CIVIL AVIATION AUTHORITY, BANGLADESH

AIR NAVIGATION ORDER

ANO (OPS) A-7 (A)

PROCEDURE

FOR

FIGHT SIMULATION TRAINING DEVICES (FSTDs)

CERTIFICATION

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PROCEDURE

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FIGHT SIMULATION TRAINING DEVICES (FSTDs)

CERTIFICATION

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1. INTRODUCTION

1.1 Purpose:

1.1.1 The availability of advanced technology has permitted greater use of flight simulation Training Devices for training and checking of flight crew. The complexity, cost and operating environment of modern aircraft also have warranted broad use of advanced simulation. With the application of advanced technology, FSTDs allow in-depth training that can provide useful transfer of learning and behaviour from the simulator to the aeroplane. It also offers safer flight training, fuel conservation, reduces use of aircraft for training, avoids adverse environmental effects and reduces training cost.

1.1.2 CAAB permits usage of FSTDs for various training purposes of flight crew such as initial licencing, refresher, recurrent, transition, up-grade, category or class rating, etc. which may give credit towards the flight training requirements for issue and renewal of flight crew licenses, endorsements and ratings and also for the training of instructors and examiners. It is, therefore, necessary that the simulators be evaluated and approved prior to its use. It is also essential that the approved FSTDs be maintained to the certification level for which they have been approved.

1.2 Applicability:

1.2.1 This ANO (OPS) A-7(A) shall apply for evaluation, certification, operation and continued qualification of FSTDs operated by an approved training organization (ATO) or air operator, applicable for aeroplanes with maximum weight 5700 kg, limited to ICAO FSTD Type I, II and III, applicable for PPL, CPL, IR, CR and MPL1(Core Flying Skills).

1.2.2 Different categories used by other regulatory bodies like EASA and FAA mentioned in this ANO, may be used in combination to facilitate evaluation and certification process. Because of the complexity of FSTD qualification, it is essential that the operator and the approving authority clearly understand the qualification process.

1.2.3 An ATO or air operator, who wishes to establish FSTD for training purposes and avail the benefit of credit hours:

i) Must submit application letter for initial CAAB evaluation not less than 90 days prior to the requested qualification date;
ii) Must submit QTG not less than 45 days prior to the requested qualification date, unless otherwise agreed by the CAAB;
iii) Complete all required tests and submit report not less than 30 days prior to the requested qualification date, unless otherwise agreed by the CAAB;
iv) CAAB evaluation team should complete initial evaluation and prepare the report including shortfalls, if any, 15 days prior to the requested qualification date;
v) ATOs or air operators must rectify the shortfalls and report to CAAB not less than 7 days prior to the requested qualification date;
vi) CAAB should issue the certificate of qualification by the requested qualification date subject to satisfactory evaluation of the FSTD.

Note 1: Days may be revised at the discretion of CAAB subject to a formal request from the applicant.
Note 2: sample application formats are included in the Attachments.

1.3 Creditable Hours:

Hours as mentioned below may be credited towards the licencing requirements if the training is conducted in an approved FSTD, following an approved syllabus, under the supervision of an approved instructor:

i) PPL: 5 hours
ii) CPL: 5 hours
iii) IR : 30 hours

1.4 Fees:

1.4.1 Initial and renewal Evaluation: Taka 25,000.00 only.

1.4.2 Any other Evaluation: Taka 15,000.00 only.

1.5 Resources and References:

This ANO has been prepared extracting relevant materials mainly from *ICAO Doc 9625: Manual of Criteria for the Qualification of Flight Simulation Training Devices 3rd edition- 2009;* Support materials have been obtained from *14 CFR Part 60; Flight Simulation Training Device – Evaluation, Qualification and Maintenance; EASA FSTD (A): initial issue 2012, Certification Specification for Aeroplane Flight Simulation Training Device and JAR - FSTD A 2008: Aeroplane Flight Simulation Training Devices.* Some assisting information have been obtained from *ICAO Annex 1- Personnel Licencing; Doc 9868, Procedure for Air Navigation Services- Training (PANS-TRG) and Royal Aeronautical Society (RAeS) Publications: Aeroplane Flight Simulator Evaluation Handbook, Vol 1, 3rd Edition, 2005.*

2. CATEGORIES AND DEFINITIONS OF FSTD

FAA, EASA and ICAO define FSTD in different ways. They are:

2.1 FAA:

i) Basic Aviation Training Device (BATD):

a) A device that meets or exceeds the criteria outlined in Appendix 2 of FAA Advisory Circular, AC 61-136 (BATD Requirements);

b) Provides a training platform for at least the procedural aspects of flight relating to an integrated ground and flight instrument training curriculum,

ii) Advanced Aviation Training Device (AATD):

a) A device that meets or exceeds the criteria outlined in Appendix 3 of FAA Advisory Circular, AC 61-136 (AATD Requirements);

b) Provides a training platform for both procedural and operational performance tasks related to ground and flight training towards private pilot, commercial pilot, and airline transport pilot certificates, a flight instructor certificate, and instrument rating per title 14 of the Code of Federal Regulations (14 CFR) parts 61 and 141.

2.2 EASA:

i) Full Flight Simulator (FFS):

A full size replica of a specific type or make, model and series aeroplane flight deck, including the assemblage of equipment and computer program necessary to represent the aeroplane in ground and flight conditions, a visual system providing an out of flight deck view and a force cueing motion system. It is in compliance with the minimum standards for FFS level of Qualification.

ii) Flight Training Device (FTD):

A full size replica of a specific aeroplane type's instruments, equipment panels and controls in an open flight deck area or enclosed aeroplane flight deck, including the assemblage of equipment and computer software programmes necessary to represent the aeroplane 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.

iii) Flight and Navigation Procedures Trainer (FNPT):

A training device which represents the flight deck or cockpit environment including the assemblage of equipment and computer programmes necessary to represent an aeroplane or class of aeroplane in flight conditions to the extent that the systems appear to function as in an aeroplane. It is in compliance with the minimum standards for a specific FNPT Level of Qualification.

iv) Basic Instrument Training Device (BITD):

A ground based training device which represent student pilot‘s station of a class of aeroplanes. 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.

v) **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.

2.3 ICAO: (Based on Licence or Type of Training):

i) **ICAO FSTD Type I:**
- a) Private Pilot License (PPL)
- b) Multi-crew Pilot License 1 (MPL1) - Core Flying Skills
- c) Commercial Pilot License (CPL)

ii) **ICAO FSTD Type II:**
Instrument Rating (IR)

iii) **ICAO FSTD Type III :**
Class Rating (CR)

iv) **ICAO FSTD Type IV :**
Multi-crew Pilot License 2 (MPL 2) – Basic

v) **ICAO FSTD Type V :**
- a) Type Rating (TR)
- b) Airline Transport Pilot License (ATPL)
- c) Recurrent License Training and Checking (RL)
- d) Recurrent Operator Training and Checking (RO)
- e) Initial Operator Training and Checking (IO)

vi) **ICAO FSTD Type VI :**
Multi-crew Pilot License 3 (MPL 3) – Intermediate

vii) **ICAO FSTD Type VII:**
- a) Multi-crew Pilot License 4 (MPL 4) – Advanced
- b) Type Rating (TR)
- c) Airline Transport Pilot License (ATPL)
- d) Take Off and Landing Recency (Re)
- e) Recurrent License Training and Checking (RL)
- f) Recurrent Operator Training and Checking (RO)
- g) Initial Operator Training and Checking (IO)
- h) Continuing Qualification (CQ)

3. GLOSSARIES, ABBREVIATIONS, LICENCES AND RATINGS

3.1 Glossary of Terms:

The terms used in this ANO have the following meanings:

Aeroplane Performance Data — 'Aircraft performance data' are performance data published by the aircraft manufacturer in documents such as the aircraft flight manual (AFM), operations manual, performance engineering manual, or equivalent.

Approved Data — Aircraft data collected by application of good engineering practice and accepted for use by the NAA. The preferred data sources are the aircraft manufacturers and/or original equipment manufacturers, however data supplied by other qualified sources may be considered.

Approved Training Organization (ATO) — An aviation training organization formally approved by CAAB to impart training to aviation personnel.

Approved Use — The ability to complete the training, testing or checking tasks as prescribed in this document.

Audited Engineering Simulation — An aircraft manufacturer's engineering simulation that has undergone a review by the appropriate competent authorities and been found to be an acceptable source of supplemental validation data.

Automatic Testing — FSTD testing wherein all stimuli are under computer control.

Basic Operating Weight (BOW) — The empty weight of the aircraft plus the weight of the following: Normal oil quantity; lavatory servicing fluid; potable water; required crewmembers and their baggage; and emergency equipment.

Checking or Testing (Pilot Proficiency) — The comparison of the knowledge about a task, or the skill or ability to perform a task, against an established set of criteria to determine that the knowledge, skill, or ability observed meets, or exceeds, or does not meet those criteria.
Note. – The use of the words testing or checking depends on the NAA's preference, as they are very similar in meaning, and may be dependent on the outcome of the event, e.g. a step towards a license issuance, a recurrent evaluation of competency, etc.

Closed Loop Testing — A test method for which the input stimuli are generated by controllers which drive the FSTD to follow a pre-defined target response.

Control Sweep — A movement of the appropriate pilot's control from neutral to an extreme limit in one direction (forward, aft, right, or left), a continuous movement back through neutral to the opposite extreme position, and then a return to the neutral position.

Critical Engine Parameter — Engine parameter that is the most appropriate measure of propulsive force.

Damping (critical) — Critical damping means that minimum damping of a second order system such that no overshoot occurs in reaching a steady state value after being displaced from a position of equilibrium and released. This corresponds to a relative damping ratio of 1:0.

Damping (over-damped) — An over-damped response is that damping of a second order system such that it has more damping than is required for critical damping, as described above. This corresponds to a relative damping ratio of more than 1:0. .

Damping (under-damped) — An under-damped response is that damping of a second order system such that a displacement from the equilibrium position and free release results in one or more overshoots or oscillations before reaching a steady state value. This corresponds to a relative damping ratio of less than 1:0.

Engineering Simulation — An integrated set of mathematical models representing a specific aircraft configuration, which is typically used by the aircraft manufacturer for a wide range of engineering analysis tasks including engineering design, development and certification. It is also used to generate data for checkout, proof-of-match/validation and other training FSTD data documents.

Engineering Simulator — An aircraft manufacturer's simulator, which typically includes a full-scale representation of the simulated aircraft flight deck, operates in real-time and can be flown by a pilot to subjectively evaluate the simulation. It contains the engineering simulation models, which are also released by the aircraft manufacturer to the industry for FSTDs. The engineering simulator may or may not include actual on-board system hardware in lieu of software models.

Engineering Simulator Data — A data generated by an engineering simulation or engineering simulator, depending on the aircraft manufacturer's processes.

Engineering Simulator Validation Data — A validation data generated by an engineering simulation or engineering simulator.

Evaluation (FSTD) — The careful appraisal of an FSTD by the CAAB to ascertain whether or not the criteria required for a specified qualification levels are met.

Fidelity Level — The level of realism assigned to each of the defined FSTD features.

Flight Simulation Training Device (FSTD) — A synthetic training device which is in compliance with the minimum standards for FSTD qualification as described in this ANO.

FSTD Approval — Declaration of the extent to which an FSTD of a specified qualification level may be used by an operator or training organization as agreed by the CAAB. It takes account of differences between aeroplanes and FSTDs and the operating and training ability of the organization.

FSTD Data — The various types of data used by the FSTD manufacturer and the applicant to design, manufacture, test and maintain the FSTD.

FSTD Operator — The person, organization or enterprise directly responsible to the NAA for requesting and maintaining the qualification of a particular FSTD.

Flight Test Data — Actual aeroplane data obtained by the aeroplane manufacturer (or other approved supplier of data) during an aeroplane flight test programme.

FSTD Feature — Describes the characteristics of an FSTD for each of the **12** categories that have been used in this ANO for the definition of the general and technical requirements for FSTDs. (Ref 4.2).

Frozen/Locked — A state where a variable is held constant with time.

Full Sweep — Movement of the controller from neutral to a stop, usually the aft or right stop, to the opposite stop and then to the neutral position.

Generic (G) — It defines the lowest level of required fidelity for a given FSTD feature.

Near Maximum Gross Weight — A weight chosen by the sponsor or data provider that is not less than the BOW of the aircraft being simulated plus 80% of the difference between the maximum certificated gross weight (either takeoff weight or landing weight, as appropriate for the test) and the BOW.

Hands-Off Manoeuvre — A test manoeuvre conducted or completed without pilot control inputs.

Hands-On Manoeuvre — A test manoeuvre conducted or completed with pilot control inputs as required.

Highlight Brightness — Maximum displayed brightness that satisfies the appropriate brightness test.

Integrated Testing — Testing of the FSTD such that all aeroplane system models are active and contribute appropriately to the results. None of the aeroplane system models should be substituted with models or other algorithms intended for testing purposes only. This should be accomplished by using controller displacements as the input. These controllers should represent the displacement of the pilot's controls and should have been calibrated.

Irreversible Control System — A control system in which movement of the control surface will not back drive the pilot's control on the flight deck.

Line Oriented Flight Training (LOFT) — Refers to flight crew training which involves full mission simulation of situations which are representative of line operations, with special emphasis on situations which involve communications, management and leadership. It means 'real-time', full-mission training.

Light Gross Weight — A weight chosen by the sponsor or data provider that is not more than 120% of the BOW of the aircraft being simulated or the minimum practical operating weight of the test aircraft. (Part-60)

Manual Testing — FSTD testing where the pilot conducts the test without computer inputs except for initial setup. All modules of the simulation should be active.

Master Qualification Test Guide (MQTG) — The CAAB approved test guide that incorporates the results of tests acceptable to the authorities at the initial qualification. The MQTG, as amended, serves as the reference for future evaluations. MQTG may have to be re-established if any approved changes occur to the device, but should still be compliant with approved data.

Medium Gross Weight — A weight chosen by the sponsor or data provider that is within 10% of the average of the numerical values of the BOW and the maximum certificated gross weight. (Part-60)

Near Maximum Gross Weight — A weight chosen by the sponsor or data provider that is not less than the BOW of the aircraft being simulated plus 80% of the difference between the maximum certificated gross weight (either takeoff weight or landing weight, as appropriate for the test) and the BOW. (Part-60)

Nominal — Normal operational weight, configuration, speed etc. for the flight segment specified.

Non-Normal Control — Term used in reference to computer controlled aircraft. Non-normal control is the state where one or more of the intended control, augmentation or protection functions are not fully available.
NOTE: Specific terms such as ALTERNATE, DIRECT, SECONDARY, BACKUP, etc., may be used to define an actual level of degradation.

None (N) — Feature is not required.

Not Applicable (N/A) — Task that was not considered as being applicable to that part of the license type or rating.

***Objective Test* —** A quantitative assessment based on comparison to objective data.

Predicted Data — Means data derived from sources other than type-specific aircraft flight tests.

Primary Reference Document — Any regulatory document which has been used by a competent authority to support the initial evaluation of an FSTD.

Pulse Input — An abrupt input to a control followed by an immediate return to the initial position.

Qualification Test Guide (QTG) — The primary reference document used for the evaluation of an FSTD. It contains test results, statements of compliance (SOC) and other prescribed information to enable the evaluator to assess if the FSTD meets the test criteria described in this ANO.

Representative (R) — It defines the intermediate level of required fidelity for a given FSTD feature.

Reversible Control System — A partially powered or unpowered control system in which movement of the control surface will back drive the pilot's control on the flight deck and/or affect its feel characteristics.

Snapshot — A presentation of one or more variables at a given instant of time.

Specific (S) — It defines the highest level of required fidelity for a given FSTD feature.

Statement of Compliance (SOC) — Declaration that specific requirements have been met.

Step Input — An abrupt input held at a constant value.

Subjective Test — A qualitative assessment based on established standards as interpreted by a suitably qualified person.

Train — The introduction of a specific training task. The training accomplished may be credited towards the issuance of a license, rating, or qualification, but the training would not be completed to proficiency. The fidelity level of one or more of the simulation features may not support training-to-proficiency.
Note. – In the context of this definition, the word train *can be replaced by* training.

Train-to-Proficiency — The introduction, continuation, or completion of a specific training task. The training accomplished may be credited towards proficiency and/or the issuance of a license, rating, or qualification, and the training is completed to proficiency. The fidelity level of all simulation features supports training-to-proficiency.
Note. – In the context of this definition, the words train-to-proficiency can be replaced by training to proficiency.

Transport delay — Total FSTD system processing time required for an input signal from a pilot primary flight control until the motion system, visual system, or instrument response. It is the overall time delay incurred from signal input until output response. It does not include the characteristic delay of the aircraft simulated.

Update. — The improvement or enhancement of an FSTD where it retains its existing qualification level.

Upgrade. — The improvement or enhancement of an FSTD for the purpose of achieving a higher qualification level.

Validation Data — Data used to prove that the FSTD performance corresponds to that of the aeroplane.

Validation Flight Test Data — Performance, stability and control, and other necessary test parameters electrically or electronically recorded in an aeroplane using a calibrated data acquisition system of sufficient resolution and verified as accurate to establish a reference set of relevant parameters to which like parameters of the FSTD can be compared.

Validation Test — A test by which FSTD parameters can be compared to the relevant validation data.

Visual Ground Segment Test — A test designed to assess items impacting the accuracy of the visual scene presented to the pilot at a decision height (DH) on an instrument landing system (ILS) approach.

3.2 Abbreviations:

The abbreviations used in this ANO have the following meanings:

A	Aeroplane
AC	Advisory Circular
A/C	Aircraft
ADF	Automatic Direction Finder
AFCS	Automatic Flight Control System
AFM	Aircraft Flight Manual
AOA	Angle Of Attack
ATA	Air Transport Association
ATC	Air Traffic Control
ATO	Approved Training Organization
ATPL	Airline Transport Pilot License
BC	(ILS Localizer) Back Course
CAP	Civil Aviation Publication
CAT I/II/III	ILS Landing Category
CCA	Computer Controlled Aeroplanes
CFR	Code of Federal Regulations
CFIT	Controlled Flight Into Terrain
CG	Centre of Gravity
CPL	Commercial Pilot Licence
CQ	Continuing Qualification
CR	Class Rating
CT&M	Correct Trend and Magnitude
db	Decibel

DH	Decision Height
DME	Distance Measuring Equipment
EASA	European Aviation Safety Agency
EFIS	Electronic Flight Instrument System
EFVS	Enhanced Flight Vision System
EGPWS	Enhanced Ground Proximity Warning System
QTG	Qualification Test Guide
ETOPS	Extended Operations

Note. – ETOPS, recently redefined as extended operations that involve extended diversion time operations, refers in this manual specifically to extended diversion time operations by aeroplanes with two turbine engines.

