	Flight Operations Standards Department **Flight Crew Licensing and Training Section - Flight Synthetic Training Devices (FSTDs)** **Flight and Navigation Procedures Trainer (FNPT) Qualification Checklist**

• **FNPT Operator Name**				
• **FNPT Qualification Level**	□ **FNPT I**	□ **FNPT II**	□ **FNPT II with MCC**	
• **FNPT Qualification Type**	□ Initial Qualification	□ Qualification renewal	□ Variation	□ Re-location
• **FNPT Manufacturer Name**				
• **FNPT Serial No**				
• **FNPT Qualification Number**				
• **FNPT Qualification Expiry Date**				

A. Flight and Navigation Procedures Trainer (FNPT) General Technical Requirements.

Qual. Level	General Technical Requirements	Result YES	Result NO
FNPT I	A cockpit/flight deck sufficiently enclosed to exclude distraction, which will replicate that of the airplane or class of airplane simulated and in which the navigation equipment, switches and the controls will operate as, and represent those in, that airplane or class of airplane.		
	An instructor's station with seat shall be provided and shall provide an adequate view of the crewmembers panels and station		
	Effects of aerodynamic changes for various combinations of drag and thrust normally encountered in flight, including the effect of change in airplane attitude, sideslip, altitude, temperature, gross mass, centre of gravity location and configuration		
	Complete navigational data for at least 5 different European airports with corresponding precision and non-precision approach procedures including current updating within a period of 3 months		
	Stall recognition device corresponding to that of the replicated airplane or class of airplane		
FNPT II	As for Type I with the following additions or amendments		
	An enclosed flight deck, including the instructor's station		
	Crew members' seats shall be provided with sufficient adjustment to allow the occupant to achieve the design eye reference position appropriate to the airplane or class of airplane and for the visual system to be installed to align with that eye position		
	Control forces and control travels which respond in the same manner under the same flight conditions as in the airplane or class of airplane being simulated		
	Circuit breakers shall function accurately when involved in procedures or malfunctions requiring or involving flight crew response		
	Aerodynamic modeling shall reflect: (a) the effects of airframe icing; (b) The rolling moment due to yawing.		
	A generic ground handling model shall be provided to enable representative flare and touchdown effects to be produced by the sound and visual systems.		
	Systems shall be operative to the extent that it shall be possible to perform all normal, abnormal and emergency operations as may be appropriate to the airplane or class of airplanes being simulated and as required for the training.		
	Significant cockpit/flight deck sounds.		
	A visual system (night/dusk or day) capable of providing a field-of-view of a minimum of 45 degrees horizontally and 30 degrees vertically, unless restricted by the type of airplane, simultaneously for each pilot. The visual system need not be collimated.		
	The responses of the visual system and the flight deck instruments to control inputs shall be closely coupled to provide the integration of the necessary cues.		

Qual. Level	General Technical Requirements	Result	
		YES	NO
FNPT II - MCC	For MCC (Multi Crew Co-operation) minimum technical requirements are as for Level II, with the following additions or amendments:		
	Turbo-jet or turbo-prop engines.		
	Performance reserves, in case of an engine failure, to be in accordance with JCAR-25. These may be simulated by a reduction in the airplane gross mass.		
	Retractable landing gear.		
	Pressurization system.		
	De-icing systems		
	Fire detection / suppression system		
	Dual controls		
	Autopilot with automatic approach mode		
	2 VHF transceivers including oxygen masks intercom system		
	2 VHF NAV receivers (VOR, ILS, DME)		
	1 ADF receiver		
	1 Marker receiver		
	1 transponder		

The following indicators shall be located in the same positions on the instrument panels of both pilots	Result	
	YES	NO
Airspeed		
Flight attitude with flight director		
Altimeter		
Flight director with ILS (HSI)		
Vertical speed		
ADF		
VOR		
Marker indication (as appropriate)		
Stop watch (as appropriate)		

Remarks	

Inspector Name	Date	Signature

B. Flight and Navigation Procedures Trainer (FNPT) Qualification Requirements.

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

Requirements		FFS Level			Statement of Compliance	YES	
		I	II	II-MCC		YES	NO
1	**General**						
a	A cockpit/flight deck sufficiently enclosed to exclude distraction, which will replicate that of the airplane or class of airplane simulated	**X**	**X**	**X**			
b	Cockpit/flight deck switches, instruments, equipment, panels, systems, primary and secondary flight controls sufficient for the training events to be accomplished shall be located in a spatially correct flight deck area and will operate as, and represent those in, that airplane or class of airplane	**X**	**X**	**X**	For Multi-Crew Co-operation (MCC) qualification additional instrumentation and indicators may be required. See table at start of this appendix.		
c	Crewmembers seats shall be provided with sufficient adjustment to allow the occupant to achieve the design eye reference position appropriate to the airplane or class of airplane and for the visual system to be installed to align with that eye position		**X**	**X**			
d	Circuit breakers that affect procedures and/or result in observable cockpit indications properly located and functionally accurate		**X**	**X**			
e	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 airplane attitude, sideslip, thrust, drag, altitude, temperature, gross weight, moments of inertia, centre of gravity location, and configuration	**X**	**X**	**X**	For FNPTs and BITDs class specific modeling is acceptable.		
f	All relevant instrument indications involved in the simulation of the applicable airplane shall automatically respond to control movement by a flight crewmember or induced disturbance to the simulated airplane; e.g., turbulence or wind shear	**X**	**X**	**X**	For FNPTs instrument indications sufficient for the training events to be accomplished. Reference AC No. 3 to JCAR-FSTD A.030.		

