and any other document relevant for the person to provide training.

(6) An AOC holder must ensure that the approved training programme is conducted safely and without unacceptable risk to the equipment, personnel or third parties.

(7) An AOC holder must ensure that all training in aircraft procedures are carried out in —

- (a) an aircraft of the type to be used by the crew member; or
- (b) an appropriate training equipment.

### **Training equipment**

**140.**—(1) An AOC holder may use a flight simulation training device to complete any part of the recurrent training segment of its training programme if the flight simulation training device —

- (a) is an approved flight simulation training device;
- (b) is specified in its Operations Manual;
- (c) is of an appropriate type for the training being undertaken; and
- (d) is only used for those parts of the training programme for which its use has been specifically approved.

*[S 681/2018 wef 09/10/2018]*

(2) An AOC holder may use simulation equipment or apparatus to represent an aircraft or environment to conduct the training specified in regulation 146 if —

- (a) the AOC holder has an approval from the Director-General of Civil Aviation for the use of simulation equipment or apparatus before such use; and
- (b) the simulation equipment or apparatus is used in accordance with the approval mentioned in sub-paragraph (a) under the supervision of a person approved by the Director-General of Civil Aviation to supervise such use.

(3) When conducting training that requires equipment or resources that are not used solely for training, an AOC holder must ensure that there is sufficient access to the equipment or resources such that the training may be completed —

- (a) without planned interruption; and
- (b) in an environment that is conducive to the objective and safety of the task.



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**Flight simulation training devices**

**141.**—(1) An AOC holder must ensure that every flight simulation training device that is being used by its personnel to accrue flight time or training credit for any purpose of these Regulations —

- (a) is an approved flight simulation training device;
- (b) is representative of the aircraft type or the particular variant of the aircraft type (if applicable) that it is intended to simulate; and
- (c) is appropriate for the specific manoeuvre, procedure or crew member function that it is being used for.

*[S 681/2018 wef 09/10/2018]*

(2) An AOC holder must ensure that each flight simulation training device mentioned in paragraph (1) —

- (a) maintains the performance, functional and other characteristics that are required for the approval in paragraph (1);
- (b) is modified to conform with any modification made to the aircraft being simulated that results in changes to performance, functional or other characteristics required for approval; and
- (c) is given a functional pre-flight check before being used for the day.

(3) An AOC holder must ensure that any discrepancy discovered during a training or check flight is logged by the appropriate flight crew supervisor or instructor at the end of the flight.

(4) An approved flight simulation training device may be used by more than one AOC holder if each AOC holder intending to use that flight simulation training device has the Director-General of Civil Aviation's specific approval for such use.

**Training instructors**

**142.**—(1) An AOC holder must have a process for appointing training instructors that is approved by the Director-General of Civil Aviation.

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- (2) The process required under paragraph (1) must specify —
- (a) the minimum knowledge, qualifications and experience required of an appointed training instructor;
  - (b) the scope and type of training, practice or supervision that an appointed instructor is entitled to provide; and
  - (c) the aircraft type that an appointed instructor is entitled to give instruction or supervision on.
- (3) Each training instructor appointed in accordance with the process mentioned in paragraph (1) must be provided with a copy of —
- (a) the AOC holder's training programme;
  - (b) the AOC holder's competency assessment programme; and
  - (c) the relevant parts of the AOC holder's Operations Manual.

### **Crew member training programme**

**143.** An AOC holder must ensure the training programme provided in accordance with regulation 139(1) to a person that may be assigned duty as a crew member for a flight of a relevant aircraft contains all of the following segments:

- (a) introduction training;
- (b) transition training;
- (c) upgrade training;
- (d) recurrent training.

### **Pilot training requirements**

**144.—**(1) An AOC holder must ensure that the training programme established and maintained for a person that may be assigned duty in a relevant aircraft as a flight crew member equips the person with sufficient knowledge of —

- (a) the functions that the person is responsible for in that flight crew member role; and

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(b) the relation of those functions to the functions of other crew members of the aircraft, particularly with regards to procedures in abnormal and emergency situations.

(2) The training programme mentioned in paragraph (1) must consist of ground and flight training on every type of aircraft that the person may be assigned duty in that flight crew member role.

(3) The training programme mentioned in paragraph (1) must include —

(a) training in procedures for normal situations and all types of emergency or abnormal situations;

(b) upset prevention and recovery training;

(c) training in knowledge and skills related to visual and instrument flight procedures for the intended area of operation, and charting; and

(d) use of the AOC holder's standard operating procedures.

(4) An AOC holder must ensure that the training programme mentioned in paragraph (1) specifies the minimum standards of qualification and experience required of a pilot for every type of flying operation conducted by the AOC holder, including the pre-requisite experience to undergo transition training or other role-specific training.

(5) When the training programme mentioned in paragraph (1) is being established for a flight crew member role as a pilot of a relevant aircraft, the AOC holder must ensure that at least the following factors are taken into account:

(a) the person's flying experience as a pilot;

(b) the availability and experience of other crew members;

(c) the influence of terrain and obstructions on departure and approach procedures at every aerodrome and alternate aerodrome that may be used;

(d) any specific instrument approach procedure that may be required;

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- (e) the type and dimensions of every runway that may be used, in relation to the performance characteristics of the aircraft;
  - (f) any seasonal meteorological conditions and the reliability of meteorological observations, reports and forecasts in the route network;
  - (g) any likely air traffic procedures that may be encountered and in particular, those procedures that may be outside the person's previous experience as a pilot;
  - (h) the influence of terrain and local geographic features on route conditions and the extent of assistance available from navigational aids and air-to-ground communication facilities;
  - (i) the extent to which ground instruction and training devices may familiarise the person with unusual aerodrome procedures and features of the route.
- (6) An AOC holder must provide recurrent training at least annually to ensure that a person that may be assigned flight crew member duty as a pilot of a relevant aircraft maintains knowledge and competency in —
- (a) the AOC holder's operational procedures; and
  - (b) the AOC holder's aircraft systems and procedures.
- (7) To avoid doubt, the pilot training mentioned in these Regulations does not include any training that leads to an endorsement of new ratings for the pilot.

### **Cabin crew training**

**145.**—(1) An AOC holder must ensure that, before a person is assigned duty as a cabin crew member for a flight of any relevant aircraft, the person has satisfactorily completed the appropriate ground and flight training for the aircraft type being used for the flight.

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(2) An AOC holder must ensure that the training established and maintained for a person that may be assigned duty as a cabin crew member addresses, as appropriate, the following matters:

- (a) the authority structure of the aircraft crew;
- (b) the assignment of crew members, including their functions and responsibilities during emergencies;
- (c) the procedures for passenger handling, including emergency procedures and procedures to be followed in dealing with special classes of passengers according to the Operations Manual;
- (d) the passenger briefings;
- (e) the proper use of cabin equipment and controls;
- (f) the location of safety and emergency equipment available for use by cabin or other crew members;
- (g) the location and use of oxygen equipment;
- (h) the location and use of all normal and emergency exits, including evacuation slides and escape ropes;
- (i) the use of all safety and emergency equipment available on the aircraft, as required under regulation 146;
- (j) the awareness of dangerous goods, as required under regulation 149;
- (k) the knowledge of human performance as related to passenger cabin safety duties, including flight crew and cabin crew coordination;
- (l) the applicable regulations and supporting documentation;
- (m) the AOC holder's documentation system and procedures.

### **Safety and Emergency Procedures training**

**146.**—(1) An AOC holder must ensure that every person to be assigned duty as a crew member for a flight of a relevant aircraft undergoes introduction and recurrent training in safety and emergency procedures as appropriate to the nature of the

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operations being carried out (called in these Regulations SEP training).

(2) The SEP training provided in accordance with paragraph (1) must enable every person mentioned in that paragraph —

- (a) to competently execute those safety duties and functions of a crew member which the person is assigned to perform in the event of an emergency or in a situation requiring emergency evacuation;
- (b) to be capable of competently using the emergency and life-saving equipment required to be carried on the aircraft;
- (c) to be aware of the other crew members' assignments and functions in the event of an emergency so far as is necessary for the fulfilment of the person's own duties; and
- (d) if assigned to an aircraft that is to be operated above 3,000 m (10,000 ft) —
  - (i) to know the effects of a lack of oxygen; and
  - (ii) to know the physiological phenomena accompanying a loss of pressurisation when the aircraft is a pressurised aircraft.

(3) An AOC holder must not assign a person to crew member duties on any flying operations or aircraft flying training unless the person has completed the introduction SEP training.

### **Crew resource management training requirements**

**147.** An AOC holder must ensure that each crew member training segment that is provided in accordance with the training programme required under regulation 139 includes theoretical and practical training in crew resource management skills appropriate to the crew member role or class of crew members participating in the training segment.

### **Threat and error management**

**148.** An AOC holder must ensure that the training programme provided to a person that may be assigned duty as a crew member for

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a flight of a relevant aircraft includes training in human performance and human factors, including principles of threat and error management.

### **Dangerous goods training**

**149.**—(1) An AOC holder must establish and maintain introduction and recurrent dangerous goods training programme that is approved by the Director-General of Civil Aviation.

(2) The dangerous goods training programme mentioned in paragraph (1) is for every person that may be assigned duty as a crew member, or a member of an AOC holder's operations personnel, for a flight of a relevant aircraft, in accordance with the relevant Annexes to the Chicago Convention and the ICAO TI.

### **Crew member introduction segment**

**150.**—(1) An AOC holder must ensure that every person who may be assigned duty as a crew member for a flight of a relevant aircraft but —

- (a) who is currently not qualified to act in that capacity; or
- (b) who is currently on the AOC holder's roster to be assigned duty in that capacity for any operation authorised by the AOC holder's air operator certificate,

completes the introduction segment of the AOC holder's training programme (provided in accordance with regulation 139) in a structured manner.

(2) An AOC holder may vary the syllabus of the introduction segment mentioned in paragraph (1) for a specific person if —

- (a) the details of the variation are recorded in the person's training record; and
- (b) the AOC holder certifies the variation made and the reasons for the variation in the person's training record.

### **Crew member transition segment**

**151.**—(1) An AOC holder must ensure that every person, who is qualified and is on the AOC holder's roster to be assigned duty as a

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crew member on a relevant aircraft for a commercial air transport operation authorised by the AOC holder's air operator certificate, completes the transition segment of the AOC holder's training programme provided in accordance with regulation 139 if —

- (a) the person is to be assigned to act as a crew member on an aircraft type, or a variant of an aircraft type, which is different from the aircraft type or variant that the person is currently being assigned duty on; or
  - (b) the AOC holder is introducing a new procedure or new equipment on the aircraft type or variant that the person is currently being assigned duty on.
- (2) The transition segment mentioned in paragraph (1) must address —
- (a) the use of all safety and emergency equipment and procedures applicable to the aircraft type or variant; and
  - (b) any new procedure or new equipment that is to be introduced on the aircraft type or variant that the person is currently being assigned duty on.
- (3) To avoid doubt, any training that relates to a pilot's aircraft type rating must be conducted only by a training organisation that is approved in accordance with paragraph 20(13)(c) of the Air Navigation Order (O 2).

### **Crew member upgrade segment**

**152.**—(1) An AOC holder must ensure that every person, who is on the AOC holder's roster to be assigned duty as a crew member on a relevant aircraft for a commercial air transport operation authorised by the AOC holder's air operator certificate, completes the upgrade segment of the AOC holder's training programme provided in accordance with regulation 139 before the person is assigned duty as a crew member in a role with more responsibilities (called in this regulation the upgraded crew member role).

- (2) The upgrade segment mentioned in paragraph (1) —
- (a) must address the use of all safety and emergency equipment and procedures applicable to the upgraded



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crew member role on the aircraft for which the upgrade is sought; and

- (b) must include training —
  - (i) on human factors and crew resource management, with particular emphasis on the changes brought about by the upgraded crew member role; and
  - (ii) in supervisory skills.

