



**THE NETHERLANDS
MILITARY AVIATION REGULATIONS
Flight Simulation Training Devices
NLD-MAR FSTD**

for
Aeroplane, Helicopter and RPAS FSTD
Aeroplane and Helicopter CTD

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Notes

- (a) This NLD-MAR FSTD is applicable to organisations that apply for a required FSTD/CTD qualification certificate or operate an FSTD/CTD within the scope as stated in FSTD.001. This FSTD/CTD shall be part of the Netherlands Military Aviation System (NLD MAS).
- (b) After MAA-NLD approval the (embedded) NLD-MAR FSTD organisation shall be documented on a certificate. This may be on an already existing MAOC or MATO certificate.

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TERMINOLOGY

Abbreviations

For abbreviations see NLD-MAD-1.

Definitions

For definitions see NLD-MAD-1.

SUBPART A: REQUIREMENTS FOR ORGANISATIONS OPERATING FLIGHT SIMULATION TRAINING DEVICES (FSTDs) AND/OR CREW TRAINING DEVICES (CTDs)

FSTD.000 General

- (a) Where the sole FSTD abbreviation is used it is applicable to FSTDs for Aeroplane, Helicopter and RPAS (FSTD-A/H/R). FSTD-A/H or FSTD-R is used when this regulation differentiates between these separate FSTD systems.
- (b) MAA-NLD inspectors shall be allowed to witness any kind of initial or recurrent qualification on an FSTD or CTD unless the FSTD or CTD have systems or software that are classified and not accessible to MAA-NLD inspectors. This shall be motivated by the organisation.

FSTD.001 Scope

This subpart is applicable for organisations that are intending to operate or operate:

- (a) FSTD-A/Hs used for MAA-NLD approved training, testing or checking of flight crews within the scope of the NLD-MAR-FCL and/or MAR-OPS 1,2 and 3;
- (b) FSTD-Rs used for training, testing or checking of RPAS flight crew or operators as part of an MAA-NLD/operator approved training manual within the scope of the MAR-OPS 4 and 5;
- (c) CTDs used for training, testing or checking of crew other than flight crew as part of an operator approved training manual within the scope of the MAR-OPS; and
- (d) FSTDs or CTDs during limited interim use prior to formal qualification.

FSTD.100 Management system requirements (+GM)

The organisation that applies for a FSTD/CTD qualification certificate shall demonstrate to the MAA-NLD that it has established a management system in accordance with NLD-MAR-FCL ORA.GEN Section II. This demonstration shall ensure that the applicant has, directly or through contract, the capability to maintain the performance, functions and other characteristics specified for the FSTD's/CTD's approved use and to control the FSTD/CTD and its installations. If the FSTD/CTD organisation is embedded in an MAA-NLD approved MAOC or MATO this management system may be adopted by the FSTD/CTD organisation.

FSTD.105 FSTD and CTD housing and installations (+AMC) (+GM)

- (a) The organisation holding an FSTD/CTD qualification certificate shall ensure that:
 - (1) The FSTD/CTD is housed in a suitable environment that supports safe and reliable operation;
 - (2) The FSTD/CTD, its technical and housing installations shall comply with the local regulations for personal health and safety; and
 - (3) All FSTD/CTD occupants and maintenance personnel are briefed on FSTD/CTD safety to ensure that they are aware of all safety equipment and procedures in the FSTD/CTD and housing in case of an emergency. This shall be recorded.
- (b) The FSTD/CTD safety features, such as emergency stops and emergency lighting, shall be checked at least annually and this shall be recorded.

FSTD.110 Application for FSTD qualification certificate (+GM)

- (a) The organisation shall apply for an initial FSTD qualification certificate through use of the NLD-MAR Form 157 (appendix 4) no later than 60 days before the date of intended operation, unless otherwise agreed with the MAA-NLD.
- (b) Applicants for an initial qualification certificate shall provide the MAA-NLD with documentation demonstrating how they comply with the requirements established in this Regulation. Such documentation shall include:
 - (1) A procedure established to ensure compliance with NLD-MAR-FCL ORA.GEN.130;
 - (2) A report of the evaluation as described in FSTD.210;
 - (3) An FSTD data sheet (FSTD.135); and
 - (4) A declaration that the organisation operating the FSTD has evaluated the FSTD for its intended use or its requested FSTD level and that it meets the criteria described in the qualification basis (FSTD.200) by the MAA-NLD. The organisation shall also declare that the Master Qualification Test Guide (MQTG) for the requested FSTD level or intended use is successfully performed.
- (c) If an FSTD already holds a valid qualification certificate issued by another authority (FSTD.170) and the FSTD is transferred to the NLD-MAS, the MAA-NLD will determine if the current qualification certificate is acceptable, depending on which authority issued the certificate, the qualification basis and the intended use.

FSTD.115 Application for CTD qualification certificate (+AMC) (+GM)

- (a) The organisation shall apply for an initial CTD qualification certificate through use of the NLD-MAR Form 157 (appendix 4) no later than 60 days before the date of intended operation, unless otherwise agreed with the MAA-NLD.
- (b) Applicants for an initial qualification shall provide the MAA-NLD with documentation demonstrating how they comply with the requirements established in this Regulation. Such documentation shall include:
 - (1) A procedure established to ensure compliance with NLD-MAR-FCL ORA.GEN.130;
 - (2) A report of the evaluation as described in FSTD.520;
 - (3) A CTD data sheet (FSTD.135); and
 - (4) A declaration that the organisation operating the CTD has evaluated the CTD for its intended use. The organisation shall also declare that the Master Qualification Test Guide (MQTG) for the intended use of the CTD is successfully performed.
- (c) If a CTD already holds a valid qualification certificate issued by another authority (FSTD.170) and the CTD is transferred to the NLD-MAS, the MAA-NLD will determine if the current qualification certificate is acceptable, depending on which authority issued the certificate, the qualification basis and the intended use.

FSTD.120 Modifications or major change into the FSTD or CTD (+AMC) (+GM)

- (a) The organisation shall establish and maintain a system to identify, assess and incorporate any important modifications into the FSTD/CTD it operates, specifically:
 - (1) Any aircraft/RPAS or crew station modifications that are essential for training, testing and checking, whether or not enforced by an airworthiness directive; and
 - (2) Any modification of an FSTD/CTD, including motion and visual systems, when essential for training, testing and checking, as in the case of data revisions.

- (b) The organisation shall inform the MAA-NLD in advance of any modification or major change to the FSTD/CTD, together with an assessment on the impact on the qualification level or approved use. The MAA-NLD shall determine, based on the assessment, if a specific evaluation of the FSTD/CTD is necessary prior to returning it in service.
- (c) It is not allowed for the organisation to return an FSTD/CTD into service after a major change without prior MAA-NLD approval unless there is an organisational necessity for the FSTD/CTD to be returned into service as soon as possible and:
 - (1) The MAA-NLD is prior informed about the major change;
 - (2) The major change is evaluated by the organisation as successful and not negatively affecting the approved use or qualification level; and
 - (3) The MAA-NLD receives the evaluation report without delay.
- (d) When the organisation requires FSTDs and/or CTDs to be (digitally) connected to enable multi-ship scenarios, the organisation shall evaluate the impact on the performance of the separate devices and whether they remain suitable for the qualification level or approved use. The MAA-NLD shall receive a copy of the evaluation.

FSTD.130 Additional equipment on FSTD or CTD

Where additional equipment has been added to the FSTD/CTD, even though not required for qualification, the organisation shall assess whether the quality of training will be affected. The MAA-NLD shall be informed about the results of the assessment.

If the organisation assesses that the additional equipment negatively affects the quality of training, the FSTD/CTD shall be subjected to one or more of the following tests to determine the continued suitability of the FSTD/CTD for its approved use:

- (a) Functions;
- (b) Validation/objective;
- (c) Subjective; or
- (d) Integrated tests.

FSTD.135 FSTD or CTD data sheet (+GM)

The FSTD/CTD data sheet (appendix 3) specifies the equipment, software and requested/approved use of the FSTD/CTD. After initial issuance of the qualification certificate and the FSTD/CTD data sheet by the MAA-NLD, the organisation shall keep the FSTD/CTD data sheet up to date during the FSTD's/CTD's lifetime. This data sheet is an integral part of the FSTD/CTD qualification certificate and shall be stored with the respective FSTD/CTD. Any change must be sent to- and verified by the MAA-NLD.

FSTD.140 Interim qualification for FSTD or CTD (+GM)

The MAA-NLD may issue an interim approval to use the device in case the organisation intends to introduce a new FSTD/CTD and when compliance with the requirements for FSTD/CTD qualification is not possible in due time. This shall be for the maximum duration of one year. To apply for an interim qualification MAA-NLD Form 157 shall be used (appendix 4).

The MAA-NLD may require from the organisation as a minimum, depending on the requested intended use:

- (a) A demonstration to the MAA-NLD that it has established a management system in accordance with NLD-MAR-FCL ORA.GEN Section II if the organisation has not operated qualified FSTDs or CTDs before.
- (b) Proof of successful (system) installation of the FSTD/CTD; and

- (c) Functions and subjective tests of the intended use by an MAA-NLD approved evaluation team.

