PART- FSTD(A)

Airplane Flight Simulator Training Devices

This new part of the Jordanian Civil Aviation Regulations is hereby adopted under the authority and provisions of the Civil Aviation Law No. (41) 2007, and its amendments.

Capt. Mohammad Amin Al-Quran
Chief Commissioner/CEO
Civil Aviation RegulatoryCommission

Revision Control Sheet

Amendment No.	Effective Date	Subpart	Paragraph
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Amendment Summary

Part FSTD(A) Airplane Flight Simulator Training Devices			
Amendment No.	**Effective Date**	**Subpart**	**Paragraph**

Contents

Subpart- A
Applicability

FSTD(A).001 Applicability.

FSTD (A) as amended applies to those persons, organizations or enterprises (Flight Simulation Training Devices (FSTD) operators) or, in the case of BITDs only, manufacturers seeking initial qualification of FSTDs.

The version of JCAR-FSTD (A) agreed by CARC and used for issue of the initial qualification shall be applicable for future re-current qualifications of the FSTD unless re-categorized.

FSTD users shall also gain approval to use the FSTD as part of their approved training programs despite the fact that the FSTD has been previously qualified.

Subpart- B
General

FSTD(A).005 Terminology.
(See AC to JCAR-FSTD A.005)

The following principal terms and abbreviations shall be used in order to comply with JCAR–FSTD(A). Further terms and abbreviations are contained in AC to FSTD A.005.

Basic Instrument Training Device (BITD): A ground based training device which represents the student pilot‘s station of a class of airplanes. It may use screen based instrument panels and spring loaded flight controls, providing a training platform for at least the procedural aspects of instrument flight.

BITD Manufacturer: That organization or enterprise being directly responsible to CARC for requesting the initial BITD model qualification.

BITD Model: A defined hardware and software combination, which has obtained a qualification. Each BITD will equate to a specific model and be a serial numbered unit.

Flight and Navigation Procedures Trainer (FNPT): A training device which represents the flight deck or cockpit environment including the assemblage of equipment and computer programs necessary to represent an airplane or class of airplane in flight operations to the extent that the systems appear to function as in an airplane. It is in compliance with the minimum standards for a specific FNPT Level of Qualification.

Flight Simulation Training Device (FSTD): A training device which is a Full Flight Simulator (FFS), a Flight Training Device (FTD), a Flight & Navigation Procedures Trainer (FNPT), or a Basic Instrument Training Device (BITD).

Flight Training Device (FTD): A full size replica of a specific airplane type’s instruments, equipment, panels and controls in an open flight deck area or an enclosed airplane flight deck, including the assemblage of equipment and computer software programs necessary to represent the airplane in ground and flight conditions to the extent of the systems installed in the device. It does not require a force cueing motion or visual system. It is in compliance with the minimum standards for a specific FTD Level of Qualification.

Flight Simulation Training Device Operator (FSTD operator): That person, organization or enterprise directly responsible to CARC for requesting and maintaining the qualification of a particular FSTD.

Flight Simulation Training Device Qualification (FSTD Qualification): The level of technical ability of an FSTD as defined in the compliance document.

Flight Simulation Training Device User Approval (FSTD User Approval): The extent to which an FSTD of a specified Qualification Level may be used by persons, organizations or enterprises as approved by CARC. It takes account of airplane to FSTD differences and the operating and training ability of the organization.

Flight Simulation Training Device User (FSTD User): The person, organization or enterprise requesting training, checking and testing credits through the use of an FSTD.

Full Flight Simulator (FFS): A full size replica of a specific type or make, model and series airplane flight deck, including the assemblage of all equipment and computer programs necessary to represent the airplane in ground and flight operations, a visual system providing an out of the flight deck view, and a force cueing motion system. It is in compliance with the minimum standards for FFS Qualification.

Other Training Device (OTD): A training aid other than FFS, FTD, FNPT or BITD which provides for training where a complete flight deck environment is not necessary.

