
BRITISH MICROLIGHT AIRCRAFT ASSOCIATION

TECHNICAL INFORMATION LEAFLET

NO: 030

ISSUE 1

19 September 2000

CRITERIA FOR BMAA ENDORSEMENT OF A SYNTHETIC TRAINING DEVICE

Introduction

Flight simulators are used widely within the large aeroplane world for procedural, emergency and conversion training. They are particularly useful for simulating emergencies without putting an aircraft at risk, or for intensive low-cost training.

A full flight simulator is an incredibly expensive device, which, whilst considerably cheaper to run than a Boeing 767, is still far more expensive to buy and operate than the most expensive modern microlight. This document does not cover full motion flight simulators, although BMAA endorsement of such a device is possible, the eventuality is considered very unlikely, and special arrangements will be made if this is ever required.

However, throughout aviation, less capable simulators have many uses in the training of pilots. These devices are known in the civil world as "*Flight and Navigation Procedures Trainers*" or FNPT; in the military they are known as "*Part Task Trainers*" or PTT. It is BMAA's belief that although it cannot permit a pilot to qualify with less than the 25 hours minimum required to obtain a PPL(Aeroplanes)-Microlights, such devices can provide a valuable training aid, allowing the continuation of training in poor weather, practice of emergencies in safety, or less expensive training so that a pilot may complete their license in the minimum required flying hours, rather than the more normal 35-40 hours.

This document is based upon JAR-STD3a change 1, which is the JAA approval code for FNPT. Although BMAA does not award a formal approval in quite the way that CAA would for an airline simulator, for consistency the same terminology is used. There are small changes from the requirements of JAR-STD3a; however, these are primarily the deletion of inappropriate terminology (e.g. multi-crew, multi-engine, night flying, or instrument approaches).

Terminology

Because of the technical complexity of Flight Simulator, Flight Training Device (FTD) and FNPT qualification, it is essential that standard terminology is used throughout. The following terms and abbreviations [shall] be used.

[(a) *Synthetic Training Device (STD)*. A training device which is either a Flight Simulator (FS), a Flight Training Device (FTD), a Flight & Navigation Procedures Trainer (FNPT), or an Other Training Device (OTD).

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

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

(d) *Flight and Navigation Procedures Trainer - Type II (FNPT II)*. A ground based training device which represents the flight deck environment of a microlight type or class to the extent that the systems appear to function as in an aeroplane. It incorporates a visual system providing an out of the flight deck view.

(e) *Flight and Navigation Procedures Trainer - Type I (FNPT I)*. A ground based training device which represents the flight deck environment of a class of aeroplanes.

(f) *Other Training Device (OTD)*. A training aid other than Flight Simulator, Flight Training Device or Flight & Navigation Procedures Trainer which provides for training where a complete flight deck environment is not necessary..

(g) *Synthetic Training Device Approval (STD Approval)*. The extent to which an STD of a specified Qualification Level may be used by persons, organisations or enterprises as approved by the Authority. It takes account of aeroplane to STD differences and the operating and training ability of the organisation.

(h) *Synthetic Training Device Operator (STD Operator)*. That person, organisation or enterprise directly responsible to the Authority for requesting and maintaining the qualification of a particular STD.

(i) *Synthetic Training Device User (STD User)*. The person, organization or enterprise requesting training and checking credits through the use of an STD.

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Levels of Endorsement

BMAA will endorse a training device as either meeting its requirements for FNPT I, or FNPT II (the latter being the higher standard).

FNPT I

To meet the BMAA's requirements for FNPT I, the following criteria must be met...