FSTD.145 Maintaining the qualification for FSTD-A/H (+AMC) (+GM)

In order to maintain the qualification of the FSTD-A/H, the organisation shall:

- (a) Keep in place a management system in accordance with FSTD.100;
- (b) Maintain the FSTD-A/H in a proper working condition through:
 - (1) Correcting the defaults identified during MAA-NLD oversight and internal evaluations.
 - (2) Addressing the (technical) issues reported during its use;
- (c) Maintain a configuration control system to ensure the continued integrity of the hardware and software of the qualified FSTD-A/H;
- (d) Maintain an up to date FSTD-A/H data sheet to document available features and capability information for the FSTD-A/H operated;
- (e) Yearly run the complete set of (recurrent) (validation) tests contained within the approved MQTG/QTG progressively over a 12-month period that confirms the proper functioning of the FSTD-A/H during FCL training and checking. Recurrent testing of the (operational) training tasks may, after MAA-NLD approval, be evaluated progressively over a 3 year period (FSTD.330(b)). The start for the recurrent period is the date of the initial qualification;
- (f) The results shall be analysed, evaluated, dated and signed by the lead of the evaluation team or FSTD organisation, in order to demonstrate that the FSTD-A/H qualification standards are being maintained. A report of the evaluation shall be submitted to the MAA-NLD and retained in accordance with FSTD.175.
- (g) When the results of the tests are not satisfactory to the MAA-NLD with regard to the approved use of the FSTD-A/H, the MAA-NLD may limit the approved use of the FSTD-A/H until the shortcomings are rectified.

FSTD.146 Maintaining the qualification for FSTD-R (+GM)

In order to maintain the qualification of the FSTD-R, the organisation shall:

- (a) Keep in place a management system in accordance with FSTD.100;
- (b) Maintain the FSTD-R in a proper working condition through:
 - (1) Correcting the defaults identified during the authority and internal evaluations.
 - (2) Addressing the issues reported during its use;
- (c) Maintain a configuration control system to ensure the continued integrity of the hardware and software of the qualified FSTD-R;
- (d) Maintain an up to date FSTD-R data sheet to document available features and capability information for the FSTD-R operated;
- (e) Yearly run the (recurrent) FSTD-R systems check/QTG in accordance with the procedures detailed in FSTD.420 (b), (c) and (d) that confirms the proper functioning of the FSTD-R during training, checking and (operational) training tasks. The start for the recurrent 12-months period is the date of the initial qualification;

- (f) The results shall be analysed, evaluated, dated and signed by the lead of the evaluation team or FSTD organisation, in order to demonstrate that the FSTD-R qualification standards are being maintained. A report of the evaluation shall be submitted to the MAA-NLD and retained in accordance with FSTD.175; and
- (g) When the results of the tests are not satisfactory to the MAA-NLD with regard to the approved use of the FSTD-R, the MAA-NLD may limit the approved use of the FSTD-R until the shortcomings are rectified.

FSTD.147 Maintaining the qualification for CTD (+GM)

In order to maintain the qualification of the CTD, the organisation shall:

- (a) Keep in place a management system in accordance with FTSD.100;
- (b) Maintain the CTD in a proper working condition through:
 - (1) Correcting the defaults identified during the authority and internal evaluations.
 - (2) Addressing the issues reported during the use of the CTD during its use;
- (c) Maintain a configuration control system to ensure the continued integrity of the hardware and software of the qualified CTD;
- (d) Maintain an up to date CTD data sheet to document available features and capability information for the CTD operated;
- (e) Yearly run the (recurrent) CTD systems check/QTG in accordance with the procedures detailed in FSTD.520 (b), (c) and (d) that confirms the proper functioning of the CTD during training, checking and (operational) training tasks. The start for the recurrent 12-months period is the date of the initial qualification;
- (f) The results shall be analysed, evaluated, dated and signed by the lead of the evaluation team or FSTD/CTD organisation, in order to demonstrate that the CTD qualification standards are being maintained. A report of the evaluation shall be submitted to the MAA-NLD and retained in accordance with FSTD.175; and
- (g) When the results of the tests are not satisfactory to the MAA-NLD with regard to the approved use of the CTD, the MAA-NLD may limit the approved use of the CTD until the shortcomings are rectified.

FTSD.150 Oversight interval FSTD-A/H (+GM)

- (a) The FSTD-A/H oversight interval of 12 months may be extended up to a maximum period of 36 months, in case the following criteria are fulfilled:
 - (1) The FSTD-A/H has been subject to an initial qualification and at least two successive recurrent yearly evaluations as stated in FSTD.145 are performed;
 - (2) The organisation operating the FSTD has a satisfactory record of MAA-NLD audits during the previous 36 months; and
 - (3) The MAA-NLD performs an audit of the FSTD organisation every 12 months.
- (b) If the FSTD-A/H system oversight interval of 12 months is extended beyond 12 months the organisation shall:
 - (1) Conduct the yearly subjective and functions test every 12 months;
 - (2) Review, validate and sign the yearly reruns of the QTG; and

- (3) Submit a report of the evaluation to the MAA-NLD for verification.

FSTD.151 Oversight interval FSTD-R (+GM)

- (a) The FSTD-R oversight interval of 12 months may be extended up to a maximum period of 36 months, in case the following criteria are fulfilled:
- (1) The FSTD-R has been subject to an initial evaluation and at least two successive recurrent yearly evaluations as stated in FSTD.146 are performed;
 - (2) For RPAS weight $\leq 150\text{kg}$: the organisation operating the FSTD has a satisfactory record of MAA-NLD audits during the previous 24 months by the MAA-NLD;
 - (3) For RPAS weight $> 150\text{kg}$: the organisation operating the FSTD has a satisfactory record of MAA-NLD audits during the previous 36 months by the MAA-NLD; and
 - (4) The MAA-NLD performs an audit of the FSTD organisation every 12 months.
- (b) If the FSTD-R oversight interval of 12 months is extended beyond 12 months the organisation shall:
- (1) Conduct the yearly subjective and functions test every 12 months;
 - (2) Review, validate and sign the yearly rerun of the QTG; and
 - (3) Submit a report of the evaluation to the MAA-NLD for verification.

FSTD.152 Oversight interval CTD (+GM)

- (a) The CTD oversight interval of 12 months may be extended up to a maximum period of 36 months, in case the following criteria are fulfilled:
- (1) The CTD has been subject to an initial evaluation and at least two successive recurrent yearly evaluations as stated in FSTD.147 are performed;
 - (2) The organisation operating the CTD has a satisfactory record of MAA-NLD audits during the previous 24 months; and
 - (3) The MAA-NLD performs an audit of the FSTD/CTD organisation every 12 months.
- (b) If the CTD oversight interval of 12 months is extended beyond 12 months the organisation shall:
- (1) Conduct the yearly subjective and functions test every 12 months;
 - (2) Review, validate and sign the yearly rerun of the QTG; and
 - (3) Submit a report of the evaluation to the MAA-NLD for verification.

FSTD.155 Continued validity and renewal of the FSTD or CTD qualification

The validity of the qualification certificate is infinite, unless the yearly recurrent testing programme is not performed in due time. In this case the organisation must inform the MAA-NLD and the FSTD/CTD may no longer be used in accordance with its qualification level or approved use unless the MAA-NLD has approved an extension of its use for a maximum of 3 months. After verification of the recurrent testing results by the MAA-NLD the FSTD/CTD certificate may be renewed.

FSTD.160 Minimum Equipment List for the FSTD or CTD (+GM)

The organisation shall develop a Minimum Equipment List (MEL) for the qualified FSTD/CTD it operates within a year after qualification. This MEL shall describe which FSTD/CTD equipment is permitted to be inoperative to continue to perform (parts of) the approved use as stated on the FSTD/CTD data sheet.

FSTD.165 Difference list for the FSTD or CTD (+GM)

The organisation shall develop and maintain a difference list for each FSTD/CTD it operates in relation to the aircraft/RPAS/crew station it simulates. This shall at least include differences in:

- (a) Configuration;
- (b) Software; and
- (c) Performance.

FSTD.170 Transferability of an FSTD or CTD qualification (+GM)

- (a) When an FSTD/CTD is transferred to the NLD-MAS, the receiving organisation shall inform the MAA-NLD in advance. An MAA-NLD Form 157 must also be submitted to the MAA-NLD.
- (b) The MAA-NLD may demand an evaluation in accordance with the original qualification basis of the FSTD/CTD.
- (c) When the handover of the FSTD/CTD to the new organisation leads to relocation of the FSTD/CTD, FSTD.231, FSTD.431 or FSTD.531 are also applicable.

FSTD.175 Record-keeping (+AMC)

The organisation shall keep records, of:

- (a) All documents describing and proving the initial qualification basis and level or approved use of the FSTD/CTD for the duration of the FSTD/CTD's lifetime;
- (b) All FSTD/CTD information regarding specifications, data sheets, evaluations, MQTGs, QTGs, modifications etc. for the duration of the FSTD/CTD's lifetime; and
- (c) Any document and report related to each FSTD/CTD recurrency and to compliance monitoring activities for a period of at least 5 years.