### **Crew member recurrent segment**

**153.**—(1) An AOC holder must ensure that every person, who is on the AOC holder's roster to be assigned duty as a crew member for a flight of a relevant aircraft, is adequately trained, current and proficient in the aircraft, crew member role and type of operation, that the person may be assigned duty in.

(2) An AOC holder must ensure that every person, who is on the AOC holder's roster to be assigned duty as a crew member for a flight of a relevant aircraft, completes the recurrent segment of the AOC holder's training programme provided in accordance with regulation 139 —

- (a) in a structured manner; and
- (b) at least once every 12 months.

*[S 771/2018 wef 24/11/2018]*

### **Manoeuvres requiring flight simulation training device**

**154.**—(1) An AOC holder must ensure that every person, who is on the AOC holder's roster to be assigned duty as a flight crew member for a flight of a relevant aircraft, carries out emergency and abnormal manoeuvres during flight crew training or competency checking.

(2) Subject to paragraph (3), an AOC holder must carry out flight crew training in the following manoeuvres in an approved flight simulation training device that is representative of the aircraft type to be flown:

- (a) any manoeuvre that needs to be carried out in close proximity to the surface;

- (b) any manoeuvre that involves the need to simulate failure of an aircraft system;
- (c) any manoeuvre that involve actions that cannot be realistically carried out in the aircraft;
- (d) any manoeuvre that, if mishandled, creates an unacceptable risk to the aircraft, crew members or third parties.

*[S 681/2018 wef 09/10/2018]*

(3) Where no approved flight simulation training device that is representative of the aircraft to be flown is available, an AOC holder may carry out the flight crew training in the manoeuvres listed under paragraph (2) in the aircraft to be flown if the AOC holder —

- (a) has developed procedures to simulate such manoeuvres in the aircraft to the limit defined by the aircraft manufacturer beyond which the safety of the aircraft, crew members or third parties may be compromised (called in this regulation the defined limit); and
- (b) continues the training in such manoeuvres past that defined limit through ground briefing.

*[S 681/2018 wef 09/10/2018]*

*[S 681/2018 wef 09/10/2018]*

### **Training records**

**155.**—(1) An AOC holder must maintain accurate records of all required training undertaken by every person who is a member of its operational personnel, that includes such records for all crew members and all of the instructors who provided such training.

(2) The approved training programme provided in accordance with regulation 139 must include specimen forms for recording any training undertaken.

(3) The training records maintained in accordance with paragraph (1) must include —

- (a) the date that the training was conducted;
- (b) the details of the training conducted;

- (c) the name and qualifications of the instructor responsible for conducting the training; and
- (d) the date and particulars of any decision to suspend or stop training a crew member.

(4) An AOC holder must maintain the training records for every person who is on the AOC holder's roster to be assigned duty as a crew member on a relevant aircraft in accordance with the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

#### *Division 10 — Crew member competency*

#### **Competency assessment programme**

**156.**—(1) For every person who is to be assigned duty as a crew member on a relevant aircraft, an AOC holder must establish and implement a competency assessment programme that comprises the relevant components prescribed in this Division.

(2) The competency assessment programme established in accordance with paragraph (1) must take into account all of the following areas, as applicable to the responsibilities of the person being assessed:

- (a) the applicable provisions of any subsidiary legislation made under the Act containing details of the person's responsibilities in the crew member role to be assigned to that person;
- (b) the operations specifications associated with the AOC holder's air operator certificate;
- (c) the AOC holder's Operations Manual;
- (d) the technical details of each aircraft type and variant operated, including aircraft systems, performance and operating procedures that may be relevant to the person's responsibilities as a crew member;
- (e) any special operations involving the aircraft on which the person is being assigned duty as a crew member;

(f) any new equipment, procedures and techniques.

(3) An AOC holder must include details of the competency assessment programme established and implemented in accordance with paragraph (1) in its Operations Manual for the approval of the Director-General of Civil Aviation.

(4) An AOC holder must ensure that every person who may be assigned duty as a crew member on a relevant aircraft is assessed in accordance with the approved competency assessment programme.

### **Operator Proficiency Check**

**157.**—(1) An AOC holder must establish and maintain an assessment (called in these Regulations an Operator Proficiency Check) to assess a person's competency in the person's expected role and duties as a pilot for a flight of any relevant aircraft before the person is assigned such duty.

(2) The Operator Proficiency Check established in accordance with paragraph (1) must include an assessment of a person's competence as a pilot in —

- (a) performing manoeuvres and procedures under normal circumstances with the use of the instruments and equipment provided; and
- (b) performing emergency manoeuvres and procedures relevant to the aircraft type or variant that the person is to be assigned to operate.

(3) An AOC holder must conduct the Operator Proficiency Check as part of the normal flight crew complement for every person who may be assigned duty as a pilot for a flight of a relevant aircraft.

(4) Where a person has passed the AOC holder's Operator Proficiency Check, that pass (called in this regulation an OPC pass) —

- (a) is valid for a period of 6 calendar months, starting from the day that the person passed the Operator Proficiency Check; and

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- (b) may be renewed for a further 6 calendar months, starting on the day immediately after the expiry of the existing OPC pass, if the person completes and passes an Operator Proficiency Check that is conducted after a period of 4 calendar months has elapsed from the commencement of the validity of the existing OPC pass.
- (5) The Operator Proficiency Check must be conducted in —
- (a) an approved flight simulation training device that is representative of the aircraft type or variant to be operated by the person being assessed; or  
*[S 681/2018 wef 09/10/2018]*
- (b) an aircraft of the type or variant to be operated by the person being assessed, during flight in actual or simulated instrument flight conditions when the aircraft is not carrying any passenger, cargo or mail.
- (6) Where an AOC holder is assessing a person for competency as a pilot to operate a relevant aircraft in accordance with the Instrument Flight Rules, the Operator Proficiency Check must be conducted in circumstances without external visual reference.

### **Operator Line Check**

**158.**—(1) An AOC holder must establish and maintain an assessment (called in these Regulations an Operator Line Check) to assess a person's competency in carrying out normal line operations, as specified in its Operations Manual, as a pilot for a flight of any relevant aircraft before the person is assigned such duty.

(2) The Operator Line Check established in accordance with paragraph (1) must include an assessment of a person's competence as a pilot of the aircraft type or variant that the person is to be assigned to operate —

- (a) in the relevant pre-flight and post-flight procedures; and
- (b) in the use of equipment provided on the aircraft.

(3) An AOC holder must conduct the Operator Line Check as part of the normal flight crew complement for every person who may be assigned duty as a pilot for a flight of a relevant aircraft.

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(4) Where a person has passed the AOC holder's Operator Line Check, that pass (called in this regulation an OLC pass) —

- (a) is valid for a period of 12 calendar months, starting from the day that the person passes the Operator Line Check; and
- (b) may be renewed for a further 12 calendar months, starting on the day immediately after the expiry of the existing OLC pass, if the person completes and passes an Operator Line Check that is conducted in the last 3 calendar months of the validity of the existing OLC pass.

(5) Unless the person being assessed holds a valid OLC pass, the Operator Line Check must be conducted in —

- (a) an approved flight simulation training device that is representative of the aircraft type or variant to be operated by the person being assessed; or

*[S 681/2018 wef 09/10/2018]*

- (b) an aircraft of the type or variant to be operated by the person being assessed, during flight when the aircraft is not carrying any passenger, cargo or mail.

(6) For a person who holds a valid OLC pass, the AOC holder may conduct the Operator Line Check during flight when the aircraft is carrying a passenger, cargo or mail.

### **Safety and Emergency Procedure Checks**

**159.**—(1) An AOC holder must establish and maintain an assessment (called in these Regulations a Safety and Emergency Procedures Check) to assess a person's competency in all the matters covered by the SEP training before the person is assigned duty as a crew member for a flight of a relevant aircraft.

(2) The Safety and Emergency Procedures Check established in accordance with paragraph (1) must include an assessment of the person's competency in the safety requirements and emergency procedures for each aircraft type and variant that the person may be assigned to operate in.

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(3) Where a person has passed a Safety and Emergency Procedures Check, that pass (called in this regulation an SEPC pass) —

- (a) is valid for the remainder of the month in which the person passes the Safety and Emergency Procedures Check and a further period of 12 calendar months (which starts on the first day of the calendar month after the person passes the Safety and Emergency Procedures Check); and
- (b) may be renewed for a further 12 calendar months, starting on the day immediately after the expiry of the existing SEPC pass, if the person completes and passes a Safety and Emergency Procedures Check in the last 3 calendar months of the validity of the existing SEPC pass.

#### **Area, route and aerodrome competence**

**160.**—(1) An AOC holder must not designate a person as the pilot-in-command for any flight of a relevant aircraft unless the person has, in the 12 months immediately preceding the commencement of the flight, demonstrated to the satisfaction of the AOC holder, that the person has adequate knowledge of —

- (a) the route to be taken for the flight;
- (b) the aerodromes of take-off and landing; and
- (c) the alternate aerodromes.

(2) The knowledge required under paragraph (1) includes knowledge of —

- (a) the terrain and minimum safe altitudes;
- (b) the seasonal meteorological conditions that may apply;
- (c) the meteorological, communication and air traffic facilities, services and procedures along the route to be taken for the flight;
- (d) the search and rescue procedures; and
- (e) the navigational facilities and procedures, including any long-range navigational procedures, associated with the route to be taken for the flight.

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(3) To determine if a person's knowledge of the matters mentioned in paragraphs (1) and (2) are sufficient to render the person competent to perform the duties of a pilot-in-command, an AOC holder must take into account the person's flying experience in conjunction with —

- (a) the experience of the other persons who are to be assigned as flight crew members for the flight;
- (b) the influence of terrain and obstructions on departure and approach procedures at the aerodromes of take-off and intended landing, and at the alternate aerodromes;
- (c) the similarity of the instrument approach procedures and let down aid to those procedures and aids with which that person is familiar;
- (d) the dimensions of runways which may be used in the course of the flight in relation to the performance limits of the aircraft type or variant to be used for the flight;
- (e) the reliability of meteorological forecasts and the probability of difficult meteorological conditions in the areas to be traversed;
- (f) the adequacy of available information in respect of the aerodrome of intended landing and any alternate aerodromes;
- (g) the nature of the air traffic control procedures and the familiarity of the person with such procedures;
- (h) the influence of terrain on route conditions and the extent of assistance which may be obtained en-route from navigational aids and air-to-ground communication facilities; and
- (i) the extent to which the person may become familiar with unusual aerodrome procedures and features of the route by means of ground instruction and training devices.

(4) An AOC holder may treat a person as having met the requirements in paragraph (1) if the person, in the 12 months immediately preceding the commencement of the flight for which the



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AOC holder is intending to assign the person as pilot-in-command (called in this paragraph the present flight) —

- (a) has previously qualified under paragraph (1) to act as a pilot-in-command on a flight between the same places, and on the same route, as the present flight; and
- (b) has acted as a pilot, check pilot or observer in the flight crew department of a flight between the same places, and on the same route, as the present flight.

(5) An AOC holder must establish a process, for the qualification and re-qualification of a pilot for the purpose of this regulation, that is approved by the Director-General of Civil Aviation.

(6) The process established in accordance with paragraph (5) must include —

- (a) the recording of the date and particulars of any decision taken by an AOC holder pursuant to paragraph (1); and
- (b) the evidence on which any such decision was based.

### **Dangerous goods tests**

**161.**—(1) If a person is to be assigned duty in a role that requires that person to undergo dangerous goods training in accordance with regulation 149, the AOC holder must ensure that the person has passed a test that verifies the person's understanding of the person's responsibilities in respect of dangerous goods before the AOC holder assigns the person to operational duties.

