



# Teaching and Testing in Flight Simulation Training Devices (FSTD)

FOR HELICOPTER PILOTS, INSTRUCTORS AND EXAMINERS

TRAINING LEAFLET



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## INTRODUCTION

— — This leaflet was developed by the European Helicopter Safety Implementation Team (EHSIT), a component of the European Helicopter Safety Team (EHEST). The EHSIT is tasked to process the Implementation Recommendations (IRs) identified from the analysis of accidents performed by the European Helicopter Safety Analysis Team (EHSAT)<sup>1</sup>.

— — This leaflet was developed in order to provide guidance to helicopter instructors and examiners on how to conduct aircrew training and testing in FSTDs, and to provide some basic principles on how to get the best use of this invaluable training asset.

— — The potential benefits of such simulation devices are covered in the previously published leaflet HE6 “Advantages of FSTDs (Simulators) in Helicopter Flight Training”.

— — Simulators are especially suited for training situations which are impractical, difficult, dangerous or expensive to reproduce in a live environment. There are many potentially dangerous situations that aircrew may only encounter infrequently. If these situations are encountered they need to be dealt with efficiently to avoid serious consequences. Simulators can be used to present trainees with such unusual scenarios in a repeatable and controllable manner without presenting risk to the crew, the aircraft, other operators or to the environment.



<sup>1</sup> Refer to the EHEST Analysis reports of 2006-2010 and 2000-2005 European Helicopter Accidents

# 1 FSTD DEFINITIONS

The different types of helicopter Flight Simulation Training Devices (FSTD) are defined in the EASA Certification Specification for Flight Simulation Training Device (CS FSTD(H)). To be recognized as such, a FSTD must be formally qualified by National Aviation Authorities (NAA) or EASA.

The CS-FSTD (H) defines the following FSTD qualification levels:

- FNPT (Flight and Navigational Procedures Trainer)
- FTD (Flight Training Device)
- FFS (Full Flight Simulator)

Note: Other types of FSTDs do exist, however they are not considered in EASA standards and therefore do not deliver any approved training credits. They can nevertheless be very useful, in particular for initial training or for the familiarisation with the helicopter cockpit layout and instrumentation.



## 1.1 The different types of FSTDs

The different types of qualified FSTDs are summarised here and more details are provided in the HE6 Training Leaflet<sup>2</sup>.

### 1.1.1 Flight Navigation Procedure Trainer<sup>3</sup> (FNPT)

A FNPT is a fixed-base generic system, primarily used for helicopter ab-initio and refresher training, including basic and safety procedures, emergencies, navigation, instrument rating (IR) and multi-crew cooperation (MCC).

### 1.1.2 Flight Training Device (FTD)

A FTD is a fixed-base type specific system, simulating a specific type of helicopter. In addition to the FNPT capabilities, the FTD is designed for type rating training. This type of FSTD has a limited checking/testing capability due to the fact that it does not include a motion system or a vibration system.

### 1.1.3 Full Flight Simulator (FFS)

A FFS is a motion-base system, which provides, in addition to the FTD, motion and vibration cues. It has the highest level of technical complexity and training capability, and can be used for proficiency checks and skill tests.

### 1.1.4 Other Training Devices (OTD)

Other Training Devices (OTD) exist and can be defined as a training aid other than a FSTD which provides for training where a complete flight deck or cockpit environment is not necessary. They can be very varied and to date there are no regulations covering their designation or training credits permissible, however the more common ones are:

#### 1.1.4.1 Desktop trainer: Computer Based Trainer (CBT)

CBTs are generally used during initial training, and are very efficient to provide self-learning activities via desktop computers. They generally use touchscreens or videos, and are very interactive according to the trainee selected options and progress. They can be used for the basic training of HMI (Human Machine Interface) instruments and displays, or to virtually view the different components of the helicopter. CBTs are used by pilots in classrooms or through e-learning activities.

<sup>2</sup> Document ref.: HE6 Training Leaflet - Advantages of Simulators (FSTDs) in Helicopter Flight Training

<sup>3</sup> In this document, "trainer" means "training device" as opposed to "instructor"

#### .1.1.4.2 Basic Instrument Training Device (BITD)

BITDs are designed for instrument familiarisation and training. They can be a simple generic fixed base cockpit instrument panel, or a desktop trainer which replicates the behaviour of the instrument by software, either through a touchscreen or a simple HMI.