FAA	United States Federal Aviation Administration
FAF	Final Approach Fix
FAR	Federal Aviation Regulations
FCL	Flight Crew Licensing
FCOM	Flight Crew Operating Manual
FD	Flight Director
FPCCM	Flight Planning and Cruise Control Manual
FSTD	Flight Simulation Training Device
G	Generic
g	Acceleration due to Gravity (m or ft/s^2 , 1g = 9.81 m/s^2 or 32.2 ft/s^2)
GPS	Global Positioning System
GS	Glide Slope
H	Helicopter
HGS	Head-up Guidance System
HUD	Head-Up Display
IAF	Initial Approach Fix
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICFQ	International Committee for FSTD Qualification
ILS	Instrument Landing System
IMC	Instrument Meteorological Condition
IO	Initial Operator training and checking
IOS	Instructor Operating Station
IR	Initial Instrument Rating
IWG	International Working Group
JAA	European Joint Aviation Authorities
JAR	Joint Aviation Regulations
MLS	Microwave Landing System
MPL	Multi-crew Pilot License
MQTG	Master Qualification Test Guide
NA	Not Applicable
NAA	National Aviation Authority
NDB	Non-Directional Beacon
PANS	Procedures for Air Navigation Services
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
POM	Proof of Match
PPL	Private Pilot License
QRH	Quick Reference Handbook
QTG	Qualification Test Guide
RAeS	Royal Aeronautical Society
Re	Take Off and Landing Recency
RL	Recurrent License Training and Checking
RNAV	Area Navigation

RO	Recurrent Operator Training and Checking
RVR	Runway Visual Range
SARPS	Standards and Recommended Practices
SOC	Statement of Compliance
T	Train(ing)
TAWS	Terrain Awareness Warning System
TCAS	Traffic Collision Avoidance System
TP	Train(ing)-to-Proficiency
TR	Type Rating training and checking
TRG	Training
VASI	Visual Approach Slope Indicator
VDR	Validation Data Roadmap
VFR	Visual Flight Rule
VHF	Very High Frequency
Vmca	Velocity Minimum Control Air
Vmcg	Velocity Minimum Control Ground
Vmcl	Velocity Minimum Control Landing
VOR	Very High Frequency Omni Directional Radio Range
V_1	Take- Off Critical Decision Speed
Vr	Take- Off Rotation Speed
Vs	Velocity Stall
Vy	Optimum Climb Speed

3.3 Licences, Ratings and Training:

3.3.1 The **15** types pilot licencing, rating and qualification training necessary that might utilize some level of FSTD were identified as follows from a review of existing regulatory materials:

3.3.2 **Licences**:

i)	PPL	Private Pilot License;
ii)	CPL	Commercial Pilot License;
iii)	ATPL	Airline Transport Pilot License;
iv)	MPL1	Multi-crew Pilot License – Phase 1, Core flying skills;
v)	MPL2	Multi-crew Pilot License – Phase 2, Basic;
vi)	MPL3	Multi-crew Pilot License – Phase 3, Intermediate;
vii)	MPL4	Multi-crew Pilot License – Phase 4, Advanced.

3.3.3 **Ratings**:

i)	CR	Class Rating (for a/c certified to operate by single pilot);
ii)	TR	Type Rating (for a/c certified to operate by more than one pilot);
iii)	IR	Instrument Rating;

3.3.4 **Training**:

i)	RL	Recurrent License (Proficiency) Training and Checking;
ii)	RO	Recurrent Operator (Proficiency) Training and Checking;
iii)	Re	Recency (Take-off and Landing);
iv)	CQ	Continuing Qualification; and
v)	IO	Initial Operator Training and Checking;

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4. TRAINING TASKS, FEATURES, FIDELITY LEVELS AND FSTD QUALIFICATION CRITERIA ROAD MAP

4.1 FSTD Training Task:

4.1.1 The following definitions extracted from PANS-TRG were used in the construction of the training matrix:

i) ***Competency*** — A combination of skills, knowledge and attitudes required to perform a task to the prescribed standard.

ii) ***Competency-based training and assessment*** — Training and assessment that are characterized by a performance orientation, emphasis on standards of performance and their measurement, and the development of training to the specific performance standards.

iii) ***Competency element*** — An action that constitutes a task that has a triggering event and a terminating event that clearly defines its limits, and an observable outcome.

4.1.2 **The training tasks** considered, include all those that are required to be trained for each of the licences, ratings or for qualification training listed in 3.3 and appropriate for the types of FSTD applicable for the ANO.

4.1.3 There are several **training tasks** from the beginning down to the competency level assembled from PANS-TRG and FAA part 60 are listed below and the table is shown in Table A-I:

i) Perform pre-take-off and pre-departure preparation;
ii) Perform take-off roll;
iii) Perform transition to instrument flight rules;
iv) Perform initial climb to flap retraction altitude;
v) Perform climb, cruise, descent, approach and landing;
vi) Perform rejected take-off;
vii) Perform navigation;
viii) Manage abnormal and emergency situations.

4.2 FSTD Simulation Features:

4.2.1 **Twelve (12)** FSTD features are defined from a training perspective that used together and with an additional "Miscellaneous" feature, create an FSTD as follows:

i) Cockpit layout and structure;
ii) Flight model (aero and engine);
iii) Ground handling;
iv) Aircraft systems;
v) Flight controls and forces;
vi) Sound cue;
vii) Visual cue;
viii) Motion cue;
ix) Environment – ATC;
x) Environment – Navigation;
xi) Environment – Weather:

xii) Environment – Aerodromes and terrain: and

xiii) Miscellaneous:
a) instructor station;
b) self-diagnostic testing;
c) computer capacity;
d) automatic testing;
e) updates to hardware and software;
f) daily pre-flight; and
g) system integration (transport delay)

4.3 Fidelity Levels:

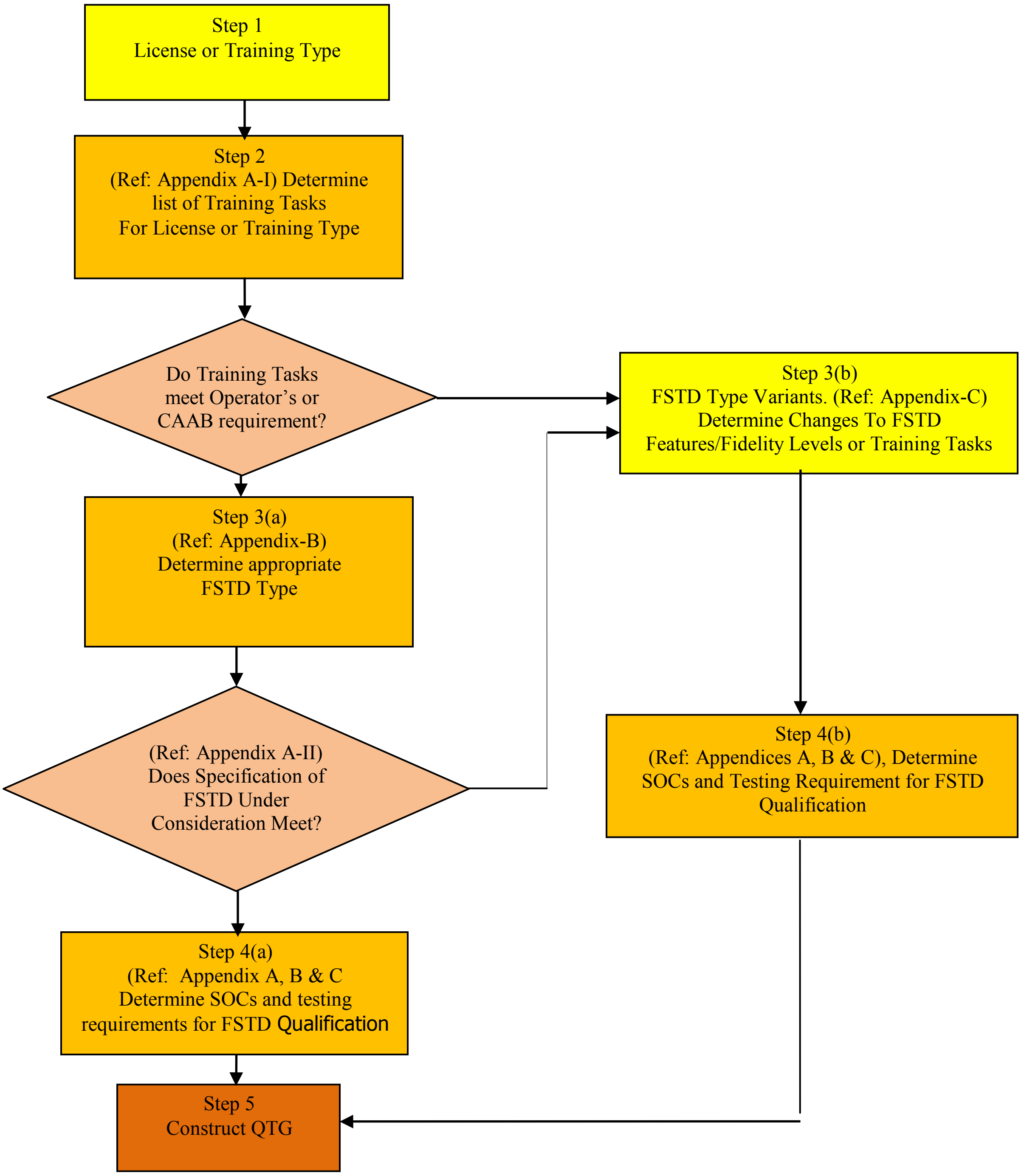
4.3.1 **Four (4)** fidelity levels, i.e. **None, Generic, Representative** and **Specific,** were used in the analysis in deciding for each training task the minimum level of fidelity required for each simulation feature, except for the "Miscellaneous" feature. These are grouped into three categories as shown in the table below:

	Aircraft simulation	Cueing simulation	Environment simulation
None	Not required	Not required	Not required
Generic	Not specific to aeroplane model, type or variant.	Generic to an aeroplane of its class. Simple modeling of key basic cueing features. For *visual cueing only*: Generic visual environment with perspective sufficient to support basic instrument flying and transition to visual from straight in instrument approaches.	Simple modeling of key basic environment features.
Representative	Representative of an aeroplane of its class, e.g. four engine turbo-fan aeroplane. It does not have to be type specific.	For *sound and motion cueing only*: Replicates the specific aeroplane to the maximum extent possible. However, physical limitations currently only provide representative, not specific cues. For *visual cueing only*: Representative of the real world visual environment and perspective.	Representative of the real world environment.
Specific	Replicates the specific aeroplane.	Applicable to *visual cueing only*: replicates the real world visual environment and (infinity) perspective.	Replicates the real world environment as far as possible for any specific location.

4.3.1 Table showing Fidelity levels for each feature category

4.4 FSTD Qualification Criteria Process Road Map:

4.4.1 Figure below provides a step-by-step road map to determine the fidelity levels and qualification criteria for the simulation features according to training task considerations. This enables the construction of a specific FSTD Qualification Test Guide (QTG).



4.4.1 FSTD Qualification Criteria Process Road Map

4.4.2 QTG Qualification Criteria Process Road Map Steps

4.4.2.1 **Step 1**

License, Rating or qualification Training Type:
The operator identifies the intended use of the FSTD with reference to the pilot's licences, ratings or qualification training types listed in 3.3 and level of training tasks or checking as defined in 4.1.3 and Table A-I.

4.4.2.2 **Step 2**

(Ref: Appendix A- I):
Determine list of training tasks for license, ratings or qualification training type. Confirm that the training tasks listed in Appendix A-I for training tasks for license, ratings or qualifications fulfill the Operator's and CAAB requirements.

If yes: if yes, proceed to

4.4.2.3 **Step 3(a)**

Determine the appropriate FSTD Type, (Ref: 3.3);

Then:

(Ref: Table A-II):
Does specification of FSTD under consideration meet selected FSTD type general requirements?

If Yes:

4.4.2.4 **Step 4(a)**

(Ref: Appendices A, B & C):
Determine SOCs and testing requirements for FSTD qualification.

4.4.2.5 **Step 5**

Construct QTG

4.4.2.6 **Decision**

Does the FSTD under consideration meet the selected FSTD type? (Ref 3.3)

If the answer is NO in any of the questions, go to the previous block and rectify the shortfalls, and then proceed normal.

5. TRAINING TASK vs. LICENCE, RATING OR QUALIFICATION TRAINING MATRIX

5.1 Introduction

5.1.1 The matrix below is derived from the Master Matrix and corresponds to 3.3 and 4.4.1 FSTD QTG.

5.1.2 Specification Criteria Process Road Map, Step 2; It allocates the tasks considered appropriate for each of the licencing, rating or qualification training defined in 3.3 for which use of an appropriately qualified FSTD is suitable.

5.1.3 ICAO references are generally used in most of the charts and tables in this ANO. However, other references have also been used where those were found to be simpler and more users friendly. In this case FAA references have been used.

5.2 TABLE A-I

Training Task vs. Licence, Rating or Qualification Training Matrix

Ref	UNIT / Element/Task	IR	PPL	CPL	CR
FAA 2.0	Pre-flight Procedures				
FAA 2.2	Flight deck inspection.	T	T	T	T
FAA 2.5	Navigation system setup.	T	T	T	N/A
FAA 3.0	Ground Operations				
FAA 3.1.1	Engine start - Normal.	N/A	T	T	N/A
FAA 3.3	Taxi.	N/A	T	T	T
FAA 3.4	Pre-take-off procedures.	N/A	T	T	T
FAA 3.5	After Landing.	T	T	T	T
FAA 3.6	Parking and securing.	N/A	T	T	T
FAA 4.0	Take-off				
FAA 4.1	Normal and crosswind – all engines operating.	N/A	T	T	T
FAA 4.2	Instrument with lowest authorized RVR.	T	N/A	N/A	N/A
FAA 4.3.1	With engine failure - between V1 and Vr	N/A	N/A	N/A	T
FAA 4.3.2	With engine failure - between Vr and 500 ft. above field elevation.	N/A	T	T	T
FAA 4.5	Short-field take-off and maximum performance climb.	N/A	T	T	T
FAA 5.0	Performance Manoeuvres				
FAA 5.1	Steep turns.	N/A	T	T	T
FAA 5.2	Steep spiral.	N/A	T	T	N/A
FAA 5.3	Chandelles.	N/A	N/A	T	N/A
FAA 5.4	Lazy eights.	N/A	N/A	T	N/A
FAA 6.0	Ground Reference Manoeuvres				
FAA 6.1	Eights on Pylons.	N/A	N/A	T	N/A
FAA 6.2	Turns about a point.	N/A	T	N/A	N/A
FAA 6.3	“S-Turns” across a road or section line.	N/A	T	N/A	N/A

Ref	UNIT / Element/Task	IR	PPL	CPL	CR
FAA 7.0	Departure, Climb, Cruise, Descent, and Arrival.				
FAA 7.1	Instrument departure.	T	N/A	N/A	N/A
FAA 7.2	Climb.	T	T	T	T
FAA 7.3	One-engine inoperative, en-route.	T	N/A	T	N/A
FAA 7.4	En-route navigation.	T	T	T	N/A
FAA 7.5	Descent.	T	T	T	T
FAA 7.6	Instrument arrival.	T	N/A	N/A	N/A
FAA 7.7	Holding.	T	N/A	N/A	N/A
FAA 7.8	Intercepting and tracking nav. system and DME arcs.	T	N/A	N/A	N/A
FAA 7.9	Aircraft control by reference to instruments.	T	T	T	N/A
FAA 7.10	Approach transition.	T	N/A	N/A	N/A
FAA 8.0	Aircraft Handling.				
FAA 8.1.1	Stalls - Recovery from: power-off stalls.	N/A	T	T	T
FAA 8.1.2.1	Recognition/recovery from, approach to stall: clean configuration	N/A	T	T	T
FAA 8.1.2.2	Recognition/recovery from, approach to stall: take-off and manoeuvring configuration	N/A	T	T	T
FAA 8.1.2.3	Recognition/recovery from, approach to stall: landing configuration	N/A	T	T	T
FAA 8.1.2.4	Recognition/recovery from, approach to stall: landing configuration with A/P engaged	N/A	N/A	N/A	N/A
FAA 8.2.1	Asymmetric thrust: engine shutdown.	N/A	N/A	T	T
FAA 8.2.2	Asymmetric thrust: Manoeuvring with one engine inoperative.	N/A	N/A	T	T
FAA 8.2.3	Asymmetric thrust: engine restart.	N/A	N/A	T	T
FAA 8.5	Upset recognition and recovery.	T	N/A	N/A	N/A
FAA 8.6	Slow flight.	N/A	T	T	N/A
FAA 9.0	Instrument Approaches				
FAA 9.1	All engines operating - autopilot coupled.	T	N/A	N/A	N/A
FAA 9.2	All engines operating – manually flown.	T	N/A	N/A	N/A
FAA 9.3	One engine inoperative – manually flown.	T	N/A	N/A	N/A
FAA 9.4.1	Approach type: category II and III.	T	N/A	N/A	N/A
FAA 9.4.2	Approach type: precision groups.	T	N/A	N/A	N/A
FAA 9.4.3	Approach type: non-precision groups.	T	N/A	N/A	N/A
FAA 9.4.4	Approach type: ground based radar approach.	T	N/A	N/A	N/A
FAA 10.0	Visual Approach				
FAA 10.1	All engines operating (normal).	N/A	T	T	T
FAA 10.2	One engine inoperative.	N/A	N/A	T	T
FAA 11.0	Missed Approach				
FAA 11.1	All engines operating.	T	N/A	N/A	T
FAA 11.2	One engine inoperative.	T	N/A	N/A	T
FAA 11.3	From a circling approach when authorized.	T	N/A	N/A	N/A

FAA 12.0	Landing				
FAA 12.1	All engines operating.	N/A	T	T	T
FAA 12.2	Crosswind.	N/A	T	T	T
FAA 12.3.1	With engine failure: one engine inoperative.	N/A	N/A	T	T
FAA 12.4.1	Landing transition: from a precision approach.	T	N/A	N/A	N/A
Ref	**UNIT / Element/Task**	**IR**	**PPL**	**CPL**	**CR**
FAA 12.4.2	Landing transition: from a non-precision approach.	T	N/A	N/A	N/A
FAA 12.4.3	Landing transition: from a visual approach.	T	T	T	N/A
FAA 12.4.4	Landing transition: from a circling approach.	T	N/A	N/A	N/A
FAA 12.5	Rejected landing.	T	T	T	T
FAA 12.6	Zero or partial flaps.	N/A	T	T	T
FAA 12.10	Landing from a short-field approach.	N/A	T	T	T
FAA 12.11	Accuracy landing.	N/A	N/A	T	N/A
FAA 13.0	Abnormal Procedures				
FAA 13.1	Un-annunciated.	N/A	T	T	N/A
FAA 14.0	Emergency Procedures				
FAA 14.1	Fire / smoke in aircraft.	N/A	T	T	N/A
FAA 14.2	Un-annunciated fire in flight.	N/A	T	T	N/A
FAA 14.4	Emergency descent (maximum rate).	N/A	T	T	N/A
FAA 14.7	Engine fire, severe damage, or separation.	N/A	T	T	N/A
FAA 14.9	Pilot incapacitation.	N/A	T	T	N/A

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6. FSTD REQUIREMENTS

(Applicable for *Type I*: PPL, CPL, MPL1; *Type II*: IR; *Type III*: CR; only)

6.1 Introduction

6.1.1 These minimum flight simulator training device (FSTD) requirements are for qualifying a device to the agreed international Types, as defined in 2 and 3.3. The validation, functions and subjective tests listed in Tables B and C of this ANO as applicable should also be consulted when determining the requirements for qualification. Certain requirements included in these tables should be supported with a statement of compliance (SOC) and, in some designated cases, an objective test. The SOC should describe how the requirement was met.