(2) An AOC holder must conduct the test mentioned in paragraph (1) after each introduction and recurrent training segment.

### **Check pilot qualifications**

**162.**—(1) An AOC holder must ensure that every person that performs the functions of a check pilot in the AOC holder's competency assessment programme —

- (a) is type rated in the aircraft to be used to conduct the operation;

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- (b) is familiar with the types of operations conducted by the AOC holder;
  - (c) is currently qualified to the level of assessment being undertaken; and
  - (d) has completed the introduction and recurrent training requirements applicable to the testing carried out.
- (2) Where a competency assessment is carried out in an approved flight simulation training device, the AOC holder must ensure that the person performing the functions of a check pilot —
- (a) has satisfactorily completed a competency check as pilot-in-command in the type of operation for which the person is acting as a check pilot;
  - (b) has an appropriate flight instructor rating; and
  - (c) has completed introduction and recurrent training requirements applicable to the assessment carried out.

*[S 681/2018 wef 09/10/2018]*

(3) An AOC holder must establish a process for the selecting and training suitably qualified check pilots for the conduct of the various pilot competency checks.

(4) The process mentioned in paragraph (3) must be approved by the Director-General of Civil Aviation as part of the AOC holder's competency assessment programme.

### **Flight instructor and check pilot competency checks**

**163.**—(1) An AOC holder must ensure it has sufficient numbers of suitably qualified supervisory flight instructors or supervisory check pilots to ensure the competency of the appointed instructors and check pilots.

(2) An AOC holder must ensure that every supervisory flight instructor and every supervisory check pilot receives instruction and maintains proficiency as appropriate in —

- (a) the methods of imparting instruction on how to operate, and how to ensure the safe operation of, a particular aircraft type or variant;

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- (b) the methods of recovery from mishandled, abnormal, and emergency manoeuvres;
  - (c) the operation of the aircraft, equipment or flight simulation training device used in operational flight procedures and manoeuvres under normal, abnormal and emergency conditions; and
  - (d) the elements of crew resource management and the methods of evaluating crew resource management skills.

### **Safety and Emergency Procedures Check Examiners**

**164.**—(1) Before allowing a person to conduct the AOC holder's Safety and Emergency Procedures Check, the AOC holder must ensure that the person is suitably qualified and has been approved by the Director-General of Civil Aviation.

(2) On application by an AOC holder, the Director-General of Civil Aviation may approve any person nominated by the AOC holder to conduct the AOC holder's Safety and Emergency Procedures Check, subject to such conditions as the Director-General of Civil Aviation considers appropriate.

### **Pilot competency checks**

**165.**—(1) Where a person is being assessed for the person's competency as a pilot, an AOC holder must ensure that the competency assessment programme established under regulation 156 includes —

- (a) an Operator Proficiency Check;
- (b) an Operator Line Check;
- (c) a Safety and Emergency Procedures Check;
- (d) an assessment of route and aerodrome competence, as specified in regulation 160; and
- (e) such additional right hand seat or left hand seat checking as may be required.

(2) An AOC holder must appoint a sufficient number of check pilots to conduct the competency assessments listed under paragraph (1).

(3) A check pilot appointed in accordance with paragraph (2) must be qualified, in accordance with regulation 162 or through an arrangement with the Director-General of Civil Aviation, to conduct the competency assessments.

(4) An AOC holder must ensure that, before a person is assigned duty as a pilot for a flight of a relevant aircraft, the person has completed and passed the competency checks required under paragraph (1) in the role and in the aircraft type that the person is to be assigned.

### **Competency checks for pilot operating in single pilot role for IFR flight or at night**

**166.** Where a person is being assessed for the person's competency to operate as the pilot-in-command for a single pilot operation in a relevant aircraft for a flight in accordance with the Instrument Flight Rules or at night, the AOC holder must ensure that the person completes and passes the following competency checks in the single pilot role:

- (a) an Operator Proficiency Check;
- (b) an Operator Line Check;
- (c) a Safety and Emergency Procedures Check;
- (d) an assessment of route and aerodrome competence, as specified in regulation 160.

### **Competency checks for pilot operating more than one type or variant**

**167.—**(1) Subject to paragraph (2), an AOC holder must ensure that every person that is currently being assigned duty as a pilot on more than one type or variant of relevant aircraft complies with all of the prescribed training, checking and recency requirements for each aircraft type or variant that the person is being assigned duty on.

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(2) Where there are similarities in the aircraft types or variants that a person mentioned in paragraph (1) is being assigned duty as a pilot on, the Director-General of Civil Aviation may approve a reduction in the training, checking or recency requirements for the person due to those similarities.

### **Cabin crew competency**

**168.** An AOC holder must not assign a person duty as a cabin crew member for a flight of a relevant aircraft unless the person —

- (a) has satisfactorily completed the cabin crew training in accordance with regulation 145; and
- (b) has a valid SEPC pass in accordance with regulation 159.

### **Competency checks of other crew members**

**169.**—(1) An AOC holder must establish the proficiency level required of a crew member role that is not the role of a pilot or a cabin crew member.

(2) For every crew member role mentioned in paragraph (1), the AOC holder must —

- (a) establish a competency assessment programme to assess the competency of a person in that crew member role and in the aircraft type that the person is to be assigned that crew member role; and
- (b) ensure that the competency assessment programme established in accordance with sub-paragraph (a) includes checks appropriate for ensuring the continued competency of a person in the crew member role.

(3) An AOC holder must ensure that the competency assessment checks provided in accordance with paragraph (2)(b) include an assessment of a person's knowledge of the crew member role, including —

- (a) the authority of the pilot-in-command;

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- (b) the crew member's assignment, functions, and responsibilities during emergencies, including evacuation of persons who may need assistance;
  - (c) the safety and emergency procedures;
  - (d) the first-aid equipment and practice;
  - (e) awareness of dangerous goods; and
  - (f) where the crew member role to be assigned involves the use of radio equipment on the flight, a competency assessment of the required skills.

### **Competency and testing records**

**170.**—(1) An AOC holder must maintain accurate and up-to-date records (called in this regulation a competency and testing record) of all competency assessments and testing for every person who may be assigned duty as a crew member on a relevant aircraft.

(2) For each person that an AOC holder maintain a competency and testing record in accordance with paragraph (1), the record must contain the following details:

- (a) the date that the competency test or assessment was carried out;
- (b) the details of the test or assessment, including the result;
- (c) the name and qualifications of the examiner responsible for carrying out the test or assessment;
- (d) the date and particulars of any decision to require the person —
  - (i) to undertake further training;
  - (ii) to retake a test or assessment; or
  - (iii) to cease acting as a crew member until such training, testing or assessment has been completed;
- (e) the date that a person was last assigned duty in the crew member role for which the test or assessment is necessary;

- (f) a statement that the AOC holder is satisfied that a person is competent to perform the person's assigned crew member duties.

(3) An AOC holder must retain the competency and testing records of every person who may be assigned duty as a flight crew member or a cabin crew member on a relevant aircraft for the period specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

*Division 11 — Fatigue of crew*

**Fatigue risk management programme**

**171.**—(1) An AOC holder must establish and implement a fatigue risk management programme for every flight of a relevant aircraft, for the purpose of managing fatigue-related safety risks and with the aim of ensuring that every person assigned to duty on the flight as a flight crew member or a cabin crew member is performing at an adequate level of alertness.

(2) The fatigue risk management programme established in accordance with paragraph (1) must be one of the following:

- (a) the system specified in Part 1 of the Fifth Schedule with the prescribed flight time, flight duty period, duty period limitations and rest period requirements for all of the AOC holder's operations;

*[S 771/2018 wef 24/11/2018]*

- (b) a Fatigue Risk Management System (FRMS) in accordance with Part 2 of the Fifth Schedule for all of the AOC holder's operations;
- (c) the FRMS mentioned in sub-paragraph (b) for part of the AOC holder's operations and the system described in sub-paragraph (a) for the remainder of the AOC holder's operations.

(3) The fatigue risk management programme established in accordance with paragraph (1) must include, for each person that is assigned duty as a crew member for a flight of a relevant aircraft —

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- (a) an opportunity for the person to consume a meal when the flight duty period exceeds 5 hours; and
- (b) the nomination of a home base for the person where the home base is assigned with a degree of permanence.
- (4) An AOC holder must not implement its fatigue risk management programme, or any change to an approved fatigue risk management programme, unless —
- (a) the programme or the proposed change has been approved by the Director-General of Civil Aviation; and
- (b) the details of the approved programme or the approved change have been included in its Operations Manual.
- (5) An AOC holder must establish, and include in the fatigue risk management programme, details of the following:
- (a) the assignment to an appropriate member of the operations personnel the responsibility for issuing instructions and making decisions on matters of flight, duty and rest periods and for processing discretion reports;
- (b) the discretion which may be exercised by a pilot-in-command, and the extent to which the pilot-in-command is authorised, in abnormal circumstances, to deviate from the AOC holder's limitations on flight duty periods or minimum rest periods;
- (c) the related reporting by a pilot-in-command or a crew member each time the pilot-in-command or crew member exercises any discretion conferred by the AOC holder;
- (d) the minimum period before a flight duty period, which must be not less than 8 hours, during which a crew member must abstain from consuming any psychoactive substance;  
*[S 181/2019 wef 31/03/2019]*
- (e) the precautions to be taken by a person who is assigned duty as a crew member when the person is taking medication.
- (6) On application by an AOC holder, the Director-General of Civil Aviation may, in exceptional circumstances, approve variations to a



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prescribed requirement of the AOC holder's fatigue risk management programme if the AOC holder —

- (a) has conducted a risk assessment on the proposed variation using a process acceptable to the Director-General of Civil Aviation;
- (b) has ensured that proposed variation provides a level of safety at least equivalent to that achieved through the prescribed requirements through the risk assessment process; and
- (c) has provided full details of the proposed variation and the corresponding risk assessment to the Director-General of Civil Aviation.

### **Responsibilities of AOC holder for fatigue management**

**172.**—(1) An AOC holder must ensure that a copy of the approved fatigue risk management programme is distributed to every person —

- (a) who is assigned duty as a crew member on a relevant aircraft; or
- (b) who is a member of the operational personnel, and is concerned with managing the roster and the scheduling of crew members.

(2) An AOC holder must take all reasonable practicable steps to ensure that every person who is assigned duty as a crew member for a flight of a relevant aircraft complies with the provisions of the AOC holder's fatigue risk management programme.

(3) An AOC holder must —

- (a) prepare and publish duty rosters sufficiently in advance to provide each person who may be assigned duty as a crew member with the opportunity to plan adequate rest;
- (b) plan for every flight of a relevant aircraft to be completed within the allowable flight duty period, taking into account the time necessary for pre-flight duties, the flight and turn-around times, and the nature of the operation;

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- (c) not permit a crew member to operate a relevant aircraft if the AOC holder known or suspected that the crew member is fatigued to the extent that the safety of flight may be adversely affected;
  - (d) ensure that every person who may be assigned duty as a flight crew member, a cabin crew member or a member of the operational personnel in charge of crew scheduling and activation —
    - (i) is trained on the approved fatigue risk management programme; and
    - (ii) is familiar with the effects of fatigue on safe performance of duties;
  - (e) when a crew member is away from home base, provide the crew member with suitable accommodation on the ground for rest in order to allow for effective recovery;
  - (f) maintain records of flight time, flight duty periods, duty periods, and rest periods for every person who may be assigned duty as a flight crew member or a cabin crew member of a relevant aircraft, for the period prescribed in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018; and
  - (g) whenever a crew member exercises a discretion to deviate from the approved flight duty or rest periods, submit a report containing details of the flight involved and the associated circumstances to the Director-General of Civil Aviation before the end of 30 days after its occurrence.

