



Australian Government

Civil Aviation Safety Authority

I, GRAEME MILLS CRAWFORD, Acting Director of Aviation Safety, on behalf of CASA, make this instrument under regulation 61.045 of the *Civil Aviation Safety Regulations 1998*.

[Signed G.M. Crawford]

Graeme M. Crawford
Acting Director of Aviation Safety

13 September 2019

Prescribed Qualification Standards for FSTD (MCC Training — Helicopter) Instrument 2019 (Edition 1)

1 Name

This instrument is the *Prescribed Qualification Standards for FSTD (MCC Training — Helicopter) Instrument 2019 (Edition 1)*.

2 Commencement

This instrument commences on the day after it is registered.

3 Definitions etc.

(1) In this instrument words and phrases have the same meaning as in Part 61 of CASR.

(2) Without affecting subsection (1), in this instrument:

CAR means the *Civil Aviation Regulations 1988*.

CASR means the *Civil Aviation Safety Regulations 1998*.

device has the same meaning as FSTD.

FCM means flight crew member.

FSTD, or **device**, means a flight simulation training device.

HLS means helicopter landing site.

IFR means the instrument flight rules.

IMC means instrument meteorological conditions.

latency means the additional time for an FSTD to respond to a control input, that is beyond the basic perceivable time for an actual helicopter to respond to the same input.

MCC means multi-crew cooperation.

MCC training means an approved course of training in multi-crew cooperation.

model, in relation to an FSTD, means a particular simulation functionality of the device.

Note For example, the flight dynamics model of an FSTD is the functionality of the device to simulate the flight dynamics of a multi-crew helicopter in a particular environment.

multi-crew helicopter means a turbine-powered multi-engine helicopter that meets all of the following requirements:

- (a) is equipped for multi-crew operations under the IFR;
- (b) can simulate an engine failure, during the take-off, en route and landing phases of an operation, in a way that is identifiable by an FCM;
- (c) has appropriate checklists and procedures describing what an FCM must do in order to manage such an engine failure.

Note The standards in this instrument are those which a device must meet to be suitable as an FSTD for MCC training for a multi-crew helicopter as defined. The standards are for simulations generic to a turbine-powered multi-engine helicopter that meets the requirements mentioned in paragraphs (a) to (c). The standards are not otherwise helicopter-type specific. The effect of the definition of a multi-crew helicopter is that the device must be capable of: simulating an engine failure and its consequences in a range of circumstances; and simulating the effects of FCM inputs to manage the engine failure.

simulate means to reproduce, at least in all essential respects, the generic actions and reactions of a multi-crew helicopter, and its systems and equipment, when on the ground or in flight, including associated noise and external environmental effects.

4 Application

The requirements set out in Schedule 1 are prescribed as qualification standards for an FSTD to be used for MCC training for a multi-crew helicopter.

Note See paragraph (d) of the definition of **flight simulation training device** in regulation 61.010 of CASR.

Schedule 1 Qualification standards for an FSTD used for MCC training for a multi-crew helicopter

1 Flight deck or cockpit layout and structure

- 1.1 The flight deck or cockpit layout and structure (as the case may be) of the device must:
 - (a) represent that of a multi-crew helicopter; and
 - (b) be enclosed, or perceived by an FCM to be enclosed; and
 - (c) include, where applicable, the following features:
 - (i) primary and secondary flight controls;
 - (ii) engine controls;
 - (iii) helicopter systems (for example, for fuel management, electronics and hydraulics) and their controls;
 - (iv) circuit breakers and panels associated with the device, except that a circuit breaker or panel may be a scale photographic representation if it is not required to be functional;
 - (v) flight instruments and instrument panels;
 - (vi) navigation and communication equipment;
 - (vii) automatic flight control system;
 - (viii) caution and warning systems.
- 1.2 Each applicable feature mentioned in a subparagraph of paragraph 1.1 (c) must:
 - (a) be located in a spatially correct cockpit area; and

- (b) be such that the technique, effort, travel and direction required to manipulate the element simulates that of a multi-crew helicopter.
- 1.3 Flight deck or cockpit instruments, or instrument panels represented by electronically displayed images with physical overlay or masking which incorporate operable controls, must be free of quantization.
Note **Quantization**, sometimes called stepping, means restraint, limitation or reduction from the scope or range of values, readings or other data that would normally be found in the relevant instrument or panel of a multi-crew helicopter.
- 1.4 The flight deck or cockpit seating for each FCM in the device must enable the FCM to comfortably achieve the optimal eye-point position.
- 1.5 The flight deck or cockpit seating in the device for the instructor must enable the instructor to:
 - (a) provide training to each FCM; and
 - (b) operate the device.
- 1.6 Flight deck or cockpit lighting must represent that of a multi-crew helicopter.