	Requirements	FFS Level			Statement of Compliance	YES	
		I	II	II-MCC		YES	NO
g	Lighting environment for panels and instruments shall be sufficient for the operation being conducted	X	X	X			
h	Navigation equipment corresponding to that of the replicated airplane or class of airplanes, with operation within the tolerances prescribed for the actual airborne equipment. This shall include communication equipment (interphone and air/ground communications systems)	X	X	X			
i	Navigational data with the corresponding approach facilities. Navigation aids should be usable within range without restriction	X	X	X	For FNPTs and BITDs complete navigational data for at least 5 different airports with corresponding precision and non-precision approach procedures including current updating within a period of 6 months		
j	In addition to the flight crewmember duty stations, three suitable seats for the instructor, delegated examiner and CARC inspector. CARC will consider options to this standard based on unique cockpit configurations. These seats shall provide adequate vision to the pilot's panel and forward windows. Observer seats need not represent those found in the airplane but in the case of FSTDs fitted with a motion system, the seats shall be adequately secured to the floor of the FSTD, fitted with positive restraint devices and be of sufficient integrity to safely restrain the occupant during any known or predicted motion system excursion	X	X	X	For FTDs and FNPT's suitable seating arrangements for the Instructor and Examiner or CARC Inspector should be provided.		
k	FSTD systems shall simulate applicable airplane system operation, both on the ground and in flight. Systems shall be operative to the extent that all normal, abnormal, and emergency operating procedures can be accomplished.		X	X	For FNPTs systems shall be operative to the extent that it shall be possible to perform all normal, abnormal and emergency operations as may be appropriate to the airplane or class of airplanes being simulated and as required for the training		
l	Instructor controls shall enable the operator to control all required system variables and insert abnormal or emergency conditions into the airplane systems	X	X	X	Where applicable and as required for training the following shall be available : - Position and flight freeze. - A facility to enable the dynamic plotting of the flight path on approaches, commencing at the final approach fix, including the vertical profile - Hard copy of map and approach plot		

	Requirements	FFS Level			Statement of Compliance	YES	
		I	II	II-MCC		YES	NO
m	Control forces and control travel shall correspond to that of the replicated airplane. Control forces shall react in the same manner as in the airplane under the same flight conditions	X	X	X	For FNPT Level I and BITDs control forces and control travel shall broadly correspond to that of the replicated airplane or class of airplane. Control force changes due to an increase/decrease in aircraft speed are not necessary. In addition for FNPT Level II and MCC control forces and control travels shall respond in the same manner under the same flight conditions as in the airplane or class of airplane being simulated		
n	Ground handling and aerodynamic programming shall include: (1) Ground Effect. For example: round-out, flare, and touchdown. This requires data on lift, drag, pitching moment, trim, and power ground effect. (2) Ground reaction – reaction of the airplane upon contact with the runway during landing to include strut deflections, tire friction, side forces, and other appropriate data, such as weight and speed, necessary to identify the flight condition and configuration. (3) Ground handling characteristics – steering inputs to include crosswind, braking, thrust reversing, deceleration and turning radius		X	X	Statement of Compliance required. Tests required. For FNPTs a generic ground handling model need only be provided to enable representative flare and touchdown effects		
o	Instructor controls for environmental effects including wind speed and direction shall be provided	X	X	X			
p	One of the following two methods is acceptable as a means to prove compliance: (1) Transport Delay: A transport delay test may be used to demonstrate that the FSTD system response does not exceed 150 milliseconds. This test shall measure all the delay encountered by a step signal migrating from the pilot's control through the control loading electronics and interfacing through all the simulation software modules in the correct order, using a handshaking protocol, finally through the normal output interfaces to the motion system, to the visual system and instrument displays.	X	X	X	Tests required. For Level 'A' & 'B' FFSs, and applicable systems for FTDs, FNPTs and BITDs the maximum permissible delay is 300 milliseconds		