### **Continuous assessment of fatigue risk**

**173.**—(1) An AOC holder must monitor the fatigue of its crew members and ensure that its approved fatigue risk management programme remains effective.

(2) An AOC holder must assess the effectiveness of its approved fatigue risk management programme (including any approved changes made to the programme) in mitigating fatigue risks to an acceptable level whenever the AOC holder —

- (a) introduces a new approved fatigue risk management programme;
- (b) undertakes a new route; or
- (c) makes changes to an established operating pattern which a crew member is accustomed to.

### **Use of controlled rest on flight deck**

**174.**—(1) An AOC holder may allow controlled rest on the flight deck as a fatigue mitigation response to unexpected fatigue experienced by a flight crew member during a flight of a relevant aircraft only if —

- (a) the flight is of sufficient length such that the taking of a controlled rest does not interfere with the flight crew member's required operational duties; and
- (b) the controlled rest takes place during a low workload phase of flight.

(2) An AOC holder must not use controlled rest on the flight deck for the following purposes:

- (a) as a substitute for proper pre-flight sleep;
- (b) as a substitute for augmented crew and associated inflight rest;
- (c) as a scheduling tool;
- (d) as a method for extending crew duty periods.

(3) An AOC holder must monitor the use of controlled rest on the flight deck to evaluate whether existing fatigue mitigation strategies are adequate.

(4) The pilot-in-command of a relevant aircraft must report to the AOC holder when controlled rest on the flight deck has been availed.

(5) An AOC holder must, on a regular basis, submit to the Director-General of Civil Aviation a report containing all the instances when controlled rest was availed since the last such report.

(6) An AOC holder must establish procedures for the use of controlled rest on the flight deck of a relevant aircraft.

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*Division 12 — Manuals, logs and records*

**Operations Manual**

**175.**—(1) An AOC holder must ensure that its Operations Manual contains all the details required in the Fourth Schedule.

(2) An AOC holder must establish procedures to ensure that its Operations Manual being used by its personnel contains current information.

**Maintenance Control Manual**

**176.**—(1) An AOC holder must ensure its Maintenance Control Manual contains the following details:

- (a) a description of the administrative arrangements between the AOC holder and the maintenance organisation, if the AOC holder has contracted out its engineering or maintenance support, or both;
- (b) a description of the maintenance procedures and the procedures for completing and signing of certificates of maintenance review and release to service, if maintenance is not contracted out;
- (c) the name and duty of every person assigned by the AOC holder to ensure that maintenance is carried out in accordance with the Maintenance Control Manual;
- (d) a reference to the maintenance programmes that the AOC holder is required to comply with;
- (e) a description of the methods used for the completion and retention of maintenance records;
- (f) a description of the AOC holder's reliability or condition monitoring programme and the associated reporting procedures;
- (g) a description of the AOC holder's procedures for assessing continuing airworthiness information and implementation of resulting actions;

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- (h) a description of the AOC holder's procedures for implementing action resulting from mandatory continuing airworthiness information;
  - (i) a description of the AOC holder's manner of establishing and maintaining a system of analysis and continued monitoring of the performance and efficiency of the maintenance programme, in order to correct any deficiency in that programme;
  - (j) a description of aircraft types and models to which the Maintenance Control Manual applies;
  - (k) a description of the AOC holder's procedures for ensuring that defects, damages or unserviceabilities affecting airworthiness are recorded and rectified;
  - (l) a description of the AOC holder's procedures for reporting to the Director-General of Civil Aviation any significant in-service occurrences.

(2) An AOC holder must establish procedures to ensure that the Maintenance Control Manual being used by the personnel concerned contains current information.

### **Operational flight plan**

**177.**—(1) Subject to paragraph (2), an AOC holder must ensure that the operational flight plan for a flight of any relevant aircraft, and the entries made to the plan during the flight, contains all of the following items:

- (a) the aircraft registration;
- (b) the aircraft type and variant;
- (c) the date of flight;
- (d) the flight identification;
- (e) the names of all flight crew members;
- (f) the place of departure;
- (g) the time of departure;
- (h) the place of arrival;

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- (i) the time of arrival;
  - (j) the type of operation;
  - (k) the route and route segments with checkpoints or waypoints with codings and frequencies of radio aids, distances, time and tracks;
  - (l) the planned cruise speed and flying times between checkpoints or waypoints, including estimated time of arrival, revised estimated time of arrival and actual time of arrival at each reporting point and each turning point;
  - (m) the safe altitudes and minimum levels;
  - (n) the planned altitudes and flight levels;
  - (o) the fuel calculations (including a fuel log, if not separately maintained, for recording in-flight fuel checks);
  - (p) the amount of fuel on board when the engine was started;
  - (q) the destination alternate aerodrome or heliport, and, where applicable, the take-off alternate aerodrome or heliport and the en-route alternate aerodrome or heliport, including the information required in sub-paragraphs (l), (m), (n), and (o) for those aerodromes or heliports;
  - (r) the initial ATS flight plan clearance and subsequent re-clearance;
  - (s) the in-flight re-planning calculations;
  - (t) the relevant meteorological information;
  - (u) the altimeter settings at the point of departure and the destination;
  - (v) the air traffic control clearance;
  - (w) the taxi, airborne, landing and engine-off times.
- (2) An AOC holder may omit from the operational flight plan any information listed under paragraph (1) —
- (a) that is readily available in other documentation or from an acceptable source; or

(b) that is irrelevant to the type of operation being carried out.

(3) An AOC holder must describe the operational flight plan and its use in the Operations Manual.

(4) An AOC holder must ensure that all the entries in the operational flight plan for a particular flight of a relevant aircraft cannot be altered after the flight.

### **Fuel and oil records**

**178.**—(1) An AOC holder must maintain fuel records to enable the Director-General of Civil Aviation to ascertain that —

(a) for every flight of a small aeroplane, regulations 46 and 49 are complied with;

(b) for every flight of a helicopter, regulation 47 is complied with.

(2) An AOC holder must maintain oil records to enable the Director-General of Civil Aviation to ascertain that the trend for oil consumption by every relevant aircraft is such that the aircraft has sufficient oil to complete every flight.

### **Document retention period**

**179.** An AOC holder must ensure that the documents, information or records specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018 are stored for their respective retention periods prescribed in that Schedule.

### **Cosmic radiation records**

**180.** For every flight of a relevant aircraft during which the aircraft operates at an altitude above 49,000 ft, the AOC holder must keep a record of the total dose of cosmic radiation which the aircraft is exposed to during the flight and the name of every person assigned as a crew member for that flight.

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PART 3  
MISCELLANEOUS

**Penalties**

**181.**—(1) Subject to paragraphs (2) and (3), where the Authority is of the opinion that an AOC holder is contravening, has contravened or has failed to comply with any provision in Part 2 being a contravention that is not a criminal offence, the Authority may impose on the AOC holder a financial penalty not exceeding the higher of the following:

- (a) \$500,000;
- (b) 5% of the AOC holder's annual revenue derived from the regulated activity.

(2) Before exercising any power under paragraph (1), the Authority must give written notice to the AOC holder concerned —

- (a) stating that the Authority intends to impose on the AOC holder a financial penalty under this regulation;
- (b) specifying each instance of non-compliance that is the subject of the financial penalty; and
- (c) specifying the time (being not less than 14 days after the service of the notice on the AOC holder) within which written representations may be made to the Authority with respect to the non-compliance that is the subject of the financial penalty.

(3) The Authority may, after considering any written representations under paragraph (2)(c), decide to impose such financial penalty under paragraph (1) as the Authority considers appropriate.

(4) Where the Authority has made any decision under paragraph (3) against any AOC holder, the Authority must serve on the AOC holder concerned a notice of its decision.

(5) To avoid doubt, this regulation does not affect the operation of section 4C, 4D or 4E of the Act.



(6) In this regulation —

“annual revenue” means the amount of money received by an AOC holder in the calendar year during which the AOC holder contravened or failed to comply with a provision in Part 2 being a provision that is not an offence under the Act;

“regulated activity” means the flights or operations conducted by an AOC holder under these Regulations.

### **Grant of approvals or acceptance**

**182.**—(1) To avoid doubt, an approval or acceptance required by these Regulations that is granted by the Director-General of Civil Aviation with the approval, under the Air Navigation (119 — Air Operator Certification) Regulations 2018, of the AOC holder’s Operations Manual, Maintenance Control Manual or any other manual, is not an aviation safety instrument.

(2) Where the Director-General of Civil Aviation is required to grant an approval or acceptance, the application —

(a) must be made by the relevant person in such form and manner as the Director-General of Civil Aviation may specify; and

(b) must provide such information as the Director-General of Civil Aviation may require.

(3) The Director-General of Civil Aviation may grant an approval or acceptance subject to such conditions as the Director-General of Civil Aviation considers necessary or expedient.

(4) The Director-General of Civil Aviation may withdraw an approval or acceptance, or impose, add, delete, substitute or modify conditions in respect of any such approval or acceptance if —

(a) the Director-General of Civil Aviation considers such action necessary to ensure compliance with these Regulations or any other relevant aviation safety subsidiary legislation; or

- (b) the Director-General of Civil Aviation is satisfied that there is or likely to be a failure to comply with these Regulations or any other relevant aviation safety subsidiary legislation.

(5) In this regulation, “relevant person” means the employee of an AOC holder who is responsible for applying to the Director-General of Civil Aviation for a specific approval or acceptance under these Regulations.

## PART 4

### SAVING AND TRANSITIONAL PROVISIONS

#### **Definition for this Part**

**183.**—(1) In this Part, “Air Operator Certificate Requirements” means the Air Operator Certificate Requirements issued under paragraph 87(5) of the Air Navigation Order (O 2).

#### **Saving and transitional provisions**

**184.**—(1) Any person who, immediately before 1 October 2018 —

- (a) is assigned duty as a crew member for a flight of a relevant aircraft on or after 1 October 2018;
- (b) has the training, experience and practice and passed periodical tests required under paragraph 27(2) of the Air Navigation Order (O 2) for that crew member role, as specified in Part B of the Ninth Schedule to the Air Navigation Order and the Air Operator Certificate Requirements; and
- (c) satisfies the AOC holder that the person is competent to perform such duty,

is treated, on or after 1 October 2018, as being qualified and competent in accordance with regulation 131 or 168 of these Regulations, as applicable, to be assigned such crew member duty.

(2) Any person who, immediately before 1 October 2018 —

- (a) is assigned to operate the flight controls of a relevant aircraft during the take-off or landing of a flight, on or after

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1 October 2018, in accordance with the Instrument Flight Rules; and

- (b) has satisfied the training, experience, practice and periodical tests required under paragraph 27(2) read with paragraph 1(2)(e)(ii) of Part B of the Ninth Schedule to the Air Navigation Order,

is treated, on or after 1 October 2018, as meeting the criteria specified in regulation 131(1) to operate the flight controls during the take-off or landing of the flight.

(3) Any person who, immediately before 1 October 2018 —

- (a) is assigned to be the pilot-in-command of a relevant aircraft for a flight on or after 1 October 2018; and
- (b) has met the recency requirements under the Air Operator Certificate Requirements to be assigned as a pilot-in-command for such a flight,

is treated, on or after 1 October 2018, as meeting the criteria in regulation 131(2) to act as a pilot-in-command for the flight.

(4) Any person who, immediately before 1 October 2018, has passed an assessment specified in the Air Operator Certificate Requirements that is equivalent to —

- (a) an Operator Proficiency Check established under regulation 157;
- (b) an Operator Line Check established under regulation 158; or
- (c) a Safety and Emergency Procedures Check established under regulation 159,

that pass is treated, on or after 1 October 2018, as a pass under regulation 157(4), 158(4) or 159(3) respectively and is valid for the period specified for that pass in regulation 157, 158 or 159, as applicable.