Qualification Test Guide (QTG): A document designed to demonstrate that the performance and handling qualities of an FSTD agree within prescribed limits with those of the airplane and that all applicable regulatory requirements have been met. The QTG includes both the airplane and FSTD data used to support the validation.

Subpart- C
Airplane Flight Simulation Training Devices

FSTD(A).015 Application for FSTD Qualification.

(See AC No. 1 to JCAR-FSTD A.015), (See AC No. 2 to JCAR-FSTD A.015)

(a) The FSTD operator requiring evaluation of a FFS, FTD or FNPT shall apply to CARC giving 3 months notice. In exceptional cases this period may be reduced to one month at the discretion of CARC.

(b) An FSTD Qualification Certificate will be issued following satisfactory completion of an evaluation of the FFS, FTD or FNPT by CARC.

(c) For BITDs the manufacturer of a new BITD model which requires evaluation shall apply to CARC giving 3 months notice. In exceptional cases this period may be reduced to one month at the discretion of CARC.

(d) A BITD Qualification Certificate will be issued for the BITD model to the manufacturer following satisfactory completion of an initial evaluation by CARC. This qualification certificate is valid for any devices manufactured to this standard without the need for the device to be subjected to further technical evaluation. The BITD model must clearly be identified by a BITD model number.

(e) The numbering of the BITD model must clearly define the hardware and software configuration of the qualified BITD model. A running serial number shall follow the BITD model identification number.

(f) To add a statement for FSTD approved before implementation of this part.

FSTD(A).020 Validity of FSTD Qualification.

(See AC to JCAR-FSTD A.020)

(a) An FSTD qualification is valid for 12 months unless otherwise specified by CARC.

(b) An FSTD qualification revalidation can take place at any time within the 30 days prior to the expiry of the validity of the qualification

document. The new period of validity shall continue from the expiry date of the previous qualification document.

(c) CARC shall refuse, revoke, suspend or vary an FSTD qualification, if the provisions of JCAR-FSTD A are not satisfied.

(d) It is the operator‘s responsibility to apply for the revalidation of the qualification.

FSTD(A).025 Rules Governing FSTD Operators.
(See AC No. 1 to JCAR-FSTD A.025), (See AC No. 2 to JCAR-FSTD A.025)
(See AC No. 3 to JCAR-FSTD A.025)

The FSTD operator shall demonstrate his capability to maintain the performance, functions and other characteristics specified for the FSTD Qualification Level as follows:

(a) **Quality System.**

(1) A Quality System shall be established and a Quality Manager designated to monitor compliance with and the adequacy of, procedures required to ensure the maintenance of the Qualification Level of FSTDs. Compliance monitoring shall include a feedback system to the Accountable Manager to ensure corrective action as necessary.

(2) The Quality System shall include a Quality Assurance Program that contains procedures designed to verify that the specified performance, functions and characteristics are being conducted in accordance with all applicable requirements, standards and procedures.

(3) The Quality System and the Quality Manager shall be acceptable to CARC.

(4) The Quality System shall be described in relevant documentation.

(b) **Updating**. A link shall be maintained between the operator’s organization, CARC and the relevant manufacturers to incorporate important modifications, especially:

(1) Airplane modifications that are essential for training and checking shall be introduced into all affected FSTDs whether or not enforced by an airworthiness directive.

(2) Modification of FSTDs, including motion and visual systems (where applicable):

(i) When essential for training and checking, FSTD operators shall update their FSTDs (for example in the light of data revisions). Modifications of the FSTD hardware and software that affect handling, performance and systems operation or any major modifications of the motion or visual system shall be evaluated to determine the impact on the original qualification criteria. FSTD operators shall prepare amendments for any affected validation tests. The FSTD operator shall test the FSTD to the new criteria.

(ii) CARC shall be advised in advance of any major changes to determine if the tests carried out by the FSTD operator are satisfactory. A special evaluation of the FSTD may be necessary prior to returning it to training following the modification.