	Requirements	FFS Level I	FFS Level II	FFS Level II-MCC	Statement of Compliance	YES	NO
	(2) Latency: The visual system, flight deck instruments and initial motion system response shall respond to abrupt pitch, roll and yaw inputs from the pilot's position within 150 milliseconds of the time, but not before the time, when the airplane would respond under the same conditions						
q	Modeling that includes the effects of airframe and engine icing		**X**	**X**	Statement of Compliance required. SOC shall describe the effects that provide training in the specific skills required for recognition of icing phenomena and execution of recovery.		
r	Daily pre-flight documentation either in the daily log or in a location easily accessible for review is required	**X**	**X**	**X**			
2	**Visual System**						
a	The visual system shall meet all the standards enumerated as applicable to the level of qualification requested by the applicant		**X**	**X**	For FTDs, FNPT 1s and BITDs, when visual systems have been added by the FSTD operator even though not attracting specific credits; they will be assessed to ensure that they do not adversely affect the qualification of the FSTD.		
b	A visual system (night/dusk or day) capable of providing a field-of-view of a minimum of 45 degrees horizontally and 30 degrees vertically, unless restricted by the type of airplane, simultaneously for each pilot, including adjustable cloud base and visibility		**X**	**X**	The visual system need not be collimated but shall be capable of meeting the standards laid down in Part 3 and 4 (Validation, Functions and Subjective Tests - See AC No.1 to JCAR-FSTD A.030). SOC is acceptable in place of this test		
c	A means of recording the visual response time for visual systems		**X**	**X**			
3	**Sound System**						
a	Significant flight deck sounds which result from pilot actions corresponding to those of the airplane or class of airplane	**X**	**X**	**X**	For FNPT Level I and BITD engine sounds only need be available		

Remarks	

Inspector Name	Date	Signature

C. Flight and Navigation Procedures Trainer (FNPT) Functions and Subjective Tests.

No.	Table of Functions and Subjective Tests	FNPT			Result	
		I	II	II-MCC	YES	NO
a	**PREPARATION FOR FLIGHT**					
	(1) Preflight. Accomplish a functions check of all switches, indicators, systems, and equipment at all crewmembers' and instructors' stations and determine that;					
	(a) the flight deck design and functions are identical to that of the airplane or class of airplane simulated	✓	✓	✓		
b	**SURFACE OPERATIONS (PRE-TAKE-OFF)**					
	(1) Engine Start					
	(a) Normal start	✓	✓	✓		
	(2) Taxi					
	(a) Thrust response	✓	✓	✓		
	(b) Power lever friction	✓	✓	✓		
	(c) Ground handling	✓	✓	✓		
	(d) Nose wheel scuffing	✓	✓	✓		
c	**TAKE-OFF**					
	(1) Normal					
	(a) Airplane/engine parameter relationships	✓	✓	✓		
	(b) Acceleration characteristics (not associated with motion)	✓	✓	✓		
	(c) Nose wheel and rudder steering	✓	✓	✓		
	(d) Crosswind (maximum demonstrated)		✓	✓		
	(e) Low visibility take-off		✓	✓		
	(f) Landing gear, wing flap leading edge device operation	✓	✓	✓		
	(2) Abnormal/emergency					
	(a) Rejected			✓		
d	**CLIMB**					
	(1) Normal	✓	✓	✓		
	(2) One or more engines inoperative	✓(2)	✓	✓		
e	**CRUISE**					
	(1) Performance characteristics (speed vs. power)	✓	✓	✓		
	(2) High altitude handling		✓	✓		
	(3) High Mach number handling (Mach tuck, Mach buffet) and recovery (trim change)		✓	✓		
	(4) High IAS handling		✓	✓		
f	**MANOEUVRES**					
	(1) High angle of attack, approach to stalls, stall warning, buffet, and g-break (take-off, cruise, approach, and landing configuration)	✓	✓	✓		
	(2) Turns with/without speed brake/spoilers deployed	✓	✓	✓		
	(3) In flight engine shutdown and restart (assisted and windmill)			✓		
	(4) Maneuvering with one or more engines inoperative, as appropriate	✓(2)	✓	✓		
	(6) Flight control system failures, reconfiguration modes, manual reversion and associated handling			✓		
g	**DESCENT**					
	(1) Normal	✓	✓	✓		
	(2) Maximum rate (clean and with speed brake, etc)	✓	✓	✓		
	(3) With autopilot			✓		
	(4) Flight control system failures, reconfiguration modes, manual reversion and associated handling			✓		