(5) Any person who, immediately before 1 October 2018, is qualified under the Air Operator Certificate Requirements to act as a

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check pilot is treated, on or after 1 October 2018, as being qualified in accordance with regulation 165(2) to perform that role.

(6) Any person who, immediately before 1 October 2018, is qualified and approved under the Air Operator Certificate Requirements to act as a safety and emergency procedures check examiner, is treated, on or after 1 October 2018, as being qualified and approved in accordance with regulation 164 to perform that role.

(7) Any AOC holder who, immediately before 1 October 2018, has an approval for an equipment in accordance with paragraph 12, 14 or 44 of the Air Navigation Order, is treated, on or after 1 October 2018 as if granted a corresponding approval under regulation 82, 84 or 85, respectively.

## FIRST SCHEDULE

Regulation 2

### DEFINITIONS

“Acclimated” means the state of being a crew member who has spent at least 3 consecutive local nights free of duty within a particular time zone.

*[S 214/2020 wef 01/04/2020]*

“Acclimated time”, in relation to a crew member, means the local time in the time zone to which the crew member is acclimated.

*[S 214/2020 wef 01/04/2020]*

“Adequate”, in relation to an alternate aerodrome, means that it is an aerodrome —

- (a) where the landing performance requirements can be met;
- (b) which is expected to be available, if required; and
- (c) which has the necessary facilities and services, such as air traffic control, lighting, communications, meteorological services, navigation aids, rescue and firefighting services and at least one suitable instrument approach procedure.

“Aerodrome elevation” means the elevation of the highest point of the landing area.

“Aircraft operating manual” means a manual, acceptable to the State of the Operator, that contains —

- (a) the procedures for normal, abnormal and emergency situations;

FIRST SCHEDULE — *continued*

- (b) the checklists;
- (c) the limitations of the aircraft;
- (d) the aircraft's performance information;
- (e) details of the aircraft systems; and
- (f) other material relevant to the operation of the aircraft.

“AOC holder” means the holder of an air operator certificate issued under the Air Navigation (119 — Air Operator Certification) Regulations 2018.

“Approved flight simulation training device” means a flight simulation training device for which the AOC holder has a specific approval, granted in accordance with paragraph 23A of the Air Navigation Order, to use for the purpose that it is being used for under these Regulations.

*[S 681/2018 wef 09/10/2018]*

“Augmented flight crew” means a flight crew that comprises more members than the number of normal operating flight crew required to operate the aeroplane, and in which every flight crew member can leave the member's assigned post and be replaced by another appropriately qualified flight crew member for the purpose of in-flight rest.

“Automatic dependent surveillance” or “ADS” means a surveillance technique in which the aircraft automatically provides, via a data link, data derived from on-board navigation and position-fixing systems, including aircraft identification, four-dimensional position and additional data as appropriate.

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

“Check pilot” means a pilot appointed by the AOC holder to conduct competency assessments on any person assigned by the AOC holder to be a flight crew member.

“Configuration deviation list” or “CDL” means a list established by the organisation responsible for the type design with the approval of the State of Design which —

- (a) identifies any external parts of an aircraft type which may be missing at the commencement of a flight; and

FIRST SCHEDULE — *continued*

(b) contains any associated operating limitations and performance correction where necessary.

“Contaminated”, in relation to a runway, means the runway has more than 25% of the runway surface area (whether isolated or not) within the required length and width of the runway surface that is being used covered by the following:

- (a) surface water or slush more than 3 mm (0.125") deep;
- (b) loose snow, equivalent to more than 20 mm (0.75") of water;
- (c) compacted snow or ice, including wet ice.

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

“Co-pilot” means a pilot serving in any piloting capacity other than as pilot-in-command, but does not include a pilot who is on board an aircraft for the sole purpose of receiving flight instruction.

“Cosmic radiation” means the ionising and neutron radiation of galactic and solar radiation that the aeroplane is exposed to.

“Day off” means an extended rest period to cater to the requirement of managing cumulative fatigue during which a crew member is free of all duties.

“Dry”, in relation to a runway, means the runway is clear of contaminants and visible moisture within the required length and width of the runway surface being used.

“Duty” means any task that a flight or cabin crew member is required by the AOC holder to perform, including, for example, flight duty, administrative work, training, positioning and standby, when doing of that task is likely to induce fatigue.

“Duty period” means a period which starts when a flight or cabin crew member is required by the AOC holder to report for or to commence a duty and ends when that crew member is free from all duties.

“Early start”, in relation to a duty period, means a scheduled departure that commences in the period 0500 to 0659 hours acclimated time.

[S 214/2020 wef 01/04/2020]

“Extended diversion time operations” or “EDTO” means any operation by an aeroplane with 2 or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the Authority in these Regulations.

FIRST SCHEDULE — *continued*

“EDTO critical fuel” means the fuel quantity necessary to fly to an en-route alternate aerodrome from the most critical point on the route upon considering the most limiting system failure.

“Fatigue Risk Management System” or “FRMS” means a data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.

“Flight duty period” means a period which commences when a flight or cabin crew member is required to report for any duty that includes a flight or series of flights and which finishes when the aircraft finally comes to rest and the engines are shut down at the end of the last flight on which he or she is a crew member.

*[S 771/2018 wef 24/11/2018]*

“Ground handling” means the services necessary for an aircraft’s arrival at or departure from an aerodrome other than air traffic services.

“Home base” means the location, nominated by an AOC holder in respect of a crew member, from which the crew member normally starts and ends a duty period or a series of duty periods.

“Human factors principles” means the principles which —

- (a) are applied to aeronautical design, certification, training, operations and maintenance; and
- (b) seek safe interface between the human user and other system components by giving proper consideration to human performance.

“ICAO TI” means the Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284), approved and issued in accordance with the procedure established by the Council of the International Civil Aviation Organization.

“Integrity”, in relation to aeronautical data, means a degree of assurance that an aeronautical data and its value has not been lost nor altered since the data origination or authorised amendment.

“Intentionally transmitting PED” means a PED that intentionally transmits electromagnetic signals.

“Late finish”, in relation to a duty period, means a scheduled arrival that ends in the period 0100 to 0159 hours acclimated time.

*[S 214/2020 wef 01/04/2020]*

FIRST SCHEDULE — *continued*

“Line maintenance” means maintenance activities required to prepare an aircraft for flight including —

- (a) pre-flight inspections and servicing;
- (b) daily inspections;
- (c) minor scheduled maintenance; and
- (d) defect rectification.

“Local night” means the period of 8 hours falling between 2200 hours and 0800 hours local time.

“Maximum diversion time” means the maximum allowable range, expressed in time, from a point on a route to an en-route alternate aerodrome.

“Mode S” means a transponder system that establishes selective and addressed interrogations with aircraft within its coverage for identification and altitude reporting.

“Normal operating flight crew” means the minimum flight deck crew required for public transport operation in compliance with the Air Navigation Order (O 2) and the Certificate of Airworthiness.

“Operational control” means the exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.

“Performance Class A operations” means commercial air transport flights operated in accordance with the Performance Class A requirements in Aviation Specifications 1 (AS-1) issued by the Director-General of Civil Aviation using —

- (a) a multi-engine aeroplane powered by turbo-propeller engines with an MAPSC exceeding 9; or
- (b) a multi-engine turbine-powered aeroplane.

“Performance Class B operations” means commercial air transport flights operated in accordance with the Performance Class B requirements in AS-1 issued by the Director-General of Civil Aviation using a propeller driven aeroplane with an MAPSC of 9 or fewer, and an MCTOM of 5,700 kg or less.

“Performance data” means material which provides the necessary data to establish the performance of the aeroplane.

“Positioning” means the transporting of a crew member from one place to another place as a passenger on surface or air transport at the behest of the AOC holder.



FIRST SCHEDULE — *continued*

“Pre-flight inspection” means an inspection, carried out before a flight commences, in accordance with the aircraft flight manual or Operations Manual, or as specified in the approved maintenance programme.

“Reporting time” means the time at which a crew personnel is required by the AOC holder to report for duty.

“Rest period” means a continuous and defined uninterrupted period of time, subsequent to or prior to duty or both, during which an individual who is a flight or cabin crew member is free of all duties, and which period commences —

(a) one hour after that individual is free of all duties, when the rest is subsequent to a duty period; or

(b) when the individual is away from base, at the time the individual reaches the accommodation designated for the rest period or one hour after that individual is free of all duties, whichever results in a shorter duration.

“Roster” means a list provided by an AOC holder containing the times when an individual acting as a crew member is required to undertake duties, and which includes, but is not restricted to, the following times:

(a) flight time;

(b) flight duty period;

(c) standby duty;

(d) rest period;

(e) day off.

“Standby duty” means a defined period of time (at the airport, hotel or at home) during which an individual acting as a crew member is required by the AOC holder to be available to receive an assignment for a specific duty without an intervening rest period.

“State of the Aerodrome” means the State in which the aerodrome is located.

“Suitable accommodation” means a furnished bedroom which provides an individual with the opportunity of adequate rest or sleep.

“Task specialist” means a crew member who is not part of the flight crew or cabin crew but who carries out duties on board the aircraft which are essential to the purpose of the flight.

“Threshold time” means the range, expressed in time, to an en-route alternate aerodrome, beyond which an approval granted under the Air Navigation

FIRST SCHEDULE — *continued*

(98 — Special Operations) Regulations 2018 for EDTO operations is required.

“Unforeseen operational circumstance” —

(a) means an unplanned event, such as aircraft unserviceability, industrial action, operational contingencies and other such unforeseeable occurrences; and

(b) excludes circumstances that are known sufficiently in advance such as scheduled charters or planned runway shortening.

“Unintentionally transmitting PED” means a PED that emits electromagnetic signals as a by-product of its operation.

“Wet runway” means a runway that is neither dry nor contaminated.

“Window of circadian low”, in relation to a take-off or landing, means the period 0200 to 0459 hours acclimated time.

[S 214/2020 wef 01/04/2020]

## SECOND SCHEDULE

Regulation 82(2)

EQUIPMENT AND INSTRUMENTS THAT  
DO NOT REQUIRE APPROVAL

1. A piece of arctic protective clothing.
2. A book on survival appropriate to the area over which the aircraft is being operated.
3. A bucket.
4. A canopy installed on a life raft.
5. A cooking implement kept on a life raft (such as cooking utensils or a stove).
6. A dye marker.
7. An item of equipment for making distress signals.
8. Any first-aid equipment.
9. [Deleted by S 214/2020 wef 01/04/2020]
10. An ice saw.
11. An inflation pump.
12. An independent portable light.

SECOND SCHEDULE — *continued*

13. A lifeline or any other means of attaching one life raft to another.
14. A life raft repair kit.
15. [*Deleted by S 214/2020 wef 01/04/2020*]
16. A means of maintaining buoyancy.
17. A means of making sea water drinkable.
18. A megaphone.
19. A paddle or any other means of propulsion.
20. A raft knife.
21. A sea anchor.
22. A signalling mirror.
23. A sleeping bag.
24. A snow shovel.
25. A survival ELT.
26. A whistle.

## THIRD SCHEDULE

Regulations 105(2) and 107(4)

## EMERGENCY EQUIPMENT

This Schedule specifies the emergency equipment, mentioned in Division 6, to be carried on a relevant aircraft.

**Life rafts**

1.—(1) A relevant aircraft must be equipped with a number of life rafts appropriate to the area that the flight covers.

