



**DIFFERENCES TRAINING IN SINGLE PILOT PISTON ENGINED AEROPLANES WITH SINGLE LEVER POWER CONTROL (SLPC AEROPLANES) AND SINGLE PILOT AEROPLANES WITH ELECTRONIC FLIGHT INSTRUMENTATION SYSTEMS (EFIS).**

**PART 1 - AEROPLANES WITH SINGLE LEVER POWER CONTROL (SLPC AEROPLANES)**

**1 Introduction**

1.1 The advance of technology has brought some significant changes to single pilot aircraft. Some piston engine aeroplanes are now fitted with an electronic engine and/or propeller control system that allows power to be controlled by a single lever. Such systems are sometimes known as Full Authority Digital Engine Controls (FADEC) or Electronic Engine Controls (EEC) and may, where fitted, include control of the propeller, turbochargers, superchargers and auto-feather systems. These new systems require additional knowledge and skill from the pilot. For the purposes of this publication, these aircraft will be referred to as aeroplanes with Single Lever Power Control (SLPC aeroplanes).

1.2 JAA and EASA formally identify SLPC aeroplanes as requiring differences training.

1.3 Differences training (LASORS Section F refers) requires both theoretical knowledge instruction and training on an appropriate training device or an aeroplane. The instructors and training providers who may give the training are described at paragraph 3.

**2 Pilots converting to a SLPC aeroplane for the first time, within the Single Engine Piston Class Ratings**

2.1 With immediate effect, such pilots are required to complete differences training to the satisfaction of an appropriately qualified Class Rating Instructor or Flight Instructor. Notwithstanding that these systems may be largely automatic, it remains important that the pilot understands how the systems work and how to use them correctly in all normal, abnormal and emergency operations. Pilots with log book evidence to show that they have been operating these aircraft as pilot in command, **prior to the date of this Circular** are exempt from this requirement.

2.2 Pilots converting to SLPC equipped aeroplanes within the privileges of other type or class ratings are strongly advised to complete similar differences training.

**2.3 Converting from SLPC aeroplanes to other types and variants**

2.3.1 Pilots trained in a SLPC aeroplane as their first type or variant within the licence or a Type/Class Rating (single or multi-engine), are strongly advised to complete differences training when converting, for the first time, to an aeroplane in the same Type/Class that is equipped with independent, manual engine controls.

2.3.2 **Note:** Pilots already qualified in SLPC aeroplanes are required to complete differences training when converting to aeroplanes with manually controlled variable pitch propellers and/or turbo/superchargers, for the first time, notwithstanding that the pilot may have experience of these features within the systems of a SLPC aeroplane. Converting to independent manual control of these systems requires a full understanding by the pilot of how each system works and its operation. Detailed guidance on differences training in the operation of manually controlled variable pitch propellers and/or turbo/ superchargers can be found in LASORS Section F, Appendix E.

2.3.3 The differences training certification is recommended to take the following format and should include the Type or Class rating designation of the aeroplane:

Example logbook entry

Date	Certified Differences Training In:	Signed	Instructor's CAA Ref No.					
21/08/10	<b>Retractable Undercarriage Variable Pitch Propeller  Single-Engine Piston (Land)</b>	<i>... A.N Instructor</i>  <small>Signature</small> Name <b>A. N. INSTRUCTOR</b>						

2.3.4 Logbook stickers in the above format are available from CAA Licensing and Training Standards at Aviation House.

### 3 Instructors

3.1 Differences training must be conducted by the holder of an appropriate instructor rating who meets the following requirements:

- a. Hold a valid Flight Instructor or Class Rating Instructor qualification (SPA) for the aircraft on which the training is to be carried out.
- b. Hold a valid Type/Class Rating applicable to the particular aircraft to be flown.
- c. Have completed their own differences training to fly the particular aircraft on their own licence, including full familiarity with the features for which the differences training is required.

3.2 The range of differences between single-pilot aeroplane types or variants is such that specific requirements for training cannot be set. The primary reference for any differences training should be the Manufacturers' and/or Aircraft Flight Manual (including supplements). It is the responsibility of the instructor to ensure that such training includes all relevant aspects of the particular aircraft or feature, taking into account the experience and qualification of the pilot undergoing training.

3.3 For an outline of minimum training content for both VMC and IMC operations, see LASORS Section F Appendix E.

3.4 Upon completion of differences training, and when the instructor is satisfied that an acceptable level of competency has been achieved, the pilot's logbook or equivalent document must be annotated to show successful completion and be signed by the instructor who conducted the training.

## PART 2 - AEROPLANES WITH ELECTRONIC FLIGHT INSTRUMENTATION SYSTEMS (EFIS)

### 4 Introduction

4.1 Increasingly, single-pilot aircraft are being fitted with digital Electronic Flight Instrumentation Systems (EFIS) consisting of electronic 'glass instruments' and integrated digital avionics displays of widely varying complexity and capability. These systems present a significant change from conventional, mechanical flight instruments in the way the information is presented and the interpretation of these systems requires a thorough understanding by the pilot.

#### 4.2 Differences Training in Single Pilot Aircraft with EFIS

4.2.1 For the purposes of this requirement, an EFIS display requiring differences training is an electronic presentation of the primary flight instruments that presents gyroscopic instrument, pressure instrument and navigation information, that is used by the pilot as a primary reference for control of the aircraft in flight.