No.	Table of Functions and Subjective Tests	FNPT			Result	
		I	II	II-MCC	YES	NO
h	**INSTRUMENT APPROACHES AND LANDING**					
	Only those instrument approach and landing tests relevant to the simulated airplane type or class should be selected from the following list, where tests should be made with limiting wind Velocities, wind shear and with relevant system failures, including the use of Flight Director. (1) Precision					
	(a) PAR	✓	✓	✓		
	(b) CAT I/GBAS (ILS/MLS) published approaches A Manual approach with/without flight director including landing B Autopilot/auto throttle coupled approach and manual landing C Manual approach to DH and G/A all engines D Manual one engine out approach to DH and G/A E Autopilot/auto throttle coupled approach, one engine out to DH and G/A F Approach and landing with minimum/standby electrical power	 ✓ ✓(2) 	 ✓ ✓ ✓ 	 ✓ ✓ ✓ ✓ ✓ ✓		
	(2) Non-precision					
	(a) NDB	✓	✓	✓		
	(b) VOR, VOR/DME, VOR/TAC	✓	✓	✓		
	(c) RNAV (GNSS)			✓		
	(d) ILS LLZ (LOC), LLZ(LOC)/BC	✓	✓	✓		
	NOTE: If Standard Operating Procedures are to use autopilot for non-precision approaches then these should be evaluated					
i	**VISUAL APPROACHES (SEGMENT) AND LANDINGS**					
	(1) Maneuvering, normal approach and landing all engines operating with and without visual approach aid guidance		✓	✓		
	(2) Approach and landing with one or more engines inoperative		✓	✓		
	(3) Approach and landing with crosswind (max. demonstrated for Flight simulator)		✓	✓		
	(4) Approach and landing with flight control system failures,(for Flight simulator reconfiguration modes, manual reversion and associated handling (most significant degradation which is probable)			✓		
j	**MISSED APPROACH**					
	(1) All engines	✓	✓	✓		
	(2) One or more engine(s) out	✓(2)	✓	✓		
	(3) With flight control system failures, reconfiguration modes, manual reversion and for flight simulator - associated handling			✓		
k	**SURFACE OPERATIONS (POST LANDING)**					
	(1) Landing roll and taxi					
	(a) Spoiler operation		✓	✓		
	(b) Reverse thrust operation		✓	✓		
	(c) Brake operation, to include auto-braking system where applicable	✓	✓	✓		
l	**ANY FLIGHT PHASE**					
	(1) Airplane and power plant systems operation					
	(a) Air conditioning and pressurization (ECS)			✓		
	(b) De-icing/anti-icing		✓	✓		
	(c) Communications	✓	✓	✓		
	(d) Electrical	✓	✓	✓		
	(e) Fire and smoke detection and suppression			✓		
	(f) Flight controls (primary and secondary)			✓		
	(g) Fuel and oil, hydraulic and pneumatic	✓	✓	✓		
	(h) Landing gear	✓	✓	✓		
	(i) Oxygen			✓		
	(j) Power plant	✓	✓	✓		
	(k) Autopilot and Flight Director			✓		
	(l) Navigation systems	✓	✓	✓		
	(m) Stall warning/avoidance	✓	✓	✓		

No.	Table of Functions and Subjective Tests	FNPT			Result	
		I	II	II-MCC	YES	NO
	(2) Airborne procedures					
	(a) Holding	✓	✓	✓		
	(3) Engine shutdown and parking					
	(a) Engine and systems operation	✓	✓	✓		
	(b) Parking brake operation	✓	✓	✓		
	(4) Other as appropriate including effects of wind	✓	✓	✓		
m	**VISUAL SYSTEM**					
	(1) Functional test content requirements (Levels A and B) **Note**—The following is the minimum airport model content requirement to satisfy visual capability tests, and provides suitable visual cues to allow completion of all functions and subjective tests described in this appendix. FSTD operators are encouraged to use the model content described below for the functions and subjective tests.					
	(a) representative airport runways and taxiways	✓	✓	✓		
	(b) runway definition	✓	✓	✓		
	(c) runway surface and markings	✓	✓	✓		
	(d) lighting for the runway in use including runway edge and centerline lighting, visual approach aids and approach lighting of appropriate colors	✓	✓	✓		
	(2) Visual feature recognition **Note**—Tests 4(a) through 4(g) below contain the minimum distances at which runway features should be visible. Distances are measured from runway threshold to an airplane 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					
	(a) Runway definition, strobe lights, approach lights, and runway edge white lights from 8 km (5 sm) of the runway threshold		✓	✓		
	(b) Visual Approach Aids lights from 5 km (3 sm) of the runway threshold		✓	✓		
	(c) Runway centerline lights and taxiway definition from 5 km (3 sm)		✓	✓		
	(d) Threshold lights and touchdown zone lights from 3 km (2 sm)		✓	✓		
	(e) Runway markings within range of landing lights for night scenes as required by the surface resolution test on day scenes		✓	✓		
	(3) Correlation with airplane and associated equipment					
	(a) visual system compatibility with aerodynamic programming		✓	✓		
	(b) Visual cues to assess sink rate and depth perception during landings. Visual cueing sufficient to support changes in approach path by using runway perspective. Changes in visual cues during take-off and approach should not distract the pilot		✓	✓		
	(c) accurate portrayal of environment relating to flight simulator attitudes		✓	✓		
	(4) Instructor controls of:					
	(a) Environmental effects, e.g. cloud base, cloud effects, cloud density, visibility in kilometers/statute miles and RVR in meters/feet		✓	✓		
	(b) Airport/aerodrome selection	✓	✓	✓		
	(c) Airport/aerodrome lighting including variable intensity where appropriate		✓(4)	✓(4)		
n	**MOTION EFFECTS**					
	Not Applicable					
o	**SOUND SYSTEM**					
	(1) The following checks should be performed during a normal flight profile with motion					
	(a) significant airplane noises perceptible to the pilot during normal operations, such as engine, flaps, gear, spoiler extension/retraction, thrust reverser to a comparable level of that found in the airplane		✓	✓		
	(b) significant engine/propeller noise perceptible to pilot during normal operations	✓	✓	✓		