6.1.2 ICAO standard format has been used in this tables including reference number on the left column and only applicable items required for the types of FSTDs are included. Statement of compliance is indicated in the comment column.

6.2 TABLE A-II

FSTD REQUIREMENTS

(Applicable for *Type I*: PPL, CPL, MPL1; *Type II*: IR; *Type III*: CR; only)

GENERAL REQUIREMENT					
1.	**FLIGHT DECK LAYOUT & STRUCTURE**	**Type I**	**Type II**	**Type III**	**COMMENTS**
1.R	An enclosed or perceived to be enclosed cockpit/flight deck, excluding distraction, which will represent that of the aeroplane derived from, and appropriate to class, to support the approved use.	√		√	
1.G	An open, enclosed or perceived to be enclosed, cockpit/flight deck, excluding distraction, which will represent that of the aeroplane derived from, and appropriate to class, to support the approved use.		√		

TECHNICAL REQUIREMENT					
1.1	**COCKPIT/FLIGHT DECK STRUCTURE**	**Type I**	**Type II**	**Type III**	**COMMENTS**
1.1.R	An enclosed, or perceived to be enclosed, spatially representative cockpit/flight deck of the aeroplane or class of aeroplanes being simulated including representative: primary and secondary flight controls; engine and propeller controls as applicable; systems and controls; circuit breakers; flight instruments; navigation and communications equipment; and caution and warning systems. The technique, effort, travel and direction required to manipulate the proceedings, as applicable, should be representative of those in the aeroplane or class of aeroplanes. *Note 1. – The cockpit/flight deck enclosure need only be representative of that in the aeroplane or those in the class of aeroplanes being simulated and should include windows.* *Note 2. – The enclosure need only extend to the aft end of the cockpit/flight deck.*	√ *		√	FSTD instruments and/or instrument panels using electronically displayed images with physical overlay or masking and operable controls representative of those in the aeroplane are acceptable. The instruments displayed should be free of quantization (stepping). A representative circuit breaker panel(s) should be presented (photographic reproductions are acceptable) and located in a spatially representative location(s). Only those circuit breakers used in a normal, abnormal or emergency procedure need to be simulated, in a class representative form, and be functionally accurate. With the requirement for only a spatially representative cockpit/flight deck, the physical dimensions of the enclosure may be acceptable to simulate more than one aeroplane or class of aeroplanes in a convertible FSTD. Each FSTD conversion should be representative of the aeroplane or class of aeroplanes being simulated which may require some controls, instruments, panels, masking, etc. to be changed for some conversions. * If the FSTD is used for VFR training, it should be a representation of the aeroplane or class of aeroplanes comparable to the actual aeroplane used for flight training.

1.2	SEATING	Type I	Type II	Type III	COMMENTS
1.1.G	An open, enclosed or perceived to be enclosed cockpit/flight deck area with aeroplane-like primary and secondary flight controls; engine and propeller controls as applicable; equipment; systems; instruments; and associated controls, assembled in a spatial manner to resemble that of the aeroplane or class of aeroplanes being simulated. The flight instrument panel(s) position and crewmember seats should provide the crewmember(s) with a representative posture at the controls and a representative design eye position. *Note. – If the FSTD is used for any VFR training credit, it should be fitted with a representation of a glare shield that provides the crewmember(s) with a representative design eye position comparable to that of the actual aeroplane used for training.*		√		The assembled components should be compatible and function in a cohesive manner. FSTD instruments and/or instrument panels using electronically displayed images with or without physical overlay or masking are acceptable. Operable controls should be incorporated if pilot input is required during training events. The instruments displayed should be free of quantization (stepping). Only those circuit breakers used in a normal, abnormal or emergency procedure need to be presented, simulated in an aeroplane-like form, and be functionally accurate. *Note. – Aeroplane-like controls, instruments and equipment means as for the aeroplane or class of aeroplanes being simulated. If the FSTD is convertible, some may have to be changed for some conversions.*
1.2.1.R	Flight crewmember seats should represent those in the aeroplane being simulated.	√		√	
1.2.1G	Crewmember seats should provide the crewmember(s) with a representative design eye position and have sufficient adjustment to allow the occupant to achieve proper posture at the controls as appropriate for the aeroplane or class of aeroplanes.		√		
1.2.2.R	In addition to the flight crewmember seats, there should be an instructor station seat and two suitable seats for an observer and an authority inspector.	√		√	

1.2.2G	In addition to the flight crewmember seats, there should be an instructor station seat and two suitable seats for an observer and an authority inspector		√		
1.3	**COCKPIT/FLIGHT DECK LIGHTING**	**Type I**	**Type II**	**Type III**	**COMMENTS**
1.3.R.G	Lighting environment for panels and instruments should be sufficient for the operations being conducted.	√	√	√	
2	**Flight Model**				
2.R.	Aerodynamic and engine modeling, aeroplane-like, derived from and appropriate to class to support the approved use. Flight dynamics model that accounts for various combinations of drag and thrust normally encountered in flight corresponding to actual flight conditions, including the effect of change in aeroplane attitude, sideslip, thrust, drag, altitude, temperature.	√		√	
2.G	Aerodynamic and engine modeling, aeroplane-like, to support the approved use. Flight dynamics model that accounts for various combinations of drag and thrust normally encountered in flight corresponding to actual flight conditions, including the effect of change in aeroplane attitude, sideslip, thrust, drag, altitude, temperature.		√		
2.1	**Flight Dynamics Model**				
2.1.R	Flight dynamics model that accounts for various combinations of drag and thrust normally encountered in flight, including the effect of change in aeroplane attitude, sideslip, thrust, drag, altitude, temperature, gross weight, moments of inertia, centre of gravity location, and configuration.	√		√	

	Flight Dynamics Model	**Type I**	**Type II**	**Type III**	**COMMENTS**
2.1.G	Modeling, aeroplane-like, not specific to class, model, type or variant. Flight dynamics model that accounts for various combinations of drag and thrust normally encountered in flight and supported by aeroplane generic data, including the effect of change in aeroplane attitude, sideslip, thrust, drag, altitude, temperature, gross weight, moments of inertia, centre of gravity location, and configuration.		√		
3	**Ground Reaction and Handling Characteristics**				
3.R	Represents ground reaction and handling, aeroplane-like, derived from and appropriate to class.	√		√	
3.G	Represents ground reaction, aeroplane-like, derived from and appropriate to class. Simple aeroplane like ground reactions, appropriate to the aeroplane mass and geometry.		√		
3.1.R	Representative aeroplane ground handling simulation to include: (1) Ground reaction. Reaction of the aeroplane upon contact withthe runway during take-off, landing and ground operations to include strut deflections, tyre friction, side forces and other appropriate data, such as weight and speed, necessary to identify the flight condition and configuration; and (2)Ground handling characteristics. Steering inputs to include crosswind, braking, thrust reversing, deceleration and turning radius.	√		√	*Note: SOC required. Tests required.*
3.1.G	Generic ground reaction and ground handling models to enable touchdown effects to be reflected by the sound and visual systems.		√		

3.2	RUNWAY CONDITIONS	Type I	Type II	Type III	COMMENTS
3.2.R	Stopping and directional control forces should be representative for at least the following runway conditions based on aeroplane related data: (1) dry; and (2) wet.	√		√	
3.2.G	Stopping and directional control forces for dry runway conditions.		√		
4.	**Aeroplane Systems (ATA)**				
4.R	Aeroplane systems should be replicated with sufficient functionality for flight crew operation to support the approved use. System functionality should enable sufficient normal and appropriate abnormal and emergency operating procedures to be accomplished.	√	√	√	
4.1	**Normal, Abnormal And Emergency System Operations**				
4.1.R	Aeroplane systems represented in the FSTD should simulate representative aeroplane system operation including system interdependencies, both on the ground and in flight. Systems should be operative to the extent that	√	√	√	Aeroplane system operation should be predicated on, and traceable to, the system data supplied by the aeroplane manufacturer, original equipment manufacturer or alternative approved data for the aeroplane system or
	appropriate normal, abnormal and emergency operating procedures can be accomplished.				component. Once activated, proper systems operation should result from system management by the crew member and not require any further input from the instructor's controls.
4.2	**Circuit Breakers**				
4.2.R	Circuit breakers that affect procedures and/or result in observable cockpit/flight deck indications should be functionally accurate.	√	√	√	Applicable if circuit breakers fitted.
4.3	**Instrument Indications**				
4.3.R	All relevant instrument indications involved in the class of aeroplanes simulated should automatically respond to control movement by a flight crew member or to atmospheric disturbance and also respond to effects resulting from icing.	√	√	√	Numerical values should be presented in the appropriate units.

4.4	COMMUNICATIONS, NAVIGATIONS AND CAUTION AND WARNING SYSTEM	Type I	Type II	Type III	COMMENTS
4.4.R	Communications, navigation, and caution and warning equipment corresponding to that typically installed in a representative aeroplane simulation should operate within the tolerances prescribed for the applicable airborne equipment.	√	√	√	
4.5	**Anti-Icing Systems**				
4.5.R	Anti-icing systems corresponding to those typically installed in that class of aeroplanes should be operative.	√	√	√	Simplified airframe and engine, including engine induction and pitot-static system, icing models with corresponding performance degradations due to icing should be provided. Effects of anti-icing/de-icing systems activation should also be present.
5.	**Flight Controls And Forces**				
5.R	Aeroplane-like, derived from class, appropriate to aeroplane mass to support the approved use. Active force feedback required.	√ PPL CPL		√	
5.R1	Aeroplane-like, derived from class, appropriate to aeroplane mass to support the approved use. Active force feedback not required.	√ MPL 1			
5.G	Aeroplane-like, to support the approved use. Active force feedback not required.		√		
5.1	**Control Forces And Travel**				
5.1.R	Control forces, control travel and surface position should correspond to that of the aeroplane or class of aeroplanes being simulated. Control travel, forces and surfaces should react in the same manner as in the aeroplane or class of aeroplanes under the same flight and system conditions.	√ PPL CPL		√	Active Force feedback required if appropriate to the aeroplane installation.

	CONTROL FORCES AND TRAVEL	Type I	Type II	Type III	COMMENTS
5.1.R1	Control forces, control travel and surface position should correspond to that of the aeroplane or class of aeroplanes being simulated. Control surfaces should react in the same manner as in the aeroplane or class of aeroplanes under the same flight and system conditions, but control travel and forces should broadly correspond to the aeroplane or class of aeroplanes simulated.	√ MPL 1			Active Force feedback not required.
5.1.G	Control forces, control travel and surface position should broadly correspond to the aeroplane or class of aeroplanes simulated.		√		Active Force feedback not required. Control forces produced by a passive arrangement are acceptable.
5.3	**Control System Operations**				
5.3.R, R1	Control systems should replicate the class of aeroplanes operation for the normal and any non-normal modes including back-up systems and should reflect failures of associated systems. Appropriate cockpit indications and messages should be replicated.	√		√	Ref: Table C for applicable testing.
5.3.G	Control systems should allow basic aeroplane operation with appropriate cockpit indications.		√		Ref: Table C for applicable testing.
6.	**Sound Cues**				
6.G	Significant sounds perceptible to the flight crew during flight operations to support the approved use. Comparable engine and airframe sounds.	√	√	√	
6.1	**Sound System**				
6.1.G	Significant cockpit/flight deck sounds during normal and abnormal operations, aeroplane class-like, including engine and airframe sounds as well as those which result from pilot or instructor-induced actions.	√	√	√	SOC required.
6.2	**Crash Sound**				
6.2.G	The sound of a crash when the simulated aeroplane exceeds limitations.	√	√	√	

6.3	ENVIRONMENT SOUND	Type I	Type II	Type III	COMMENTS
6.3.G	Environmental sounds are not required. However, if present, they should be coordinated with the simulated weather.	√	√	√	
6.4	**Sound Volume**				
6.4.G	The volume control should have an indication of sound level setting which meets all qualification requirements. Full volume should correspond to actual volume level agreed at the initial evaluation. When full volume is not selected, an indication of abnormal setting should be provided to the instructor.	√	√	√	
6.5	**Sound Directionality**				
6.5 .G	Sound not required to be directional.	√	√	√	
7.	**Visual Display Cue**				
7.R	Continuous field of view with textured representation of all ambient conditions for each pilot, to support the approved use. Horizontal and vertical field of view to support the most demanding manoeuvres requiring a continuous view of the runway. A minimum of 200° horizontal and 40° vertical field of view.	√ PPL CPL		√	
7.G	A textured representation of appropriate ambient conditions, to support the approved use. Horizontal and vertical field of view to support basic instrument flying and transition to visual from straight-in instrument approaches.	√ MPL 1	√		

7.1.1	DISPLAY GEOMETRY AND FIELD OF VIEW	Type I	Type II	Type III	COMMENTS
7.1.1. R	Continuous visual field of view providing each pilot with 200° horizontal and 40° vertical field of view.	√ PPL CPL		√	(Ref: Table B) and Test 4.a.1 (Ref: Doc 9625). Collimation is not required but parallax effects should be minimized (not greater than 10° for each pilot when aligned for the point midway between the left and right seat eyepoint). The system should have the capability to align the view to the pilot flying. *Note. – Larger fields of view may be required for certain training tasks. The FOV should be agreed with the CAAB.* Installed alignment should be confirmed in an SOC. (This would generally be results from acceptance testing).
7.1.1. G	A field of view of a minimum of 45° horizontally and 30° vertically, unless restricted by the type of aeroplane, simultaneously for each pilot. The minimum distance from the pilot's eye position to the surface of a direct view display may not be less than the distance to any front panel instrument.	√ MPL 1	√		(Ref: Table B) and Test 4.a.1. (Ref: Doc 9625) Collimation is not required.
7.1.2	**Display Resolution**				
7.1.2. R	Display resolution demonstrated by a test pattern of objects shown to occupy a visual angle of not greater than 4 arc minutes in the visual display used on a scene from the pilot's eye point.	√ PPL CPL		√	SOC required containing calculations confirming resolution. (Ref: Table B) visual scene quality and Test 4.a.3 (Ref: Doc 9625).
7.1.2. G	Adequate resolution to support the approved use.	√ MPL 1	√		
7.1.3	**Light Point Zone**				
7.1.3. R	Light-point size — not greater than 8 arc minutes.	√ PPL CPL		√	SOC required confirming test pattern represents lights used for airport lighting. (Ref: Table B) and Test 4.a.4.(Ref: Doc 9625)
7.1.3. G	Suitable to support the approved use.	√ MPL 1	√		

7.1.4	DISPLAY CONTRAST RATIO	Type I	Type II	Type III	COMMENTS
7.1.4. R	Display Contrast ratio — not less than 5:1.	√ PPL CPL		√	(Ref: Table B) surface contrast ratio and Test 4.a.5.(Ref: Doc 9625)
7.1.4. G	Suitable to support the approved use.	√ MPL 1	√		
7.1.5	**Light- Point Contrast Ratio**				
7.1.5. R	Light-point contrast ratio — not less than 10:1.	√ PPL CPL		√	(Ref: Table B) light-point contrast ratio and Test 4.a.6.(Ref: Doc 9625)
7.1.5. G	Suitable to support the approved use.	√ MPL 1	√		
7.1.6	**Light Point Brightness**				
7.1.6. R	Light-point brightness – not less than 20 cd/m2 (5.8 foot-lamberts).	√ PPL CPL		√	(Ref: Table B), light-point contrast ratio and Test 4.a.7.(Ref: Doc 9625)
7.1.6. G	Suitable to support the approved use.	√ MPL 1	√		
7.1.7	**Display Brightness**				
7.1.7. R	Display brightness should be demonstrated using a raster drawn test pattern. The surface brightness should not be less than 14 cd=/m2 (4.1 foot-lamberts).	√ PPL CPL		√	(Ref: Table B) and Test 4.a.8.(Ref: Doc 9625)
7.1.7. G	Suitable to support the approved use.	√ MPL 1	√		
7.1.8	**Black Level And Sequential Contrast** (Light Valve System Only)				
7.1.8. R	Suitable to support the approved use.	√ PPL CPL		√	
7.1.8. G	Suitable to support the approved use.	√ MPL 1	√		

7.1.9	**Motion Blurr (Light Valve System Only)**	**Type I**	**Type II**	**Type III**	**COMMENTS**
7.1.9.R	Suitable to support the approved use.	√ PPL CPL		√	
7.1.9.G	Suitable to support the approved use	√ MPL 1	√		
7.1.10	**Speckle Test** (Laser System Only)				
7.1.10. R	Suitable to support the approved use.	√ PPL CPL		√	
7.1.10. G	Suitable to support the approved use.	√ MPL 1	√		
7.1.10	**Speckle Test** (Laser System Only)				
7.1.10. R	Suitable to support the approved use.	√ PPL CPL		√	
7.1.10. G	Suitable to support the approved use.	√ MPL 1	√		
7.2.1	**Head Up Display** (Where Fitted)				
7.2.1. R	The system should be shown to perform its intended function for each operation and phase of flight. An active display (repeater) of all parameters displayed on the pilot's combiner should be located on the instructor operating station (IOS), or other location approved by the CAAB. Display format of the repeater should represent that of the combiner.	√ PPL CPL		√	SOC required. (See Table B), Test 4.b and Attachment K(Ref: Doc 9625). Only the one HUD can be used by the pilot flying due to alignment display issues. Alternatively the HUD may be presented as part of the visual scene.

7.2.2	ENHANCED FLIGHT VISION SYSTEM (EFVS) (where fitted)	Type I	Type II	Type III	COMMENTS
7.2.2.R	The EFVS simulator hardware/software, including associated cockpit displays and annunciation, should function the same or equivalent to the EFVS system installed in the aeroplane. A minimum of one airport should be modeled for EFVS operation. The model should include an ILS and a non-precision approach (with VNAV if required for that aeroplane type).	√ PPL CPL		√	(See Table B), Test 4.c and Attachment L. (Ref: Doc 9625) Only the one EFVS can be used by the pilot flying due to alignment display issues. Alternatively the EFVS may be presented as part of the visual scene.
7.3	**Visual Ground System**				
7.3.R	A test is required to demonstrate that the visibility is correct on final approach in CAT II conditions and the positioning of the aeroplane is correct relative to the runway.	√ PPL CPL		√	(See Table B), Test 4.d. (Ref: Doc 9625)
7.3.G	A demonstration of suitable visibility.	√ MPL 1	√		
9	**Environment - ATC**				
9 .G	Flight phase and content specific ATC messages, including responses to own ship voice transmissions in appropriate flight phases, to support the approved use. Content of own ship messages in English (as per ICAO Doc 4444, PANS ATM -*Air Traffic Management*). Messages to own ship typical of ATC control. Can be achieved by the instructor providing the ATC simulation.		√		
9.1	**Automated Weather Reporting**				
9 .1.G	Single station automated weather reporting.		√		At least one automated weather-reporting message is required for all airports in range. The message(s) should consist of the actual weather conditions set in the FSTD including reference airport, reference runway, temperature, wind, QNH, clouds, visibility, runway conditions as well as predefined other conditions (transition level, etc.), which cannot be read out from the simulation.