#### 1.1.4.3 Part Task Trainer (PTT), Cockpit Part Task Trainer (CPT), Virtual Interactive Procedure Trainer (VIPT)

PTT, CPT or VIPT are designed for basic procedure training. These devices generally consist of a simple fixed-base cockpit replica with an Instructor Station but without any visual system. Designed for the pre-flight procedures (check list, engine start, etc), a flight is not possible on these devices, but malfunctions involved during these pre-flight start procedures can be simulated. These devices are also used to familiarize pilots with cockpit instruments.



#### 1.1.4.4 Helicopter Mission Trainer (HMT)

HMTs are generally designed for collective mission training, involving the rear cockpit crew members of the helicopter or several helicopter crews in a shared and common exercise. The objective of this trainer is to practice the coordination between the different crew members (pilot and co-pilot, and also the rear crew members such as the Search And Rescue (SAR) operator, the winch man, etc...), or the other crews when several helicopters are involved in performing a common mission. These types of trainers include the networking of several training devices, either several FSTDs, or one FSTD with additional rear cockpit training devices. The main objectives of this type training devices are to practice communication, coordination, navigation, synchronisation, mission rehearsal, etc. Missions can be Search & Rescue missions, Emergency Medical Services missions, Law Enforcement, or any other types of missions, and role play stations can be added to simulate ground vehicles or Commander & Control Stations. These trainers generally provide simplified and generic simulation, except for the role equipment used during the mission.





## 1.2 Training credits definition

The value of training using FSTDs is recognised within the EASA and international regulations for the ability to replace or complement real flight training hours with hours on FSTDs. The amount of training hours that may be performed on the FSTD towards the minimum hours required for the issue of a licence, rating or certificate is known as 'training credit'. The training credit allowed is dependent upon the type of FSTD and its qualification level: more training credits are allowed on an FFS than on an FNPT. More details on the training credits are provided in the HE6 Training Leaflet<sup>4</sup>.



## 1.3 Types of training and testing permitted on FSTDs

The two main categories that can be conducted on a FSTD are:

Category of training	Type of training
Initial Training	<ul style="list-style-type: none"> <li>• PPL, CPL, ATPL from ab-initio</li> <li>• Type Rating Training</li> <li>• Operator Conversion Courses</li> <li>• Instrument Rating Training</li> <li>• Multi Crew Cooperation</li> <li>• Instructor training (FI, TRI, IRI)</li> <li>• Examiner training</li> </ul>
Recurrent Training	<ul style="list-style-type: none"> <li>• Type renewal/revalidation</li> <li>• Operator Recurrent Training</li> <li>• IR renewal/revalidation</li> </ul>

A range of testing and checking, can also be totally or partially performed on FSTDs:

Category of testing	Type of testing
Initial Testing	<ul style="list-style-type: none"> <li>• Skill tests</li> </ul>
Recurrent / renewal Testing	<ul style="list-style-type: none"> <li>• Proficiency Checks</li> <li>• Operator Proficiency Checks</li> <li>• Recency</li> </ul>

<sup>4</sup> Document ref.: HE6 Training Leaflet - Advantages of Simulators (FSTDs) in Helicopter Flight Training

## 2 TEACHING TECHNIQUES ON FSTDs

FSTDs can be used to enhance flight training especially in the training of emergencies and malfunctions. They can also provide additional benefits which can be very effective during training sessions and debriefing, such as record/replay, quick repositioning, freeze/unfreeze and the ability to conduct a large range of malfunctions that cannot, or are undesirable to be practiced on the helicopter.

However it should be noted that the teaching techniques on FSTDs require specific skills and differ to those used in a helicopter. Simulation has limitations and specificities that the instructor must be aware of and must manage correctly.

### 2.1 The different categories of instructors

A person can carry out flight instruction if he/she holds an instructor certificate appropriate to the instruction given in accordance with Part FCL Subpart J <sup>5</sup>.

The 6 different helicopter instructor categories are:

- FI:Flight Instructor;
- TRI:Type Rating Instructor;
- IRI:Instrument Rating Instructor;
- MCCI:Multi Crew Coordination Instructor;
- SFI:Synthetic Flight Instructor;
- STI:Synthetic Training Instructor.