No.	Table of Functions and Subjective Tests	FNPT			Result	
		I	II	II-MCC	YES	NO
p	**SPECIAL EFFECTS**					
	Not applicable					

Note: Motion and buffet cues will only be applicable to FSTD equipped with an appropriate motion system:
(1) Takeoff characteristics sufficient to commence the airborne exercises
(2) For FNPT 1
(3) Only trim change required
(4) For FNPT, variable intensity airport lighting not required

Remarks	

Inspector Name	Date	Signature

D. Flight and Navigation Procedures Trainer (FNPT) Validation Test.

1. PERFORMANCE										
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
a	**TAXI**						**Not applicable**		
b	**TAKE-OFF**						**Not applicable**		
c	**CLIMB**								
	(1) Normal Climb All engines operating	± 3 kts airspeed ± 5% or ± 0·5 m/s (100 ft/min) R/C	Clean or specified climb configuration	✓	✓	✓	Flight test data or airplane performance manual data may be used. Record at nominal climb speed and mid initial climb altitude. FSTD performance to be recorded over an interval of at least 300 m (1 000 ft).		
	(2) One Engine Inoperative Second Segment Climb	± 3 kts airspeed ± 5% or ± 0.5 m/s (100 ft/min) R/C but not less than AFM values.	2nd Segment Climb for FNPTs and BITDs Gear up and Take-off Flaps	✓	✓	✓	Flight test data or airplane performance manual data may be used. Record at nominal climb speed. Flight simulator performance to be recorded over an interval of at least 300m (1 000 ft). Test at WAT (Weight, Altitude, or Temperature) limiting condition.		
d	**CRUISE/DESCENT**						**Not applicable**		
e	**STOPPING**						**Not applicable**		
f	**ENGINES**								
	(1) Acceleration	± 10% Ti or ± 0·25s ± 10% Tt	Approach or Landing	✓	✓	✓	Ti = Total time from initial throttle movement until a 10% response of a critical engine parameter. Tt = Total time from initial throttle movement to 90% of go around power. Critical engine parameter should be a measure of power (N1, N2, EPR, etc). Plot from flight idle to go around power for a rapid throttle movement. FTD, FNPT and BITD only: CT&M acceptable.		

1. PERFORMANCE										
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
	(2) Deceleration	± 10% TI or ± 0·25s ± 10% Tt	Ground	✓	✓	✓	Ti = Total time from initial throttle movement Ti = Total time from initial throttle movement until a 10% response of a critical engine parameter. Tt = Total time from initial throttle movement to 90% decay of maximum take-off power. Plot from maximum take-off power to idle for a rapid throttle movement. FTD, FNPT and BITD only: CT&M acceptable.		

2. HANDLING QUALITIES									
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
a	STATIC CONTROL CHECKS								
							NOTE: Pitch, roll and yaw controller position vs. force or time shall be measured at the control. An alternative method would be to instrument the FSTD in an equivalent manner to the flight test airplane. The force and position data from this instrumentation can be directly recorded and matched to the airplane data. Such a permanent installation could be used without any time for installation of external devices. CCA: Testing of position versus force is not applicable if forces are generated solely by use of airplane hardware in the FSTD.		
	(1) Pitch Controller Position vs. Force and Surface Position Calibration.	± 0.9 daN (2 lbs) breakout. ± 2.2 daN (5 lbs) or ± 10% force. ± 2º elevator angle	Ground				Uninterrupted control sweep to stops. Should be validated (where possible) with in-flight data from tests such as longitudinal static stability, stalls, etc. Static and dynamic flight control tests should be accomplished at the same feel or impact pressures.		
	Column Position vs. Force only.	± 2.2 daN (5 lbs) or ± 10% Force.	Cruise or Approach	✓	✓	✓	FNPT 1 and BITD: Control forces and travel shall broadly correspond to that of the replicated class of airplane		