9.2	BACKGROUND CHATTER	Type I	Type II	Type III	COMMENTS
9 .2.1 S,R,G	Background chatter (party line). In general all background chatter should meet the following criteria: 1. communications should make sense within the context of the simulation environment and should not contain obviously erroneous information; 2. only messages relevant to the purpose of a given frequency should be heard on said frequency; 3. simulated communications on a given frequency should not step over one another or over communications from the simulator crew; and 4. reasonable pauses should be provided between communication exchanges to allow the simulator crew access to the frequency when required.		√		Party line communications simulate background chatter heard on the flight deck e.g. aeroplane-to-aeroplane, aeroplane-to-ground, or ground-to-ground communications other than own ship.
9 .2.2 G	Context-generic – Generic messages with no correlation.		√		Background chatter communications simulation can be based on generic messages only. Such messages should be defined in such a way that they require no or very little information to be adapted to the simulation context. The voices used need only be diverse enough to avoid confusion between pilots and ATC services.
9.6	**Phraseology**				
9 .6.1 S, R, G	Phraseology & voice characteristics		√		To increase training effectiveness it is of utmost importance that the ATC radio communication simulation should reinforce correct phraseology. The focus should be on achieving 100% realism, to achieve proper situational awareness among the students, during training sessions.
9.7	**Flight Phase Specific ATC Frequency Recognition**				
9 .7.1 S,R,G	Communications should be appropriate to the radio frequencies set in the cockpit: 1) single-frequency communications;		√		Flight phase specific ATC frequency recognition, a requirement for all levels of ATC simulation, means that all communication received by the pilot should be appropriate to the radio frequencies set in the cockpit.

	FLIGHT PHASE SPECIFIC ATC FREQUENCY RECOGNITION	Type I	Type II	Type III	COMMENTS
9 .7.2 S,R,G	The simulated environment should be kept updated in conjunction with other system updates with regard to company or ATC radio frequency changes.		√		The facility to use company radio frequencies should be available, but these should not necessarily be linked to “real world” company radio frequencies, providing this does not cause a conflict with existing ATC frequencies.
9.8	**Instructor Control Over Other Traffic**				
9.8.1 S,R,G	Instructor control over other traffic. Instructor should have the ability to control other traffic.		√		Examples of instructor control of other traffic: 1. Priority for own ship for take-off, landing and ground manoeuvres with respect to other traffic; 2. Another aeroplane in the scenario to have an emergency or to obstruct own ship aeroplane; 3. Levels of traffic activity in the scenario; and 4. Restrictions on speed for an approaching aeroplane.
10	**Environment - Navigation**				
10.S	Navigational data with the corresponding approach facilities to support the approved use. Navigation aids should be usable within range or line-of-sight without restriction, as applicable to the geographic area.	√	√	√	
10.1	**Navigation Database**				
10.1.S	Navigation database sufficient to support simulated aeroplane systems for real world operations.	√	√	√	
10.2	**Minimum Airport Requirement**				
10.2.S	Complete navigation database for at least 3 airports with corresponding precision and non-precision approach procedures, including regular updates.	√	√	√	Regular updates means navigation database updates as mandated by the CAAB.

10.3	INSTRUCTOR CONTROL	Type I	Type II	Type III	COMMENTS
10.3.S	Instructor controls of internal and external navigational aids.	√	√	√	E.g. aeroplane ILS glideslope receiver failure compared to ground facility glideslope failure.
10.4	**Arrival/Departure Features**				
10.4.S	Navigational data with all the corresponding standard arrival and departure procedures.	√	√	√	
10.5	**Navigation Aids Range**				
10.5.S	Navigation aids should be usable within range or line-of-sight without restriction, as applicable to the geographic area.	√	√	√	Replication of the geographic environment with its specific limitations.
11	**Environment – Atmosphere and Weather**				
11.G	Basic atmospheric model, pressure, temperature, visibility, cloud base and winds to support the approved use. The environment should be synchronized with appropriate aeroplane and simulation features to provide integrity.	√	√	√	
11.1	**Standard Atmosphere**				
11.1.R, G	Simulation of the standard atmosphere including instructor control over key parameters.	√	√	√	
11.2	**Windshear**				
11.2.G	The FSTD should employ windshear models that provide training for recognition of windshear phenomena.	√		√	A subjective test is required. See Table C
11.3	**Weather Effects**				
11.3 G	The following weather effects as observed on the visual system should be simulated and respective instructor controls provided. (1) Visibility.	√	√	√	A subjective test is required. See Table C

11.4	INSTRUCTOR CONTROLS	Type I	Type II	Type III	COMMENTS
11.4.R, G	The following features should be simulated with appropriate instructor controls provided: (1) surface wind speed, direction and gusts; (2) intermediate and high altitude wind speed and direction; (3) thunderstorms and microbursts; and (4) turbulence.	 √ √ √	 √ √	 √ √ √	A subjective test is required. See Table 10.3 For devices without motion, effects should be simulated on the instruments.
12	**Environment – Airports and Terrain**				
12.R	Specific airport models with topographical features to support the approved use. Correct terrain modelling, runway orientation, markings, lighting, dimensions and taxiways. Visual terrain and EGPWS databases should be matched to support training to avoid CFIT accidents. Where the device is required to perform low visibility operations, at least one airport scene with functionality to support the required approval type, e.g. low visibility taxi route with marker boards, stop bars, runway guard lights plus the required approach and runway lighting.	√ PPL			*Note. – The requirements should be read in conjunction with* Table 10.3 of Doc 9625 *to fully understand the details to be provided.*
12.R (S)	Specific airport models with topographical features to support the approved use. Correct terrain modelling, runway orientation, markings, lighting, dimensions and taxiways. Visual terrain and EGPWS databases should be matched to support training to avoid CFIT accidents. For specific VFR cross-country training the capability to replicate ground visual references and topographical features sufficient to support VFR navigation according to appropriate charts - minimum standard 1:500,000 scale mapping.	√ PPL			

		Type I	Type II	Type III	COMMENTS
12.G	Generic airport models with topographical features to support the approved use. Correct terrain modelling, runway orientation, markings, lighting, dimensions and taxiways.	√ CPL MPL 1	√	√	*Note. – The requirements should be read in conjunction with* Table 10.3 *to fully understand the details to be provided.*
12.1	**Airports and Terrain –Visual Cues**				
12.1.1 R(S) G(S)	Visual cues to assess sink rate and depth perception during take-off and landing should be provided. This should include: (1) surface on runways, taxiways, and ramps; (2) terrain features; and (3) highly detailed and accurate surface depiction of the terrain surface within an area sufficient to achieve cross-country flying under VFR conditions.	√ PPL CPL			
12.1.1 R	Visual cues to assess sink rate and depth perception during take-off and landing should be provided. This should include: (1) surface on runways, taxiways, and ramps; (2) terrain features; and (3) highly detailed and accurate surface depiction of the terrain surface within an approximate area from 400 m (1/4 sm) before the runway approach end to 400 m (1/4 sm) beyond the runway departure end with a total width of approximately 400 m (1/4 sm) including the width of the runway.	√ PPL			
12.1.1 G	Visual cues to assess sink rate and depth perception during take-off and landing should be provided. This should include: (1) surface on runways, taxiways, and ramps; and (2) terrain features	√ CPL MPL 1	√	√	

12.2	VISUAL EFFECTS	Type I	Type II	Type III	COMMENTS
12.2.1 R	The system should provide visual effects for: (1) light poles; (2) raised edge lights as appropriate; and (3) glow associated with approach lights in low visibility before physical lights are seen.	√ PPL			*Note. – For Type I, PPL, "(3) glows associated with approach lights in low visibility before physical lights are seen", is not required.*
12.3	**Environment Attitude**				
12.3.1 S,R,G	The FSTD should provide for accurate portrayal of the visual environment relating to the FSTD attitude.	√	√	√	Visual attitude versus FSTD attitude is a comparison of pitch and roll of the horizon as displayed in the visual scene compared to the display on the attitude indicator. Required for initial qualification only (SOC acceptable).
12.4	**Airport Scenes**				
12.4.1. bR	The system should include at least 1 designated real-world airport available in daylight, twilight (dusk or dawn) and night illumination states.	√ PPL			The designated real-world airport(s) should be part of the approved training programme.
12.4.1 G	The system should include a generic airport available in daylight, twilight (dusk or dawn) and night illumination states.	√ CPL MPL 1	√	√	
12.4.2. 1 S,R, G	Daylight Capability.	√	√	√	SOC required for system capability. System objective tests are required. See Table 9.4 (visual scene quality) — Test 4.a. (Doc 9625) Scene content tests are also required. (See Table C).
12.4.2. 2 S,R, G	The system should provide full-colour presentations and sufficient surfaces with appropriate textural cues to successfully accomplish a visual approach, landing and airport movement (taxi).	√	√	√	
12.4.2. 3 R	Surface shading effects should be consistent with simulated sun position.	√ PPL			This does not imply continuous time of day.
12.4.2. 4 R	Total scene content comparable in detail to that produced by 10,000 visible textured surfaces and 6,000 visible lights should be provided.	√ PPL			

	AIRPORT SCENES	Type I	Type II	Type III	COMMENTS
12.4.2.4 G	Total scene content should be sufficient to identify the airport and represent the surrounding terrain.	√ CPL MPL 1	√	√	
12.4.2.5 R	The system should have sufficient capacity to display 16 simultaneously moving objects.	√ PPL			
12.4.3.1. S.R	Twilight (dusk) capability.	√ PPL CPL			
12.4.3.2 S,R	The system should provide twilight (or dusk) visual scenes with full colour presentations of reduced ambient intensity and typical terrain characteristics such as fields, roads and bodies of water and surfaces illuminated by representative own ship lighting (e.g. landing lights) sufficient to successfully accomplish visual approach, landing and airport movement (taxi).	√ PPL CPL			
12.4.3.3 R	Total scene content comparable in detail to that produced by 10,000 visible textured surfaces and 15,000 visible lights should be provided.	√ PPL			
12.4.3.4 R	Scenes should include self-illuminated objects such as road networks, ramp lighting and airport signage, to conduct a visual approach, landing and airport movement (taxi).	√ PPL			
12.4.3.5 S,R	The system should include a definable horizon.	√ PPL CPL			If provided, directional horizon lighting should have correct orientation and be consistent with surface shading effects.
12.4.3.6 R	The system should have sufficient capacity to display 16 simultaneously moving objects.	√ PPL			
12.4.4 S,R	Night capability.	√ PPL CPL			
12.4.4.1 S,R	The system should provide at night all features applicable to the twilight scene, as defined above, with the addition of the need to portray reduced ambient intensity that removes ground cues that are not self-illuminating or illuminated by aeroplane lights (e.g. landing lights).	√ PPL			

12.5	AIRPORT CLUTTER	Type I	Type II	Type III	COMMENTS
12.5.1 R	Airport models should include representative static and dynamic clutter such as gates, aeroplanes, and ground handling equipment.	√ PPL			Clutter need not be dynamic unless required (e.g. ATC correlation).
12.7	**Visual System For Reduced FOV**				
12.7.1 G	The system should provide a visual scene with sufficient scene content to allow a pilot to successfully accomplish a visual landing. Scenes should include a definable horizon and typical terrain characteristics such as fields, roads and bodies of water and surfaces illuminated by aeroplane landing lights.	√ CPL MPL 1	√		Airport model may be generic (no specific topographical features required).
12.7.2 G	Total scene content comparable in detail to that produced by 3,500 visible textured surfaces and 5,000 visible lights should be provided.	√ CPL MPL 1	√		
12.8	**VFR Training**				
12.8.1 S	The system, when used for VFR training, should include a database area that can support a 300 nautical miles triangular flight incorporating three airports. Within the defined area the system should replicate ground visual references and topographical features sufficient to support VFR navigation according to appropriate charts.	√ CPL PPL			Applies only to Type I FSTD when used for VFR operations to support CPL and PPL training. Correlation should be with 1: 500,000 scale VFR Navigation Charts at a minimum, or larger scales (e.g. 1:250,000) if applicable to the area.
13	**Miscellaneous**				
13.1	**Instructor Operating Station (IOS)**				
13.1 R	The instructor station should provide an adequate view of the pilots' panels and forward windows.	√	√	√	
13.2	**Instructors' Controls**				
13.2 S.R.G	Instructor control should be provided for all required system variables, freezes, resets and for insertion of malfunctions to simulate abnormal or emergency conditions. The effects of these malfunctions should be sufficient to correctly exercise the procedures in relevant operating manuals.	√	√	√	

13.4	COMPUTER CAPACITY	Type I	Type II	Type III	COMMENTS
13.4 S,R,G	Sufficient FSTD computer capacity, accuracy, resolution and dynamic response should be provided to fully support the overall FSTD fidelity needed to meet the qualification Type sought.	√	√	√	An SOC is required.
13.5	**Automatic Testing Facilities**				
13.5 R,G	Validation testing of FSTD hardware and software to enable recurrent testing should be available.	√	√	√	Evidence of testing should include test identification, FSTD number, date, time, conditions, tolerances, and the appropriate dependent variables portrayed in comparison with the Master QTG test standard. Automatic QTG validation/testing is encouraged.
13.6	**Updates To FSTD Hardware And Software**				
13.6 S,R	Timely permanent update of FSTD hardware and software should be conducted subsequent to aeroplane modification where it affects training, sufficient for the qualification type sought.	√		√	
13.6 G	Timely permanent update of FSTD hardware and software should be conducted subsequent to FSTD manufacturer recommendation where it affects training and/or safety.		√		
13.7	**Daily Pre-Flight Documentation**				
13.7 S,R,G	Daily pre-flight documentation either in the daily log or in a location easily accessible for review is required.	√	√	√	
13.8	**System Integration**				
13.8 R,G	Transport delay: A transport delay test may be used to demonstrate that the FSTD system response does not exceed 200 ms.	√	√	√	Results required for applicable systems only.

7. QUALIFICATION TEST GUIDE (QTG)

7.1 Introduction

7.1.1 Purpose

This ANO establishes the criteria that define the performance and documentation requirements for the evaluation of FSTDs used for training, testing and checking of flight crew members.

7.1.2 Levels of FSTD Qualification

Refer to 1.2 and 3.3 of this ANO.

7.1.3 Glossary of Terms and Abbreviations

Refer to 3.1 and 3.2 of this ANO.

7.1.4 FSTD Qualification Level Criteria are given in validation tests, function and subjective tests.

i) The FSTD should be assessed in those areas that are essential for completing the flight crew member training, testing and checking process. This includes the FSTD's longitudinal and lateral-directional responses; performance in take-off, climb, cruise, descent, approach, landing; specific operations; control checks; flight deck and instructor station functions checks; and certain additional requirements depending on the complexity or qualification level of the FSTD. The motion and visual systems (where applicable) should be evaluated to ensure their proper operation. Tolerances listed for parameters in the validation tests (Table B) of this ANO are the maximum acceptable for FSTD qualification and should not be confused with FSTD design tolerances.

ii) The intent is to evaluate the FSTD as objectively as possible. Pilot acceptance, however, is also an important consideration. Therefore, the FSTD should be subjected to validation, functions and subjective tests listed in (Table B) and (Table C) of this ANO. Validation tests are used to compare objectively FSTD with aircraft data to ensure that they agree within specified tolerances. Functions and subjective tests provide a basis for evaluating FSTD capability to perform over a typical training period and to verify correct operation of the FSTD.

iii) For FSTDs with generic (G) fidelity level for an initial evaluation, correct trend and magnitude (CT&M) should be used. The tolerances listed in (Table B) of this ANO are also applicable for recurrent evaluations and should be applied to ensure the device remains at the standard initially qualified.

iv) For initial qualification, testing of FSTD's validation data should be used. They may be derived from a specific aeroplane within the class of aeroplane or may be based on information from several aeroplanes within the class. With the concurrence of CAAB, it may be in the form of a manufacturer's previously approved set of validation data for the applicable FSTD. Once the set of data for a specific FSTD has been accepted and approved by the CAAB, it will become the validation data that should be used as reference for subsequent recurrent evaluations with the application of the stated tolerances.

v. The substantiation of the set of data used to build the validation data should be in the form of an engineering report and should show that the proposed validation data are representative of the aeroplane or the class of aeroplane modeled. This report may include flight test data, manufacturer's design data, information from the aircraft flight manual and maintenance manuals, results of approved or commonly accepted simulations or predictive models, recognized theoretical results, information from the public domain, subjective assessment of a qualified pilot or other sources as deemed necessary by the FSTD manufacturer to substantiate the proposed model.

(vi) In the case of new aeroplane programmes, the aircraft manufacturer's data partially validated by flight test data may be used in the interim qualification of the FSTD. However, the FSTD should be re-evaluated following the release of the aeroplane manufacturer's final data. The schedule should be agreed by CAAB, FSTD operator, FSTD manufacturer, and aeroplane manufacturer.

(vii) FSTD operators seeking initial or upgrade evaluation of an FSTD should be aware that performance and handling data for older aircraft may not be of sufficient quality to meet some of the test standards contained in this ANO. In this instance it may be necessary for an operator to acquire additional flight test data.

(viii) During FSTD evaluation, if a problem is encountered with a particular validation test, the test may be repeated to ascertain if the problem was caused by test equipment or FSTD operator error. Following this, if the test problem persists, an FSTD operator should be prepared to offer an alternative test.

(ix) Validation tests that do not meet the test criteria should be addressed to the satisfaction of CAAB.

7.2 Qualification Test Guide (QTG)

7.2.1 The QTG is the primary reference document used for evaluating an FSTD. It contains test results, statements of compliance (SOC) and other information for the evaluator to assess if the FSTD meets the test criteria described in this ANO.