FSTD.180 Crediting of FSTD training time as flying time (+GM)

Crediting of FSTD training time as flying time is acceptable when an FSTD is qualified as FFS level D or when the (separate) training events in an FSTD are evaluated as 'Training to Proficiency' (TP).

SUBPART B: REQUIREMENTS FOR THE QUALIFICATION OF FSTD-A/H FOR FLIGHT CREW

SECTION I: WITHIN THE SCOPE OF THE NLD-MAR-FCL

FSTD.200 General (reserved)

Reserved

FSTD.210 FSTD-A/H qualification basis (+AMC)(+GM)

- (a) The qualification basis for the issuance of an FSTD-A/H qualification certificate shall consist of:
- (1) The minimum FSTD-A/H system requirements for a particular FSTD-A/H qualification level as described in appendix 1 and 2;
 - (2) Any special conditions prescribed by the MAA-NLD if the related Certification Specifications do not contain adequate or appropriate standards for the FSTD-A/H. For example because the FSTD-A/H has novel or different features to those upon which the applicable Certification Specifications are based; and
 - (3) If available, the aeroplane/helicopter validation data, as defined by the mandatory part of the Operational Suitability Data (OSD).
- (b) Any FSTD-A/H submitted for an initial qualification level shall be evaluated against applicable Certification Specifications-Flight Simulating Training Device (CS-FSTD) criteria for the qualification level sought. The primary reference document describing the Certification Specifications is the latest issue of the EASA regulation CS-FSTD for aeroplane and helicopters.
- (c) When an organisation does not seek an FSTD-A/H qualification level but instead opts to evaluate an FSTD-A/H for the intended use, the level of fidelity of the separate FSTD-A/H features still needs to be evaluated against the latest issue of the EASA regulation CS-FSTD (A) and (H) and/or ICAO doc 9625 – ‘Manual of Criteria for the qualification of Flight Simulating Training Devices, Volume 1 or 2’. This evaluation shall determine whether the MAA-NLD will qualify the FSTD-A/H for its intended use.
- (d) Footprint data may be used for parts of the evaluation if any other means of validation of the FSTD-A/H are not available.
- (e) The MQTG, which needs MAA-NLD approval, is the basis for the initial FSTD-A/H qualification. The resulting QTG is the basis for the subsequent yearly recurrent FSTD-A/H evaluations.
- (f) The qualification basis is applicable for future recurrent qualifications of the FSTD-A/H, unless it is re-categorized.

FSTD.220 Initial FSTD-A/H evaluation procedure (+AMC)(+GM)

- (a) The organisation shall inform the MAA-NLD in advance in order to agree upon a plan to qualify the FSTD-A/H.
- (b) The team that will perform the evaluation of the FSTD-A/H must be acceptable to the MAA-NLD.
- (c) To determine whether the FSTD-A/H is suitable for the requested level or its intended use, the FSTD-A/H shall be evaluated through:

- (1) Functions;
- (2) Validation/objective;
- (3) Subjective; and
- (4) Integrated tests.

(d) The MQTG and the FSTD-A/H data sheet (FSTD.135), supporting material and information shall be submitted to the MAA-NLD in a report and in a format that allows efficient review and evaluation before the FSTD-A/H can be qualified.

FSTD.230 Changes, upgrades of the qualification level or expansion of the approved use of the qualified FSTD-A/H (+AMC) (+GM)

When the organisation intends to incorporate an upgrade of the FSTD-A/H's qualification level or expand its approved use, the organisation shall apply in advance to the MAA-NLD for an (upgrade) evaluation by submitting MAA-NLD Form 157. The organisation shall determine and perform the evaluation. Results from previous evaluations shall not be used to validate the FSTD-A/H performance for the current upgrade. The change may affect the FSTD-A/H MQTG and data sheet (FSTD.135) and it shall be updated accordingly.

FSTD.231 Relocation of the FSTD-A/H

When the FSTD-A/H is moved to a new or temporary location, the organisation shall inform the MAA-NLD prior the relocation. Before returning the FSTD-A/H into service at the new location, at least one third of the validation, functions and subjective tests shall be performed to verify that the FSTD-A/H performance meets its original qualification standard. A copy of the test documentation shall be retained together with the FSTD-A/H records for review by the MAA-NLD.

FSTD.235 Temporary conservation of the FSTD-A/H

If the organisation plans to remove an FSTD-A/H from active status and conserve the FSTD-A/H for prolonged periods with the intent of later returning it back into service, the MAA-NLD shall be notified with an accompanying plan.

SECTION II: WITHIN THE SCOPE OF THE MAR-OPS 1,2 and 3

FSTD.300 General

- (a) This Section II is applicable to FSTD-A/Hs used for operational training, testing and checking (training tasks) within the scope of the MAR-OPS 1,2 and 3.
- (b) Requirements in Subpart A and B are applicable except for FSTD.200 FSTD-A/H qualification basis.

FSTD.310 FSTD-A/H qualification basis of the training tasks (+AMC)

The organisation shall develop an MQTG that describes the subjective and functions test guide to evaluate all the intended training tasks. This MQTG is the qualification basis and the basis for the yearly recurrent QTG. The MQTG needs MAA-NLD approval.

FSTD.320 Initial FSTD-A/H evaluation of the training tasks (+GM)

- (a) The organisation shall inform the MAA-NLD in advance of the initial evaluation of the FSTD-A/H for the intended training tasks.
- (b) The organisation shall evaluate the intended/approved training tasks in accordance with the subjective and functions test guide.
- (c) The FSTD-A/H shall be subjected to integrated tests to confirm the proper functioning for its intended/approved training tasks during a representative training sortie.
- (d) The evaluation team shall have sufficient experience to evaluate the fitness of the FSTD for the intended training tasks.

FSTD.330 Maintaining the qualification of the FSTD-A/H for the training tasks

- (a) Every year the FSTD-A/H shall be evaluated by performing FSTD.320(b) and (c) to determine the continuous suitability of the FSTD-A/H for the approved training tasks. This yearly evaluation may be combined for reasons of efficiency with the yearly evaluation within the scope of the NLD-MAR-FCL.
- (b) Depending on the complexity of- and the amount of training tasks, the MAA-NLD may approve an alternative evaluation scheme. In any case all approved training tasks shall be evaluated within a three year time period.

SUBPART C: REQUIREMENTS FOR THE QUALIFICATION OF FSTD-Rs FOR FLIGHT CREW AND REMOTE PILOTS OF RPAS WITHIN THE SCOPE OF THE NLD-MAR-FCL, NLD-MAR-MRPL, MAR-OPS 4 and MAR- OPS 5

FSTD.400 (reserved)

Reserved.

FSTD.410 FSTD-R qualification basis (+AMC) (+GM)

The qualification basis for the issuance of an FSTD-R qualification certificate shall consist of:

- (a) An MAA-NLD approved MQTG to evaluate the total system fitness of the FSTD-R for the intended use. This is the qualification basis and the basis for the yearly recurrent QTG; and
- (b) For RPAS weight > 150kg: RPAS performance validation data supplied by the manufacturer or third party.

FSTD.420 Initial FSTD-R evaluation procedure (+AMC) (+GM)

- (a) The organisation shall inform the MAA-NLD in advance in order to agree upon a plan to qualify the FSTD-R.
- (b) The team that performs the evaluation must have sufficient experience, qualifications and system knowledge. The evaluation team must be acceptable to the MAA-NLD.
- (c) To determine whether the FSTD-R is suitable for its intended use the FSTD-R shall be evaluated:
 - (1) For RPAS weight $\leq 150\text{kg}$:
the MQTG shall at a minimum consist of:
 - (i) Functions; and
 - (ii) Subjective tests.
 - (2) For RPAS weight > 150kg:
the MQTG shall at a minimum consist of:
 - (i) Functions;
 - (ii) Validation/objective;
 - (iii) Subjective; and
 - (iv) Integrated tests.
- (d) The MQTG, supporting material and information shall be submitted in a report and format to allow efficient review and evaluation before the FSTD-R can be qualified.

FSTD.430 Expansion of the approved use of the qualified FSTD-R

In case the organisation needs to expand the approved use of the FSTD-R, the organisation shall apply in advance to the MAA-NLD for an (upgrade) evaluation by submitting MAA-NLD Form 157. The organisation shall develop and perform the evaluation. Results from previous evaluations shall not be used to validate the FSTD-R's performance for the current upgrade. The change may affect the MQTG and FSTD-R data sheet (FSTD.135) and shall be updated accordingly.

FSTD.431 Relocation of the FSTD-R >150kg

When the FSTD-R representing an RPAS >150 kg is moved to a new or temporary location, the organisation shall inform the MAA-NLD prior the relocation. Before returning the FSTD-R to service

at the new location, the organisation shall only within the scope of the NLD-MAR-FCL and NLD-MAR-MRPL evaluate whether the FSTD-R's performance is acceptable for the approved use. A copy of the evaluation shall be stored for review on request by the MAA-NLD.

FSTD.435 Temporary conservation of the FSTD-R>150kg

If the organisation plans to remove an FSTD-R >150kg from active status and conserve the FSTD-R for prolonged periods with the intent of later returning it back into service, the MAA-NLD shall be notified with an accompanying plan.