2. HANDLING QUALITIES										
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
	(2) Roll Controller Position vs. Force and Surface Position Calibration.	± 0.9 daN (2 lbs) breakout ± 1.3 daN (3 lbs) or ± 10% force ± 2º aileron angle ± 3º spoiler angle	Ground				Uninterrupted control sweep to stops. Should be validated with in-flight data from tests such as engine out trims, steady state sideslips, etc. Static and dynamic flight control tests should be accomplished at the same feel or impact pressures.		
	Wheel Position vs. Force only.	± 1.3 daN (3 lbs) or ± 10% Force	Cruise or Approach	✓	✓	✓	FNPT 1 and BITD: Control forces and travel shall broadly correspond to that of the replicated class of airplane		
	(3) Rudder Pedal Position vs. Force and Surface Position Calibration.	± 2.2 daN (5 lbs) breakout ± 2.2 daN (5 lbs) or ± 10% force ± 2º rudder angle	Ground				Uninterrupted control sweep to stops. Should be validated with in flight data from tests such as engine out trims, steady state sideslips, etc. Static and dynamic flight control tests should be accomplished at the same feel or impact pressures		
	Pedal Position vs. Force only	± 2.2 daN (5 lbs) or ± 10% Force.	Cruise or Approach	✓	✓	✓	FNPT 1 and BITD: Control forces and travel shall broadly correspond to that of the replicated class of airplane		
	(6) Pitch Trim Indicator vs. Surface Position Calibration	± 0.5º trim angle.	Ground				Purpose of test is to compare flight simulator against design data or equivalent		
		±1° of trim angle	Ground	✓	✓	✓	.		
	(8) Alignment of Cockpit Throttle Lever vs. Selected Engine Parameter.	± 5º of TLA or ± 3% N1 or ± 0·03 EPR or ± 3% torque For propeller-driven airplanes, where the propeller levers do not have angular travel, a tolerance of ± 2 cm (± 0.8 in) applies.	Ground	✓	✓	✓	Simultaneous recording for all engines. The tolerances apply against airplane data and between engines. For airplanes with throttle detents, all detents to be presented. In the case of propeller-driven airplanes, if an additional lever, usually referred to as the propeller lever, is present, it should also be checked. Where these levers do not have angular travel a tolerance of ± 2 cm (± 0.8 inches) applies. May be a series of Snapshot tests		

2. HANDLING QUALITIES										
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
	(8) Alignment of Cockpit Throttle Lever vs. Selected Engine Parameter.	± 5º of TLA or ± 3% N1 or ± 0·03 EPR or ± 3% torque For propeller-driven airplanes, where the propeller levers do not have angular travel, a tolerance of ± 2 cm (± 0.8 in) applies.	Ground	✓	✓	✓	Simultaneous recording for all engines. The tolerances apply against airplane data and between engines. For airplanes with throttle detents, all detents to be presented. In the case of propeller-driven airplanes, if an additional lever, usually referred to as the propeller lever, is present, it should also be checked. Where these levers do not have angular travel a tolerance of ± 2 cm (± 0.8 inches) applies. May be a series of Snapshot tests		
b	**DYNAMIC CONTROL CHECKS**						**Not applicable**		
c	**LONGITUDINAL**						Power setting may be that required for level flight unless otherwise specified.		
	(1) Power Change Dynamics.	± 3 kts airspeed ± 30 m (100 ft) altitudes. ± 1.5º or ± 20% pitch angle	Approach		✓	✓	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 sec before initiation of the power change to completion of the power change + 15 sec. CCA: Test in Normal AND Non-normal Control state.		
	Power Change Force	± 2.2 daN (5 lbs) or ± 10% Force	Approach	✓	✓	✓	For an FNPT I and a BITD the power change force test only is acceptable.		
	(2) Flap Change Dynamics.	± 3 kts airspeed ± 30 m (100 ft) altitudes. ± 1.5º or ± 20% pitch angle	Take-off Through initial flap retraction and approach to landing		✓	✓	Time history of uncontrolled free response for a time increment equal to at least 5 sec before initiation of the reconfiguration change to completion of the reconfiguration change + 15 sec. CCA: Test in Normal and Non-normal Control state.		
	Flap Change Force	± 2.2 daN (5 lbs) or ± 10% Force		✓	✓	✓	For an FNPT I and a BITD the flap change force test only is acceptable.		