7.2.2 The FSTD operator should submit a QTG which includes the following:

A title page including (as a minimum):

(a) FSTD operator's name;
(b) Aeroplane model and series or class, as applicable, being simulated;
(c) FSTD qualification level;
(d) FSTD location;
(e) FSTD manufacturer's identification or serial number; and
(f) Approval authority signature block.

iv) FSTD information page for each configuration in the case of convertible FSTDs providing (as a minimum):

(a) FSTD manufacture;
(b) Date of FSTD manufacture;
(c) Aeroplane model and series or class, being simulated;
(d) FSTD operator's identification number;
(e) FSTD computer identification;
(f) Visual system type and manufacturer (if fitted);
(g) Motion system type and manufacturer (if fitted);

(h) References to aerodynamic data or sources for aerodynamic model;
(i) References to engine data or sources for engine model;
(j) References to flight control data or sources for flight controls model;
(k) Avionic equipment system identification where the revision level affects the training and checking capability of the FSTD.

v) Table of contents;

vi) List of effective pages and log of test revisions;

vii) Listing of all reference and source data;

viii) Glossary of terms and symbols used;

ix) Statements of compliance (SOC) with certain requirements. SOCs should refer to sources of information and show compliance rationale to explain how the referenced material is used, applicable mathematical equations and parameter values, and conclusions reached;

x) Recording procedures and required equipment for the validation tests;

xi) The following items are required for each validation test:

(a) Test number: refer numbering system given in Table B;
(b) Test title: this should be short and definitive, based on the test title referred to in Table B;
(c) Test objective: this should be a brief summary of what the test is intended to demonstrate;
(d) Demonstration procedure: this is a brief description of how the objective is to be met;
(e) References: these are the aeroplane data source documents including both the document number and the page or condition number;
(f) Initial conditions: a full and comprehensive list of the test initial conditions is required;
(g) Manual test procedures: procedures should be sufficient to enable the test to be flown by a qualified pilot, using reference to flight deck instrumentation and without reference to other parts of the QTG or flight test data or other documents;
(h) Automatic test procedures (if applicable);
(i) Evaluation criteria: specify the main parameter(s) under scrutiny during the test;
(j) Expected result(s): the aeroplane result, including tolerances and, if necessary, a further definition of the point at which the information was extracted from the source data. The initial validation test result including tolerances is sufficient for FSTD type as applicable;
(k) Test result: FSTD validation test results obtained by the FSTD operator. Tests run on a computer that is independent of the FSTD are not acceptable;
(l) Source data: copy of the aeroplane source data or other validation data, as applicable, be clearly marked with the document, page number, issuing authority, and the test number and title as specified above;
(m) Comparison of results: an acceptable means of easily comparing FSTD test results to the validation data is over-plotting;
(n) The preferred method is over plotting. The FSTD operator's FSTD test results should be recorded on a multi-channel recorder, line printer, electronic capture and display or other appropriate recording media acceptable to the competent authority conducting the test. FSTD results should be labeled using terminology common to aeroplane parameters as opposed to computer software identifications. These results should be easily compared with the supporting data by employing cross plotting or other acceptable means. Aeroplane data documents included in the QTG may be photographically reduced only if such reduction will not alter the graphic scaling or

cause difficulties in scale interpretation or resolution. Incremental scales on graphical presentations should provide resolution necessary for evaluation of the parameters shown in Appendix B. The test guide will provide the documented proof of compliance with the FSTD validation tests in the tables in Appendix B. For tests involving time histories, flight test data sheets, FSTD test results should be clearly marked with appropriate reference points to ensure an accurate comparison between the FSTD and aeroplane with respect to time. FSTD operators using line printers to record time histories should clearly mark that information taken from line printer data output for cross plotting on the aeroplane data. The cross plotting of the FSTD operator's FSTD data to aeroplane data is essential to verify FSTD performance in each test. The evaluation serves to validate the FSTD operator's FSTD test results;

(o) A copy of the version of the primary reference document as agreed with the CAAB and used in the initial evaluation should be included.

xii) Configuration control. A configuration control system should be established and maintained to ensure the continued integrity of the hardware and software as originally qualified.

8. FSTD EVALUATION

8.1 Types of Evaluations:

8.1.1 **Initial Evaluation**– an initial evaluation is the first evaluation of an FSTD to qualify it for use. It consists of a technical review of the QTG and a subsequent on-site validation of the FSTD to ensure it meets all the requirements of this ANO.

8.1.2 **Recurrent evaluations**– recurrent evaluations are those evaluations accomplished periodically to ensure that the FSTD continues to meet its qualification level.

8.1.3 **Special evaluations** – special evaluations are those that may be accomplished resulting from any of the following circumstances:

a) a major hardware and/or software change which may affect the handling qualities,
b) performance or systems representations of the FSTD;
c) a request for an upgrade for a higher qualification level; and
d) discovery of a situation that indicates the FSTD is not performing at its initial qualification standard.

Note. – Some of the above circumstances may require establishing revised tests leading to an amendment of the MQTG.

8.2 Conduct of Evaluations:

8.2.1 Initial FSTD Evaluations:

i) An FSTD operator seeking qualification of an FSTD should make the request for an evaluation to the CAAB of the State in which the FSTD will be located.

ii) A copy of the FSTD's QTG, with annotated test results, should accompany the request. Any QTG deficiencies raised by the NAA should be corrected prior to the start of the evaluation.

iii) The request for evaluation should also include a **statement** that the FSTD has been thoroughly tested using a documented acceptance testing procedures covering cockpit layout, all simulated aeroplane systems and the Instructor Operating Station as well as the engineering facilities, motion, visual and other systems, as applicable. In addition a statement should be provided that the FSTD meets the criteria described in this ANO. The applicant should further certify that all the QTG tests for the requested qualification level have been satisfactorily conducted.

8.2.2 Modification of an FSTD:

i) A modification is a result of a change to the existing device where it retains its existing qualification level. The change may be approved through a recurrent evaluation or a special evaluation if deemed necessary by the CAAB, according to the applicable regulations in effect at the time of initial qualification.

ii) If such modification to an existing device would imply that the performance of the device could no longer meet the requirements at the time of initial qualification, but that the result of the modification would, in the opinion of the CAAB, clearly mean an improvement to the performance and training capabilities of the device altogether, then the CAAB may accept the proposed modification as an **update** while allowing the device to retain its original qualification level.

iii) An **up-grade** is defined as the raising of the qualification level of a device, which can only be achieved by undergoing an initial qualification according to the latest applicable regulations.

iv) In summary, as long as the qualification level of the device does not change, all changes made to the device should be considered to be updates pending approval by the CAAB. An upgrade and consequent initial qualification according to latest regulations is only applicable when the operator requests a higher qualification level for the FSTD.

8.2.3 Temporary Deactivation of A Currently Qualified FSTD:

i) In the event it is planned to remove an FSTD from active status for prolonged periods, the appropriate CAAB should be notified and suitable controls established for the period the FSTD is inactive.

ii) An understanding should be arranged with the CAAB to ensure that the FSTD can be restored to active status at its originally qualified level.

8.2.4 Moving An FSTD To A New Location:

i) In instances where an FSTD is to be moved to a new location, the CAAB should be advised of the planned activity and provided with a schedule of events related thereto.

ii) Prior to returning the FSTD to service at the new location, the operator will agree with the CAAB what amount of the validation and functional tests from the QTG should be performed to ensure that the FSTD performance meets its original qualification standard. A copy of the test documentation should be retained with the FSTD records for review by the CAAB.

8.2.5 Composition of An Evaluation Team:

i) For the purposes of qualification of an FSTD, an evaluation team is usually <u>led by a pilot inspector from the CAAB along with engineers and a type-qualified pilot.</u>

ii) The applicant should provide technical assistance in the operation of the FSTD and the required test equipment. The applicant should make <u>available</u> a suitably knowledgeable person to assist the evaluation team as required.

iii) On an initial evaluation, the FSTD manufacturer and/or aeroplane manufacturer should have technical staff available to assist as required.

8.2.6 FSTD Continued Qualification:

i) Following satisfactory completion of the initial evaluation and qualification tests, a system of periodic checks should be established to ensure that FSTDs continue to maintain their initially qualified performance, functions and other characteristics.

(ii) The FSTD operator should run the complete QTG, which includes validation, functions & subjective tests, between each annual evaluation by the CAAB. As a minimum, the QTG tests should be run progressively in at least four approximately equal three-monthly blocks on an annual cycle. Each block of QTG tests should be chosen to provide coverage of the different types of validation, functions & subjective tests. Results should be dated and retained in order to satisfy both the FSTD operator as well as the CAAB that the FSTD standards are being maintained. It is <u>not</u> acceptable that the complete QTG is run just prior to the annual evaluation.

iii) The CAAB having jurisdiction over the FSTD should establish the time interval required for the recurrent evaluation.

8.2.7 Validation Test

The FSTD operator may elect to accomplish the QTG validation tests while the FSTD is at the manufacturer's facility. Tests at the manufacturer's facility should be accomplished at the latest practical time prior to disassembly and shipment. The FSTD operator should then validate FSTD performance at the final location by repeating at least **one-third** of the validation tests in the QTG and submitting those tests to the CAAB. After reviewing these tests, the CAAB should schedule an **initial evaluation**. The QTG should be clearly annotated to indicate when and where each test was accomplished.

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9. FSTD VALIDATION TESTS

9.1 General

9.1.1 FSTD performance and system operation should be objectively evaluated by comparing the results of tests conducted in the FSTD with aeroplane data unless specifically noted otherwise. To facilitate the validation of the FSTD, an appropriate recording device acceptable to CAAB should be used to record each validation test result. These recordings should then be compared to the approved validation data.

9.1.2 Certain tests in this ANO are not necessarily based upon validation data with specific tolerances. However, these tests are included here for completeness, and the required criteria should be fulfilled instead of meeting a specific tolerance.

9.1.3 The FSTD QTG should describe clearly and distinctly how the FSTD will be set up and operated for each test. Use of a driver programme designed to accomplish the tests automatically is encouraged. Overall integrated testing of the FSTD should be accomplished to assure that the total FSTD system meets the prescribed standards.

9.1.4 "It is not the intent, nor is it acceptable, to test each Flight Simulator subsystem independently. Overall Integrated Testing of the Flight Simulator should be accomplished to assure that the total Flight Simulator system meets the prescribed standards."

9.1.5 Submittals for approval of data other than flight tests should include an explanation of validity with respect to available flight test information. Tests and tolerances should be included in the FSTD QTG.

9.1.6 The table of FSTD validation tests in this ANO indicates the required tests. Unless noted otherwise, FSTD tests should represent aeroplane performance and handling qualities at operating weights and centre's of gravity (cg) positions typical of normal operation.

9.1.7 For the testing of computer controlled aeroplane (CCA) FSTDs, flight test data are required for both the normal (N) and non-normal (NN) control states, as applicable to the aeroplane simulated and, as indicated in the validation test table. Tests in the non-normal state should always include the least augmented state. Tests for other levels of control state degradation may be required as detailed by the CAAB at the time of definition of a set of specific aeroplane tests for FSTD data. Where applicable, flight test data should record:

i) Pilot controller deflections or electronically generated inputs including location of input; and
ii) Flight control surface positions unless test results are not affected by, or are independent of, surface positions.

9.1.8 Where normal, non-normal or other degraded control states are not possible to the aeroplane being simulated, appropriate rationales should be included in the QTG by the aeroplane manufacturer's validation data roadmap (VDR).

9.2 Test Requirements

9.2.1 ***The ground and flight tests required for qualification are listed in the table of FSTD validation tests***. Computer-generated FSTD test results should be provided for each test. The results should be produced on an appropriate recording device acceptable to the CAAB. Time histories are required unless otherwise indicated in the table of validation tests.

9.2.2 ***Approved validation data that exhibit rapid variations of the measured parameters***. May require engineering judgment when making assessments of FSTD validity. Such judgments should not be limited to a single parameter. All relevant parameters related to a given manoeuvre or flight condition should be provided to allow overall interpretation. When it is difficult or impossible to match FSTD to aeroplane data or approved validation data throughout a time history, differences should be justified by providing a comparison of other related variables for the condition being assessed.

9.2.3 ***Parameters, tolerances, and flight conditions***. The table of FSTD validation tests describes the parameters, tolerances, and flight conditions for FSTD validation. When two tolerance values are given for a parameter, the less restrictive may be used unless indicated otherwise.

9.2.4 ***Where tolerances are expressed as a percentage*:**

i) for parameters that have units of per cent, or parameters normally displayed in the cockpit in units of per cent (e.g. N1, N2, engine torque or power), then a percentage tolerance should be interpreted as an absolute tolerance for an observation of 50% N1 and a tolerance of 5%, the acceptable range should be from 45% to 55%); and

ii) for parameters not displayed in units of per cent, a tolerance expressed only as a percentage should be interpreted as the percentage of the current reference value of that parameter during the test, except for parameters varying around a zero value for which a minimum absolute value should be agreed with the competent authority.

9.2.5 ***Flight condition verification***. When comparing the parameters listed to those of the aeroplane, sufficient data should also be provided to verify the correct flight condition. For example, to show the control force is within ± 2.2daN (5 lb) in a static stability test, data to show correct airspeed, power, thrust or torque, aeroplane configuration, altitude, and other appropriate datum identification parameters should also be given. If comparing short period dynamics on an FSTD, normal acceleration may be used to establish a match to the aeroplane, but airspeed, altitude, control input, aeroplane configuration, and other appropriate data should also be given. All airspeed values should be assumed to be calibrated unless annotated otherwise and like values used for comparison.

9.2.6 ***Where the tolerances have been replaced by correct trend and magnitude (CT&M).*** The FSTD should be tested and assessed as representative of the aeroplane or class of aeroplane to the satisfaction of the competent authority. To facilitate future evaluations, sufficient parameters should be recorded to establish a reference.

9.2.7 ***Flight conditions***. The flight conditions are specified as follows:

i) **Ground** – on ground, independent of aeroplane configuration;
ii) **Take-Off** – gear down with flaps in any certified take-off position;
iii) **Second Segment Climb** – gear up with flaps in any certified take off position;
iv) **Clean** – flaps and gear up;
v) **Cruise** – clean configuration at cruise altitude and airspeed;

vi) **Approach** – gear up or down with flaps at any normal approach positions as recommended by the aeroplane manufacturer; and

vii) **Landing** – gear down with flaps in any certified landing position.

9.3 FSTD Validation Tests

9.3.1 A number of tests within the QTG have had their requirements reduced to CT&M for initial evaluations thereby avoiding the need for specific flight test data. Where CT&M is used it is strongly recommended that an automatic recording system be used to 'footprint' the baseline results, thereby avoiding the effects of possible divergent subjective opinions on recurrent evaluation.

9.3.2 **Information for Validation Tests** (for detail information refer to Doc 9625 appendix B item 3)

Following items should be tested:

i) Engines;
ii) Control Dynamics;
iii) Ground Effects;
iv) Engineering Simulator—Validation Data;
v) Motion System;
vi) Visual System; and
vii) Sound System.

9.3.3 In all cases the tests are intended for use in recurrent evaluations at least to ensure repeatability.

9. 4 TABLE-B

FSTD VALIDATION TESTS

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
1.	**Performance**						
1.b	**Take-Off**						
1.b	(1) ground acceleration time and distance	±1.5 s or ±5% of time ; and ±rate of clim 61 m (200 ft) or ±5% of distance. For type I, III and VI devices: ±1.5 s or ±5% of time.	Take-off.	√		√	Acceleration time and distance should be recorded for a minimum of 80% of the total time from brake release to Vr. May be combined with normal take-off (1.b.4) or rejected take-off (1.b.7). plotted data should be shown using appropriate scales for each portion of the manoeuvre.
1.b	(7) Rejected take-off	±5% of time or ±1.5 s. ±7.5% of distance or ± 76 m (250 ft). For type I, III and VI devices: ±1.5 s or ±5% of time.	Take-off	√		√	Record at mass near MCTM. .Speed of reject should be at least 80% of V1. Auto brake will be used where applicable. Maximum braking effort, automatic or manual. Where a maximum braking demonstration is not available, an acceptable alternative is attest using approximately 80% braking and full reverse , if applicable. Time and distance should be recorded from brake release to a full stop. For type I, III, VI devices: record time for at least 80% of the time segment from initiation of the rejected take-off to full stop.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
1.c	**Climb**						
1.c	(1) Normal climb all engines operating.	±3 kt airspeed. ±0.5 m/s (100 ft/ min) or ±5% of rate of climb.	Clean.	√	C T & M	√	Flight test data is preferred; however, aeroplane performance manual data is an acceptable alternative. Record at nominal climb speed and mid initial climb altitude. FSTD performance is to be recorded over an interval of at least 300 m (1000 ft). For type I, II, III, IV and VI devices, this test may be a snapshot test.
1.c	(2) One engine inoperative 2nd segment climb.	±3 kt airspeed. ±0.5 m/s (100 ft/ min) or ±5% of rate of climb, but not less than aeroplane performance data requirements.	2^{nd} segment climb.	√	C T & M	√	Flight test data is preferred; however, aeroplane performance manual data is an acceptable alternative. Record at nominal climb speed. FSTD performance is to be recorded over an interval of at least 300 m (1000 ft). Test at WAT (weight. Altitude or temperature) limiting condition. For type I, II, III, IV and VI devices, this test may be a snapshot test.
1.d	**Cruise/Descent**						
1.d	(1) Level flight acceleration	±5% of time	Cruise.	√		√	Time required increasing airspeed a minimum of 50 kt, using maximum continuous thrust rating or equivalent. For aeroplanes with a small operating speed range, speed change may be reduced to 80% of operational speed change

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
1.d	(2) Level flight deceleration	±5% of time.	Cruise.	√		√	Time required to decrease airspeed a minimum of 50 kt, using idle power. For aeroplanes with a small operating speed range, speed change may be reduced to 80% of operational speed change
1.d	3) Cruise performance	±.05 EPR or ±3% N1 or ±5% of torque. ±5% of fuel flow.	Cruise.	√			The test may be a single snapshot showing instantaneous fuel flow, or a minimum of two consecutive snapshots with a spread of at least 3 minutes in steady flight
1.f	**Engines**						
1.f	(1) Acceleration.	For type I, III and VI devices: ±10% Ti or ±1s; and ±10% Tt or ±1s. For type II and IV devices: ±10% Ti or ±1s; and ±10% Tt or ±1s.	Approach or landing.	√	C T & M	√	Ti = total time from initial throttle movement until a critical engine parameter reaches 10% of its total response above idle power. Tt = total time from initial throttle movement until a critical engine parameter reaches 90% of its total response above idle power. Total response is the incremental change in the critical engine parameter from idle power to go-around power. Refer to paragraph 3.1, Figure B-1, Appendix B of Doc 9625

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
1.f	(2) Deceleration	For type I, III and VI devices: ±10% Ti or ± 1 s; and ±10% Tt or ± 1 s. For type II and IV devices: ±10% Ti or ± 1 s; and ±10% Tt or ± 1 s.	Ground	√	C T & M	√	Ti = total time from initial throttle movement until a critical engine parameter reaches 10% of its total response below maximum take-off power. Tt = total time from initial throttle movement until a critical engine parameter reaches √0% of its total response below maximum take-off power. Total response is the incremental change in the critical engine parameter from maximum take-off power to idle power. Refer to paragraph 3.1, Figure B-2, Appendix B, of Doc 9625
2	**Handling Qualities**						
2.a	**Static Control Checks**						
	Note.- Testing of position versus force is not applicable if forces are generated solely by use of aeroplane hardware in the FSTD						
2.a	(1) Pitch controller position vs. force and surface position calibration. ………… Pitch controller position vs. force.	±0.9 daN (2 lbf) breakout. ±2.2 daN (5 lbf) or ±10% of force. ±2° elevator angle. …………….. ±0.9 daN (2 lbf) breakout. ±2.2 daN (5 lbf) or ±10% of force.	Ground ……… Approach	√ PPL CPL ……. CT &M MPL 1	…… CT &M	√	Uninterrupted control sweep to stops. Test results should be validated with in-flight data from tests such as engine-out trims, steady state side-slips, etc. ………………………………….. Control forces and travel should broadly correspond to that of the replicated class of aeroplane