SUBPART D: REQUIREMENTS FOR THE QUALIFICATION OF CTDs FOR CREW OTHER THAN FLIGHT CREW

FSTD.500 General

This Subpart is applicable to CTDs used for approved training, testing or checking and within the scope of the MAR-OPS of:

- (a) Aircrew, if this is performed in a CTD; and
- (b) Other crew if the CTD represents the crew station it simulates.

FSTD.510 CTD Qualification basis (+AMC) (+GM)

The qualification basis for the issuance of a CTD qualification certificate shall consist of an MQTG to evaluate the total system fitness of the CTD for the intended use. This is the qualification basis and the basis for the yearly recurrent QTG. The MQTG needs MAA-NLD approval.

FSTD.520 Initial CTD evaluation procedure (+AMC) (+GM)

- (a) The organisation shall inform the MAA-NLD in advance in order to agree upon a plan to qualify the CTD.
- (b) The team that performs the evaluation must have sufficient experience, qualifications and system knowledge. The evaluation team must be acceptable to the MAA-NLD.
- (c) To determine whether the CTD is suitable for its intended use, the CTD shall be evaluated through:
 - (1) Functions; and
 - (2) Subjective tests.
- (d) The MQTG and the CTD data sheet, supporting material and information shall be submitted in a report and format to allow efficient review and evaluation before the CTD can be qualified for its intended use.

FSTD.530 Expansion of the approved use of the qualified CTD

In case the organisation needs to expand the CTD's approved use, the organisation shall apply in advance to the MAA-NLD for an (upgrade) evaluation by submitting MAA-NLD Form 157. The organisation shall develop and perform the evaluation. Results from previous evaluations shall not be used to validate the CTD's performance for the current upgrade. The change may affect the CTD MQTG and data sheet (FSTD.135) and shall be updated accordingly.

FSTD.531 Relocation of the CTD

When the CTD is moved to a new or temporary location the organisation shall inform the MAA-NLD prior the relocation. Before returning the CTD into service at the new location, the organisation shall evaluate whether the CTD's performance is acceptable for the approved use. A copy of the evaluation shall be stored for review on request by the MAA-NLD.

FSTD.535 Temporary conservation of the CTD

If the organisation plans to remove a CTD from active status and conserve the CTD for prolonged periods with the intent of later returning it back into service, the MAA-NLD shall be notified with an accompanying plan.

Appendix 1: Aeroplane FSTD standards

This Appendix describes the minimum FFS, FTD, FNPT and BITD requirements for qualifying devices to the required qualification levels. Certain requirements included in these Certification Specifications should be supported with a Statement Of Compliance (SOC) and, in some designated cases, an objective test. The SOC shall describe how the requirement was met. The test results should show that the requirement has been complied with. In the following tabular listing of FSTD standards, statements of compliance are indicated in the compliance column.

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

For MCC the minimum technical requirements are as for FNPT level II, with the following additions or amendments:

1	Turbo-jet or turbo-prop engines	
2	Performance reserves, in the case of an engine failure. These may be simulated by a reduction in the aeroplane gross mass	
3	Retractable landing gear	
4	Pressurisation system	
5	De-icing systems	
6	Fire detection / suppression system	
7	Dual controls	
8	Autopilot with automatic approach mode	
9	2 VHF transceivers including oxygen masks intercom system	
10	2 VHF NAV receivers (VOR, ILS, DME)	
11	1 ADF receiver	
12	1 Marker receiver	
13	1 transponder	
The following indicators shall be located in the same positions on the instrument panels of both pilots:		
1	Airspeed	
2	Flight attitude with flight director	
3	Altimeter	
4	Flight director with ILS (HSI)	
5	Vertical speed	

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL					FTD LEVEL			FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D		1	2		I	II	MCC		
	1. General													
a.1	A fully enclosed flight deck.	✓	✓	✓	✓					✓				
a.2	A cockpit/flight deck sufficiently enclosed to exclude distraction, which will replicate that of the aeroplane or class of aeroplane simulated.							✓		✓	✓	✓	✓	
a.3	Flight deck, a full-scale replica of the aeroplane simulated. Equipment for operation of the cockpit windows shall be included in the FSTD, but the actual windows need not be operable. The flight deck, for FSTD purposes, consists of all that space forward of a cross section of the fuselage at the most extreme aft setting of the pilot seats. Additional required flight crew member duty stations and those required bulkheads aft of the pilot seats are also considered part of the flight deck and shall replicate the aeroplane.	✓	✓	✓	✓	✓								Flight deck observer seats are not considered to be additional flight crew member duty stations and may be omitted. Bulkheads containing items such as switches, circuit breakers, supplementary radio panels, etc., to which the flight crew may require access during any event after preflight cockpit preparation is complete are considered essential and may not be omitted. Bulkheads containing only items such as landing gear pin storage compartments, fire axes or extinguishers, spare light bulbs, aeroplane document pouches, etc., are not considered essential and may be omitted. Such items, or reasonable facsimile, shall still be available in the FSTD but may be relocated to a suitable location as near as practical to the original position. Fire axes and any similar purpose instruments need only be represented in silhouette.
a.4	Direction of movement of controls and switches identical to that in the aeroplane.	✓	✓	✓	✓									
a.5	A full-size panel of replicated system(s) which will have actuation of controls and switches that replicate those of the aeroplane simulated.						✓	✓						The use of electronically displayed images with physical overlay incorporating operable switches, knobs, buttons replicating aeroplane instrument panels may be acceptable to the competent authority.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL					FTD LEVEL			FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D		1	2		I	II	MCC		
e.3	Navigational data with the corresponding approach facilities. Navigation aids should be usable within range without restriction.	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	For FTD level 1 applies where navigation equipment is replicated. For all FFSs and FTDs level 2 where used for area or airfield competence training or checking, navigation data should be updated within 28 days. For FNPTs and BITDs, complete navigational data for at least five different European airports with corresponding precision and non-precision approach procedures including current updating within a period of three months.
f.1	In addition to the flight crew member duty stations, three suitable seats for the instructor, delegated examiner and competent authority inspector. The competent authority shall 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 aeroplane 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.	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	For FTDs and FNPTs, suitable seating arrangements for the instructor and examiner or competent authority's inspector should be provided. For BITDs, suitable viewing arrangements for the instructor shall be provided.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC			
e.3	Navigational data with the corresponding approach facilities. Navigation aids should be usable within range without restriction.	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	For FTD level 1 applies where navigation equipment is replicated. For all FFSs and FTDs level 2 where used for area or airfield competence training or checking, navigation data should be updated within 28 days. For FNPTs and BITDs, complete navigational data for at least five different European airports with corresponding precision and non-precision approach procedures including current updating within a period of three months.
f.1	In addition to the flight crew member duty stations, three suitable seats for the instructor, delegated examiner and competent authority inspector. The competent authority shall 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 aeroplane 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.	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	For FTDs and FNPTs, suitable seating arrangements for the instructor and examiner or competent authority's inspector should be provided. For BITDs, suitable viewing arrangements for the instructor shall be provided.

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

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
h.2	The FSTD must have a real-time feedback tool that provides the instructor/evaluator with visibility of whenever the FSTD training envelope or aeroplane operating limits have been exceeded. Additionally, and optionally, a recording mechanism may be utilised.			✓	✓							This feedback tool must include the following: (a) FSTD validation envelope: This must be in form of an alpha/beta envelope (or equivalent method) depicting the 'confidence level' of the aerodynamic model. This 'confidence level' depends on the degree of flight validation or on the source of predictive methods. There must be a minimum of a flaps-up and flaps-down envelope available. (b) Flight control inputs: These must enable the instructor/evaluator to assess the pilot's flight control displacements and forces (including fly-by-wire, as appropriate). (c) Aeroplane operational limits: This must display the aeroplane's operational limits during the manoeuvre as applicable for the configuration of the aeroplane. A SOC is required that defines the source data used to construct the FSTD validation envelope.

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

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC			
j.1	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 aeroplane upon contact with the runway during landing 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. (3) Ground handling characteristics — steering inputs to include crosswind, braking, thrust reversing, deceleration and turning radius.	✓	✓	✓	✓				✓	✓			Statement of compliance required. Tests required. For level A FFSs, generic ground handling to the extent that allows turns within the confines of the runway, adequate control on flare, touchdown and roll-out (including from a crosswind landing) only is acceptable. For FNPTs, a generic ground handling model need only be provided to enable representative flare and touch down effects.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC			
k.1	Wind shear models shall provide training in the specific skills required for recognition of wind shear phenomena and execution of recovery manoeuvres. Such models shall be representative of measured or accident derived winds, but may include simplifications which ensure repeatable encounters. For example, models may consist of independent variable winds in multiple simultaneous components. Wind models shall be available for the following critical phases of flight: (1) Prior to take-off rotation, (2) At lift-off, (3) During initial climb, (4) Short final approach.			✓	✓								Tests required.
l.1	Instructor controls for environmental effects including wind speed and direction shall be provided.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	For FTDs environment modelling sufficient to permit accurate systems operation and indication.
m.1	Stopping and directional control forces shall be representative for at least the following runway conditions based on aeroplane related data: (1) Dry (2) Wet (3) Icy (4) Patchy wet (5) Patchy icy (6) Wet on rubber residue in touchdown zone.			✓	✓								Statement of compliance required. Objective tests required for (1), (2), (3); subjective check for (4), (5), (6).