Note: An instructor with only a SFI or STI certificate is restricted to training on FSTDs and the privileges are normally initially restricted to the FNPT, FTD, or FFS on which the SFI or STI training course was conducted. The other instructor categories privileges can permit them to instruct on a FSTD, provided they have completed an appropriate course of training on the FSTD and an assessment of competence where applicable. The different categories and the privileges of instructors are defined in Subpart J of the Part FCL document.

### 2.2 Instructional competencies and techniques

The instructor competencies listed at Part FCL.920 and AMC1 FCL.920 which are detailed below apply to the instruction given in FSTDs:

- Prepare resources;
- Create a climate conducive to learning;
- Present knowledge;
- Integrate Threat and Error Management (TEM) or Crew Resource Management (CRM);
- Manage time to achieve training objectives;
- Facilitate learning;

<sup>5</sup> EU1178/2011 as amended

- Assesses trainee performances;
- Monitor and review progress;
- Evaluate training sessions;
- Report outcome.

However, in addition to these competences are the knowledge, skills and attitudes specifically required by FSTD instructors:

- Instructor Operator Station (IOS): Instructors must be competent in giving instruction from the instructor station which is normally behind the cockpit and out of the view of the student.



- Instructor seating position: In the majority of FSTDs, the instructor occupies the IOS, and if necessary can instruct from the co-pilot seat within the cockpit. In this case, the instructor should also be prepared to control the lesson from a Remote Control Unit (generally a PC tablet).
- Instructor tools: Dedicated training is required for the specific capabilities provided by the instructor station e.g. monitoring tools, communications tools, etc.

- Competence with the IOS HMI: Instructors are required to be trained and competent with the IOS before delivering instruction on the FSTD.



- Familiarisation with the exercise library or pre-programmed training scenarios: the instructor must be familiar with the training objectives of each scenario and have a clear understanding of the different stages of the training.

### 2.3 Differences in FSTD training techniques

Instructional techniques must be as close as possible to a real helicopter, with the following phases:

- Planning;
- A pre-flight or briefing phase;
- A flight phase;
- When possible, use upper mode stabilization to reduce pilot's work load
- A post-flight or debriefing phase.

FTSDs require some specific techniques which need to be taken into account by the instructor in all these phases.

### 2.3.1 Planning

Traditional training on a real helicopter is limited by the availability of the helicopter and the appropriate environmental conditions. FSTDs can be operated 7 days a week, 24 hours a day and is only limited by the availability of the resources to deliver training.

Furthermore, by its nature, simulation can provide means to experience a wide range of scenarios in a compressed time frame. The aim of a lesson should be specific and realistic. Lesson plans should not be over ambitious as time management is essential for effective and efficient use of the allocated timeslot.

A timeslot should also not exceed two hours to keep the trainees fully concentrated and because flying in a FSTD can be very tiring particularly when complex manoeuvres may be repeated several times.

From a training perspective, the possible compressed time frame that is provided by the FSTD training environment needs to be properly managed by a thorough and specific briefing prior to the training session in the simulator.

In some cases training must be performed in very early or late hours in the day. Make sure that appropriate rest time for both instructor and trainee are applied before, between and after training sessions. In addition, a rest period between training on FSTD and a real flight should be applied.

The instructor should consider the effects of motion sickness even with experienced crew (more details are provided in the HE6 Training Leaflet)<sup>6</sup>.

The instructor should plan to sit in the unoccupied pilot seat whenever a demonstration is necessary. Other than that, the crew should be constituted as single pilot / multi pilots as appropriate.

Aide memoirs, lesson plans, Flight Manual (FM), check lists, reference cards and any performance calculations should all be prepared in advance of the pre-flight briefing.

Prior to any training the instructor must ensure that the simulator is qualified and has a valid user approval, the technical log must be checked for defects and a visual inspection made of the area in the vicinity of the simulator.

Following the training, the instructor must ensure any snags, defects, failures and lost time caused by faulty FSTD operation are reported in the operator's FSTD technical log system.