2 Flight dynamics model (aircraft and engines)

The flight dynamics model of the device must be able to simulate the various combinations of airspeed and power that are normally encountered in the flight of a multi-crew helicopter, and that give rise to changes in the following:

- (a) helicopter attitude;
- (b) aerodynamic and propulsive forces and moments;
- (c) temperature;
- (d) altitude;
- (e) helicopter mass.

3 Ground reaction and handling

- 3.1 The ground reaction models of the device (the *models*) must be sufficient for the FCM to determine when the simulated helicopter has landed.
- 3.2 If the device simulates a helicopter capable of ground taxi operations, the ground handling model must be capable of simulating the helicopter being taxied by the FCM.

Note For simulation, a helicopter with a retractable undercarriage but not fitted with brakes for ground taxi operations may be treated as a helicopter with landing skids.

4 Helicopter systems

- 4.1 Helicopter systems of the device, as used in training, must simulate those of a multi-crew helicopter.
- 4.2 The systems must be functionally correct to simulate specified normal, non-normal and emergency operating procedures for a multi-crew helicopter.
- 4.3 The systems must simulate multi-crew helicopter system operations, including interdependencies, both on the ground and in flight.
- 4.4 Circuit breakers operated in the conduct of MCC training must be functionally accurate and simulate the functions of circuit breakers in a multi-crew helicopter.
- 4.5 Instrument indications must automatically respond:
 - (a) to movements of the flight controls by an FCM; and

- (b) to simulated atmospheric disturbance;
as they would in a multi-crew helicopter and with no discernible latency.
- 4.6 For subclause 4.5, numerical values displayed or otherwise conveyed by the instruments must be presented in units relevant to a multi-crew helicopter.
- 4.7 The device must simulate the following multi-crew helicopter systems:
 - (a) a communication system;
 - (b) a navigation system;
 - (c) a caution and warning system.
- 4.8 The simulated systems mentioned in subclause 4.7 must include the following:
 - (a) a noise-attenuating headset communications system for each FCM;
 - (b) a method of identifying selected navigation aids;
 - (c) push-to-transmit switches for each FCM, installed on the flight controls;
 - (d) a capacity enabling each FCM to select the radio frequency that he or she intends to use;
 - (e) a system which enables the instructor to determine if each FCM is transmitting on the correct frequency except if this may be determined visually by the instructor.
- 4.9 The device must simulate the effects of operation of the anti-ice system when the FCM selects the system.
- 4.10 The device must be fitted with an automatic flight control system that simulates the operation of an autopilot fitted to a helicopter.
- 4.11 If the device is fitted with a traffic collision avoidance system (*TCAS*), activation of the TCAS must simulate activation of a TCAS fitted to a helicopter.
- 4.12 If the device is fitted with a terrain awareness warning system (*TAWS*), activation of the TAWS must simulate activation of a TAWS fitted to a helicopter.

5 Flight control forces and control travel

- 5.1 Flight control forces on the device must simulate those of a multi-crew helicopter.
- 5.2 The device must have a cyclic control trim system operable in the pitch and roll axis by each of the FCMs.
- 5.3 Flight control travel must simulate that of a multi-crew helicopter.
- 5.4 Reactions to the operation of the flight controls must simulate the reactions of a multi-crew helicopter to its flight controls.

6 Sound cues

- 6.1 Flight deck sounds in the device resulting from pilot actions or helicopter system malfunctions must simulate those of a multi-crew helicopter responding to the same actions or malfunctions.

7 Visual display cues

- 7.1 The visual display of the device must produce at least a generic textured representation of ambient conditions, and be free of optical discontinuities that may create non-realistic visual cues.

- 7.2 The visual display field of view must be not less than: 110° horizontally and 40° vertically.
- 7.3 For each FCM, distance from the FCM's eye position to the surface of a direct view display must not be less than the distance from the FCM's eye position to the instrument panel.
- 7.4 The visual display must be capable of producing the same changes to runway or HLS perspective as arise in a multi-crew helicopter from changes to its height during:
- (a) approach to a landing and a touchdown; and
 - (b) the hover; and
 - (c) lift off and departure.
- 7.5 The visual display contrast ratio must be capable of the following:
- (a) displaying variations in ground terrain;
 - (b) distinguishing landing sites, and runway and taxiway surfaces, at aerodromes;
- as they would appear to the FCMs of a multi-crew helicopter.
- 7.6 The visual display brightness must be sufficient to support daylight, twilight and night environment conditions.