2. HANDLING QUALITIES										
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
	(3) Spoiler / Speed brake Change Dynamics.	± 3 kts airspeed ± 30 m (100 ft) altitude. ± 1.5 º or ± 20% pitch angle	Cruise		✓	✓	Time history of uncontrolled free response for a time increment equal to at least 5 sec before initiation of the reconfiguration change to completion of the reconfiguration change + 15 sec. Results required for both extension and retraction. CCA: Test in Normal AND Non-normal Control state.		
	(4) Gear Change Dynamics.	± 3 kts airspeed ± 30 m (100 ft) altitude. ± 1.5º or ± 20% pitch angle For FNPTs and BITDs, ± 2º or ± 20% pitch angle	Takeoff (retraction) and Approach (extension)		✓	✓	Time history of uncontrolled free response for a time increment equal to at least 5 sec before initiation of the configuration change to completion of the reconfiguration change + 15 sec. CCA: Test in Normal AND Non-normal Control state.		
	Gear Change Force	± 2.2 daN (5 lbs) or ± 20% Force.	Take-off and Approach	✓	✓	✓	For an FNPT I and a BITD the gear change force test only is acceptable.		
	(5) Longitudinal Trim	± 1º elevator ± 0·5º stabilizer ± 1º pitch angle ± 5% net thrust or equivalent	Cruise, Approach and Landing				Steady-state wings level trim with thrust for level flight. May be a series of snapshot tests. CCA: Test in Normal OR Non-normal Control state.		
		± 2 deg Pitch Control (Elevator & Stabilizer) ± 2 deg Pitch ± 5% Power or Equivalent	Cruise, Approach	✓	✓	✓	May be a series of Snapshot tests. FNPT I and BITD may use equivalent stick and trim controllers.		
	(6) Longitudinal Maneuvering Stability (Stick Force /g).	± 2.2 daN (5 lbs) or ± 10% pitch controller Force Alternative method: ± 1º or ± 10% change of elevator	Cruise, Approach and Landing		✓	✓	Continuous time history data or a series of snapshot tests may be used. Test up to approximately 30º of bank for approach and landing configurations. Test up to approximately 45º of bank for the cruise configuration. Force tolerance not applicable if forces are generated solely by the use of airplane hardware in the FSTD. Alternative method applies to airplanes which do not exhibit stick-force-per-g characteristics. CCA: Test in Normal AND Non-normal Control state as applicable.		

2. HANDLING QUALITIES										
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
	(7) Longitudinal Static Stability.	± 2.2 daN (5 lbs) or ± 10% pitch controller force. Alternative method: ± 1° or ± 10% change of elevator	Approach	C T & M	✓	✓	Data for at least two speeds above and two speeds below trim speed. May be a series of snapshot tests. Force tolerance not applicable if forces are generated solely by the use of airplane hardware in the FSTD. Alternative method applies to airplanes which do not exhibit speed stability characteristics. CCA: Test in Normal OR Non-normal Control state as applicable		
	(8) Stall Characteristics.	± 3 kts airspeed for initial buffet, stall warning, and stall speeds. For airplanes with reversible flight control systems (for FS only): ± 10% or ± 2·2 daN (5 lb) column force (prior to g-break only)	2nd Segment Climb and Approach or Landing	✓	✓	✓	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 airplanes exhibiting a sudden pitch attitude change or 'g break' should demonstrate this characteristic. CCA: Test in Normal and Non-normal Control state. FNPT and BITD: Test need only determine the actuation of the stall warning device only		
	(9) Phugoid Dynamics.	± 10% period. ± 10% time to ½ or double amplitude or ± 0.02 of damping ratio.	Cruise		✓	✓	Test should include 3 full cycles or that necessary to determine time to ½ or double amplitude, whichever is less. CCA: Test in Non-normal Control state.		
		± 10% Period with representative damping	Cruise	✓			Test should include at least 3 full cycles. Time history recommended.		
	(10) Short Period Dynamics.	± 1.5º pitch angle or ± 2º/s pitch rate. ± 0.1 g normal acceleration.	Cruise		✓	✓	CCA: Test in Normal AND Non-normal Control state.		

2. HANDLING QUALITIES										
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
d	**LATERAL DIRECTIONAL**						Power setting may be that required for level flight unless otherwise specified.		
	(1) Minimum Control Speed, Air (V_{MCA} or V_{MCL}), per Applicable Airworthiness Standard or Low Speed Engine Inoperative Handling Characteristics in the Air.	± 3 kts airspeed	Take-off or Landing (whichever is most critical in The airplane)	C T & M	C T & M	C T & M	Minimum speed may be defined by a performance or control limit which prevents demonstration of V_{MC} or V_{MCL} in the conventional manner. Take-off thrust should be set on the operating engine(s). Time history or snapshot data may be used CCA: Test in Normal OR Non-normal Control state. FNPT and BITD: It is important that there exists a realistic speed relationship between Vmca and Vs for all configurations and in particular the most critical full-power engine-out take-off configurations.		
	(2) Roll Response (Rate).	± 10% or ± 2º/sec roll rate FS only: For airplanes with reversible flight control systems: ± 10% or ± 1·3 daN (3 lb) roll controller force.	Cruise and Approach or Landing	✓	✓	✓	Test with normal roll control displacement (about 30% of maximum control wheel). May be combined with step input of flight deck roll controller test (2d3).		
	(3) Step Input of Cockpit Roll Controller (or Roll Overshoot).	± 10% or ± 2º bank angle	Approach or Landing		✓	✓	With wings level, apply a step roll control input using approximately one-third of roll controller travel. At approximately 20° to 30° bank, abruptly return the roll controller to neutral and allow at least 10 seconds of airplane free response. May be combined with roll response (rate) test (2d2). CCA: Test in Normal AND Non-normal Control state.		
	(4) Spiral Stability.	Correct trend and ± 2º or ± 10% bank angle in 20 seconds If alternate test is used: correct trend and ± 2° aileron.	Cruise and Approach or Landing	C T & M	✓	✓	Airplane 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 bank angle of approximately 30°. CCA: Test in Non-normal Control state.		