<sup>6</sup> Document ref.: HE6 Training Leaflet - Advantages of Simulators (FSTDs) in Helicopter Flight Training

### 2.3.2 Pre-flight and briefing phase

As with all instructional flights the instructor will be required to give the trainees a pre-flight briefing possibly using the **INTRO** format:

- **Introduction** – of the trainee to the instructor which should give an indication of the trainee technical and non technical skills including:
  - knowledge of English language, aircraft technical terms and Standard Operational Procedures (SOP);
  - helicopter experience (total flight hours and types flown);
  - recency (last flight on helicopter/FTD);
  - and which mission profile the trainee is familiar with.
- **Need to Know** – what is the relevance of learning this lesson to the trainee
- **Title** – exercise number/sortie profile
- **Range** – what exercises were covered last flight, the range of exercises to be taught in this flight from start to finish, ready for the progression to the next flight.
- **Objectives** – presentation of the general goal of the training session: the list of the all enabling objectives that will be covered in the flight to achieve the aim of the flight, including CRM, TEM and HF elements. Sometime a detailed presentation of the manoeuvres would be needed:
  - Type and objective of the manoeuvre;
  - Key points.

Identify the key points, explain why it is important, be concise.

In addition for the FSTD the following should be considered:

- Readiness for flight: Trainees should consider wearing appropriate flight clothes/flying suit/gloves etc..., as if flying in a real helicopter. It is important to condition the trainees for a FSTD flight as if it is a real flight for more realistic training as it contributes to the mental preparation of the trainees before the flight, and it can also bring some constraints which are generally not present on a FSTD.
- Flight planning: Time should be allocated as flight planning will need to be prepared as for a real flight, with the same constraints, rules, format, calculations, SOPs, manufacturer or operator checklists (verify latest edition and is the same as the instructor is using). A support to prepare

this phase can be the appendix “Pre-flight-planning-Checklist” of the HE1 Training Leaflet<sup>7</sup>: “Safety Considerations” which is also applicable for FSTD training.

- Briefing: In addition to the normal flight brief the instructor shall cover additional safety considerations related to the FSTD: emergency escape, fire alarm, emergency stops, etc... Some adjustments are also necessary since no external inspection of the helicopter is possible on a FSTD: the training only starts when the trainees are seated in the cockpit. Trainees need to be made aware of any differences between the FSTD and the actual aircraft.

### 2.3.3 Flight phase

The flight phase needs to be conducted as close as possible to that of the real helicopter. Nevertheless, the FSTD provides some benefits that can be used during the flight training phase. Conversely, some drawbacks need to be understood by the instructor in order to avoid any negative training.

- Quick start: The FSTD provides the capacity to start the training with main systems already ON. However this should not preclude the need to perform a full switch-ON and engine start during the first sessions of the training. This full start could be replaced by a quick start later on in order to optimize the following training sessions on the FSTD.
- Progressive training: The training needs to be progressive with a gradual level of complexity according to the trainee competencies and his capability to assimilate the training. However, during training sessions, the difficulty should increase progressively:
  - Start the flight with a standard VFR traffic pattern in order to “enter” into the training session
  - When the session structure permits, request the trainee to perform one manoeuvre covered during the last flight
  - Perform new manoeuvres or emergency after a demonstration from the instructor (if applicable) Introduce new system failures with a step by step explanation identifying the relevant warning lights/messages and the control actions required to manage the failure.
- Multiple attempts: As the simulated conditions are fully controllable and repeatable, it is possible to restart the same exercise several times if required unlike the helicopter. Any manoeuvre or flight considered as unsatisfactory should be repeated. In addition, all trainees can experience exactly the same conditions, experience the same level of training, and therefore be assessed under the same conditions.

<sup>7</sup> Document ref.: HE1 Training Leaflet – Safety Considerations



- Demonstrations: In the case of a complex manoeuvre, it might be beneficial if the instructor first demonstrates and gives a brief explanation either before, during or after the demonstration. The trainee generally needs supervision and oral guidance during first practice of a new manoeuvre.
- Weather conditions: A major benefit of FSTDs is the ability to simulate realistic training environments on demand and create specific training opportunities for various situations such as:
  - Adverse weather conditions such as fog, rain, snow, strong wind, etc...;
  - Adverse visibility conditions in day/night, Degraded Visual Environment (DVE), etc...;
  - Training to react to environmental safety factors (congested airport, diversion, air traffic, etc...);
  - Adverse terrain condition (mountain, maritime, city, etc...).