4.2.2 Differences training requires both theoretical knowledge and training on an appropriate training device or an aeroplane. The instructors and training providers who may give the training are detailed below.

4.2.3 Pilots converting to an EFIS equipped aeroplane for the first time, within the Single Engine Piston Class Rating are, with immediate effect, required to complete differences training to the satisfaction of an appropriately qualified Class or Instrument Rating Instructor or Flight Instructor. Those pilots with logbook evidence to show that they have been operating these aircraft as pilot in command, prior to the date of this Circular, are exempt from this requirement.

4.2.4 Pilots converting to another EFIS equipped aeroplane within the privileges of other type or class ratings are strongly advised to complete similar differences training. When converting either to or from EFIS within a single-pilot type rating, pilots should attend a Training Organisation approved to conduct type-rating training courses on the particular aircraft type and variant.

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### 4.3 Converting between different EFIS Installations

4.3.1 Pilots converting to another Integrated EFIS display should obtain further differences training, whether or not the same manufacturer produces the new system. Familiarisation training should be conducted by FIs or CRI/ TRIs who are fully qualified to teach all applied instrument flying and who are already trained on another Integrated EFIS system.

### 4.4 Converting from EFIS to Mechanical Instruments for the first time

4.4.1 Pilots trained in using Integrated EFIS displays but not trained on mechanical flight instruments, are likely to have established a scan pattern quite different from the techniques required by a conventional, mechanical instrument layout. These pilots are strongly advised to obtain differences training on conventional instruments, including selective radial scan techniques, before flying an aircraft with conventional mechanical instrumentation. EFIS can provide very precise information, which requires little interpretation, as opposed to conventional instrument displays, which require considerable interpretation and different scan techniques. A key element in this type of training, on whatever system, is ensuring the pilot fully understands what information is available, what is being displayed and how to interpret the display correctly.

## 5 Logbook endorsement for EFIS Differences Training

### 5.1 VMC Restriction

5.1.1 Where the trainee does not hold an Instrument or IMC Rating, or will not operate the aeroplane under IFR, differences training for EFIS equipped aircraft may, at the discretion of the instructor, be limited to only those elements of the system that are necessary for flight in VMC and basic instrument flight and when this discretion is exercised, the logbook endorsement for EFIS differences training must then be annotated 'VMC Only'. The logbook endorsement should also state the manufacturer and type of EFIS equipment used during training (eg 'Garmin 1000' or 'Avidyne Entegra'). Additional training or revision of theoretical knowledge and operational procedures may also be necessary, again at the discretion of the instructor.

### 5.2 Applied Instrument Flight

5.2.1 Further differences training in those techniques and parts of the system necessary for applied instrument flight, including IFR navigation, RNAV (where applicable) and instrument approach, must be completed before the pilot may operate the aircraft under IFR. The logbook endorsement for EFIS differences training may then be annotated 'EFIS - Applied IF'. The logbook endorsement should also state the manufacturer and type of EFIS equipment used during training. (eg 'Garmin 1000' or 'Avidyne Entegra')

For an outline of minimum training content for both VMC and IMC operations, see LASORS Section F Appendix E.

## 6 Instructors

6.1 Differences training must be conducted by the holder of an appropriate instructor rating who must:

- a. Hold a valid Flight Instructor or Class Rating Instructor qualification (SPA) for the aircraft on which the training is to be carried out.
- b. Hold a valid Type/Class Rating applicable to the particular aircraft to be flown.
- c. Have completed their own differences training to fly the particular aircraft on their own licence, including full familiarity with the features for which the differences training is required.
- d. Hold an IRI or FI rating and be qualified to teach applied instrument flight where differences training is required in an EFIS equipped aircraft for applied instrument flight (see para 5.2 'Applied Instrument Flight' above).

6.2 The range of differences between single-pilot aeroplane types or variants is such that specific requirements for training cannot be set. The primary reference for any differences training should be the Manufacturers' and/or Aircraft Flight Manual (including UK and other supplements). It is the responsibility of the instructor to ensure that such training includes all relevant aspects of the particular aircraft or feature, taking into account the experience and qualification of the pilot undergoing training.

6.3 Airborne training in the use of Integrated EFIS demands considerable attention by both instructor and pilot, which must not be allowed to compromise lookout and flight safety. It is recommended, therefore, that this training be carried out with an appropriate Part Task Trainer or other Flight Simulation Training Device (FSTD). In any event maximum use should be made of any available video's, manufacturers' or agents' computer based training aids and programmes.

6.4 For further guidance on training content, refer to LASORS Section F, Appendix E which may be accessed via the CAA website.

6.5 Upon completion of differences training, and when the instructor is satisfied that an acceptable level of competency has been achieved, the pilot's logbook should be annotated to show successful completion and be signed by the instructor who conducted the training (paragraphs 2.3.3 and 2.3.4 above refer).

## 7 Contacts

7.1 Advice about the requirements for differences training described in this circular may be obtained from Licensing and Training Standards (L&TS) by emailing: [fclweb@caa.co.uk](mailto:fclweb@caa.co.uk)

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