8 Motion cues — Reserved

Note There is no requirement for motion cues.

9 Air traffic control environment simulation

The device must be capable of generating at least 1 simulated automated airport weather reporting message of an Automated Terminal Information Service (ATIS) broadcast.

10 Navigation environment — replication of real-world operations

- 10.1 The navigation data and corresponding landing approach facilities programmed into a device must be capable of supporting scenario-based training designed to simulate operations in the environment of specific, real-world, locations.
- 10.2 The navigation database, and its supporting maps and charts for relevant geographical areas, must be accurate and designed for simulated operations in the environment of specific, real-world, locations.
- 10.3 Ground-based navigation aids programmed into a device must be useable for simulated operations within their range or line-of-sight without any restrictions.
- 10.4 The navigation database must include instrument approach procedures for simulated operations at no fewer than 5 different, real-world locations that support instrument approach operations.

11 Atmosphere and weather environment

- 11.1 The device must be able to simulate the following atmospheric conditions as they would affect a multi-crew helicopter:
- (a) changes in atmospheric temperature;
 - (b) IMC;
 - (c) icing conditions;
 - (d) surface wind speed, including direction;
 - (e) turbulence.

- 11.2 The instructor must be able to adjust the visual display to produce changes to cloud base and visibility during a simulated flight.

12 Airports and terrain

- 12.1 The navigation database of a device must contain correct terrain modelling and runway orientation for simulated operations at aerodromes.
- 12.2 The simulated visual environment attitude must provide an accurate portrayal of the horizon as it would be displayed on a multi-crew helicopter's attitude indicator.
- 12.3 The visual system must include representative scenery for at least 3 different, specific, real-world, aerodromes as they each appear in daylight, twilight and night illumination.
- 12.4 For subclause 12.3, with daylight illumination:
- (a) each of the 3 aerodromes must be visible for a simulated straight-in approach from a distance of at least 10 nautical miles (*NM*); and
 - (b) the associated runway or runways must be visible from a distance of at least 5 NM.
- 12.5 The visual system must provide full colour presentations and surfaces with textural cues to enable:
- (a) a simulated visual approach and landing; and
 - (b) simulated air taxi operations.
- 12.6 The visual system must have sufficient capacity to display simultaneously moving objects.
- 12.7 The visual system must simulate the twilight visual scene, with full colour presentations of reduced ambient intensity and typical terrain that would be illuminated by a multi-crew helicopter's lights in the following:
- (a) approach to a landing, and touchdown;
 - (b) the hover;
 - (c) lift off and departure.
- 12.8 For a simulated air taxi operation and visual approach and landing, scenes in the visual system must include self-illuminated objects such as roads, ramp lighting, vehicles and airport signage.
- 12.9 The visual system must have a definable horizon that is synchronised with the artificial horizon displayed on the instrumentation of the device, with no discernible latency.
- 12.10 The visual system must provide night visual scenes, without ground cues, that are:
- (a) self-illuminating; or
 - (b) illuminated by the simulated lights of the helicopter or other aircraft.

13 Miscellaneous

- 13.1 The instructor station for a device must be so located that the instructor can introduce:
- (a) helicopter system variables used in training; and
 - (b) time freezes; and
 - (c) changes to environmental conditions.

- 13.2 When an instructor is conducting training in the device, the instructor must be able to observe:
- (a) the simulated external environment; and
 - (b) the actions of each FCM receiving training.
- 13.3 The device must have sufficient computer capacity to support its overall fidelity at all times when used to conduct MCC training.
- 13.4 The device must be supported by:
- (a) maintenance and inspections in accordance with the manufacturer's instructions and recommendations; and
 - (b) any other maintenance and inspections necessary to ensure the device complies with the standards in this Schedule; and
 - (c) relevant documents demonstrating satisfactory completion of the maintenance and inspections mentioned in paragraphs (a) and (b).
- 13.5 The device must have an operations manual that describes the following:
- (a) the emergency procedures;
 - (b) the tests and checks used by the operator to determine:
 - (i) the serviceability of the device; and
 - (ii) the device's compliance with the standards in this Schedule;
 - (c) the device's operating procedures for an instructor conducting training.
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