- Malfunctions: FSTDs offer extensive possibilities in emergency and malfunction training. One of the most effective forms of learning is by “hands-on” practice and from the ability to make errors<sup>8</sup> under safe, controlled conditions. FSTDs provide safe environments in which the actions can be repeated, and trainees can make errors without risk to themselves, other people, the aircraft and the surrounding environment. Simulation can therefore be used to mitigate the risks inherent which are not possible to the same extent on a real aircraft. Examples include, but are not limited to:
  - Total engine failure and autorotation;
  - Loss of Tail Rotor in critical flight phase – for example with sling load Vortex Ring (Settling with power);
  - Undesired Aircraft State (UAS) following entry into Degraded Visual Environment (DVE).

Therefore it is possible to train for “real” malfunctions on the FSTD which is not possible on the real helicopter. For example, the engine malfunction is never performed on the real helicopter by switching off the engine, but generally by using the training mode available on the helicopter; on the FSTD you can perform a total engine failure without taking any risks.

A possibility is to activate malfunctions without previous warning to the trainee. However, it is recommended not to give multiple failures to the trainee at the same time, unless simulating a realistic scenario, as this can cause unnecessary confusion.

<sup>8</sup> Errors includes slips, lapses, and mistakes:refer to Skybrary Website

Naturally, complexity of scenario's represents a pilot's experience and capability. For example, if a trainee is not familiar with the cockpit, complex failures must be explained first to allow identification and analysis of messages & warnings before going into such training scenario.



- Freeze, repositioning and snapshots: the FSTD provides specific functions as freeze/unfreeze, repositioning and taking snapshots. It can be useful to freeze the simulation especially at the early stage of the training in order to go through the scenario step by step and explaining each step individually. Repositioning and a snapshot recall can also be very useful to save time when a manoeuvre needs to be repeated.
- Automation: Automation training in FSTD should incorporate the aircraft manufacturers' operating philosophies and recommended practices<sup>9</sup>. This should include:
  - Understanding the integration of autopilot modes;
  - Understanding pilot-system interfaces (pilot to system communication and system to pilot feedback);
  - Understanding all mode transition and reversion sequences;
  - Awareness of available guidance (PFD/ND, modes armed or engaged, active targets);
  - Alertness to adapt the level of automation to the task and/or circumstances, or to revert to hand flying.

<sup>9</sup> Document ref.: HE9 Training Leaflet – Automation and Flight Path Management



- Scenario based training: FSTD is a powerful instructional tool as it can incorporate real-world experiences to address a training objective. Once the student is competent in the manoeuvre based skills then specific LOFT or operational scenarios can provide an opportunity to experience a situation that can occur during a real flight. Scenario based training teaches systematic risk reduction, critical thinking skills and is the most effective way to prepare the pilot to make safe decisions during a flight. LOFT is effective in both aircraft and FSTDs. FSTDs now provide efficient tools to reproduce complex operational scenarios to immerse the trainee in a realistic situation.

During the flight, when discussing a trainee error, the instructor could either freeze the FSTD or take control to enable the student to devote full attention to the instruction being given. At all times however, instructors should not be overly critical of minor faults during early stages. Major faults should be corrected first, and then, as improvement is noted, the minor errors corrected.

A possibility is also to let the scenario run and not intervene. During debriefing and through asking appropriate questions, trainees may themselves come up with better ways to handle a situation. The choice is up to the instructor and depends on the appropriateness in a particular situation.

### **2.3.4 Post-flight and Debriefing phase**

Before leaving the simulator, the instructor should consult his notes prior to the debriefing as there may be points that require clarification before leaving the cockpit.

The debriefing is conducted to evaluate, to guide and facilitate an open discussion. The frame work should be:

- Start with constructive points;
- Identify errors, reasons for errors and strategies for improvement. A maximum of three key areas for improvement for the next flight in order to prioritise and facilitate memorization;
- Technical and non technical errors should also be clearly identified and explained;
- Conclude with encouragements;
- Open discussion.

On some FSTDs, a video playback function allows the instructor to replay the training session on a dedicated debriefing station. This offers an opportunity to explain after the session the previous exercises and review a trainee's performance in more detail.

Write the points on a whiteboard: It facilitates understanding, particularly for the student not comfortable with local language. Concentrate on the technical skills for the first flights and then introduce guidance for non-technical skills as the training progresses.