FLIGHT SIMULATION TRAINING DEVICE STANDARDS	FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
	A	B	C	D	1	2	I	II	MCC		
n.1 Brake and tyre failure dynamics (including antiskid) and decreased brake efficiency due to brake temperatures shall be representative and based on aeroplane related data.			✓	✓							Statement of compliance required. Subjective test is required for decreased braking efficiency due to brake temperature, if applicable.
o.1 A means for quickly and effectively conducting daily testing of FSTD programming and hardware shall be available.	✓	✓	✓	✓							Statement of compliance required.
p.1 Computer capacity, accuracy, resolution, and dynamic response shall be sufficient to fully support the overall fidelity, including its evaluation and testing.	✓	✓	✓	✓	✓	✓					Statement of compliance required.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL				FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC				
q.1	Control feel dynamics shall replicate the aeroplane simulated. Free response of the controls shall match that of the aeroplane within the tolerances specified. Initial and upgrade evaluations will include control free response (pitch, roll and yaw controller) measurements recorded at the controls. The measured responses shall correspond to those of the aeroplane in take-off, cruise, and landing configurations. (1) For aeroplanes with irreversible control systems, measurements may be obtained on the ground if proper pitot static inputs are provided to represent conditions typical of those encountered in flight. Engineering validation or aeroplane manufacturer rationale will be submitted as justification to ground test or omit a configuration. (2) For FSTDs requiring static and dynamic tests at the controls, special test fixtures shall not be required during initial evaluation if the FSTD operator's MQTG shows both text fixture results and alternate test method results such as computer data plots, which were obtained concurrently. Repetition of the alternate method during initial evaluation may then satisfy this requirement.			✓	✓									Tests required.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL		FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC		
r.1	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 ms. 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. (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 ms of the time, but not before the time, when the aeroplane would respond under the same conditions.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Tests required. For level 'A' & 'B' FFSs, and applicable systems for FTDs, FNPTs and BITDs the maximum permissible delay is 300 ms.

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

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

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

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL				FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC				
u.1	Aerodynamic and ground reaction modelling for the effects of reverse thrust on directional control shall be provided.	✓	✓	✓	✓									Statement of compliance required.
v.1	Realistic aeroplane mass properties, including mass, centre of gravity and moments of inertia as a function of payload and fuel loading shall be implemented.	✓	✓	✓	✓									Statement of compliance required at initial evaluation. SOC shall include a range of tabulated target values to enable a demonstration of the mass properties model to be conducted from the instructor's station.
w.1	Self-testing for FSTD hardware and programming to determine compliance with the FSTD performance tests shall be provided. Evidence of testing shall include FSTD number, date, time, conditions, tolerances, and the appropriate dependent variables portrayed in comparison with the aeroplane standard.			✓	✓									Statement of compliance required. Tests required.
x.1	Timely and permanent update of hardware and programming subsequent to aeroplane modification sufficient for the qualification level sought.	✓	✓	✓	✓	✓	✓							
y.1	Daily preflight documentation either in the daily log or in a location easily accessible for review is required.	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	
	2. Motion system													
a.1	Motion cues as perceived by the pilot shall be representative of the aeroplane, e.g. touchdown cues shall be a function of the simulated rate of descent.	✓	✓	✓	✓									For FSTDs where motion systems are not specifically required, but have been added, they will be assessed to ensure that they do not adversely affect the qualification of the FSTD. For level C or level D devices, special consideration is given to the motion system response during upset prevention and recovery manoeuvres. Notwithstanding the limitations of simulator motion, the operator should place specific emphasis on tuning out objectionable motion system responses, where possible.

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

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC			
d.1	Motion effects programming shall include: (1) effects of runway rumble, oleo deflections, uneven groundspeed, runway centreline lights and taxiway characteristics; (2) buffets on the ground due to spoiler/speedbrake extension and thrust reversal; (3) bumps associated with the landing gear; (4) buffet during extension and retraction of landing gear; (5) buffet in the air due to flap and spoiler/speedbrake extension; (6) approach-to-stall buffet and stall buffet (where applicable); (7) touchdown cues for main and nose gear; (8) nose-wheel scuffing; (9) thrust effect with brakes set; (10) Mach and manoeuvre buffet; (11) tyre failure dynamics; (12) engine malfunction and engine damage; and (13) tail and pod strike.	✓	✓	✓	✓								For level A FFSs: effects may be of a generic nature sufficient to accomplish the required tasks. For level B, C and D FFSs: if there are known flight conditions where buffet is the first indication of the stall, or where no stall buffet occurs, this characteristic should be included in the model.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL				FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC				
e.1	Motion vibrations: tests with recorded results that allow the comparison of relative amplitudes versus frequency are required. Characteristic motion vibrations that result from operation of the aeroplane in so far as vibration marks an event or aeroplane state that can be sensed at the flight deck shall be present. The FSTD shall be programmed and instrumented in such a manner that the characteristic vibration modes can be measured and compared with aeroplane data.				✓									Statement of compliance required. Tests required.
	3. Visual System													
a.1	The visual system shall meet all the standards enumerated as applicable to the level of qualification requested by the applicant.	✓	✓	✓	✓				✓	✓				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. For FTDs if the visual system is to be used for the training of manoeuvring by visual reference (such as route and airfield competence) then the visual system should at least comply with that required for level A FFS.
b.1	Continuous minimum collimated visual field-of-view of 45 degrees horizontal and 30 degrees vertical field of view simultaneously for each pilot.	✓	✓											SOC is acceptable in place of this test.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC			
b.2	Continuous, cross-cockpit, minimum collimated visual field of view providing each pilot with 180 degrees horizontal and 40 degrees vertical field of view. Application of tolerances require the field of view to be not less than a total of 176 measured degrees horizontal field of view (including not less than ±88 measured degrees either side of the centre of the design eye point) and not less than a total of 36 measured degrees vertical field of view from the pilot's and co-pilot's eye points.			✓	✓								Consideration shall be given to optimising the vertical field of view for the respective aeroplane cut-off angle.
b.3	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 aeroplane, simultaneously for each pilot, including adjustable cloud base and visibility.								✓		✓		SOC is acceptable in place of this test.
c.1	A means of recording the visual response time for visual systems.	✓	✓	✓	✓				✓		✓		
d.1	System geometry. The system fitted shall be free from optical discontinuities and artefacts that create non-realistic cues.	✓	✓	✓	✓				✓		✓		Test required. A statement of compliance is acceptable in place of this test.
e.1	Visual textural cues to assess sink rate and depth perception during take-off and landing shall be provided.	✓	✓	✓	✓								For level A FFS visual cueing shall be sufficient to support changes in approach path by using runway perspective.
f.1	Horizon and attitude shall correlate to the simulated attitude indicator.	✓	✓	✓	✓								Statement of compliance required.
g.1	Occulting - a minimum of ten levels shall be available.	✓	✓	✓	✓								Occulting shall be demonstrated. Statement of compliance required.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL					FTD LEVEL				FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D		1	2	I	II	MCC				
h.1	Surface (Vernier) resolution shall occupy a visual angle of not greater than 2 arc minutes in the visual display used on a scene from the pilot's eyepoint.			✓	✓										Test and statement of compliance required containing calculations confirming resolution.
i.1	Surface contrast ratio shall be demonstrated by a raster drawn test pattern showing a contrast ratio of not less than 5:1.			✓	✓										Test and statement of compliance required.
j.1	Highlight brightness shall be demonstrated using a raster drawn test pattern. The highlight brightness shall not be less than 20 cd/m ² (6ft-lamberts).			✓	✓										Test and statement of compliance required. Use of calligraphic lights to enhance raster brightness is acceptable.
k.1	Light point size – not greater than 5 arc minutes.			✓	✓										Test and statement of compliance required. This is equivalent to a light point resolution of 2.5 arc minutes.
l.1	Light point contrast ratio – not less than 10:1.	✓	✓												Test and statement of compliance required.
l.2	Light point contrast ratio – not less than 25:1.			✓	✓										Test and statement of compliance required.
m.1	Daylight, twilight and night visual capability as applicable for level of qualification sought.	✓	✓	✓	✓										Statement of compliance required for system capability. System objective and scene content tests are required.
m.2	The visual system shall be capable of meeting, as a minimum, the system brightness and contrast ratio criteria as applicable for level of qualification sought.	✓	✓	✓	✓										
m.3	Total scene content shall be comparable in detail to that produced by 10 000 visible textured surfaces and (in day) 6 000 visible lights or (in twilight or night) 15 000 visible lights, and sufficient system capacity to display 16 simultaneously moving objects.			✓	✓										