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.a	(2) Roll controller position versus force and surface position calibration. Roll controller position versus force.	±0.9 daN (2 lbf) breakout. ±1.3 daN (3 lbf) or ±10% of force. ±2° aileron angle. ±3° spoiler angle. ±0.9 daN (2 lbf) breakout. ±1.3 daN (3 lbf) or ±10% of force.	Ground. Approach	√ PPL CPL C T &M MPL 1	CT &M	√	Uninterrupted control sweep to stops. Test results should be validated with in-flight data from tests such as engine-out trims, steady state side-slips, etc. Control forces and travel should broadly correspond to that of the replicated class of aeroplane.
2.a	(3) Rudder pedal position versus force and surface position calibration. Rudder pedal position versus force.	±2.2 daN (5 lbf) breakout. ±2.2 daN (5 lbf) or ±10% of force. ±2° rudder angle. ±2.2 daN (5 lbf) breakout. ±2.2 daN (5 lbf) or ±10% of force.	Ground. Approach.	√ PPL CPL C T &M MPL 1	C T &M	√	Uninterrupted control sweep to stops. Test results should be validated with in-flight data from tests such as engine-out trims, steady state side-slips, etc. Control forces and travel should broadly correspond to that of the replicated class of aeroplane.
2.a	(4) Nosewheel steering controller force and position calibration.	±0.9 daN (2 lbf) breakout. ±1.3 daN (3 lbf) or ±10% of force. ±2° NWA.	Ground.	√ PPL CPL C T &M MPL 1 √		√	Uninterrupted control sweep to stops.
2.a	(5) Rudder pedal steering calibration	±2° NWA.	Ground.	√		√	Uninterrupted control sweep to stops.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.a	(6) Pitch trim versus surface position calibration.	±1.0° trim angle.	Ground.	√	C T & M	√	
2.a	(7) Pitch trim rate.	±10% of trim rate (°/s) or ±0.1°/s trim rate.	Ground and approach.	√		√	Trim rate to be checked at pilot primary induced trim rate (ground) and autopilot or pilot primary trim rate in-flight at go-around flight conditions. For CCA, representative flight test conditions should be used.
2.a	(8) Alignment of cockpit throttle lever versus selected engine parameter.	When matching engine parameters: ±5° of TLA. When matching detents: ±3% N1 or ±.03 EPR or ±3% torque, or equivalent. Where the levers do not have angular travel, a tolerance of ±2 cm (±0.8 in) applies.	Ground.	√	C T & M	√	Simultaneous recording for all engines. The tolerances apply against aeroplane data. For aeroplanes with throttle detents, all detents to be presented and at least one position between detents/ endpoints (where practical). For aeroplanes without detents, end points and at least three other positions are to be presented. Data from a test aeroplane or engineering test bench are acceptable, provided the correct engine controller (both hardware and software) is used. In the case of propeller-driven aeroplanes, if an additional lever, usually referred to as the propeller lever, is present, it should also be checked. This test may be a series of snapshot tests.
2.a	(9) Brake pedal position versus force and brake system pressure calibration.	±2.2 daN (5 lbf) or ±10% of force.	Ground.	√	CPL PPL CT &M MPL 1	√	FSTD computer output results may be used to show compliance. Relate the hydraulic system pressure to pedal position in a ground static test. Both left and right pedals should be checked.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.c	**Longitudinal**						*Note; power setting may be that required for level flight unless otherwise specified.*
2.c	(1) Power change dynamics. OR for type II and IV devices: (1) Power change force.	±3 kt airspeed. ±30 m (100 ft) altitude. ±1.5° or ±20% of pitch angle. ±2.2 daN (5lbf) or ±20% of pitch controller force.	Approach.	√	C T & M CT & M	√	Power change from thrust for approach or level flight to maximum continuous or go-around power. Time history of uncontrolled free response for a time increment equal to at least 5 s before initiation of the power change to the completion of the power change + 15 s. CCA: Test in normal and non-normal control mode for type V and VII devices. For type I, II, III, IV and VI devices, test in normal mode only. Force tests (type II or IV devices) should provide the force required to maintain constant airspeed or altitude to complete the configuration change
2.c	(2) Flap change dynamics. OR for type II and IV devices: (2) Flap change force.	±3 kt airspeed. ±30 m (100 ft) altitude. ±1.5° or ±20% of pitch angle. ±2.2 daN (5 lbf) or ±20% of pitch controller force	Take-off through initial flap retraction, and approach to landing.	√	C T & M C T & M	√	Time history of uncontrolled free response for a time increment equal to at least 5 s before initiation of the reconfiguration change to the completion of the reconfiguration change + 15 s. CCA: Test in normal and non-normal control mode for type V and VII devices. For type I, II, III, IV and VI devices test in normal mode only. Force tests (type II or IV devices) should provide the force required to maintain constant airspeed or altitude to complete the configuration change.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.c	(3) Spoiler /speedbrake change dynamics.	±3 kt airspeed. ±30 m (100 ft) altitude. ±1.5° or ±20% of pitch angle.	Cruise.	√	C T & M	√	Time history of uncontrolled free response for a time increment equal to at least 5 s before initiation of the configuration change to the completion of the configuration change +15 s. Results required for both extension and retraction. CCA: Test in normal and non-normal control mode for type V and VII devices. For type I, II, III, IV and VI devices, test in normal mode only.
2.c	(4) Gear change dynamics. **OR** for type II and IV devices: (4) Gear change force.	±3 kt airspeed. ±30 m (100 ft) altitude. ±1.5° or ±20% of pitch angle. ±2.2 daN (5 lbf) or ±20% of pitch controller force.	Take-off: Retraction and Approach: Extension.	√	CT &M CT &M	√	Time history of uncontrolled free response for a time increment equal to at least 5 s before initiation of the configuration change to the completion of the configuration change + 15s. **CCA:** Test in normal and non-normal control mode for type V and VII devices. For type I,II,III, IV and VI devices, test in normal mode only. Force tests (type II or IV devices) should provide the force required to maintain constant airspeed or altitude to complete the configuration change.
2.c	(5) Longitudinal trim.	±2° elevator angle. ±1° stabilizer angle. ±2° pitch angle. ±5% of net thrust or equivalent. ±2° elevator angle. ±1° stabilizer angle. ±2° pitch angle. ±5% of net thrust or equivalent.	Cruise, approach and landing.	√	C T & M	√	Steady-state wings level trim with thrust for level flight. This test may be a series of snapshot tests. CCA: Test in normal or non-normal control mode, as applicable. Types I, III & VI may use pitch controller position instead of elevator angle and trim control position instead of stabilizer angle.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.c	(6) Longitudinal manoeuvring stability (stick force/g).	±2.2 daN (5 lbf) or ±10% of pitch controller force. Alternative method: ±1° or ±10% of the change of elevator angle.	Cruise, approach and landing.	√ PPL CPL CT &M MPL 1	CT &M	√	Continuous time history data or a series of snapshot tests may be used. Test up to approximately 30° of roll angle for approach and landing configurations. Test up to approximately 45° of roll angle for the cruise configuration. Force tolerance not applicable if forces are generated solely by the use of aeroplane hardware in the FSTD. Alternative method applies to aeroplanes which do not exhibit stick-force-per-g characteristics. For the Alternative method, Types I, III & VI may use pitch controller position instead of elevator angle. **CCA:** Test in normal and non-normal control mode for type V and VII devices. For type I, II, III, IV and VI devices, test in normal mode only.
2.c	(7) Longitudinal static stability	±2.2 daN (5 lbf) or ±10% of pitch controller force. Alternative method: ±1° or ±10% of the change of elevator angle.	Approach	√ PPL CPL CT &M MPL 1	CT &M	√	Data for at least two speeds above and two speeds below trim speed. The speed range should be sufficient to demonstrate stick force versus speed characteristics. This test may be a series of snapshot tests. Force tolerance is not applicable if forces are generated solely by the use of aeroplane hardware in the FSTD. Alternative method applies to aeroplanes which do not exhibit speed stability characteristics. For the alternative method, Types I, III & VI may use pitch controller position instead of elevator angle. **CCA:** Test in normal or non-normal control mode, as applicable.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.c	(8) Stall characteristics.	For type I, II, III, IV and VI devices (the manoeuvre need not include full stall): ±3 kt airspeed for stall warning	2nd segment climb and approach or landing.	√	CT &M	√	Wings-level (1 g) stall entry with thrust at or near idle power. Time history data should be shown to include full stall and initiation of recovery. Stall warning signal should be recorded and should occur in the proper relation to stall. FSTDs for aeroplanes exhibiting a sudden pitch attitude change or “g break” should demonstrate this characteristic. **CCA:** Test in normal and non-normal control mode for type V and VII devices, as applicable. For type I, II, III, IV and VI devices test in normal mode only, if applicable.
2.c	(9) Phugoid dynamics	For type I, II, III, IV and VI devices: ±10% of period, with representative damping.	Cruise	√	CT &M	√	Test should include three full cycles or that necessary to determine time to one half or double amplitude, whichever is less. **CCA:** Test in non-normal control mode.
2.d	**Lateral directional**						
2.d	(1) Minimum control speed, air (Vmca) or landing (Vmcl), per applicable airworthiness requirement or low speed engine inoperative handling characteristics in the air.	±3 kt air speed.	Take-off or landing (whichever is most critical in the aersoplane).				Minimum speed may be defined by a performance or control limit which prevents demonstration of Vmca or Vmcl in the conventional manner. Take-off thrust should be set on the operating engine(s). Time history or snapshot data may be used. For type I, II, III, IV and VI devices it is important that there exists a realistic speed relationship between Vmca (or Vmcl) and Vs for all configurations and in particular the most critical full-power engine out configuration. **CCA**: Test in normal or non-normal control state, as applicable.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.d	(2) Roll response (rate).	±2°/s or ±10% of roll rate. For aeroplanes with reversible flight control systems: ±1.3 daN (3 lbf) or ±10% of wheel force.	Cruise and approach or landing.	√ √ PPL CPL CT &M MPL 1	CT &M CT &M	√ √	Test with normal roll control displacement (approximately one-third of maximum roll controller travel). This test may be combined with step input of flight deck roll controller test 2.d.3.(Ref: Doc 9625).
2.d	(3) Step input of flight deck roll controller.	±2° or ±10% of roll angle.	Approach or landing.	√		√	With wings level, apply a step roll control input using approximately one third of maximum roll controller travel. At approximately 20° to 30° roll angle, abruptly return the roll controller to neutral and allow at least 10 s of aeroplane free response. This test may be combined with roll response (rate) test 2.d.2.(Ref Doc 9625). **CCA**: Test in normal and non-normal control mode for type V and VII devices. For type I, III and VI devices, test in normal mode only

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.d	(4) Spiral stability.	For type I, II, III, IV and VI devices: Correct trend and ±3° or ±10% of roll angle in 20 s.	Cruise and approach or landing	√	CT &M	√	Aeroplane data averaged from multiple tests may be used. Test for both directions. As an alternative test, show lateral control required to maintain a steady turn with a roll angle of approximately 30°. **CCA:** Test in non-normal control mode.
2.d	(5) Engine inoperative trim.	±1° rudder angle or ±1° tab angle or equivalent rudder pedal. ±2° side-slip angle.	2nd segment climb and approach or landing.	√		√	Test should be performed in a manner similar to that for which a pilot is trained to trim an engine failure condition. 2nd segment climb test should be at take-off thrust. Approach or landing test should be at thrust for level flight. This test may consist of snapshot tests. Type I, III & VI: Side-slip angle is matched only for repeatability and only on continuing recurrent evaluations.
2.d	(6) Rudder response.	±2°/s or ±10% of yaw rate. **Or** for type II and IV devices: ±2°/s or ±10% of yaw rate Or ±10% of heading change.	Approach and landing.	√	CT &M	√	Test with stability augmentation on and off. Test with a step input at approximately 25% of full rudder pedal throw. **CCA:** Test in normal and non-normal control mode for type V and VII devices. For type I, II,III, IV and VI devices, Test in normal mode only.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
2.d	(7) Dutch roll	For type I, III and VI devices: ±0.5 s or ±10% of period, with representative damping.	Cruise and approach or landing.	√		√	Test for at least six cycles with stability augmentation off. **CCA:** Test in non-normal control mode.
2.d	(8) Steady state side slip.	For a given rudder position: ±2° roll angle; ±1° side-slip angle; ±2° or ±10% of aileron angle; and ±5° or ±10% of spoiler or equivalent roll controller position or force. For aeroplanes with reversible flight control systems: ±1.3 daN (3 lbf) or ±10% of wheel force. ±2.2 daN (5 lbf) or ±10% of rudder pedal force.	Approach and landing.	√ PPL CPL CT &M MPL 1	CT &M CT &M	√ √	This test may be a series of snapshot tests using at least two rudder positions (in each direction for propeller-driven aeroplanes), one of which should be near maximum allowable rudder. For Type I, III & VI: Roll controller position instead of aileron angle may be used. Side-slip angle is matched only for repeatability and only on continuing recurrent evaluations.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
4.	**Visual System**						
4.a	**Visual Scene Quality**						
4.a.1	Continuous cross cockpit visual field of view.	Visual display providing each pilot with a minimum of 200° horizontal and 40° vertical continuous field of view.	Not applicable.	√ PPL CPL		√	Field of view should be measured using a visual test pattern filling the entire visual scene (all channels) consisting of a matrix of black and white 5° squares. Installed alignment should be confirmed in an SOC (this would generally consist of results from acceptance testing).
4.a.1 (ctd)	Display field of view.	Visual field-of-view for each pilot with a minimum of 45° horizontally and 30° vertically, unless restricted by the type of aeroplane, simultaneously for each pilot.	Not applicable.	√ MPL 1	√		The minimum distance from the pilot's eye position to the surface of a direct view display may not be less than the distance to any front panel instrument. 30° vertical field of view may be insufficient to meet the requirements of the visual ground segment (if required). This needs to be considered in the FOV calculation.
4.a.2. b	System geometry– Relative geometry.	Geometry of image should have no distracting discontinuities.		√	√	√	
4.a.3 (ctd)	Surface resolution (object detection).	Not greater than 4 arc minutes.	Not applicable.	√ PPL CPL		√	Resolution will be demonstrated by a test of objects shown to occupy the required visual angle in each visual display used on a scene from the pilot's eyepoint. The object will subtend 4 arc minutes to the eye. This may be demonstrated using threshold bars for a horizontal test. A vertical test should also be demonstrated. The subtended angles should be confirmed by calculations in an SOC.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
4.a.4 (ctd)	Light point size.	Not greater than 8 arc minutes.	Not applicable.	√ PPL CPL		√	Light point size should be measured using a test pattern consisting of a centrally located single row of white light points displayed as both a horizontal and vertical row. It should be possible to move the light points relative to the eyepoint in all axes. At a point where modulation is just discernible in each visual channel, a calculation should be made to determine the light spacing. An SOC is required to state test method and calculation.
4.a.5	Raster surface contrast ratio.	Not less than 5:1.	Not applicable.	√ PPL CPL		√	Surface contrast ratio should be measured using a raster drawn test pattern filling the entire visual scene (all channels). The test pattern should consist of black and white squares, 5° per square, with a white square in the centre of each channel. Measurement should be made on the centre bright square for each channel using a 1° spot photometer. This value should have a minimum brightness of 7cd/m2 (2 ft lamberts). Measure any adjacent dark squares. The contrast ratio is the bright square value divided by the dark square value. *Note 1. — During contrast ratio testing, FSTD aft-cab and flight deck ambient light levels should be as low as possible.* *Note 2. — Measurements should be taken at the centre of squares to avoid light spill into the measurement device.*

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
4.a.6	Light point contrast ratio.	Not less than 10:1.	Not applicable.	√ PPL CPL		√	Light point contrast ratio should be measured using a test pattern demonstrating an area of greater than 1° area filled with white light points and should be compared to the adjacent background. *Note. — Light point modulation should be just discernible on calligraphic systems but will not be discernable on raster systems.* Measurements of the background should be taken such that the bright square is just out of the light meter FOV. *Note. — During contrast ratio testing, FSTD aft-cab and flight deck ambient light levels should be as low as practical.*
4.a.7	Light point brightness.	Not less than 20 cd/m2 (5.8 ft-lamberts).	Not applicable.	√ PPL CPL		√	Light points should be displayed as a matrix creating a square. On calligraphic systems the light points should just merge. On raster systems the light points should overlap such that the square is continuous (individual light points will not be visible).
4.a.8	Surface brightness.	Not less than 14 cd/m2 (4.1 ft-lamberts) on the display.	Not applicable.	√ PPL CPL		√	Surface brightness should be measured on a white raster, measuring the brightness using the 1°spot photometer. Light points are not acceptable. Use of calligraphic capabilities to enhance raster brightness is acceptable.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
4.b	**Head-Up Display (HUD)**						
4.b.1	Static Alignment.	Static alignment with displayed image. HUD bore sight should align with the centre of the displayed image spherical pattern. Tolerance +/- 6 arc min.	Not applicable			√	Alignment requirement only applies to the pilot flying.
4.b.2	System display.	All functionality in all flight modes should be demonstrated.				√	A statement of the system capabilities should be provided and the capabilities demonstrated.
4.b.3	HUD attitude versus FSTD attitude indicator (pitch and roll of horizon).	Pitch and roll align with aircraft instruments.	Flight.			√	For type III and V: Alignment requirement only applies to the pilot flying.
4.c	**Enhanced Flight Vision System (EFVS)**						
4.c.1	Registration test.	Alignment between EFVS display and out of the window image should represent the alignment typical of the aircraft and system type.	Take-off point and on approach at 200 ft.			√	Alignment requirement only applies to the pilot flying. *Note. – The effects of the alignment tolerance in 4.b.1 should be taken into account.*
4.c.2	EFVS RVR and visibility calibration.	The scene represents the EFVS view at 350 m (1200 ft) and 160√ m (1 sm) RVR including correct light intensity.	Flight.			√	Infra-red scene representative of both 350 m (1200 ft), and 160√ m (1 sm) RVR. Visual scene may be removed.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
4.c.3	Thermal crossover.	Demonstrate thermal crossover effects during day to night transition.	Day & night.			√	The scene will correctly represent the thermal characteristics of the scene during a day to night transition.
4.d	**Visual Ground Segment**						
4.d.1	Visual ground segment (VGS).	Near end: the correct number of approach lights within the computed VGS should be visible. Far end: ±20% of the computed VGS. The threshold lights computed to be visible should be visible in the FSTD.	Trimmed in the landing configuration at 30 m (100 ft) wheel height above touchdown zone on glide slope at an RVR setting of 300 m (1000 ft) or 350 m (1200 ft).			√	This test is designed to assess items impacting the accuracy of the visual scene presented to a pilot at DH on an ILS approach. These items include: 1) RVR/Visibility; 2) glide slope (G/S) and localizer modelling accuracy (location and slope) for an ILS; 3) for a given mass, configuration and speed representative of a point within the aeroplane's operational envelope for a normal approach and landing; and 4) Radio altimeter. If a generic aeroplane is used as the basic model, a generic cut-off angle of 15˚ is assumed as an ideal. *Note. — If non homogeneous fog is used, the vertical variation in horizontal visibility should be described and included in the slant range visibility calculation used in the VGS computation.*

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
4.e	**Visual System Capacity**						
4.e.1	System capacity – Day mode.	Not less than: 10,000 visible textured surfaces, 6,000 light points, 16 moving models.	Not applicable.	√ PPL CPL		√	Demonstrated through use of a visual scene rendered with the same image generator modes used to produce scenes for training. The required surfaces, light points, and moving models should be displayed simultaneously.
4.e.2	System capacity – Twilight/night mode.	Not less than: 10,000 visible textured surfaces, 15,000 light points, 16 moving models.	Not applicable.	√ PPL CPL		√	Demonstrated through use of a visual scene rendered with the same image generator modes used to produce scenes for training. The required surfaces, light points, and moving models should be displayed simultaneously.
4.e.3	System capacity – Reduced FOV visual systems.	Not less than: 3,500 visible textured surfaces, 5,000 light points, 16 moving models.	Not applicable.	√ MPL 1	√		Demonstrated through use of a visual scene rendered with the same image generator modes used to produce scenes for training. The required surfaces, light points, and moving models should be displayed simultaneously. The stated capacity should be available in all time of day conditions. Applies only to Type I FSTD when used to support MPL1 training, and to Type II FSTD when used to support IR training, both applications allowing the use of a reduced FOV visual system.