(3) BITD operators shall maintain a link between their own organization, CARC and the BITD manufacturer to incorporate important modifications.

(c) **Installations.** Ensure that the FSTD is housed in a suitable environment that supports safe and reliable operation.

(1) The FSTD operator shall ensure that the FSTD and its installation comply with the Jordanian health and safety regulations. However, as a minimum all FSTD occupants and maintenance personnel shall be briefed on FSTD safety to ensure that they are aware of all safety equipment and procedures in the FSTD in case of emergency.

(2) The FSTD safety features such as emergency stops and emergency lighting shall be checked at least annually and recorded by the FSTD operator.

(d) **Additional Equipment**. Where additional equipment has been added to the FSTD, even though not required for qualification, it will be assessed to ensure that it does not adversely affect the quality of training.

Therefore any subsequent modification, removal or un-serviceability could affect the qualification of the device.

FSTD(A).030 Requirements for FSTD qualification.

(See Appendix 1 to JCAR-FSTD A.030), (See AC No. 1 to JCAR-FSTD A.030)
(See AC No. 2 to JCAR-FSTD A.030),(See AC No. 3 to JCAR-FSTD A.030)
(See AC No. 4 to JCAR-FSTD A.030), (See AC No. 1 to JCAR-FSTD A.030(c) (1)), (See AC No. 2 to JCAR-FSTD A.030(c) (1))

(a) Any FSTD submitted for initial evaluation will be evaluated against applicable JCAR–FSTD (A) criteria for the Qualification Levels applied for. Recurrent evaluations of a FSTD will be based on the same version of FSTD (A). An upgrade will be based on the currently applicable version of JCAR-FSTD (A).

(b) FSTD shall be assessed in those areas that are essential to completing the flight crewmember training and checking process as applicable.

(c) The FSTD shall be subjected to:

(1) Validation tests and

(2) Functions & subjective tests.

(d) Data shall be of a standard that satisfies CARC before the FSTD can gain a Qualification Level.

(e) The FSTD operator shall submit a QTG in a form and manner that is acceptable to CARC.

(f) The QTG will only be approved after completion of an initial or upgrade evaluation, and when all the discrepancies in the QTG have been addressed to the satisfaction of CARC. After inclusion of the results of the tests witnessed by CARC, the approved QTG becomes the Master QTG (MQTG), which is the basis for the FSTD qualification and subsequent recurrent FSTD evaluations. A copy of the MQTG shall be delivered by the BITD manufacturer together with any BITD model delivered to an Operator.

(g) The FSTD operator shall:

(1) Run the complete set of tests contained within the MQTG progressively between each annual evaluation by CARC. Results shall be dated and retained in order to satisfy both the FSTD operator and CARC that FSTD standards are being maintained; and

(2) Establish a Configuration Control System to ensure the continued integrity of the hardware and software of the qualified FSTD.

FSTD (A) .031 – Thru FSTD A.034 Reserved.

FSTD(A).035 Requirements for Full Flight Simulators approval.
(See AC to JCAR-FSTD A.035)

(a) Full Flight simulators approval either will be re-categorized or will continue to maintain their approval or qualification (and be known as FFSs(G)) under the Grandfather Rights provision, in accordance with JCAR-FSTD A.035-(c) and JCAR-FSTD A.O35-(d) provided that period of Grandfather Rights shall not exceed 2 years.

(b) Re-categorized of Full Flight simulators will be qualified in accordance with JCAR-FSTD A.030.

(c) Full Flight simulators that are not re-categorized but that have a primary reference document used for their testing may be qualified by CARC to an equivalent JCAR–FSTD (A) Qualification Level. These Qualification Levels refer to similar credits achieved by JCAR–FSTD (A) Levels A, B, C & D. An upgrade requires the re-categorization of the flight simulator.

(1) To gain and maintain an equivalent Qualification Level, these Full Flight simulators shall be assessed in those areas which are essential to completing the flight crew member training and checking process, including:

(i) Longitudinal, lateral and directional handling qualities.