(2) A life raft must contain the following equipment:

- (a) a means of maintaining buoyancy;
- (b) a sea anchor;
- (c) a lifeline and a means of attaching one life raft to another;
- (d) if the life raft has a capacity of 6 or less, paddles or another means of propulsion;

*[S 214/2020 wef 01/04/2020]*

- (e) a canopy to protect the occupants;

THIRD SCHEDULE — *continued*

- (f) a life raft repair kit;
- (g) a bailing bucket;
- (h) an inflation pump;
- (i) [*Deleted by S 214/2020 wef 01/04/2020*]
- (j) a raft knife;
- (k) a life raft survival pack that is equipped in accordance with paragraph 2.

**Life rafts survival pack**

2. A life raft survival pack must contain the following equipment:

- (a) an independent waterproof portable light; *[S 214/2020 wef 01/04/2020]*
- (b) marine type pyrotechnic distress signals;
- (c) a means of making sea water drinkable;
- (d) for every 4 persons the life raft is designed to carry;
  - (i) any readily distributable energy supplement with an energy value of about 400 kJ;
  - (ii) one litre of fresh water in durable containers, of which a proportion may be provided by the means described in sub-paragraph (c);
- (e) first-aid equipment;
- (f) a signalling mirror;
- (g) a whistle;
- (h) a dye marker;
- (i) [*Deleted by S 214/2020 wef 01/04/2020*]
- (j) a book on survival appropriate for the area over which the aircraft is operated.

**Survival equipment**

3. Where a relevant aircraft is required to carry survival equipment in accordance with regulation 105, the aircraft must carry the following items:

- (a) for an operation in polar conditions, the equipment required in accordance with the Air Navigation (98 — Special Operations) Regulations 2018;

THIRD SCHEDULE — *continued*

- (b) for an operation in tropical conditions —
- (i) a survival ELT;
  - (ii) pyrotechnic distress signals;
  - (iii) first-aid equipment; and
  - (iv) for every 4 persons, any readily distributable energy supplement with an energy value of about 400 kJ and one litre of fresh water in durable containers.

## FOURTH SCHEDULE

Regulation 175

## CONTENTS OF OPERATIONS MANUAL

## GENERAL

1. An AOC holder must ensure that its Operations Manual contains the contents described in this Schedule and is organised according to the following structure:

- (a) Part A — General;
- (b) Part B — Aircraft operating information;
- (c) Part C — Routes and aerodromes;
- (d) Part D — Training.

## PART A

## GENERAL

2. Part A of an AOC holder's Operations Manual must contain the following elements:

- (a) the instructions outlining the responsibilities of each crew member role and the roles of other members of the operating personnel pertaining to the conduct of flight operations;
- (b) the flight and duty time limitations and rest schemes for flight and cabin crew members;
- (c) a list of the navigational equipment to be carried including any equipment required for an operation with performance-based navigation;

FOURTH SCHEDULE — *continued*

- (d) where relevant to an AOC holder's operations, the long-range navigation procedures, engine failure procedure for EDTO and the nomination and utilisation of alternate aerodromes;
- (e) the circumstances in which a radio listening watch is to be maintained;
- (f) the method for determining minimum flight altitudes;
- (g) the methods for determining aerodrome operating minima;
- (h) the safety precautions to be taken when refuelling with passengers on board;
- (i) the ground handling arrangements and procedures;
- (j) the procedures for a pilot-in-command when an accident is observed;
- (k) the composition of the flight crew for each type of operation including the designation of the succession of command;
- (l) the specific instructions for the computation of the quantities of fuel and oil to be carried, taking into account all circumstances of the operation including the possibility of loss of pressurisation and the failure of one or more engines while en-route;
- (m) the conditions under which oxygen must be used and the amount of oxygen determined in accordance with Division 6;
- (n) the instructions for mass and balance control;
- (o) the instructions for the conduct and control of ground de-icing or anti-icing operations;
- (p) the specifications for the operational flight plan;
- (q) the standard operating procedures for each phase of flight;
- (r) the instructions on the use of normal checklists and the timing of their use;
- (s) the departure contingency procedures;
- (t) the instructions on the maintenance of altitude awareness and the use of automated or flight crew altitude call-out;
- (u) the instructions on the use of autopilots and auto throttles in instrument meteorological conditions;
- (v) the instructions on the clarification and acceptance of air traffic control clearances, particularly where terrain clearance is involved;
- (w) the departure and approach briefings;

FOURTH SCHEDULE — *continued*

- (x) the procedures for familiarisation with areas, route and aerodromes;
- (y) the stabilised approach procedure;
- (z) the limitation on high rates of descent near the surface;
- (za) the conditions required to commence or to continue an instrument approach;
- (zb) the instructions for the conduct of precision and non-precision instrument approach procedures;
- (zc) the allocation of flight crew duties and procedures for the management of crew workload during instrument approach and landing operations at night and under Instrument Meteorological Conditions;
- (zd) the instructions, training and awareness programmes, as appropriate for —
  - (i) the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning system;
  - (ii) the prevention of and recovery from loss of control of aircraft in-flight;
  - (iii) the avoidance of level busts, or unauthorised or uncommanded vertical deviation, equal to or more than 300 ft, or 200 ft while in RVSM airspace, if applicable; and
  - (iv) the avoidance of and recovery from loss of tail rotor effectiveness in relation to a helicopter;
- (ze) the policy, instructions, procedures and training requirements for the avoidance of collisions and the use of ACAS II;
- (zf) the information and instructions relating to the interception of civil aircraft including —
  - (i) procedures, for pilots-in-command of intercepted aircraft; and
  - (ii) visual signals for use by intercepting and intercepted aircraft;
- (zg) for every aeroplane within the description of regulation 3(1)(b) intended to be operated above 49,000 ft (15,000 m) —
  - (i) information which will enable the pilot to determine the best course of action to take in the event of exposure to solar cosmic radiation; and
  - (ii) the procedures in the event that a decision to descend is taken, covering —

FOURTH SCHEDULE — *continued*

- (A) the necessity of giving the appropriate air traffic services unit prior warning of the situation and of obtaining a provisional descent clearance;
- (B) the action to be taken in the event that communication with the appropriate air traffic services unit cannot be established or is interrupted; and
- (iii) the procedures to maintain records such that the total cosmic radiation dose received by each crew member over a period of 12 consecutive months can be determined;
- (zh) the information on the safety management system and related flight safety programs as are relevant to flight operations;
- (zi) the information and instructions on the carriage of dangerous goods;  
*[S 771/2018 wef 24/11/2018]*
- (zj) the security instructions and guidance;
- (zk) a checklist of the procedures to be followed —
  - (i) when searching for a bomb in case of suspected sabotage; and
  - (ii) when inspecting an aircraft for concealed weapons, explosives or other dangerous devices,  
  
when a well-founded suspicion exists that the aircraft may be the object of an act of unlawful interference, supported by guidance on the course of action to be taken should a bomb or suspicious object be found and information on the least-risk bomb location specific to the aircraft;
- (zl) the instructions and training requirements for the use of head-up displays and enhanced vision systems equipment if applicable;
- (zm) the instructions and training requirements for the use of the Electronic Flight Bag, if applicable.

## PART B

## AIRCRAFT OPERATING MATTERS

3. Part B of an AOC holder's Operations Manual must contain the following elements:

- (a) the aircraft's certification limitations and operating limitations;
- (b) the procedures for normal, abnormal and emergency situations and checklists to be used by the flight crew in such situations;



FOURTH SCHEDULE — *continued*

- (c) the operating instructions and information on climb performance with all engines operating;
- (d) the flight planning data for pre-flight and in-flight planning with different thrust, power and speed settings;
- (e) the maximum crosswind and tailwind components for each aeroplane type operated and the reductions to be applied to these values having regard to —
  - (i) gusts;
  - (ii) low visibility;
  - (iii) runway surface conditions;
  - (iv) crew experience;
  - (v) use of autopilot;
  - (vi) abnormal or emergency circumstances; or
  - (vii) any other relevant operational factors;
- (f) the instructions for aircraft loading and securing of load;
- (g) the aircraft systems, associated controls and instructions for their use;
- (h) the minimum equipment list and configuration deviation list for the aircraft types operated and specific operations authorised, including any equipment required for an operation with performance-based navigation;
- (i) the checklist of emergency and safety equipment and instructions for the use of the equipment;
- (j) the emergency evacuation procedures, including type specific procedures, crew coordination, assignment of crew's emergency positions and the emergency duties assigned to each crew member;
- (k) the procedures for normal, abnormal and emergency situations to be used by the cabin crew, the checklists relating to such procedures and aircraft systems information as required, including a statement related to the necessary procedures for the coordination between flight crew and cabin crew;
- (l) survival and emergency equipment for different routes and the necessary procedures to verify its normal functioning before take-off, including procedures to determine the required amount of oxygen and the quantity available;
- (m) the ground-air visual signal code for use by survivors.

FOURTH SCHEDULE — *continued*

## PART C

## ROUTES AND AERODROMES

4. Part C of an AOC holder's Operations Manual must contain the following elements:

- (a) a route guide for each flight to ensure that the flight crew will have, for each flight, information relating to communication facilities, navigation aids, aerodromes, instrument approaches, instrument arrivals and instrument departures as applicable for the operation, and such other information as the AOC holder may deem necessary for the proper conduct of flight operations;
- (b) the minimum flight altitudes for each route to be flown;
- (c) the aerodrome operating minima for each of the aerodromes that are likely to be used as aerodromes of intended landing or as alternate aerodromes;
- (d) the increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities;
- (e) the instructions for determining aerodrome operating minima for instrument approaches using head-up displays and enhanced vision systems;
- (f) the information necessary for compliance with all flight profiles required by regulations, including but not limited to, the determination of —
  - (i) take-off runway length requirements for a dry, contaminated or wet runway, including those dictated by system failures which affect the take-off distance;
  - (ii) take-off climb limitations;
  - (iii) en-route climb limitations;
  - (iv) approach climb limitations and landing climb limitations;
  - (v) landing runway length requirements for a dry, contaminated or wet runway, including systems failures which affect the landing distance; and
  - (vi) supplementary information, such as tire speed limitations.

FOURTH SCHEDULE — *continued*

## PART D

## TRAINING

5. Part D of an AOC holder's Operations Manual must contain details of the training programme for a person who may be assigned duty on a relevant aircraft in the following crew member roles:

- (a) a flight crew member;
- (b) a cabin crew member;
- (c) a flight dispatcher who is employed in conjunction with an AOC holder's method of flight supervision;
- (d) any other crew member as applicable.

## FIFTH SCHEDULE

Regulation 171

## FATIGUE RISK MANAGEMENT PROGRAMMES

## PART 1

## BASIC REQUIREMENTS FOR FATIGUE RISK MANAGEMENT

**Types of fatigue**

1. An AOC holder must take into account the following types of fatigue in its Fatigue Risk Management Programme:

- (a) transient fatigue, which is fatigue that may be dispelled by a single sufficient period of rest or sleep;
- (b) cumulative fatigue, which occurs after incomplete recovery from transient fatigue over a period of time.

**Flight duty period**

2.—(1) The flight duty period of a person assigned duty as a crew member for a flight of a relevant aircraft —

- (a) commences when the person is required to report for duty in advance of the stipulated report time for a scheduled flight, to carry out a task at the behest of the AOC holder;
- (b) includes any time the person spent on positioning at the behest of the AOC holder when this positioning immediately precedes a flight in which that person participates as a crew member; and

FIFTH SCHEDULE — *continued*

- (c) does not include the time spent by the person to commute from the crew member's place of rest to the point of reporting for duty.
- (2) In the planning of duty periods and flight duty periods, an AOC holder must consider all relevant factors, which includes —
- (a) the number and direction of time zones crossed;
  - (b) the time at which a flight duty period is scheduled to begin;
  - (c) the number of planned and actual sectors within the flight duty period;
  - (d) the pattern of working and sleeping relative to the circadian rhythm, or the 24-hour physiological cycle of the crew;
  - (e) the scheduling of days off;
  - (f) the sequence of early reporting times and late releases from duty;
  - (g) the mixing of early, late or night duties;
  - (h) the flight operation characteristics;
  - (i) the allocation of work patterns which avoid such undesirable practices such as alternating day and night duties or the positioning of crew such that a serious disruption of established sleep and work patterns occur;
  - (j) the planning of days off and notifying crew members well in advance of their duty periods;
  - (k) the basic roster concepts which ensure adequate rest prior to flight;
  - (l) the crew complement and the extent to which various tasks to be performed can be divided among the crew; and
  - (m) the availability of facilities onboard the aeroplane for a crew member to obtain recuperative rest.