Do	Do Not
Be factual and quantitative. Be fair (give praise when deserved). Be constructive (how to avoid or correct). Be prepared to concede (graciously!). Encourage self-analysis (but not self-assessment). Consider situational awareness, R/T discipline, trends and CRM. Include all fail points. Listen.	Ask the candidate to assess himself. Be vague. Be emotive (avoid aggression, irritability, sarcasm). Be apologetic. Focus too much on minor items Personalise. Exaggerate. Ramble. Debrief items you are unsure of. Impose your own SOPs. Undermine Company SOPs.

The performance of the trainee needs to be reliably measured and assessed against the required standard and as well as against the progress of other trainees. FSTD and computer-based training could provide performance recording and assessment facilities that automatically and objectively compare the trainee's performance against pre-set standards. Presently such functions are not very common and the assessment of the trainee's performance still relies on the instructor's judgment.



## 3 EXAMINING AND TESTING TECHNIQUES ON FSTDs

The aim of a skill test or check is to determine through practical demonstration that an applicant has acquired or maintained the required level of knowledge, skill and proficiency to operate the helicopter safely. AMC 2 FCL.1015 states that a test or check is intended to simulate a practical flight.

As for the training, the testing techniques on FSTDs differ to those used on an helicopter and simulation has limitations or specificities that the examiner must be aware of.

### 3.1 The different types of helicopter examiner certificates

There are 6 different types of helicopter examiner categories specified in Part FCL Subpart K:

- Flight Examiner (FE);
- Type Rating Examiner (TRE);
- Instrument Rating Examiner (IRE);
- Synthetic Flight Examiner (SFE);
- Flight Instructor Examiner (FIE);
- Senior Examiner (SE).

### 3.2 Examining competencies

The examiner training, standardisation and conduct are listed in Part FCL Subpart K.

An examiner may set practical scenarios for an applicant whilst ensuring that the applicant is not confused.

Part FCL Appendix 9C lists the specific requirements for the helicopter training, skill test and proficiency check items including the normal, abnormal and emergencies procedures. ORO.FC 230 (B) requires each flight crew member to complete operator proficiency checks (OPC) as part of the crew compliment to demonstrate competence in carrying out normal, abnormal and emergencies procedures. AMC1 ORO.FC.230(b)(ii)<sup>20</sup> identifies the specific helicopters abnormal/emergency procedures that should be tested.

### 3.3 Differences and specifics in examining techniques in FSTDs

Persons authorised to conduct tests in the simulator must themselves have had practical training in its operation, especially with regard to the functionality of the Instructor Operating Station or Console.

Prior to any test an examiner must ensure that the simulator is qualified and has a valid user approval. Before the test/check the technical log must be checked for defects and a visual inspection made of the area in the vicinity of the simulator.

Differences between the real helicopter and the simulator must be briefed and pointed out to the crew prior to the test/check.

<sup>20</sup> EU965/2012 as amended

All applicants must be given a briefing on the fire alarm system, safety equipment and use of escape ropes etc. prior to the test. All persons should be in full harness before the selection of motion.

The test should be flown in “real time” as far as practicable. However, limited use of freeze or repositioning is acceptable, at the discretion of the examiner any manoeuvre or procedure of the test may be repeated once by the applicant.

Following the test, examiners must ensure any snags, defects, failures and lost time caused by faulty FSTD operation are reported in the operator’s FSTD technical log system.



## 4 BASIC PRINCIPLES AND GOOD PRACTICES

This section summarizes the good practises already mentioned in the previous sections, and gives some advices about the risk of negative training.

### 4.1 Differences between helicopter and FSTD

The simulation must be appropriate to the task being trained. The need remains to include real aircraft hours in the training programme even when using high fidelity FSTD. If the performance of the simulator is inadequate, there is a risk that actions undertaken in training may be ineffective or inappropriate in the real environment and lead to negative training and safety issues.

The simulated environment provided by FSTDs is excellent for building confidence and competence, however there is the potential that a false sense of security can be induced in the trainee, who may fail to appreciate the difference in consequences between the simulated environment and the real environment. This risk is more significant for trainee with low level of flying experience, particularly during ab-initio training.

FSTDs also provide additional functionalities as explained previously, and the instructor needs to know which are the available appropriate functions and need to prepare the training session accordingly for a maximum efficiency.