(ii) Performance on the ground and in the air.

(iii) Specific operations where applicable.

(iv) Flight deck configuration.

(v) Functioning during normal, abnormal, emergency and, where applicable non-normal operation.

(vi) Instructor station function and FSTD control; and

(vii) Additional requirements depending on the Qualification or approval Level and the installed equipment.

(2) The Full Flight simulators shall be subjected to:

(i) Validation tests; and

(ii) Functions and subjective Tests.

(d) Full Flight simulators devices that are not re-categorized and that do not have a primary reference document used for their testing shall be qualified by special arrangement:

(1) Such Full flight simulators will be issued with Special Categories.

(2) These Full Flight simulators shall be subjected to the same functions and subjective tests referred to in JCAR-FSTD A.035-(c) (2) (ii) above.

(3) In addition any previously re-cognized validation test shall be used.

FSTD(A).036 Requirements for Flight Training Devices approval.

(See AC to JCAR-FSTD A.036)

(a) Flight Training Devices approved or qualified will be re-categorized or will continue to maintain their approval or qualification (and be known as FTDs(G)) under the Grandfather Rights provision, in accordance with JCAR-FSTD A.036 (c) and JCAR-FSTD A.036(d), provided that period of Grandfather Rights shall not exceed 2 years.

(b) Recategorized of FTDs will be qualified in accordance with FSTD(A) .030.

(c) FTDs that are not re-categorized but that have a primary reference document used for their testing may be qualified by CARC to an equivalent JCAR-FSTD A Qualification Level. These Qualification Levels refer to similar credits achieved by JCAR-STD A Level 1 and 2.

(1) To gain and maintain an equivalent Qualification Level, these FTDs shall be assessed in those areas which are essential to completing the flight crew member training and checking process, including:

(i) Longitudinal, lateral and directional handling qualities (where applicable);

(ii) Performance on the ground and in the air;

(iii) Specific operations where applicable;

(iv) Flight deck configuration;

(v) Functioning during normal, abnormal, emergency and, where applicable non normal operation;

(vi) Instructor station function and FSTD control, and

(vii) Certain additional requirements depending on the Qualification or approval Level and the installed equipment.

(2) The FTDs shall be subjected to:

(i) Validation Tests, and

(ii) Functions and Subjective tests.

(d) FTDS devices that are not re-categorized and that do not have a primary reference document used for their testing shall be qualified by special arrangement.

(1) Such FTDs will be issued with Special Categories.

(2) These FTDs shall be subjected to the same Functions and Subjective Tests referred to in JCAR-FSTD A.O36(c) (2) (ii).

(3) In addition any previously recognized Validation Test shall be used.

FSTD(A).037 Requirements for Flight Navigation and Procedures Trainers approval.
(See AC to JCAR-FSTD A.037)

(a) FNPTs approved or qualified will continue to maintain their approval or qualification (and be known as FNPT(G)) under the Grandfather Rights provision, in accordance with JCAR-FSTD A.O37-(c) and JCAR-FSTD A.O37-(d) provided that period of Grandfather Rights shall not exceed 2 years.

(b) Re-categorized FNPTs will be qualified in accordance with JCAR-FSTD A.030.

(c) FNPTs devices that are not re-categorized but that have a primary reference document used for their testing may continue under previous authorization, provided that they continue to comply with the primary reference document.

(1) To maintain their qualification/ approval, these FNPTs devices shall be assessed in those areas which are essential to completing the flight crew member training, testing and checking process, including:

(i) Longitudinal, lateral and directional handling qualities.

(ii) Performance on the surface and in the air.

(iii) Specific operations where applicable.

(iv) Cockpit / flight deck configuration.

(v) Functioning during normal, abnormal and emergency operation.

(vi) Instructor station function and FSTD control; and

(vii) Certain additional requirements depending on the qualification or approval and the installed equipment.