ICAO NO	TEST	TOLERANCE	FLIGHT CONDITION	Type I	Type II	Type III	COMMENTS
6	**System Integration**						
6.a	**System Response Time**						
	(1) Transport delay.	200 milliseconds or less after controller movement.	Pitch, roll and yaw.	√	√	√	One separate test is required in each axis. Where EFVS systems are installed, the EFVS response should be within + or - 30 ms from visual system response, and not before motion system response. *Note. – The delay from the aeroplane EFVS electronic elements should be added to the 30 ms tolerance before comparison with visual system reference as described in Attachment G of this Part.*

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10. FUNCTIONS AND SUBJECTIVE TESTS

10.1 General

10.1.1 Accurate replication of aeroplane systems functions should be checked at each flight crew member position. This includes procedures using the AFM and checklists. Handling qualities, performance and FSTD systems operation will be subjectively assessed. Prior coordination with the CAAB for the evaluation is essential to ensure that the functions tests are conducted in an efficient and timely manner and that any skills, experience or expertise required by the evaluation team are available.

10.1.2 The necessity of functions and subjective tests arises from the need to confirm that the simulation has produced a totally integrated and acceptable replication of the aeroplane. Unlike the objective tests listed in Appendix B, the subjective testing should cover those areas of the flight envelope that may reasonably be reached by a trainee. Like the validation tests, the functions and subjective tests conducted during the initial evaluation are only a "spot check" and not a rigorous examination of the quality of the simulation in all areas of flight and systems operation. The operator should have completed the acceptance testing of the FSTD with support from the FSTD manufacturer prior to the device being submitted for the initial evaluation to be conducted by the CAAB evaluator(s).

10.1.3 At the request of an operator, the FSTD may be assessed for a special aspect of a relevant training programme during the functions and subjective portion of an evaluation. Such an assessment may include a portion of a LOFT (line-oriented flight training) scenario or special emphasis items in the training programme. Unless directly related to a requirement for the current qualification level, the results of such an evaluation would not affect the FSTD's current status.

10.1.4 Functions tests should be run in a logical flight sequence at the same time as performance and handling assessments. This also permits the FSTD to run for two to three hours in real time, without repositioning of flight or position freeze, thereby permitting proof of reliability. A useful source of guidance for conducting the functions and subjective tests is published in the RAeS *Aeroplane Flight Simulator Evaluation Handbook*, Volume II.

10.1.5 The FSTD should be assessed to ensure that repositions, resets and freezes support efficient and effective training.

10.1.6 The FSTD should be assessed to ensure that ATC environment simulation supports efficient and effective training.

10.2 Test Requirements

10.2.1 The ground and flight tests and other checks required for qualification are listed in the following Table of Functions and Subjective Tests. The table includes manoeuvres and procedures to ensure that the FSTD functions and performs appropriately for use in pilot training, testing and checking in the manoeuvres and procedures normally required of an approved training programme.

10.2.2 Manoeuvres and procedures are included to address some features of advanced technology aeroplanes and innovative training programmes. For example, "high angle of attack manoeuvring" is included to provide an alternative to "approach to stalls". Such an alternative is necessary for aeroplanes employing flight envelope limiting technology.

10.2.3 A representative selection of systems functions should be assessed for normal and, where appropriate, alternate operations. Normal, abnormal and emergency procedures associated with a flight phase should be assessed during the evaluation of manoeuvres or events within that flight phase. The effects of the selected malfunctions should be sufficient to correctly exercise the aeroplane related procedures, normally contained in a Quick Reference Handbook (QRH). Systems are listed separately under "any flight phase" to ensure appropriate attention to systems checks.

10.3 TABLE - C
FUNCTIONS AND SUBJECTIVE TESTS

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE I	TYPE II	TYPE III
1	**Preparation for Flight**			
1.a	**Pre-Flight.** Accomplish a functions check of all switches, indicators, systems and equipment at all crew members' and instructors' stations and determine that:			
1.a.2	The flight deck design and functions represent those of the simulated class of aeroplanes.	√		√
1.a.3	The flight deck design and functions are aeroplane-like and generic but recognizable as within a class of aeroplanes.		√	
2	**Surface Operations (Pre-Flight)**			
2.a	**Engine Start**			
2.a.1	Normal start.	√	√	√
2.a.2	Alternate start procedures.			√
2.a.3	Abnormal starts and shutdowns (hot start, hung start, tail pipe fire, etc.).	√		√
2.b	**Taxi**			
2.b.1	Pushback/power back.			√
2.b.2	Thrust response.	√	√	√
2.b.3	Power lever friction.	√	√	√
2.b.4	Ground handling.	√	√	√
2.c	**Brake Operation**			
2.c.1	Normal, automatic and alternate/emergency operation.	√	√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
3	**Take Off**			
	Note.- Only those take-off tests relevant to the simulated aeoplane type or class should be selected from the following list. Where testes should be made with limiting wind velocities, wind shear and with relevant system failure.			
3.a	**Normal**			
3.a.1	Aeroplane/engine parameter relationships, including run-up.	√	√	√
3.a.2	Nosewheel and rudder steering.	√	√	√
3.a.3	Crosswind (maximum demonstrated).	√	√	√
3.a.4	**Special performance**			
3.a.4.a	Reduced V1.			√
3.a.4.b	Maximum engine de-rate.			√
3.a.4.c	Soft surface.	√		√
3.a.4.d	Short field/short take-off and landing (STOL) operations.	√		√
3.a.4.e	Obstacle (performance over visual obstacle).	√		√
3.a.5	Low visibility take-off.		√	√
3.a.6	Landing gear, wing flap and leading edge device operation.	√	√	√
3.a.7	Contaminated runway operations.	√		√
3.b	**Abnormal/Emergency.**			
3.b.1	Rejected take-off.	√	√	√
3.b.2	Rejected special performance take-off (e.g. reduced V1, maximum engine de-rate, soft field, short field / short take-off and landing (STOL) operations, etc.)	√		√
3.b.3	Rejected take-off with contaminated runway.	√		√
3.b.4	Continued take-off with failure of most critical engine at most critical point.			√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
4	**Climb.**			
a	Normal.	√	√	√
4.b	One or more engine(s) inoperative.		√	√
5	**Cruise.**			
5.a	**Performance Characteristics (Speed Versus Power, Configuration, and Attitude).**			
5.a.1	Straight and level flight.	√	√	√
5.a.2	Change of airspeed.	√	√	√
5.a.3	High-altitude handling.			√
5.a.5	Overspeed warning (in excess of Vmo or Mmo).			√
5.a.6	High-IAS handling.			√
5.b	**Manoeuvres.**			
5.b.1	High angle of attack, approach to stalls, stall warning, buffet, and g-break (take-off, cruise, approach, and landing configuration).	√	√	√
5.b.2	Slow flight.	√		√
5.b.3	Spin.	√		√
5.b.4	Flight envelope protection (high angle of attack, bank limit, overspeed, etc.).			√
5.b.5	Turns with/without speedbrake/spoilers deployed.			√
5.b.6	Normal and standard rate turns.	√	√	√
5.b.7	Steep turns.	√	√	√
5.b.8	Performance turn.	√	√	√
5.b.9	In-flight engine shutdown and restart (assisted and windmill).			√
5.b.10	Manoeuvring with one or more engines inoperative.			√
5.b.11	Specific flight characteristics (e.g. direct lift control).			√
5.b.13	Gliding to a forced landing.	√		√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
5.b.14	**Visual Resolution and FSTD Handling and Performance for the Following:**			
5.b.14.a	Terrain accuracy for forced landing area selection.	√		√
5.b.14.b	Terrain accuracy for VFR Navigation.	√		√
5.b.14.c	Eights on pylons (visual resolution).	√		√
5.b.14.d	Turns about a point.	√		√
5.b.14.e	S-turns about a road or section line.	√		√
6	**Descent**			
6.a	Normal.	√	√	√
6.b	Maximum rate/emergency (clean, with speedbrakes, etc.).			√
6.c	With autopilot.	√	√	√
7	**Instrument Approaches and Landing**			
	Note. - Only those take-off tests relevant to the simulated aeoplane type or class should be selected from the following list. Where testes should be made with limiting wind velocities, wind shear (except for the CAT II and III precision approaches) and with relevant system failure.			
7.a	**Precision Approach**			
7.a.1	**CAT I Published Approaches**			
7.a.1.a	Manual approach with/without flight director including landing.		√	√
7.a.1.b	Autopilot/autothrottle coupled approach and manual landing.		√	√
7.a.1.c	Autopilot/autothrottle coupled approach, engine(s) inoperative.		√	√
7.a.1.d	Manual approach, engine(s) inoperative.		√	√
7.a.1.e	HUD/EFVS.			√
7.a.5	PAR approach, all engine(s) operating and with one or more engine(s) inoperative.		√	√
7.a.6	MLS, GBAS, all engine(s) operating and with one or more engine(s) inoperative.		√	√
7.b	**Non-Precision Approach.**			
7.b.1	Surveillance radar approach, all engine(s) operating and with one or more engine(s) inoperative.		√	√
7.b.2	NDB approach, all engine(s) operating and with one or more engine(s) inoperative.		√	√
7.b.3	VOR, VOR/DME, TACAN approach, all engines(s) operating and with one or more engine(s) inoperative.		√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
7.b.4	RNAV / RNP / GNSS (RNP at nominal and minimum authorized temperatures) approach, all engine(s) operating and with one or more engine(s) inoperative.		√	√
7.b.5	ILS LLZ (LOC), LLZ back course (or LOC-BC) approach, all engine(s) operating and with one or more engine(s) inoperative.		√	√
7.b.6	ILS offset localizer approach, all engine(s) operating and with one or more engine(s) inoperative.		√	√
7.c	**Approach Procedures with Vertical Guidance (APV), E.G. SBAS, Flight Path Vector.**			
7.c.1	APV / baro-VNAV approach, all engine(s) operating and with one or more engine(s) inoperative.		√	√
7.c.2	Area navigation (RNAV) approach procedures based on SBAS, all engine(s) operating and with one or more engine(s) inoperative.		√	√
8	**Visual approaches (segment) and landings.**			
8.a	Manoeuvring, normal approach and landing all engines operating, with and without visual and navigational approach aid guidance.	√		√
8.b	Approach and landing with one or more engine(s) inoperative.	√		√
8.c	Operation of landing gear, flap/slats and speedbrakes (normal and abnormal).	√		√
8.d	Approach and landing with crosswind (maximum demonstrated crosswind component).	√		√
8.g	Approach and landing from circling conditions (circling approach). *Note. – For Types III, V, VI and VII, this test requires as a minimum a representative airport scene that can provide a heading difference of 90°, or more, and 180°, or less, between approach and landing runways. Any associated hazard lights or any other visual aids for use as part of the published circling procedure should be included in the correct position(s) and be of the appropriate colour(s), directionality and behaviour. For Type II and Type IV, a generic airport model to be consistent with published data used for aeroplane operations may be used and should contain both the approach and landing runways and have the capability to light both at the same time. Any associated hazard lights or any other visual aids for use as part of the published circling procedure need to be included in the correct position(s) and be of the appropriate colour(s) and behaviour.*		√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
8.h	Approach and landing from visual traffic pattern.	√		√
8.i	Approach and landing from non-precision approach.		√	√
8.j	Approach and landing from precision approach.		√	√
9	**Missed Approach**			
9.a	All engines, manual and autopilot.	√	√	√
9.b	Engine(s) inoperative, manual and autopilot.	√	√	√
9.c	Rejected landing.	√	√	√
10	**Surface Operations (Landing, after Landing and Post Flight)**			
10.a	**Landing Roll and Taxi**			
10.a.1	HUD/EFVS.			√
10.a.2	Spoiler operation.	√	√	√
10.a.3	Reverse thrust operation.	√	√	√
10.a.4	Directional control and ground handling, both with and without reverse thrust.	√	√	√
10.a.5	Reduction of rudder effectiveness with increased reverse thrust (rear pod-mounted engines).			√
10.a.6	**Brake and Anti-Skid Operation:**			
10.a.6.b	Brake and anti-skid operation with dry and wet conditions.	√		√
10.a.6.c	Brake and anti-skid operation with dry conditions.		√	
10.a.6.d	Auto-braking system operation.			√
10.b	**Engine Shutdown and Parking.**			
10.b.1	Engine and systems operation.	√	√	√
10.b.2	Parking brake operation.	√	√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
11	**Any Flight Phase.**			
11.a	**Aeroplane and Engine Systems Operation (Where Fitted).**			
11.a.1	Air conditioning and pressurization (Environmental Control System).			√
1.a.2	De-icing/anti-icing.			√
11.a.3	Auxiliary engine / auxiliary power unit (APU).			√
11.a.4	Communications.	√	√	√
11.a.5	Electrical.	√	√	√
11.a.6	Fire and smoke detection and suppression.			√
11.a.7	Flight controls (primary and secondary).	√	√	√
11.a.8	Fuel and oil.	√	√	√
11.a.9	Hydraulic.	√	√	√
11.a.10	Pneumatic.	√	√	√
11.a.11	Landing gear.	√	√	√
11.a.12	Oxygen.			√
11.a.13	Engine.	√	√	√
11.a.14	Airborne radar.			√
11.a.15	Autopilot and flight director.	√	√	√
11.a.16	Terrain awareness warning systems and collision avoidance systems (e.g. EGPWS, GPWS, TCAS).	√	√	√
11.a.17	Flight control computers including stability and control augmentation.			√
11.a.18	Flight display systems.	√	√	√
11.a.19	Flight management systems.	√	√	√
11.a.20	Head-up displays (including EFVS, if appropriate).			√
11.a.21	Navigation systems.	√	√	√
11.a.22	Stall warning/avoidance.			√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
11.b	**Air Borne Procedure**			
11.b.1	Holding.	√	√	√
11.b.2	Air hazard avoidance (traffic, weather, including visual correlation).			√
11.b.3	**Wind Shear**			
11.b.3.a	Prior to take-off rotation.	√		√
11.b.3.b	At lift-off	√		√
11.b.3.c	During initial climb.	√		√
11.b.3.d	On final approach, below 150 m (500 ft) AGL.	√		√
12	**Visual System**			
12.a.1	**Airport Scenes**			
12.a.1.b	A minimum of one (1) real-world airport model to be consistent with published data used for aeroplane operations. This model should be acceptable to the operator's NAA and selectable from the IOS.	√		√
12.a.1.c	A minimum of one (1) generic airport model to be consistent with published data used for aeroplane operations. This model should be acceptable to the operator's NAA and selectable from the IOS.		√	
12.a.2	**Visual Scene Fidelity.**			
12.a.2.b	The fidelity of the visual scene should be sufficient for the aircrew to visually identify the airport; determine the position of the simulated aeroplane; successfully accomplish take-offs, approaches, and landings; and manoeuvre around the airport on the ground as necessary.	√		√
12.a.2.c	The fidelity of the visual scene should be sufficient for the aircrew to successfully accomplish take-offs, approaches, and landings.		√	
12.a.3	**Runways And Taxiways.**			
12.a.3.b	Representative runways and taxiways.	√		√
12.a.3.c	Generic runways and taxiways.		√	
12.a.5	Runway threshold elevations and locations should be modelled to provide correlation with aeroplane systems (e.g. HUD, GPS, compass, altimeter).	√	√	√
12.a.7	**Runway Surface And Markings For Each "In-Use" Runways Should Include The Following, If Appropriate:** *Note: the feature, if required, should be representative for types I and III and generic for types II and IV.*			
12.a.7.a	Threshold markings.	√	√	√
12.a.7.b	Runway numbers.	√	√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
12.a.7.c	Touchdown zone markings.	√		√
12.a.7.d	Fixed distance markings.	√		√
12.a.7.e	Edge markings.	√		√
12.a.7.f	Centre line markings.	√	√	√
12.a.7.i	Windsock that gives appropriate wind cues.	√	√	√
12.a.8	**Runway Lighting Of Appropriate Colours, Directionality, Behaviour And Spacing For "In-Use" Runways Including The Following:** *Note: the feature, if required, should be representative for Types I and III and generic for Types II and IV.*			
12.a.8.a	Threshold lights.	√	√	√
12.a.8.b	Edge lights.	√	√	√
12.a.8.c	End lights.	√	√	√
12.a.8.d	Centre line lights.	√	√	√
12.a.8.e	Touchdown zone lights.	√	√	√
12.a.8.g	Appropriate visual landing aid(s) for that runway.	√	√	√
12.a.8.h	Appropriate approach lighting system for that runway.	√	√	√
12.a.9	**Taxiway Surface And Markings (Associated With Each "In-Use" Runway):***Note: the feature, if required, should be representative for Types I and III and generic for Types II and IV.*			
12.a.9.a	Edge markings	√	√	√
12.a.9.b	Centre line markings.	√	√	√
12.a.9.c	Runway holding position markings.	√	√	√
12.a.9.d	ILS critical area markings.		√	
12.a.10	**taxiway lighting of appropriate colours, directionality, behaviour and spacing (associated with each "in-use" runway):** *Note: the feature, if required, should be representative for Types I and III and generic for Types II and IV.*			
12.a.10.a	Edge lights.	√	√	√
12.a.10.b	Centre line lights.	√	√	√
12.a.10.c	Runway holding position and ILS critical area lights.	√	√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
12.a.11	**Required Visual Model Correlation with Other Aspects of the Airport Environment Simulation.**			
12.a.11 .a	The airport model should be properly aligned with the navigational aids that are associated with operations at the runway "in-use".	√	√	√
12.a.12	**Airport Buildings, Structures and Lightings**			
12.a.12 .a.2	Representative airport buildings, structures and lighting.	√		√
12.a.12 a.3	Generic airport buildings, structures and lighting.		√	
12.a.13	**Terrain and Obstacles.**			
12.a.13 .b	Representative depiction of terrain and obstacles within 46 km (25 NM) of the reference airport.	√		√
12.a.14	**Significant, Identifiable Natural and Cultural Features.**			
12.a.14 .b	Representative depiction of significant and identifiable natural and cultural features within 46 km (25 NM) of the reference airport. *Note. – This refers to natural and cultural features that are typically used for pilot orientation in flight. Outlying airports not intended for landing need only provide a reasonable facsimile of runway orientation.*	√		√
12.a.14 .c	Representative moving airborne traffic (including the capability to present air hazards – e.g. airborne traffic on a possible collision course).		√	
12.b	**Visual Scene Management.**			
12.b.2	Airport runway, approach and taxiway lighting and cultural lighting intensity for any approach should be set at an intensity representative of that used in training for the visibility set; all visual scene light points should fade into view appropriately.	√	√	√
12.c	**Visual Feature Recognition.** *Note. – The following are the minimum distances at which runway features should be visible. Distances are measured from runway threshold to an aeroplane aligned with the runway on an extended 3-degree glide slope in suitable simulated meteorological conditions. For circling approaches, all tests below apply both to the runway used for the initial approach and to the runway of intended landing.*			
12.c.1	Runway definition, strobe lights, approach lights, and runway edge white lights from 8 km (5 sm) of the runway threshold.	√	√	√
12.c.2	**Visual Approach Lights.**			
12.c.2. b	Visual approach aids lights from 4.8 km (3 sm) of the runway threshold.	√	√	√
12.c.3	Runway centre line lights and taxiway definition from 4.8 km (3 sm).	√	√	√