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL					FTD LEVEL				FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D		1	2	I	II	MCC				
m.4	The system, when used in training, shall provide in daylight, full colour presentations and sufficient surfaces with appropriate textural cues to conduct a visual approach, landing and airport movement (taxi). Surface shading effects shall be consistent with simulated (static) sun position.			✓	✓										
m.5	The system, when used in training, shall provide at twilight, as a minimum, full colour presentations of reduced ambient intensity, sufficient surfaces with appropriate textural cues that include self-illuminated objects such as road networks, ramp lighting and airport signage, to conduct a visual approach, landing and airport movement (taxi). Scenes shall include a definable horizon and typical terrain characteristics such as fields, roads and bodies of water and surfaces illuminated by representative ownship lighting (e.g. landing lights). If provided, directional horizon lighting shall have correct orientation and be consistent with surface shading effects.			✓	✓										
m.6	The system, when used in training, shall provide at night, as a minimum, all features applicable to the twilight scene, as defined above, with the exception of the need to portray reduced ambient intensity that removes ground cues that are not self-illuminating or illuminated by ownship lights (e.g. landing lights).	✓	✓	✓	✓										

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL			BITD	COMPLIANCE
		A	B	C	D	1	2	I	II	MCC			
	4. Sound System												
a.1	Significant flight deck sounds which result from pilot actions corresponding to those of the aeroplane or class of aeroplane.	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	For FNPTs level I and BITDs, engine sounds only need to be available.
b.1	Sound of precipitation, rain removal equipment and other significant aeroplane noises perceptible to the pilot during normal and abnormal operations and the sound of a crash when the FSTD is landed in excess of limitations.			✓	✓								A statement of compliance is required. Sounds have to be directionally representative. For FSTDs that are to be qualified for full stall training tasks, sounds associated with stall buffet have to be replicated, if significant in the aeroplane.
c.1	Comparable amplitude and frequency of flight deck noises, including engine and airframe sounds. The sounds shall be coordinated with the required weather.				✓								Tests required.
d.1	The volume control shall have an indication of sound level setting which meets all qualification requirements.	✓	✓	✓	✓								

Appendix 2: Helicopter FSTD standards

This Appendix describes the minimum FFS, FTD and FNPT requirements for qualifying devices to the required qualification levels. Certain requirements included in these Certification Specifications should be supported with a SOC and, in some designated cases, an objective test. The SOC shall describe how the requirement was met. The test results should show that the requirement has been attained. In the following tabular listing of FSTD standards, statements of compliance are indicated in the compliance column.

For FNPT use in MCC training the general technical requirements are expressed in the MCC column with additional systems, instrumentation and indicators as required for MCC training and operation.

For MCC, the minimum technical requirements are as for FNPT level II or III, with the following additions or amendments:

1	Multi-engine and multi-pilot helicopter	
2	Performance reserves, in case of an engine failure, to be in accordance with Category A criteria	
3	Anti-icing or de-icing systems	
4	Fire detection / suppression system	
5	Dual controls	
6	Autopilot with upper modes	
7	2 VHF transceivers	
8	2 VHF NAV receivers (VOR, ILS, DME)	
9	1 ADF receiver	
10	1 Marker receiver	
11	1 transponder	
12	Weather radar	
The following indicators shall be located in the same positions on the instrument panels of both pilots:		
1	Airspeed	
2	Flight attitude	
3	Altimeter and radio altimeter	
4	HSI	
5	Vertical speed	
6	ADF	
7	VOR, ILS, DME	
8	Marker indication	
9	Stop watch	