**Minimum rest period**

3.—(1) Subject to sub-paragraph (2), an AOC holder must provide a minimum rest period subsequent to or prior to a scheduled flight duty period that is —

- (a) if the rest period includes a local night, not less than 10 hours;
- (b) if the rest period does not include a local night, not less than 12 hours;
- (c) if the preceding duty period exceeded 10 hours but is not more than 16 hours, at least as long as the preceding duty period rounded to the next whole hour;
- (d) if the preceding duty period exceeded 16 hours, at least 24 hours and include a local night.

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FIFTH SCHEDULE — *continued*

(2) The pilot-in-command has the discretion to reduce a minimum rest period in unforeseen operational circumstances by no more than 2 hours if the requirement for a local night, where required, is satisfied.

**Duty with take-off or landing within window of circadian low**

4.—(1) An AOC holder who has assigned a person to crew member duty on a relevant aircraft for a series of flight duty periods that encompass an early start, a late finish, or a take-off or landing in the window of circadian low must provide that person with —

- (a) a rest period of 24 hours (inclusive of a local night) prior to the person commencing duty for the first flight duty period in the series; and
- (b) except as provided in sub-paragraph (2), the appropriate minimum rest period specified in paragraph 3 between and after each flight duty period in the series of flight duty periods.

(2) Where a crew member completes 2 consecutive flight duty periods that each includes an early start, a late finish, or a take-off or landing in the window of circadian low, the AOC holder must provide the crew member with a rest period of 24 hours (inclusive of a local night) prior to the person commencing the next flight duty period that encompasses an early start, a late finish, or a take-off or landing in the window of circadian low.

*[S 214/2020 wef 01/04/2020]*

**Day off**

5.—(1) A day off for a crew member must be at least 34 consecutive hours (including a local night) free of all duties, and commences —

- (a) one hour after the crew member completes a duty period; or
- (b) if the crew member is away from base, either one hour after the crew member is free of all duties, or after the crew member reaches the accommodation designated for the day off, whichever is earlier.

(2) A planned minimum rest period may be included as part of a day off.

(3) When days off are rostered on consecutive days, each subsequent day off following the day off described in sub-paragraph (1) must be a period of at least 24 hours and include a local night.

(4) An AOC holder must ensure that every person who may be assigned duty as a crew member on a relevant aircraft —

- (a) does not work more than 7 consecutive days between days off;
- (b) is rostered to have at least 2 days off every 2 consecutive weeks; and

FIFTH SCHEDULE — *continued*

- (c) has at least 8 days off every 4 consecutive weeks except that a minimum of 6 days off in a consecutive 4-week period is permissible if the shortfall of the remaining days off has been or will be rectified in the preceding or following consecutive 4-week period.
- (5) When a crew member has been away from home base for any period of 7 days or more, a period of at least 82 hours (including 3 local nights) at home base must be provided to re-acclimate the crew member to home base before the start of the next flight duty period.
- (6) In the event that a flight is disrupted or delayed due to unforeseen circumstances, the ensuing day off may be reduced by 4 hours if the shortfall is rectified in the next allocation of a day off and is in compliance with sub-paragraph (4).

**Standby duty**

6.—(1) An AOC holder must define the start time and end time of a crew member's standby duty.

- (2) The length of any standby duty must not exceed —
  - (a) 18 hours for a flight crew member; and
  - (b) 24 hours for a cabin crew member.
- (3) When a person is on standby duty as a crew member at an airport (called in this paragraph airport standby) and subsequently undertakes a flight duty immediately after, the standby duty period —
  - (a) is part of the minimum rest period if the airport standby is provided with adequate rest facilities in accordance with sub-paragraph (4); or
  - (b) is part of the flight duty period of this subsequent flight if the airport standby is provided without adequate rest facilities.
- (4) A rest facility at an airport must provide an environment that is conducive to rest or sleep, and comprise, at minimum, an independent, screened off rest area with a horizontal sleeping surface.
- (5) When an AOC holder requires a person to be on standby as a crew member at an accommodation, the AOC holder must ensure adequate rest facilities are provided at the accommodation.
- (6) When an AOC holder activates a person who is on standby as a crew member —
  - (a) the standby duty ceases from the moment the person is activated for duty; and

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FIFTH SCHEDULE — *continued*

(b) the duty period commences from the moment that person reports for duty at the designated reporting point.

(7) Only 20% of the total time spent on standby at home or in local accommodation will be counted in the total period of standby for the purpose of determining cumulative duty limits under paragraph 12.

**Provision of adequate time**

7.—(1) An AOC holder must ensure that each crew member is provided with adequate time to complete that crew member's duties, which includes ensuring that the crew member's reporting time realistically reflects the time required to complete all assigned pre-flight duties.

(2) A minimum of 90 minutes must be provided for the completion of pre-flight checks and post-flight checks, which must include allocating a minimum of one hour to the completion of pre-flight checks.

(3) To avoid doubt, the completion of pre-flight checks and post-flight checks includes the completion of any necessary documentation.

**Positioning**

8. Positioning is not considered as an operating sector when planning or calculating a flight duty period.

**Mixed simulator and aircraft flying**

9.—(1) When a person who may be assigned duty as a flight crew member flies in an approved flight simulation training device, either undergoing or conducting training, and then within the same duty period flies as a crew member on a commercial air transport, or training, or test flight, all the time spent in the flight simulation training device is counted in full towards the subsequent flight duty period.

*[S 681/2018 wef 09/10/2018]*

(2) The flight duty period for flight in an approved flight simulation training device is calculated from the reporting time of the simulator detail even though flying in an approved flight simulation training device does not count as a sector for the purpose of paragraph 14.

*[S 681/2018 wef 09/10/2018]*

**Delayed reporting time**

10. When a crew member is informed of a delay to the reporting time before leaving the place of rest, the flight duty period is calculated as follows:

FIFTH SCHEDULE — *continued*

- (a) where the delay is less than 4 hours, the maximum permitted flight duty period is based on the original reporting time but the flight duty period starts at the actual reporting time;
- (b) where the delay is 4 hours or more, the maximum permitted flight duty period is based on the actual reporting time but the flight duty period starts 4 hours after the original reporting time;
- (c) where the AOC holder informs a crew member of a delay in reporting time of 10 hours or more before the crew member is scheduled to leave the place of rest and that crew member is not further disturbed by the AOC holder until a mutually agreed hour, then that elapsed time is considered a continuation of the rest period.

**Limits on flight time**

11. An AOC holder must take into account the maximum number of flying hours a flight crew member may perform, as specified in regulation 107 of the Air Navigation (91 — General Operating Rules) Regulations 2018, when scheduling a person's duty as a flight crew member.

**Limits on duty hours**

12.—(1) An AOC holder must ensure that the duty hours of any person who may be assigned duty as a flight crew member do not exceed —

- (a) 90 hours in any consecutive 14 days; and
- (b) 180 hours in any consecutive 28 days.

(2) An AOC holder must ensure that the duty hours of any person who may be assigned duty as a cabin crew member does not exceed —

- (a) 100 hours in any consecutive 14 days; and
- (b) 200 hours in any consecutive 28 days.

**Discretion by pilot-in-command to extend flight duty period**

13.—(1) An AOC holder may grant the pilot-in-command the discretion to extend a flight duty period by no more than 3 hours in the event of unforeseen operational circumstances if all of the following conditions are met:

- (a) before exercising such discretion, the pilot-in-command —
  - (i) has carried out a fatigue risk assessment; and
  - (ii) is satisfied that all members of the crew required to operate the aeroplane consider themselves fit to do so;



FIFTH SCHEDULE — *continued*

- (b) the safety of the flight will not be prejudiced;
- (c) the extended flight duty period does not exceed the maximum permitted flight duty period by more than 3 hours except in an emergency.
- (2) For the purposes of sub-paragraph (1)(c), an emergency is a situation which, in the judgment of the pilot-in-command, presents a serious risk to the health or safety of the persons on board the aircraft.
- (3) An AOC holder must —
- (a) ensure that the pilot-in-command reports to the AOC holder the use of discretion to extend duty or reduce rest by more than 2 hours from the normal limitations; and
- (b) report to the Director-General of Civil Aviation when such discretion is exercised in accordance with regulation 172.
- (4) If the discretion is exercised for similar reasons on more than 20% of occasions when a particular route or route pattern is flown, an AOC holder must review the schedule or the crewing management —
- (a) to ensure that the intent of its fatigue risk management programme is being met; and
- (b) to reduce the frequency at which such events occur.

**Maximum permitted flight duty periods — flight crew**

14.—(1) Except as provided in sub-paragraph (2) and paragraphs 13(1) and 15, an AOC holder must ensure that every person who may be assigned duty as a flight crew member on an aeroplane that is operated with a normal flight crew complement of 2 pilots, does not exceed the maximum permitted flight duty period (in hours) specified in —

- (a) Table A — where the time difference (if any) between the person's acclimated time and the local time at the place of commencement of the person's flight duty period does not exceed 2 hours; or

Table A: Maximum permitted flight duty period for flight crew

[S 214/2020 wef 01/04/2020]

Maximum flight duty period (hours)	Local time of start	Total sectors to be flown							
		1	2	3	4	5	6	7	8 or more

FIFTH SCHEDULE — *continued*

0600 - 0759	13	12 ¼	11 ½	10 ¾	10	9 ¼	9	9
0800 - 1459	14	13 ¼	12 ½	11 ¾	11	10 ¼	9 ½	9
1500 - 2159	13	12 ¼	11 ½	10 ¾	10	9 ¼	9	9
2200 - 0559	11	10 ¼	9 ½	9	9	9	9	9

[S 214/2020 wef 01/04/2020]

(b) Table B — in any other case.

Table B: Maximum permitted flight duty period for flight crew

[S 214/2020 wef 01/04/2020]

Total sectors to be flown	1	2	3	4	5	6 or more
Maximum flight duty period (hours)	12 ½	12	11	10 ½	10	9

[S 214/2020 wef 01/04/2020]

(c) [Deleted by S 214/2020 wef 01/04/2020]

(d) [Deleted by S 214/2020 wef 01/04/2020]

[S 214/2020 wef 01/04/2020]

(1A) An AOC holder must ensure that every person who may be assigned duty as a flight crew member on a single pilot aeroplane does not exceed the maximum permitted flight duty period specified in Table C.

Table C: Maximum permitted flight duty period for flight crew

Local time of start	Total sectors to be flown				
	Up to 4	5	6	7	8 or more
0600 – 0759	10	9 ¼	8 ½	8	8
0800 – 1459	11	10 ¼	9 ½	8 ¾	8
1500 – 2159	10	9 ¼	8 ½	8	8
2200 – 0559	9	8 ¼	8	8	8

[S 214/2020 wef 01/04/2020]

FIFTH SCHEDULE — *continued*

(1B) An AOC holder must ensure that every person who may be assigned duty as a flight crew member on a helicopter does not exceed the maximum permitted flight duty period specified in Table D.