1. A cockpit/flight deck sufficiently enclosed to exclude distraction, which will replicate that of the aeroplane or class of aeroplane simulated and in which the switches and all the controls will operate as, and represent those in, that microlight or class of microlight.
2. Instruments, equipment, panels, systems, primary and secondary, sufficient for the training events to be accomplished aeroplane type or class shall be located in a spatially correct flight deck area.
3. Lighting environment for panels and instruments sufficient for the operation being conducted.
4. In addition to the pilots cockpit, suitable viewing arrangements for the instructor shall be provided. These shall provide an adequate view of the pilot, controls and instruments.
5. Effects of aerodynamic changes for various combinations of drag and thrust normally encountered in flight, including the effect of change in aeroplane attitude, sideslip, altitude, temperature, gross mass, centre of gravity location and configuration¹.
6. Navigation equipment corresponding to that of the replicated aeroplane or class of aeroplanes, with operation within the prescribed for the actual airborne equipment. This shall include communication equipment (intercom and air/ground VHF communications systems).
7. Control forces and control travel shall broadly correspond to that of the replicated aeroplane or class of aeroplane.
8. Complete navigational data for at least 5 different airfields which might be flown to from the STD's operating base including current updating within a period of 3 months. All navigational aids that might be used by a microlight should be usable, if within range, without restriction and without Instructor intervention.
9. Engine sounds shall be available.

¹ Note, it is accepted that CG effects on the handling of most microlights are small, and this requirement need not be met unless the aircraft being simulated is known to have particular characteristics that a student pilot should understand.

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10. The following shall be available:
 - a. variable effects of wind and turbulence
 - b. hard copy of map and approach plot.
 - c. provision for position freeze and flight freeze.
 - d. Instructor controls necessary to perform the training task.
11. Stall warning corresponding to that of the replicated microlight or class of microlight.

FNPT II

In order to meet the BMAA's requirements for endorsement at the higher FNPT II level, all of the above requirements must be met, in addition to the following.

1. The cockpit, including the instructor's seat, must be enclosed.
2. Circuit breakers for any devices fitted with them, shall function accurately when involved in procedures or malfunctions requiring or involving pilot response.
3. Crew members seats shall be provided with sufficient adjustment to allow the occupant to achieve the design eye reference position.
4. A generic ground handling model shall be provided to enable representative flare and touch down effects to be produced by the sound and visual systems.
5. 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 microlight or class of microlight being simulated and as required for the training. Once activated, proper systems operation must result from system management by the crew member and not require any further input from the instructor's controls.
6. The Instructor's station shall include the following controls:
 - a. representative crosswinds
 - b. a facility to enable the dynamic plotting of the flight path during approach and landing.
7. Control forces and control travels which respond in the same manner under the same flight conditions as in the microlight or class of microlight being simulated.
8. Aerodynamic modelling shall reflect
 - a. the rate of deceleration following engine failure in the climb.
 - b. the rolling moment due to yawing.
9. Significant cockpit sounds, responding to pilot actions, corresponding to the microlight or class of microlight being simulated
10. A visual system (daytime) 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, including adjustable cloud base and visibility. The responses of the visual system and the flight deck instruments to control inputs shall be closely coupled to provide the integration of the necessary cues.

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How to Obtain Approval for a FNPT

The STD operator must do the following:-

1. Prepare an operators handbook for the FNPT, which should broadly be in the same format as a Section S compliance aircraft operators handbook. On request, BMAA can provide an example of a real aircraft handbook that might be used as a template.
2. Arrange for a BMAA Test Pilot (class 1 or 2, in the correct class of aircraft) to fly the aircraft. They must then prepare a report stating the extent to which the device meets the above requirements.
3. Arrange for a Microlight QFI (currently teaching on the correct class of aircraft) to do the same.
4. Where possible the TP and QFI should be separate individuals, and both independent of the STD operator.
5. Send a copy of the manual, and both reports to the BMAA Chief Technical Officer.

The BMAA CTO will then liase with the STD Operator to sort out any areas of disagreement or non-compliance, and consult where necessary with the BMAA training committee.

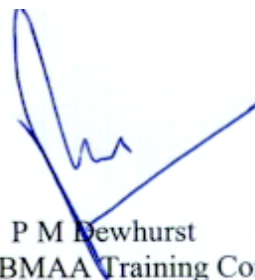
Once the BMAA is content, a certificate will be issued to the STD Operator stating...

1. That the BMAA endorses the use of the particular device as supplement to microlight training.
2. For what sort of training the device is recommended.
3. A standard warning, that the minimum requirements of the PPL(A)(Microlights) flight training syllabus must still be met.

Approved for Issue:



Eur.Ing. G B Gratton
Chief Technical Officer, BMAA



P M Dewhurst
Chairman, BMAA Training Committee