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		COMPLIANCE											
		FFS LEVEL				FTD LEVEL			FNPT LEVEL				
		A	B	C	D	1	2	3	I	II	III	MCC	
1.1 General													
a.1	A cockpit that is a full-scale replica of the helicopter simulated. Additional required crew member duty stations and those required bulkheads aft of the pilot seats are also considered part of the cockpit and shall replicate the helicopter. A cockpit that replicates the helicopter.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
a.2	The cockpit, including the instructor's station is fully enclosed. A cockpit, including the instructor's station that is sufficiently closed off to exclude distractions.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
b.1	Full size panels with functional controls, switches, instruments and primary and secondary flight controls, which shall be operating in the correct direction and with the correct range of movement. Functional controls, switches, instruments and primary and secondary flight controls sufficient for the training events to be accomplished, shall be located in a spatially correct area of the cockpit.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	For FTD level 1 as appropriate for the replicated system. The use of electronically displayed images with physical overlay or masking for FSTD instruments and/or instrument panels incorporating instrument controls and switches that replicate those of the helicopter and operate with the same technique, effort, travel and in the same direction may be acceptable. FSTD instruments and/or instrument panels using electronically displayed images with physical overlay or masking and operable controls representative of those in the type of helicopter are acceptable. The instruments displayed should be free of quantisation (stepping).
c.1	Lighting for panels and instruments shall be as per the helicopter. Lighting for panels and instruments shall be sufficient for the training events	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3	I	II	III	MCC	
c.2	Cockpit ambient lighting environment shall be dynamically consistent with the visual display and sufficient for the training event. The ambient lighting should provide an even level of illumination which is not distracting to the pilot.	✓		✓	✓		✓			✓	✓	✓	
d.1	Relevant cockpit circuit breakers shall be located as per the helicopter and shall function accurately when involved in operating procedures or malfunctions requiring or involving flight crew response.	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
e.1	Effect of aerodynamic changes for various combinations of airspeed and power normally encountered in flight, including the effect of change in helicopter attitude, aerodynamic and propulsive forces and moments, altitude, temperature, mass, centre of gravity location and configuration. Aerodynamic and environment modelling shall be sufficient to permit accurate systems operation and indication.	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	Effects of C_d , mass and configuration changes are not required for FNPT level I.
e.2	Aerodynamic modelling which includes ground effect, effects of airframe and rotor icing (if applicable), aerodynamic interference effects between the rotor wake and fuselage, influence of the rotor on control and stabilisation systems, and representations of nonlinearities due to sideslip, vortex ring and retreating blade stall.			✓	✓		✓	✓		✓	✓	✓	
f.1	Validation flight test data shall be used as the basis for flight and performance and systems characteristics. Representative/generic aerodynamic data tailored to the helicopter with fidelity sufficient to meet the objective tests and sufficient to permit accurate system operation and indication.	✓		✓	✓	✓	✓	✓	✓		✓	✓	Aerodynamic data need not be necessarily based on flight test data.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL					FTD LEVEL				FNPT LEVEL				COMPLIANCE
		A	B	C	D		1	2	3		I	II	III	MCC	
g.1	All relevant cockpit instrument indications automatically respond to control movement by a crew member, helicopter performance, or external simulated environmental effects upon the helicopter.	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	
h.1	All relevant communications, navigation, caution and warning equipment shall correspond to that installed in the helicopter. All simulated navigation aids within range shall be usable without restriction. Navigational data shall be capable of being updated.	✓	✓	✓	✓		✓	✓	✓						For FTD 1 applies where the appropriate systems are replicated.
h.2	Navigation equipment corresponding to that of a helicopter, with operation within the tolerances typically applied to the airborne equipment. This shall include communication equipment (interphone and air/ground communications systems).										✓	✓	✓	✓	
h.3	Navigational data with the corresponding approach facilities. Navigation aids should be usable within range without restriction.	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	For FFSs and FTDs the navigation database should be updated within 28 days. For FNPTs complete navigational data for at least five different European airports with corresponding precision and non-precision approach procedures including current updating within a period of three months.
i.1	In addition to the flight crew member stations, at least two suitable seats for the instructor and an additional observer shall be provided permitting adequate vision to the crew members' panel and forward windows. Observer and instructor seats need not represent those found in the helicopter but shall be adequately secured to the floor of the FFS, fitted with positive restraint devices and be of sufficient integrity to safely restrain the occupant during any known or predicted motion system excursion.	✓	✓	✓	✓										The competent authority shall consider options to this standard based on unique cockpit configurations. Any additional seats installed shall be equipped with similar safety provisions.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3	I	II	III	MCC	
j.2	Crew member seats shall afford the capability for the occupants to be able to achieve the design eye reference position. In addition to the flight crew member stations, at least two suitable seats for the instructor and an additional observer shall be provided permitting adequate vision to the crew members' panel and forward windows.					✓	✓	✓	✓		✓	✓	The instructor's and observer's seats need not represent those found in the helicopter.
j.1.1	FFS systems shall simulate the applicable helicopter system operation, both on the ground and in flight. Systems shall be operative to the extent that normal, abnormal, and emergency operating procedures appropriate to the simulator application can be accomplished. Once activated, proper system operation shall result from system management by the flight crew and not require input from instructor controls.	✓	✓	✓	✓								
j.1.2	FTD systems represented shall be fully operative to the extent that normal, abnormal and emergency operating procedures can be accomplished. Once activated, proper system operation shall result from system management by the flight crew and not require input from instructor controls.					✓	✓	✓					
j.1.3	The systems should be operative to the extent that it should be possible to perform normal, abnormal, and emergency operations appropriate to a helicopter as required for training. Once activated, proper systems operations should result from the system management by the crew member and not require any further input from the instructor's controls.								✓	✓	✓	✓	
k.1	The instructor shall be able to control system variables and insert abnormal or emergency conditions into the helicopter systems. Independent freeze and reset facilities shall be provided.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FNPT I: applicable only to enable the instructor to carry out selective failure of basic flight instruments and navigation equipment. For FNPT level I: ability to set the FNPT to minimum IMC speed or above.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3	I	II	III	MCC	
1.1.1	Control forces and control travel which correspond to that of the replicated helicopter. Control forces shall react in the same manner as in the helicopter under the same flight conditions.	✓	✓	✓	✓								For level A only static control force characteristics need to be tested.
	Control forces and control travel shall be representative of the replicated helicopter under the same flight conditions as in the helicopter.					✓	✓	✓					For FTD level 1 as appropriate for the system training required.
	Control forces and control travel shall broadly correspond to that of a helicopter.								✓				Only static control force characteristics need to be tested.
	Control forces and control travels shall respond in the same manner under the same flight conditions as in a helicopter.									✓	✓	✓	Only static control force characteristics need to be tested.
1.2	Cockpit control dynamics, which replicate the helicopter simulated. Free response of the controls shall match that of the helicopter within the given tolerance. Initial and upgrade evaluation shall include control free response (cyclic, collective, and pedal) measurements recorded at the controls. The measured responses shall correspond to those of the helicopter in ground operations, hover, climb, cruise, and auto-rotation.		✓	✓	✓		✓	✓					For helicopters with irreversible control systems, measurements may be obtained on the ground. Engineering validation or helicopter manufacturer rationale shall be submitted as justification for ground test or to omit a configuration. For FFS requiring static and dynamic tests at the controls, special test fixtures shall not be required during the initial evaluations if the FSTD operator's QTG shows both test fixture results and alternate test method results, such as computer data plots, which were obtained concurrently. Use of the alternate method during initial evaluation may then satisfy this test requirement. FTD level 2 aerodynamic data can be representative/generic and need not necessarily be based on flight test data.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3	I	II	III	MCC	
n.1	Ground handling and aerodynamic programming to include the following: Ground effect - hover and transition IGE. (Ground reaction - reaction of the helicopter upon contact with the landing surface during landing to include strut deflections, tire or skid friction, side forces, and other appropriate data, such as weight and speed, necessary to identify the flight condition and configuration. Ground handling characteristics - control inputs to include braking, deceleration turning radius and the effects of crosswind.	✓	✓	✓	✓								Level A can utilise generic simulation of ground effect and ground handling.
	Ground handling and aerodynamic ground effects models should be provided to enable lift-off, hover, and touch down effects to be simulated and harmonised with the sound and visual system. Generic ground handling and aerodynamic ground effects models should be provided to enable lift-off, hover, and touch down effects to be simulated and harmonised with the sound and visual system.						✓	✓		✓	✓	✓	
n.1	Instructor controls for: (i) wind speed and direction (ii) turbulence (iii) other atmospheric models to support the required training (iv) adjustment of cloud base and visibility (v) temperature and barometric pressure.	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	Examples: generic atmospheric models of local wind patterns around mountains and structures.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL				FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3		I	II	III	MCC	
p.1	Representative stopping and directional control forces for at least the following landing surface conditions based on helicopter related data, for a running landing: (i) dry (ii) wet (soft surface and hard surface) (iii) icy (iv) patchy wet (v) patchy icy			✓	✓									
p.1	Representative brake and tire failure dynamics.			✓	✓									
q.1	(1) Transport delay. Transport delay is the time between control input and the individual hardware (systems) responses. As an alternative, a latency test may be used to demonstrate that the FSTD system does not exceed the permissible delay. (2) Latency. Relative response of the visual system, cockpit instruments and initial motion system response shall be coupled closely to provide integrated sensory cues. These systems shall respond to abrupt pitch, roll, and yaw inputs at the pilot's position within the permissible delay, but not before the time, when the helicopter would respond under the same conditions. Visual scene changes from steady state disturbance shall occur within the system dynamic response limit but not before the resultant motion onset.	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	For FTD level 1, only instrument response is required within a maximum permissible delay of 200 ms. For level 'A' & 'B' FFS and level 2 FTD the maximum permissible delay is 150 ms. For level 'C' & 'D' FFS and level 3 FTD the maximum permissible delay is 100 ms. For FTD level 1 and FNPT level I, only instrument response is required within a maximum permissible delay of 200 ms. For level 'A' & 'B' FFS, level 2 FTD and FNPT level II and III the maximum permissible delay is 150 ms. For level 'C' & 'D' FFS and level 3 FTD the maximum permissible delay is 100 ms.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3	I	II	III	MCC	
r.1	A means for quickly and effectively testing FSTD programming and hardware. This may include an automated system, which could be used for conducting at least a portion of the tests in the QTG.	✓	✓				✓					✓	Recommended for FTD Level 1, FNPT level I and II. Automatic flagging of "out-of-tolerance" tests results is encouraged.
	Self-testing for FSTD hardware and programming to determine compliance with the FSTD performance tests. Evidence of testing shall include FSTD number, date, time, conditions, tolerances, and the appropriate dependent variables portrayed in comparison with the helicopter standard.			✓									
s.1	A system allowing for timely continuous updating of FSTD hardware and programming consistent with helicopter modifications.	✓	✓	✓	✓	✓	✓						
t.1	The FSTD operator shall submit a QTG in a form and manner acceptable to the competent authority. A recording system shall be provided that will enable the FSTD performance to be compared with QTG criteria.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
u.1	FSTD computer capacity, accuracy, resolution and dynamic response sufficient for the qualification level sought.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
v.1	Daily preflight documentation either in the daily log or in a location easily accessible for review.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL			COMPLIANCE	
		A	B	C	D	1	2	3	I	II	III		MCC
1.2 Motion System													
a.1	Motion cues as perceived by the pilot shall be representative of the helicopter, e.g. touch down cues should be a function of the simulated rate of descent.	✓	✓	✓	✓								Motion tests to demonstrate that each axes onset cues are properly phased with pilot input and helicopter response.
b.1	A motion system: Having a minimum of 3 degrees of freedom (pitch, roll, heave) to accomplish the required task. 6 degrees of freedom synergistic platform motion system.	✓											
c.1	A means of recording the motion response time as required	✓	✓	✓	✓								For level B, a reduced motion performance envelope is acceptable. See para 1.1.q.1 above.
d.1	Special effects programming to include the following: (1) runway rumble, oleo deflections, effects of groundspeed and uneven surface characteristics; (2) buffet due to translational lift; (3) buffet during extension and retraction of landing gear; (4) buffet due to high speed and retreating blade stall; (5) buffet due to vortex ring; (6) representative cues resulting from: (i) touch down (ii) translational lift; (7) antitorque device ineffectiveness;	✓	✓	✓	✓								For level A it may be of a generic nature sufficient to accomplish the required tasks.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE	
		A	B	C	D	1	2	3	I	II	III	MCC		
e.1	Characteristic vibrations/buffets that result from operation of the helicopter and which can be sensed in the cockpit. Simulated cockpit vibrations to include seat(s), flight controls and instrument panel(s), although these need not be tested independently.				✓								Statement of compliance required. Tests required with recorded results which allow the comparison of relative amplitudes versus frequency in the longitudinal, lateral and vertical axes with helicopter data. Steady state tests are acceptable.	
1.3 Visual System														
a.1	Visual system capable of meeting all the standards of this paragraph and the respective paragraphs of validation tests as well as functions and subjective tests as applicable to the level of qualification requested by the FSTD operator.	✓	✓	✓	✓		✓	✓		✓	✓	✓	The choice of the display system and of the field of view requirements should fully consider the intended use of the FSTD. The balance between training and testing/checking may influence the choice and geometry of the display system. In addition the diverse operational requirements should be addressed.	
b.1	Visual system capable of providing at least a 45 degree horizontal and 30 degree vertical field of view simultaneously for each pilot. Visual system capable of providing at least a 75 degrees horizontal and 40 degrees vertical field of view simultaneously for each pilot.	✓		✓										
	"Continuous", cross-cockpit, minimum visual field of view providing each pilot with 150 degrees horizontal and 40 degrees vertical			✓			✓			✓		✓	A minimum of 75 degrees horizontal field of view on either side of the zero degree azimuth line relative to the helicopter fuselage is required.	
b.2	"Continuous," cross-cockpit, minimum visual field of view providing each pilot with 150 degrees horizontal and 60 degrees vertical.							✓			✓		A minimum of 75 degrees horizontal field of view on either side of the zero degree azimuth line relative to the helicopter fuselage is required. This will allow an offset per side of the horizontal field of view if required for the training. Where training tasks require extended fields of view beyond the 150 degrees x 60 degrees, then such extended fields of view should be provided.	