Table D: Maximum permitted flight duty period for flight crew

Local time of start	Single Pilot		2 Pilots	
	Maximum Flight Duty Period	Maximum Flying	Maximum Flight Duty Period	Maximum Flying
0600 – 0759	9	6	11	8
0800 – 1459	10	7	12	9
1500 – 2159	9	6	11	8
2200 – 0559	8	5	10	7

[S 214/2020 wef 01/04/2020]

(2) When the assigned flight crew for a flight of a relevant aircraft only consists of 2 flight crew members, the flight duty period calculated from Table A or B must be adjusted by counting long sectors as more than one sector in the following manner:

Single sector length (block time) as	Count as (sectors)	
	Table A	Table B
Over 7 but not over 9 hours	2	3
Over 9 but not over 11 hours	3	4
Over 11 hours	4	5

**Maximum permitted flight duty period with augmented flight crew**

15.—(1) An AOC holder may extend the maximum permitted flight duty period specified in paragraph 14(1) in accordance with sub-paragraph (2) when all of the following conditions are met:

- (a) the flight crew is augmented with appropriate composition and number of flight crew members to provide in-flight relief;
- (b) there are appropriate in-flight rest facilities for use by the flight crew members;
- (c) there is an appropriate division of in-flight duties and rest among the crew members.

FIFTH SCHEDULE — *continued*

(2) When all the conditions in sub-paragraph (1) are met, the maximum permitted flight duty period may be extended as follows:

- (a) if augmented with one flight crew member and appropriate rest facilities are available for one pilot, up to a maximum flight duty period of 15 hours;
- (b) if augmented with 2 flight crew members and appropriate rest facilities are available for one pilot, up to a maximum flight duty period of 18 hours.

(3) For the purpose of sub-paragraph (2) —

- (a) in an augmented flight crew, a flight crew member may leave the member's assigned post for the purpose of in-flight rest, and be replaced by another appropriately qualified flight crew member; and
- (b) no extension of flight duty period is permitted if no rest facilities are available, even with augmented flight crew.

(4) An AOC holder must ensure that horizontal rest facilities are available in an aeroplane before the aeroplane can be used for a long haul flight with augmented flight crew, particularly if the flight duty period includes the time span from 0100 to 0659 hours (local time at the point of departure).

**Flight duty period for cabin crew**

16.—(1) An AOC holder may require a person assigned to duty as a cabin crew member of any relevant aircraft to report at a time that is earlier than the cabin crew member's scheduled reporting time for pre-flight briefing only if the earlier time is not more than 60 minutes before the reporting time for a flight crew member.

(2) The maximum permitted flight duty period for a cabin crew member is the same as that applicable to a flight crew member (as specified in paragraph 14), plus the difference in reporting time specified in sub-paragraph (1).

(3) An AOC holder must not assign a person to duty as a cabin crew member for a flight duty period that exceeds 13 hours (not including the difference in reporting time between flight crew and cabin crew as described in sub-paragraph (1)) without providing in-flight rest facilities.

(4) The AOC holder may assign a cabin crew member a flight duty period of up to 19 hours only if —

- (a) horizontal rest facilities are available on the aeroplane;
- (b) the division of duty and rest is appropriately distributed among all cabin crew members on a flight; and

FIFTH SCHEDULE — *continued*

- (c) the cabin crew member is provided with a minimum in-flight rest period of —
- (i) 3 hours for a flight duty period of up to 16 hours; or
  - (ii) 4 hours for a flight duty period of up to 19 hours.

(5) If horizontal rest facilities are not available in the aeroplane due to unforeseen circumstances, and the in-flight rest has to be taken in a suitable seat, the minimum in-flight rest period specified in paragraph (4)(c) must be increased by one hour.

**Records**

17.—(1) An AOC holder must keep records of the duties performed and rest periods achieved in respect of every person who is assigned duty as a flight crew member, or as a cabin crew member, for the duration specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

(2) The AOC holder must ensure that these records include, but are not limited to —

- (a) for a person assigned duty as a flight crew member —
  - (i) the start, duration and end of each flight duty period;
  - (ii) the start, duration and end of each duty period;
  - (iii) rest periods;
  - (iv) days off; and
  - (v) flight time; and
- (b) for a person assigned duty as a cabin crew member —
  - (i) the start, duration and end of each flight duty period;
  - (ii) the start, duration and end of each duty period;
  - (iii) rest periods; and
  - (iv) days off.

(3) An AOC holder must keep a record of every occasion a pilot-in-command exercises the pilot-in-command's discretion to extend a duty period or reduce a rest period.

FIFTH SCHEDULE — *continued*

## PART 2

## FATIGUE RISK MANAGEMENT SYSTEM

**FRMS**

18.—(1) An AOC holder's FRMS must be approved by the Director-General of Civil Aviation before it may take the place of all or any of the basic fatigue risk management requirements prescribed in Part 1.

(2) Before the Director-General of Civil Aviation approves an AOC holder's FRMS, the Director-General of Civil Aviation must be satisfied that the proposed FRMS will provide a level of safety equivalent to or better than the requirements prescribed in Part 1.

(3) An AOC holder must —

- (a) establish maximum values for flight times, flight duty periods and duty periods, and minimum values for rest periods;
- (b) decrease the maximum values and increase the minimum values in the event that the AOC holder's data indicates these values are too high or too low respectively; and
- (c) not increase any maximum values or decrease in minimum values unless the AOC holder has —
  - (i) evaluated accumulated FRMS experience and fatigue-related data to justified such changes; and
  - (ii) obtained the Director-General of Civil Aviation's approval.

(4) The values established for sub-paragraph (3) must —

- (a) be based on scientific principles and knowledge;
- (b) be subject to safety assurance processes; and
- (c) be acceptable to the Director-General of Civil Aviation;

(5) An AOC holder must, as a minimum —

- (a) incorporate scientific principles and knowledge within the FRMS;
- (b) identify fatigue-related safety hazards and the resulting risks on an ongoing basis;
- (c) ensure that remedial actions, necessary to effectively mitigate the risks associated with the hazards, are implemented promptly;
- (d) provide for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions;

FIFTH SCHEDULE — *continued*

- (e) provide for continuous improvement to the overall performance of the FRMS; and
  - (f) integrate the FRMS into the AOC holder's safety management system.
- (6) An AOC holder's FRMS must include the following:
- (a) FRMS policy and documentation;
  - (b) Fatigue risk management processes;
  - (c) FRMS safety assurance processes;
  - (d) FRMS promotion processes.
- (7) An AOC holder must maintain, for the duration specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018, a record for every person acting as a flight crew member or a cabin crew member that pertains to the duties performed and rest periods achieved for that person.

**FRMS Policy and Documentation**

19.—(1) An AOC holder must include the policy and define the scope of FRMS operations in its Operations Manual.

(2) The AOC holder must define its FRMS policy to reflect the shared responsibility of management, flight crew and other involved personnel.

(3) The FRMS policy mentioned in sub-paragraph (2) must —

- (a) clearly state the safety objectives of the FRMS;
- (b) declare management commitment to —
  - (i) effective safety reporting;
  - (ii) the provision of adequate resources for the FRMS; and
  - (iii) the continuous improvement of the FRMS;
- (c) require that clear lines of accountability for management, flight and cabin crews, and all other involved personnel are identified; and
- (d) require periodic reviews to ensure it remains relevant and appropriate.

(4) The FRMS policy must be signed by the accountable executive of the organisation and communicated, with visible endorsement, to all the relevant areas and levels of the organisation.

(5) An AOC holder must develop and keep current FRMS documentation that describes and records —

FIFTH SCHEDULE — *continued*

- (a) the FRMS policy and objectives;
- (b) the FRMS processes and procedures;
- (c) the accountabilities, responsibilities and authorities for these processes and procedures;
- (d) mechanisms for ongoing involvement of management, flight and cabin crew members, and all other involved personnel;
- (e) FRMS training programmes, training requirements and attendance records;
- (f) scheduled and actual flight times, duty periods and rest periods with significant deviations and reasons for deviations noted; and
- (g) FRMS outputs including findings from collected data, recommendations, and actions taken.

**Fatigue risk management processes***Identification of hazards*

20.—(1) An AOC holder must develop and maintain 3 fundamental and documented processes for fatigue hazard identification, namely —

- (a) a predictive process;
- (b) a proactive process; and
- (c) a reactive process.

(2) The predictive process mentioned in sub-paragraph (1)(a) —

- (a) must identify fatigue hazards by examining crew scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance; and
- (b) may include, but are not limited to, methods of examination such as —
  - (i) operator or industry operational experience and data collected on similar types of operations;
  - (ii) evidence-based scheduling practices; and
  - (iii) bio-mathematical models.

(3) The proactive process mentioned in sub-paragraph (1)(b) —

- (a) must identify fatigue hazards within current flight operations; and



FIFTH SCHEDULE — *continued*

- (b) may include, but are not limited to, methods of examination such as —
- (i) self-reporting of fatigue risks;
  - (ii) crew fatigue surveys;
  - (iii) relevant flight and cabin crew performance data;
  - (iv) available safety databases and scientific studies; and
  - (v) analysis of planned versus actual time worked.
- (4) The reactive process mentioned in sub-paragraph (1)(c) —
- (a) must identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimised; and
  - (b) may be triggered by any of the following:
    - (i) fatigue reports;
    - (ii) confidential reports;
    - (iii) audit reports;
    - (iv) incidents; and
    - (v) flight data analysis events.

*Risk assessment*

(5) An AOC holder must develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation.

(6) The risk assessment procedures developed in accordance with sub-paragraph (5) must review the hazards identified under the processes in sub-paragraphs (2), (3) and (4) and draw the correlation to —

- (a) the current operational processes;
- (b) the probability of the hazard occurring;
- (c) the possible consequences upon its occurrence; and
- (d) the effectiveness of existing safety barriers and controls in preventing its occurrence.

*Risk mitigation*

(7) An AOC holder must develop and implement procedures to mitigate the risks identified in sub-paragraph (6).

FIFTH SCHEDULE — *continued*

(8) The risk mitigation procedures developed in accordance with sub-paragraph (7) must include —

- (a) the selection of the appropriate mitigation strategies;
- (b) the implementation of the mitigation strategies; and
- (c) the monitoring of the strategies' implementation and effectiveness.

**FRMS safety assurance processes**

21.—(1) An AOC holder must develop and maintain FRMS safety assurance processes —

- (a) to provide for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls;
- (b) to provide a formal process for the management of change; and
- (c) to provide for the continuous improvement of the FRMS.

(2) The sources of data for performance monitoring under sub-paragraph (1)(a) may include, but are not limited to —

- (a) hazard reporting and investigations;
- (b) audits and surveys; and
- (c) reviews and fatigue studies.

(3) The formal processes mentioned in sub-paragraph (1)(b) must include —

- (a) the identification of changes in the operational environment that may affect FRMS;
- (b) the identification of changes within the organisation that may affect FRMS; and
- (c) the consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes.

(4) The improvements mentioned in sub-paragraph (1)(c) must include —

- (a) the elimination or modification of risk controls that have had unintended consequences or that are no longer needed due to changes in the operational or organisational environment;
- (b) routine evaluations of facilities, equipment, documentation and procedures; and
- (c) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

FIFTH SCHEDULE — *continued***FRMS promotion processes**

22.—(1) An AOC holder must establish and implement promotion processes which support —

- (a) the ongoing development of the FRMS;
- (b) the continuous improvement of its overall performance of the FRMS; and
- (c) the attainment of optimum safety levels.

(2) The FRMS promotion processes mentioned in sub-paragraph (1) include —

- (a) training programmes to ensure competency commensurate with the roles and responsibilities of management, flight crew and cabin crew, and all other involved personnel under the planned FRMS; and
- (b) an effective FRMS communication plan that —
  - (i) explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and
  - (ii) describes communication channels used to gather and disseminate FRMS-related information.

Made on 21 June 2018.

LEE HSIEN YANG  
*Chairman,*  
*Civil Aviation Authority of*  
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