(2) The FNPTs shall be subjected to:

(i) Validation Tests (if applicable); and Tests.

(ii) Functions and Subjective.

(d) FNPTs devices that do not have a primary reference document used for their testing may continue by special arrangement:

(1) Such FNPTs will be issued with Special Categories.

(2) These FNPTs shall be subjected to the same Functions and Subjective Tests referred to in JCAR-STD A.037-(c) (2) (ii).

(3) In addition any previously recognized Validation Test shall be used.

FSTD(A).038 Requirements for BITDs approval.

(a) FNPT (G) s and STDs under special category may be re categorized as BITDs. The FSTD operator shall apply for the evaluation. Following satisfactory completion of the evaluation the FSTD operator will be issued a Qualification Certificate.

(b) Re-categorized BITD’s will be qualified in accordance with JCAR-FSTD A.030.

FSTD(A).040 Changes to qualified FSTD.

(a) **Requirement to notify major changes to a FSTD**. The operator of a qualified FSTD shall inform CARC of proposed major changes such as:

(1) Airplane modifications, which could affect FSTD qualification.

(2) FSTD hardware and or software modifications that could affect the handling qualities, performances or system representations.

(3) Re-location of the FSTD; and

(4) Any de-activation of the FSTD.

CARC may complete a special evaluation following major changes or when a FSTD appears not to be performing at its initial Qualification Level.

(b) **Upgrade of a FSTD**. A FSTD may be upgraded to a higher Qualification Level. Special evaluation is required before the award of a higher Level of Qualification:

(1) If an upgrade is proposed the FSTD operator shall seek the advice of CARC and give full details of the modifications. If the upgrade evaluation does not fall upon the anniversary of the original qualification date, a special evaluation is required to permit the FSTD to continue to qualify even at the previous Qualification Level.

(2) In the case of a FSTD upgrade, an FSTD operator shall run all validation tests for the requested Qualification Level. Results from previous evaluations shall not be used to validate FSTD performance for the current upgrade.

(c) **Relocation of a FSTD.**

(1) In instances where a FSTD is moved to a new location, CARC shall be advised before the planned activity along with a schedule of related events.

(2) Prior to returning the FSTD to service at the new location, the FSTD operator shall perform at least one third of the validation tests and, functions and subjective tests to ensure that the FSTD performance meets its original qualification standard. A copy of the test documentation shall be retained together with the FSTD records for review by CARC.

(d) **Deactivation of a currently qualified FSTD.**

(1) If a FSTD operator plans to remove a FSTD from active status for prolonged periods, CARC shall be notified and suitable controls established for the period during which the FSTD is inactive.

(2) The FSTD operator shall agree a procedure with CARC to ensure that the FSTD can be restored to active status at its original Qualification Level.

FSTD(A).045 Interim FSTD Qualification.
(See AC to JCAR-FSTD A.045).

(a) In case of new airplane programs, special arrangements shall be made to enable an interim Qualification Level to be achieved.

(b) For Full Flight Simulators, an Interim Qualification Level will only be granted at levels A, B or C.

(c) Requirements, details relating to the issue, and the period of validity of an interim Qualification Level will be decided by CARC.

FSTD(A).050 Transferability of FSTD Qualification.

When there is a change of FSTD operator:

(a) The new FSTD operator shall advise CARC in advance in order to agree upon a plan of transfer of the FSTD.

(b) At the discretion of CARC, the FSTD shall be subject to an evaluation in accordance with JCAR-FSTD A.

(c) Provided that the FSTD performs to its original standard, its original Qualification Level shall be restored. Revised user approval(s) may also be required.

Appendix- 1 to FSTD (A) .030
Flight Simulation Training Device Standards

This appendix describes the minimum Full Flight Simulator (FFS), Flight Training Device (FTD), Flight and Navigation Procedures Trainer (FNPT) and Basic Instrument Training Devices (BITD) requirements for qualifying devices to the required Qualification Levels. Certain requirements included in this section shall be supported with a statement of compliance (SOC) and, in some designated cases, an objective test. The SOC will describe how the requirement was met. The test results shall show that the requirement has been attained. In the following tabular listing of FSTD standards, statements of compliance are indicated in the compliance column.