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3	I	II	III	MCC	
b.3	"Continuous" cross cockpit, minimum visual field of view providing each pilot with 180 degrees horizontal and 60 degrees vertical.				✓								A minimum of 75 degrees of horizontal field of view on either side of zero degrees azimuth line relative to the helicopter fuselage is required. This will allow an offset per side of the horizontal field of view if required for the training. Where training tasks require extended fields of view beyond the 180 degrees x 60 degrees, then such extended fields of view shall be provided.
c.1	A means of recording the visual response time for the visual system shall be provided.	✓	✓	✓	✓	✓				✓	✓	✓	
d.1	Visual cues to assess rate of change of height, translational displacements and rates, during take-off and landing. Visual cues to assess rate of change of height, height AGL, translational displacements and rates, during take-off, low altitude/low airspeed manoeuvring, hover, and landing.	✓	✓				✓	✓			✓	✓	For level 'A', visual cueing sufficient to support changes in approach path by using the final approach and take-off (FATO) perspective.
e.1	Test procedures to quickly confirm visual system colour, RVR, focus, intensity, level horizon, and attitude as compared with the specified parameters.	✓	✓	✓	✓			✓		✓	✓	✓	Statement of compliance required. Test required.
f.1	A minimum of 10 levels of occulting. This capability should be demonstrated by a visual model through each channel.			✓	✓		✓	✓		✓	✓	✓	Statement of compliance required. Test required.
g.1	Surface (Vernier) resolution shall be demonstrated by a test pattern of objects shown to occupy a visual angle of not greater than 3 arc minutes in the visual display used on a scene from the pilot's eye point.			✓	✓			✓		✓	✓	✓	Statement of compliance required. Test required.
h.1	Lightpoint size shall not be greater than 6 arc minutes Lightpoint size shall not be greater than 8 arc minutes		✓	✓	✓					✓	✓	✓	This is equivalent to a lightpoint resolution of 3 arc minutes. This is equivalent to a lightpoint resolution of 4 arc minutes.

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3	I	II	III	MCC	
i.1	Daylight, dusk, and night visual scenes with sufficient scene content to recognise aerodromes, operating sites, terrain, and major landmarks around the FATO area and to successfully accomplish low airspeed/low altitude manoeuvres to include lift-off, hover, translational lift, landing and touch down.			✓	✓		✓	✓		✓	✓	✓	Generic database is acceptable only for FTDs and FNPTs, Where applicable. Where applicable. Where applicable. The ambient lighting should provide an even level of illumination, which is not distracting to the pilot.
j.1	A visual database sufficient to support the requirements, including (i) Specific areas within the database needing higher resolution to support landings, take-offs and ground cushion exercises and training away from an aerodrome/operating site. Including elevated FATO, helidecks and confined areas. (ii) For cross-country flights sufficient scene details to allow for ground to map navigation over a sector length equal to 30 minutes at an average cruise speed. (iii) For offshore airborne radar approaches (ARA), harmonised visual/radar representations of installations. (iv) For training in the use of night vision goggles (NVG) a visual display with the ability to represent various scenes with the required levels of ambient light/colour.	✓		✓	✓		✓	✓		✓		✓	
k.1	Daylight, twilight (dusk/dawn) and night visual capability for system brightness and contrast ratio criteria as applicable for level of qualification sought. Night and Dusk scene.	✓		✓	✓		✓	✓		✓		✓	
k.2	The visual system should be capable of producing: Full colour presentations. Full colour texture shall be used to enhance visual cue perception for illuminated landing surfaces.			✓	✓		✓	✓		✓	✓	✓	

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL				COMPLIANCE
		A	B	C	D	1	2	3	I	II	III	MCC	
k.3	The visual system should be capable of producing, as a minimum: (i) A scene content comparable in detail with that produced by 6 000 polygons for daylight and 1 000 visible lightpoints for night and dusk scenes for the entire visual system. (ii) A scene content comparable in detail with that produced by 4 000 polygons for daylight and 5 000 visible lightpoints for night and dusk scenes for the entire visual system. (iii) A scene content comparable in detail with that produced by 6 000 polygons for daylight and 7 000 visible lightpoints for night and dusk scenes for the entire visual system.			✓			✓	✓		✓	✓	✓	Statement of compliance required. Freedom of apparent quantisation and other distracting visual effects are also applicable for levels A and B.
l.1	Surface contrast ratio: Demonstration model Not less than 5:1.			✓			✓	✓		✓	✓	✓	
l.2	Lightpoint contrast ratio. Not less than 25:1.			✓			✓	✓					
m.1	Highlight Brightness. The minimum light measured at the pilot's eye position should be: 14 cd/m² (4 ft-Lamberts) 17 cd/m² (5ft-Lamberts) 20 cd/m² (6 ft-Lamberts)			✓	✓		✓	✓		✓	✓	✓	
1.4 Sound Systems													
a.1	Significant cockpit sounds, and those, which result from pilot actions corresponding to those of the helicopter shall be provided.	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	For FTD level 1 as appropriate for the system training required. Statement of compliance required for FFS.
a.2	Sounds due to engines, transmission and rotors should be available								✓				

FLIGHT SIMULATION TRAINING DEVICE STANDARDS		FFS LEVEL				FTD LEVEL			FNPT LEVEL			COMPLIANCE	
		A	B	C	D	1	2	3	I	II	III		MCC
b.1	Sound of precipitation, windshield wipers, the sound resulting from a blade strike and a crash condition when operating the helicopter in excess of limitations.			✓	✓		✓	✓					Crash sounds may be generic. Statement of compliance or demonstration of representative sounds required.
c.1	Realistic amplitude and frequency of cockpit acoustic environment.				✓								Objective steady-state tests required.
d.1	The volume control shall have an indication of sound level setting which meets all qualification requirements.	✓	✓	✓	✓								

These standards always refer to the type of helicopter being simulated, except for FNPT, which may be generic. For FNPT, the term “the/a helicopter” is used to represent the aircraft being modelled, which can be a specific helicopter type, a family of similar helicopter types or a totally generic helicopter. Wherever the term runway is used, it includes runways, final approach and take-off (FATO) and touch down and lift-off (TLOF) areas.

Appendix 3: FSTD/CTD data sheet example, type or device specific**FSTD/CTD No: xxxxx****A/C type**

Located at
Airbase xxxxx
xxxxx Command

FSTD/CTD DATA SHEET issue x.x date/month/year

Software installed:			
FSTD/CTD qualification level or approved use:			
Qualification documents (M)QTG or equivalent:			
Visual system:			
Motion system:			
Engine fit:			
Instrument fit:			
Additional capabilities:			
Restrictions or limitations:			
Credits for logging flying time:	yes / no /% or training events evaluated as TP		
Approved training, testing, checking:	According evaluation, Exposition manual or other documentation		
Other:			
MoD cat A/B/C/D/E approach limits	RVR	m	DH ft
Recency / emergency procedure training	yes / yes		
Type rating/ check	yes / yes		
Instrument training / check	yes / yes		
Proficiency / skill test	yes / yes		
Operational scenario training / check	yes / yes		
MCC	yes		
Dusk / Night / NVG	yes / yes/ yes		
Autopilot	yes		
Auto-throttle / auto coupled approach	yes / no		
Auto-land / roll out guidance	no / no		
ACAS 1/ 2	no / no		

AGCAS	yes
Wind shear warning system / predictive wind shear	no / no
WX / Air-surface radar	yes / yes
Rad alt	yes
HMDS	yes
FANS	no
GPWS / EGPWS	no / no
GPS	yes
INS	yes
Stalls / UPRT	yes / yes
As per type applicable	x
As per type applicable	x
As per type applicable	x
Etc.	
Other:	Any information defining the specifications of the FSTD/CTD.

Initial issue, date: dd/mon/year. This FSTD/CTD data sheet is part of certificate number: NLD-xxxxxx

The organisation is responsible for keeping this FSTD/CTD data sheet up to date. Any change must be approved by the MAA-NLD.

Appendix 4: Application form 157 for FSTD or CTD qualification

NLD-MAR FSTD Application form for initial qualification or upgrade of a Flight Simulator Training Device (FSTD) or Crew Training Device (CTD)

Applicant		
FSTD ☐	Initial qualification ☐	Upgrade in approved use or qualification level ☐
CTD ☐	Interim qualification ☐	
Indicate choice in applicable box(es)		
1. Command		
2. Organisation		
3. FSTD/CTD specifications	Simulated aircraft/RPAS/ crew station:	
	FSTD/CTD Manufacturer:	
	Serial number:	
	Location:	
	Projected date of operation:	
4. Requested qualification level and/or intended use	If applicable, specify the intended use or kinds of training, this may be on an attachment.	
5. Composition of evaluation team, name and function	Lead evaluator:	
	Co-evaluator:	
6. Contact details	SME:	
	SME:	
		
Function and name of the Accountable Manager		
Signature of the Accountable Manager	Date:	
	Place:	
Send this application form and the evaluation report(s) including the FSTD/CTD data sheet to the MAA-NLD at: MLA@Mindef.nl		

FINAL CLAUSES

NLD-MAR FSTD – Netherlands Military Aviation Regulations Flight Simulation Training Devices together with its Acceptable Means of Compliance (AMC) and Guidance Material (GM).

This Netherlands Military Aviation Regulation shall enter into force from the day after the date of issue on the MAA-NLD intranet/internet.

This Netherlands Military Aviation Regulation will be binding in its entirety and directly applicable to all (Military) Aviation Organisations who are involved in any way with or are acting within the Netherlands Military Aviation System (NLD-MAS) and need to be compliant no later than 1 year after the date of issue.

The Hague, 10 March 2026

For the Minister of Defence,
The Director of the Military Aviation Authority - The Netherlands

A handwritten signature in blue ink, consisting of a stylized 'A' with a horizontal line through it and a vertical line extending upwards.

A.A.W.K. Appels, LLM, Msc,
Air Commodore