2. HANDLING QUALITIES

No	Tests	Tolerance	Flight Conditions	FNPT I	FNPT II	FNPT II-MCC	COMMENTS	Result YES	Result NO
	(5) Engine Inoperative Trim.	± 1º rudder angle or ± 1º tab angle or equivalent pedal. ± 2º sideslip 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. May be snapshot tests.		
	(6) Rudder Response.	± 2º/s or ± 10% yaw rate	Approach or Landing				Test with stability augmentation ON and OFF.		
		± 2 deg/sec or ± 10% yaw rate or heading change		C T & M	✓	✓	Test with a step input at approximately 25% of full rudder pedal throw. CCA: Test in Normal AND Non-normal Control state.		
	(7) Dutch Roll (Yaw Damper OFF).	± 0.5 s or ± 10% of period. ± 10% of time to ½ or double amplitude or ± 0.02 of damping ratio. ± 20% or ± 1 s of time difference between peaks of bank and sideslip	Cruise and Approach or Landing	C T & M	C T & M	C T & M	Test for at least 6 cycles with stability augmentation OFF. CCA: Test in Non-normal Control state		
	(8) Steady State Side slip.	For a given rudder position: ± 2º bank angle ± 1º sideslip angle ± 10% or ± 2º aileron ± 10% or ± 5º spoiler or equivalent roll controller position or force For FFSs representing aircraft with reversible flight control systems: ±10% or ±1·3 daN (3 lb) wheel force ±10% or ±2·2 daN (5 lb) rudder pedal force.	Approach or Landing	C T & M	✓	✓	May be a series of snapshot tests using at least two rudder positions (in each direction for propeller driven airplanes) one of which should be near maximum allowable rudder. For FNPT and BITD a roll controller position tolerance of ± 10% or ± 5º applies instead of the aileron tolerance.		

2. HANDLING QUALITIES										
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
e	LANDINGS						Not applicable		
F	GROUND EFFECT						Not applicable		
g	WIND SHEAR						Not applicable		
h	Flight And Maneuver Envelope Protection Functions						Not applicable		
3. MOTION SYSTEM							Not applicable		

4. VISUAL SYSTEM									
No	Tests	Tolerance	Flight Conditions	FNPT			COMMENTS	Result	
				I	II	II-MCC		YES	NO
a	SYSTEM RESPONSE TIME								
	(1) Transport Delay	150 milliseconds or less after controller movement. 300 milliseconds or less after controller movement.	Pitch, roll and yaw	✓	✓	✓	One separate test is required in each axis. See Appendix 5 to AC FSTD A.030 FNPT I and BITD only the instrument response time apply.		
	or								
	(2) Latency	- 150 milliseconds or less after controller movement. - 300 milliseconds or less after controller movement	Take-off, Cruise, and Approach or Landing	✓	✓	✓	One test is required in each axis (pitch, roll, yaw) for each of the 3 conditions compared with airplane data for a similar input. The visual scene or test pattern used during the response testing shall be representative of the required system capacities to meet the daylight, twilight (dusk/dawn) and night visual capability as applicable. FNPT I and BITD only the instrument response time applies		
b	DISPLAY SYSTEM TESTS						Not applicable		

4. VISUAL SYSTEM										
No	**Tests**	**Tolerance**	**Flight Conditions**	**FNPT**			**COMMENTS**	**Result**	
				I	**II**	**II-MCC**		**YES**	**NO**
c	**VISUAL GROUND SEGMENT**	Near end. The lights computed to be visible should be visible in the FSTD. Far end: ± 20% of the computed VGS	Trimmed in the landing Configuration at 30 m (100 ft) wheel height above touchdown zone elevation on glide slope at a RVR setting of 300 m (1000 ft) or 350m (1200ft)		✓	✓	Visual Ground Segment. This test is designed to assess items impacting the accuracy of the visual scene presented to a pilot at DH on an ILS approach. Those items include RVR, glide slope (G/S) and localizer modeling accuracy (location and slope) for an ILS, For a given weight, configuration and speed representative of a point within the airplane's operational envelope for a normal approach and landing. If non-homogenous fog is used, the vertical variation in horizontal visibility should be described and be included in the slant range visibility calculation used in the VGS computation. FNPT: If a generic airplane is used as the basic model, a generic cut-off angle of 15 deg. is assumed as an ideal.		
5. SOUND SYSTEMS							**Not applicable**		

Remarks	

Inspector Name	**Date**	**Signature**