For FNPT use in Multi-Crew Co-operation (MCC) training the general technical requirement are expressed in the MCC column with additional systems, instrumentation and indicators as required for MCC training and operation.

For MCC (Multi Crew Co-operation) minimum technical requirements are as for Level II, with the following additions or amendments:

1	Turbo-jet or turbo-prop engines.
2	Performance reserves, in case of an engine failure, to be in accordance with JCAR-25. These may be simulated by a reduction in the airplane gross mass.
3	Retractable landing gear.
4	Pressurization system.
5	De-icing systems
6	Fire detection / suppression system
7	Dual controls
8	Autopilot with automatic approach mode
9	2 VHF transceivers including oxygen masks intercom system
10	2 VHF NAV receivers (VOR, ILS, DME)
11	1 ADF receiver
12	1 Marker receiver
13	1 transponder

The following indicators shall be located in the same positions on the instrument panels of both pilots:

1	Airspeed
2	Flight attitude with flight director
3	Altimeter
4	Flight director with ILS (HSI)
5	Vertical speed
6	ADF
7	VOR
8	Marker indication (as appropriate)
9	Stop watch (as appropriate)

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
d.1	All relevant instrument indications involved in the simulation of the applicable aeroplane shall automatically respond to control movement by a flight crew member or induced disturbance to the simulated aeroplane, e.g. turbulence or wind shear.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	For FNPTs, instrument indications sufficient for the training events to be accomplished. Reference: Appendix- 1 to FSTD (A) .030 For BITDs, instrument indications sufficient for the training events to be accomplished. Reference Appendix- 1 to FSTD (A) .030.
d.2	Lighting environment for panels and instruments shall be sufficient for the operation being conducted.					✓	✓	✓	✓	✓	✓	For FTD level 2 lighting environment shall be as per aeroplane.
d.3	Instrument indications respond appropriately to icing			✓	✓				✓	✓		
e.1	Communications, navigation, and caution and warning equipment corresponding to that installed in the applicant's aeroplane with operation within the tolerances prescribed for the applicable airborne equipment.	✓	✓	✓	✓	✓	✓					For FTD level 1 applies where the appropriate systems are replicated.
e.2	Navigation equipment corresponding to that of the replicated aeroplane or class of aeroplanes, with operation within the tolerances prescribed for the actual airborne equipment. This shall include communication equipment (interphone and air–ground communications systems).							✓	✓	✓	✓	

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
g.1	FSTD systems shall simulate applicable aeroplane system operation, both on the ground and in flight. Systems shall be operative to the extent that all normal, abnormal, and emergency operating procedures can be accomplished.	✓	✓	✓	✓	✓	✓		✓	✓		For FTD level 1, applies where system is simulated. For FNPTs systems shall be operative to the extent that it shall be possible to perform all normal, abnormal and emergency operations as may be appropriate to the aeroplane or class of aeroplanes being simulated and as required for the training.
g.2	For aeroplanes equipped with stick pusher system (e.g. longitudinal control feel system, or equivalent) control forces, displacement, and surface position of the aeroplane correspond to those of the aeroplane being simulated.			✓	✓							A statement of compliance (SOC) is required verifying that the stick pusher system has been modelled, programmed, and validated using the aeroplane manufacturer's design data or other acceptable data source. The SOC must address, at a minimum, the stick pusher activation and cancellation logic as well as system dynamics, control displacement and forces as a result of the stick pusher activation. This requirement applies only to FSTDs that are to be qualified to conduct full stall training tasks. Test required.