12.c.4	Threshold lights and touchdown zone lights from 3.2 km (2 sm).	√	√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
12.c.6	For circling approaches, the runway of intended landing and associated lighting should fade into view in a non-distracting manner.		√	
12.d	**Selectable Airport Visual Scene Capability For:**			
12.d.3	Day.	√	√	√
12.d.4	Dynamic effects - the capability to present multiple ground and air hazards such as another aeroplane crossing the active runway or converging airborne traffic; hazards should be selectable via controls at the instructor station.		√	
12.e	**Correlation With Aeroplane And Associated Equipment.**			
12.e.1	Visual cues to relate to actual aeroplane responses.	√	√	√
12.e.2	**Visual Cues During Take-Off, Approach And Landing.**			
12.e.2.a	Visual cues to assess sink rate and depth perception during landings.	PPL		
12.e.2.b	Visual cueing sufficient to support changes in approach path by using runway perspective. Changes in visual cues during take-off, approach and landing should not distract the pilot.	MP L1 CPL	√	√
12.e.3	Accurate portrayal of environment relating to aeroplane attitudes.	√	√	√
12.e.4	The visual scene should correlate with integrated aeroplane systems, where fitted (e.g. terrain, traffic and weather avoidance systems and HUD/EFVS).			√
12.f	**Scene Quality.**			
12.f.1	**Quantization.**			
12.f.1.b	Surfaces and textural cues should not create distracting quantization (aliasing).	√	√	√
12.f.2	System capable of portraying full colour realistic textural cues.	√	√	√
12.f.3	The system light points should be free from distracting jitter, smearing or streaking.	√	√	√
12.f.5	System capable of providing light point perspective growth.	√		√
12.g	**Environmental effects.**			
12.g.7	Visibility and RVR measured in terms of distance. Visibility/RVR should be checked at and below a height of 600 m (2000 ft) above the airport and within a radius of 16 km (10 sm) from the airport . *Note. – RVR only required for Types V, VI and VII.*	√	√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
14	**Sound System.**			
14.c	Significant aeroplane noises perceptible to the pilot during normal operations, such as engine, propeller, flaps, gear, anti-skid, spoiler extension/retraction, thrust reverser to a comparable level of that found in the aeroplane.	√	√	√
14.d	Abnormal operations for which there are associated sound cues including, but not limited to, engine malfunctions, landing gear/tyre malfunctions, tail and engine pod/propeller strike and pressurization malfunction.	√	√	√
14.e	Sound of a crash when the FSTD is landed in excess of limitations.	√	√	√
15	**Special Effects.**			
15.b.	Effects of airframe and engine icing.		√	
16	**Air Traffic Control (ATC) Environment Simulation System.**			
16.c	Automated weather reporting.		√	
16.d	Party-line (background chatter).		√	
16.j	Phraseology.		√	
16.k	Flight phase specific ATC frequency recognition.		√	
16.m	Instructor over-ride of the system.		√	
17	**Instructor Operating Station.**			
17.a	Repositions (repositions should be in-trim at the appropriate speed and configuration for the point):			
17.a.1	Ramp/gate.	√	√	√
17.a.2	Take-off.	√	√	√
17.a.3	Approach.	√	√	√
17.b	**Resets.**			
17.b.1	System.	√	√	√
17.b.2	Temperature.	√	√	√
17.b.3	Fluids and agents.	√	√	√
17.c	**Environment.**			
17.c.1	**Weather Presets.**			
17.c.1.b	Unlimited, CAVOK, VFR.	√	√	√
17.c.2	**Visual Effects.**			
17.c.2.c	Time of day (day, dusk, night); clouds (bases, tops); visibility in kilometers/statute miles.	√	√	√

ICAO NO	FUNCTIONS AND SUBJECTIVE TESTS	TYPE		
		I	II	III
17.c.3	**Wind.**			
17.c.3.a	Surface.	√	√	√
17.c.3.e	Turbulence.	√	√	√
17.c.4	Temperature – surface.	√	√	√
17.c.5	Atmospheric pressure (QNH, QFE).	√	√	√
17.d	**Airport.**	√	√	√
17.d.1	**Runway Selection.**			
17.d.1.b	To include active runway selection.	√	√	√
17.d.2	**Airport Lighting.**			
17.d.2.b	Airport lighting.	√	√	√
17.d.3	Dynamic effects including ground and flight traffic.		√	
17.e	Aeroplane configuration (fuel, weight, cg, etc.).	√	√	√
17.f	FMS - reloading of programmed data unless precluded by installed equipment.	√	√	√
17.g	Plotting and recording (take-off and approach).		√	
17.h	Malfunctions (inserting and removing).	√	√	√

11. QUALITY AND ASSURANCE SYSTEM

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

11.1 Quality System:

11.1.1 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 actions as necessary.

11.1.2 The Quality System shall include a Quality Assurance Programme 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.

11.1.3 The Quality System and the Quality Manager shall be acceptable to CAAB.

11.1.4 The Quality System shall be described in relevant documentation.

11.2 Updating:

A link shall be maintained between the operator's organization, CAAB and the relevant Manufacturer's to incorporate important modifications, especially:

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

11.2.2 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) CAAB 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.

11.2.3 Operators shall maintain a link between their own organization, CAAB and the manufacturer to incorporate important modifications.

11.3 Installations:

11.3.1 Ensure that the FSTD is housed in a suitable environment that supports safe and reliable operation.

11.3.2 The FSTD operator shall ensure that the FSTD and its installation comply with the local regulations for health and safety. 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.

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

11.4 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.

Air Vice Marshal Mahmud Hussain, ndc, psc
Chairman
Civil Aviation Authority, Bangladesh

ATTACHMENT-A

Request For

INITIAL, RENEWAL, UP-GRADATION, RE-INSTATEMENT EVALUATION OF FSTD.
(Sample)

Date:

Chairman,
Civil Aviation Authority, Bangladesh,
Civil Aviation Head Quarter,
HSIA Airport, Kurmitola,
Dhaka.

Attn: Director Flight Safety and Regulation

SUB: Request for Initial/Renewal/Up-gradation/Re-instatement Evaluation Date

Dear Sir,

This is to inform you of our intent to request an initial (or Renewal/Up-gradation/Re-instatement) evaluation of our (FSTD Manufacturer and Type), (Aircraft Type/FSTD Level) Flight Simulation Training Device (FSTD), (FAA ID Number, if previously qualified), located in (Address) on (Proposed Evaluation Date), (The proposed evaluation date shall not be more than 180 days and less than 90 days following the date of this letter.) The FSTD will be sponsored by (Name of ATO/Air Operator). The FSTD will be sponsored as follows, (√ the appropriate box (s):

☐ The FSTD will be used within the sponsor's CAAB approved training program and placed in the sponsor's Training/Operations Specifications; or

☐ The FSTD will be used for dry lease only.

We agree to provide the formal request for the evaluation to you as follows, (Select one):

☐ For QTG tests run at the factory, not later than 45 days prior to the proposed evaluation date with the additional "1/3 on-site" tests not later than 30 days prior to the proposed evaluation date.

☐ For QTG tests run on-site, not later than 30 days prior to the proposed evaluation date.

The formal request will contain the following documents:

1. Sponsor's Letter of Request *(Company Compliance Letter);*
2. Principal Operations Inspector (POI)'s endorsement;
3. Evidences of Completion of QTG.

If *we are unable to meet the above requirements, we understand this may result in a significant delay, perhaps 45 days or more, in rescheduling and completing the evaluation.*

(The sponsor should add additional comments as necessary).

Please contact (Name, Telephone and Email of Sponsor's Contact) to confirm the date for this initial evaluation. We understand that a member of CAAB evaluation team will respond to this request within 21days.

A copy of this letter of intent has been provided to (Name), the Principal Operations Inspector (POI)

Sincerely,

(Name of the Authorized Person)

Attachment: FSTD Information and
Characteristics Form (Attachment B)

CC: Principal Operations Inspector (POI).

ATTACHMENT-B

FSTD INFORMATION FORM
(Sample)

<table>
<tr><td>Ref:</td><td colspan="3"></td><td>Date</td><td colspan="2"></td></tr>
<tr><td colspan="7">1.1 General</td></tr>
<tr><td>Sponsor Name</td><td colspan="3"></td><td>FSTD Location</td><td colspan="2"></td></tr>
<tr><td>Sponsor Address</td><td colspan="3"></td><td>FSTD
Physical Address</td><td colspan="2"></td></tr>
<tr><td>Country</td><td colspan="3"></td><td>Country</td><td colspan="2"></td></tr>
<tr><td>Accountable Manager</td><td colspan="3"></td><td>Nearest Airport</td><td colspan="2"></td></tr>
<tr><td colspan="7">1.2 Information Regarding Evaluation</td></tr>
<tr><td colspan="4">Type of Evaluation Requested</td><td colspan="3">☐ Initial ☐ Renewal ☐ Up-gradation
☐ Re-instatement ☐ Any Other (Specify)</td></tr>
<tr><td>Aircraft Make/model/series</td><td colspan="6">a)
b)
c)</td></tr>
<tr><td rowspan="2">Initial Qualification (If Applicable)</td><td colspan="2">Date</td><td>Level</td><td rowspan="2" colspan="2">Manufacturer's Identification or Serial Number</td><td rowspan="2"></td></tr>
<tr><td colspan="2">DD/MM/YYYY</td><td></td></tr>
<tr><td rowspan="2">Upgrade Qualification (If Applicable)</td><td colspan="2">Date</td><td>Level</td><td rowspan="2" colspan="2">☐ MQTG</td><td rowspan="2"></td></tr>
<tr><td colspan="2">DD/MM/YYYY</td><td></td></tr>
<tr><td rowspan="2">Qualification Basic (ICAO)</td><td>☐ Type I</td><td colspan="2">☐ Type II</td><td colspan="2">☐ Interim Certificate</td><td></td></tr>
<tr><td>☐ Type III</td><td colspan="2">☐ (Specify)</td><td colspan="2">☐ Provisional Status</td><td></td></tr>
<tr><td colspan="7">1.3 Technical Information</td></tr>
<tr><td>FAA FSTD ID No (If Applicable)</td><td colspan="3"></td><td colspan="2">FSTD Manufacturer</td><td></td></tr>
<tr><td>Convertible FSTD</td><td colspan="3">☐ Yes</td><td colspan="2">Date of Manufacture</td><td></td></tr>
<tr><td>FAA Qualification Level (If Applicable)</td><td colspan="3"></td><td colspan="2">Sponsor FSTD ID No</td><td></td></tr>
<tr><td>Engine Model(s)</td><td colspan="3">a)
b)</td><td colspan="2">Source Of Aerodynamic Model</td><td></td></tr>
<tr><td>FMS and NAV data Identification</td><td colspan="3"></td><td colspan="2">Source Of Aerodynamic Coefficient Data</td><td></td></tr>
<tr><td>Visual System Manufacturer/Model</td><td colspan="3"></td><td colspan="2">Aerodynamic Data Revision Number</td><td></td></tr>
<tr><td>Flight Control Data Revision</td><td colspan="3"></td><td colspan="2">Visual System Display</td><td></td></tr>
</table>

Motion System Manufacturer/Type		FSTD Computer(s) Identification	

Visual System Manufacturer and Type		FSTD Seats Available:		Motion System Manufacturer and Type	
Type of Aircraft Flight Instruments:	☐ EFIS ☐ HUD ☐ HGS ☐ EFVS ☐ TCAS ☐ GPWS ☐ GPS ☐ FMS ☐ Plain View ☐ Wx-Radar ☐ Others		Engine Type and Model Engine Instruments:	☐ EICAS ☐ FADEC ☐ Others	

1.4 CAAB Qualification			
CAAB FSTD ID No		Last CAAB Evaluation Date	
CAAB Qualification Level		CAAB Qualification Basis	
1.5 Airport Model			
Circle to Land	Airport Designator	Airport Designator	Airport Designator
Visual Segment	Airport Designator	Airport Designator	Airport Designator
Ground Segment	Airport Designator	Airport Designator	Airport Designator

2.1 Supplementary Information			
FAA Training Program Approval Authority:		Principal Operation Inspector:	
Name		Name	
Address		Address	
Tel		Tel	
Email		Email	
Operator FSTD Manager (Authorized Person):		Operator FSTD Technical Manager:	
Name		Name	
Address		Address	
Tel		Tel	
Email		Email	

2.2 Exercises		
Area/Function/Maneuver	**Requested**	**Remarks**
Private Pilot: Training / Checks	☐	
Commercial Pilot: Training /Checks	☐	
Multi-Engine Rating: Training / Checks	☐	
Instrument Rating: Training / Checks	☐	
Type Rating: Training / Checks	☐	

Proficiency Checks	☐	
CAT I: (RVR 800m, DH200 ft)	☐	
Circling Approach	☐	
Windshear Training: Mild, Moderate, Severe	☐	
Unusual Attitudes and Recoveries within the Normal Flight Envelope	☐	
Specific Unusual Attitudes Recoveries	☐	
Auto-coupled Approach/Auto Go Around	☐	
Auto-land / Roll Out Guidance	☐	
TCAS/ACAS I/ II	☐	
WX-Radar	☐	
HUD	☐	
HGS	☐	
EFVS	☐	
Future Air Navigation Systems	☐	
GPWS/EGPWS	☐	
ETOPS Capability	☐	
GPS	☐	
SMGCS	☐	

ATTACHMENT-C

LETTER OF COMPLIANCE
(Sample)

Date:

Chairman,
Civil Aviation Authority, Bangladesh,
Civil Aviation Head Quarter,
HSIA Airport, Kurmitola,
Dhaka.

Attn: Director Flight Safety and Regulation

SUB: Letter of Compliance

Dear Sir,

(Operator/Sponsor Name) requests evaluation of our (Aircraft Type) FSTD for Type ( ) qualification. The (FSTD Manufacturer Name) FSTD with (Visual System Manufacturer Name/Model) system is fully defined on the FSTD Information page of the accompanying Qualification Test Guide (QTG). We have completed the tests of the FSTD and certify that it meets all applicable requirements of ANO (OPS) A-7 (A) and the associated guidance. Appropriate hardware and software configuration control procedures have been established. Our Pilot(s), (Name(s)), who is/are qualified on (Aircraft Type) aircraft have assessed the FSTD and have found that it conforms to the (Operator/Sponsor) (Aircraft Type) flight deck configuration and that the simulated systems and subsystems function equivalently to those in the aircraft. The above named pilot(s) have also assessed the performance and the flying qualities of the FSTD and found that it represents the respective aircraft.

(Further Comments may be placed here)

Sincerely,

(FSTD Manager)

CC: Principle Operation Officer (POI)

ATTACHMENT-D

QUALIFICATION TEST GUIDE
(COVER PAGE)
(Sample)

SPONSOR NAME

SPONSOR ADDRESS

FAA QUAUFICATION TEST GUIDE (SPECIFIC AIRPLANE MODEL)

(for example)
Cirrus 20
(Type of FSTD)

(FSTD Identification Including Manufacturer, Serial Number, Visual System Used)

(Level of FSTD)
(Qualification Performance Standard Used)
(FSTD Location)

FAA Initial Evaluation

Manager (Name),
National Simulator Program, FAA

ATTACHMENT-E

QUALIFICATION OF CERTIFICATE
(Sample)

CIVIL AVIATION AUTHORITY BANGLADESH

FSTD

CERTIFICATE OF QUALIFICATION

This is to certify that Civil Aviation Authority Bangladesh
Completed an Evaluation of the

Arirang Aviation Ltd
Cirrus 20 Flight Simulation Training Device
FAA Identification Number ( )
CAAB Identification Number ( )

And pursuant to CAR 84 and ANO (OPS) A-7(A) found it to have met its original qualification basis, (MM/DD/YY)

The Master Qualification Test Guide and the attached
Configuration List and Restrictions List
Provide the Qualification Basis for this device to operate as
ICAO FSTD TYPE ( )

Until (Date)

Unless sooner rescinded or extended by the CAAB

(Date)

(Name)
Chairman
Civil Aviation Authority Bangladesh

ATTACHMENT-F

STATEMENT OF QUALIFICATIONS

List of Qualified Tasks
(Sample)

(Arirang Aviation Limited—Cirrus-20 –ICAO FSTD Type-------FAA ID No-----CAAB ID No------)

The FSTD is qualified to perform all of the tasks listed in
Table A-I
for its assigned level of qualification *except* for the following listed tasks.

Qualified for all tasks in Table A-I, for which the sponsor has requested qualification, except for the following:

FAA 6.1	Eights on pylons;
FAA 9.4.1	Approach Cat II and Cat III;
FAA 14.1	Fire/smoke in aircraft;
FAA 14.4	Emergency Descent (maximum rate)

Additional tasks for which this FTD is qualified (i.e., in addition to the list in Table A-I) (Endorse list here)

Signed:
CAAB Evaluation Team Leader Date
(Seal)

ATTACHMENT-G

CONTINUING QUALIFICATION EVALUATION REQUIREMENTS
(Sample)

Continuing Qualification Evaluation Requirements ***Completed at conclusion of Initial Evaluation***	
Continuing qualification Evaluations to be conducted Each: (fill in) months, OR Allotting (Hours) of FSTD time (Whichever is earlier) Signed: CAAB Evaluation Team Leader (Seal)	Continuing qualification evaluations are due as Follows: (month) and (month) and (month) (Enter or strike out, as appropriate) Date
Revision: Based on (enter reasoning):	
Continuing qualification Evaluations to be conducted Each (fill in) months, OR Allotting (Hours) of FSTD time (whichever is earlier) Signed: CAAB Evaluation Team Leader (Seal)	Continuing qualification evaluations are due as Follows: (month) and (month) and (month) (enter or strike out, as appropriate) Date

(Repeat as Necessary)