h.1	Instructor controls shall enable the operator to control all required system variables and insert abnormal or emergency conditions into the aeroplane systems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Where applicable, and as requ ired for training, the following shall be available: — position and flight freeze; — a facility to enable the dynamic plotting of the flight path on approaches, commencing at the final approach fix, including the vertical profile; — hard copy of map and approach plot.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
g.1	FSTD systems shall simulate applicable aeroplane system operation, both on the ground and in flight. Systems shall be operative to the extent that all normal, abnormal, and emergency operating procedures can be accomplished.	✓	✓	✓	✓	✓	✓		✓	✓		For FTD level 1, applies where system is simulated. For FNPTs systems shall be operative to the extent that it shall be possible to perform all normal, abnormal and emergency operations as may be appropriate to the aeroplane or class of aeroplanes being simulated and as required for the training.

g.2	For aeroplanes equipped with stick pusher system (e.g. longitudinal control feel system, or equivalent) control forces, displacement, and surface position of the aeroplane correspond to those of the aeroplane being simulated.			✓	✓							A statement of compliance (SOC) is required verifying that the stick pusher system has been modelled, programmed, and validated using the aeroplane manufacturer's design data or other acceptable data source. The SOC must address, at a minimum, the stick pusher activation and cancellation logic as well as system dynamics, control displacement and forces as a result of the stick pusher activation. This requirement applies only to FSTDs that are to be qualified to conduct full stall training tasks. Test required.
h.1	Instructor controls shall enable the operator to control all required system variables and insert abnormal or emergency conditions into the aeroplane systems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Where applicable, and as required for training, the following shall be available: — position and flight freeze; — a facility to enable the dynamic plotting of the flight path on approaches, commencing at the final approach fix, including the vertical profile; — hard copy of map and approach plot.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		

h.2	The FSTD must have a real-time feedback tool that provides the instructor/evaluator with visibility of whenever the FSTD training envelope or aeroplane operating limits have been exceeded. Additionally, and optionally, a recording mechanism may be utilized.			✓	✓							This feedback tool must include the following: (a) FSTD validation envelope: This must be in form of an alpha/beta envelope (or equivalent method) depicting the 'confidence level' of the aerodynamic model. This 'confidence level' depends on the degree of flight validation or on the source of predictive methods. There must be a minimum of a flaps-up and flaps-down envelope available. (b) Flight control inputs: These must enable the instructor/evaluator to assess the pilot's flight control displacements and forces (including fly-by-wire, as appropriate). (c) Aeroplane operational limits: This must display the aeroplane's operational limits during the manoeuvre as applicable for the configuration of the aeroplane. An SOC is required that defines the source data used to construct the FSTD validation envelope. Please refer to AC15 to FSTD A.030

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		

h.3	Upset scenarios: When equipped with instructor operating station (IOS) selectable dynamic aeroplane upsets, the IOS is to provide guidance on the method used to drive the FSTD into an upset condition, including any malfunction or degradation of the FSTD's functionality, required to initiate the upset. The unrealistic degradation of simulator functionality (such as degrading flight control effectiveness) to drive an aeroplane upset is generally not acceptable unless used purely as a tool for repositioning the FSTD with the pilot out of the loop.			✓	✓							An SOC is required to confirm that each upset prevention and recovery feature programmed at the IOS and the associated training manoeuvre have been evaluated by a suitably qualified pilot. Please refer AC 15 to FSTD (A) .030 (a)(3).
i.1	Control forces and control travel shall correspond to that of the replicated aeroplane. Control forces shall react in the same manner as in the aeroplane under the same flight conditions.	✓	✓	✓	✓		✓	✓	✓	✓	✓	For FTD level 2, control forces and control travel should correspond to that of the replicated aeroplane with CT&M. It is not intended that the device should be flown manually other than for short periods when the autopilot is temporarily disengaged. For FNPT level I and BITDs, control forces and control travel shall broadly correspond to that of the replicated aeroplane or class of aeroplane. Control force changes due to an increase/decrease in aeroplane speed are not necessary. In addition, for FNPT level II and MCC, control forces and control travels shall respond in the same manner under the same flight conditions as in the aeroplane or class of aeroplane being simulated.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
s.1	Aerodynamic modelling includes, for aeroplanes issued an original type certificate after June 1980, low altitude level flight ground effect, Mach effect at high altitude, normal and reverse dynamic thrust effect on control surfaces, aeroelastic representations, and representations of non-linearities due to sideslip based on aeroplane flight test data provided by the manufacturer.			✓	✓							Statement of compliance required to include: — Mach effect, aeroelastic representations, ground effect and non-linearities due to sideslip; — separate tests for thrust effects. Please refer to Appendix- 1 to FSTD (A) .030 (a)(2).
s.2	The aerodynamic model has to incorporate data representing the aeroplane's characteristics covering an angle of attack and sideslip range to support the training tasks.			✓	✓							An SOC is required. Please refer to AC 15 to FSTD (A) .030 (a)(3).

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
s.3	Applicable only for those FSTDs that are to be qualified for full stall training tasks. The aerodynamic modelling has to support stall-recovery training tasks in the following flight conditions: (a) stall entry at wing level (1g); (b) stall entry into turning flight of at least 25° bank angle (accelerated stall); (c) stall entry into a power-on condition (required only for propeller-driven aeroplanes); and (d) aeroplane configurations of second-segment climb, high- altitude cruise ('near performance limited condition'), and approach or landing.			✓	✓							An SOC is required which describes the aerodynamic-modelling methods, validation, as well and check of the stall characteristics of the FSTD. An additional SOC has also to include a verification that the FSTD has been evaluated by a subject-matter expert pilot acceptable to the competent authority. Please refer AC 15 to FSTD (A) .030. (e) for clarification on the definition of a 'subject-matter expert pilot'. Please refer to AC 15 to FSTD (A) .030.(a)(4) for clarification on the stall modelling. Please refer to AC 15 to FSTD (A) 005 for clarification of the 'near performance limited condition'.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
t.1	Modelling that includes the effects of icing, where appropriate, on the airframe, aerodynamics and the engine(s). Icing-effects simulation models are only required for aeroplanes authorised for operations in icing conditions.			✓	✓							Icing models simulate the aerodynamic degradation effects of ice accretion on the aeroplane lifting surfaces, including (if present on the simulated aeroplane) loss of lift, decrease in stall angle of attack, change in pitching moment, decrease in control effectiveness, and changes in control forces in addition to any overall increase in drag. Aeroplane systems (such as the stall protection system and auto flight system) must respond properly to ice accretion, consistent with the simulated aeroplane. Aeroplane original equipment manufacturer (OEM) data or other acceptable analytical methods must be used to develop ice accretion models. Acceptable analytical methods may include wind tunnel analysis and/or engineering analysis of the aerodynamic effects of icing on the aeroplane lifting surfaces coupled with tuning and supplemental subjective assessment by a subject-matter expert pilot knowledgeable of the effect of ice accretion on the handling qualities of the simulated aeroplane. An SOC is required describing the effects that provide training in the specific skills for recognition of icing phenomena and execution of recovery. The SOC must describe the source data and any analytical methods used to develop ice accretion models, including a verification that these effects have been tested. Please ref: AC 15- to FSTD (A) .030 1.1

t.2	Modelling that includes the effects of icing, where appropriate, on the airframe, aerodynamics and the engine(s). Icing-effects simulation models are only required for those aeroplanes authorised for operations in icing conditions.								✓	✓		An SOC is required describing the effects that provide training in the specific skills for recognition of icing phenomena and execution of recovery.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
b.1	A motion system shall: (1) provide sufficient cueing, which may be of a generic nature to accomplish the required tasks;	✓										Statement of compliance required. Tests required.
	(2) have a minimum of 3 degrees of freedom (pitch, roll & heave); and		✓									
	(3) produce cues at least equivalent to those of a six-degrees-of-freedom synergistic platform motion system.			✓	✓							
c.1	A means of recording the motion response time as required.	✓	✓	✓	✓							