## 4.2 Basic principles

**Rule 1 – Define clear training objectives:** It is important to ensure that during the briefing there is specific focus on the important elements of the training objectives to be evaluated during the training session. After the training session the debriefing should review these specific elements and provide feedback to the trainee. The measurement should be performed using an evaluation grid or specific tools as part of the training methodology TEM evaluation tools for example, or by using an evaluation debriefing function of the FSTD.

**Rule 2 – Establish and maintain a good Instructor/Trainee relationship:** Establish a positive atmosphere in order to encourage the trainee to ask any questions which should avoid misunderstanding. The main focus should be on learning and the instructor should facilitate this process (give concise explanations, speak slowly). Remember that the trainee should be encouraged to be the most active during the training. Emotions can play an important part in the training: the instructor must learn how to recognize and manage it.

**Rule 3 – Avoid negative training:** A regular check of the consistency of the training objectives with the FSTD capabilities is required in order to avoid such deviations. Only perform on the FSTD the training which is possible on it, in conjunction with the formal FSTD qualification report which identifies any potential training limitations of the FSTD.

**Rule 4 – Master the basics before moving into the complex:** Manage a gradual level of complexity according to the trainee capacity to assimilate the training. It is important to check that the trainee has correctly assimilated the previous lessons before starting a more complex one.

**Rule 5 – Manage malfunction training appropriately:** A FSTD is the best training device to experience malfunctions and emergencies safely. Each malfunction must be carefully explained, its effects shown, and the procedures to manage the malfunction demonstrated and trained. To avoid confusion, it is recommended not to generate multiple malfunctions at the same time except when this is realistic. If the trainee is not familiar with the cockpit, complex failures must be explained before the flight to allow a better identification and analysis of messages & warnings.

**Rule 6 – Let the trainee make errors and improve fault analysis:** To get maximum benefit from the specific “error proof” learning environment possible in an FSTD, the training session should be conducted to let the trainee make errors relevant to appropriate training level in order to get a demonstration of the full effects. It is very important that the errors are explained by the instructor (including the origin and the subsequent consequences along with the correct procedures, flying skills and techniques to avoid encountering a hazardous situation). TEM should be introduced to make use of these situations and appropriately debriefed.

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**Rule 7 – Experience complex and emergency situations on the FSTD first:** Abnormal and emergency malfunctions should be part of all training programme, FSTDs offer the best solution for this form of training without any flight safety risks. Such situations can be reproduced on demand to ensure that the first time the trainee experiences these are in the FSTD and not in the real environment.

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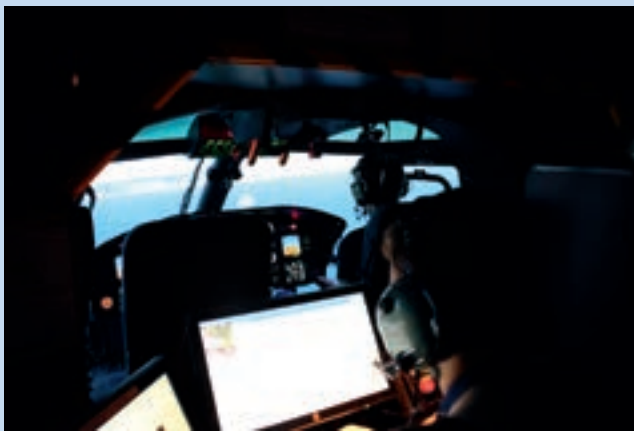
**Rule 8 – Promote the good flight safety practices:** Flight safety is a major aspect of practical training. Instructors are in a position to influence the attitudes and disciplines of future pilots. To be successful, a flight safety program requires the correct attitude, proper supervision, rigid enforcement, and proper training. The trainee learns by example: the instructor must be this example.

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**Rule 9 – Make FSTD flight as realistic as possible:** The aim of using FSTD is to replicate reality which allows the trainee to act as if it's a real flight. Make sure in any event the trainee is given the opportunity to finish the scenario including applicable procedures (as example emergency drills, ...).

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**Rule 10 – Make a demonstration first:** For most new exercises and complex manoeuvres the instructor should first review the main points of the manoeuvre and make a demonstration before the trainee takes over.



**EHEST**

Component of ESSI



European Helicopter Safety Team

## TEACHING AND TESTING IN FSTD BASIC PRINCIPLES

 Component of ESSI European Helicopter Safety Team	<b>BASIC PRINCIPLES</b>
1	Define clear training objectives
2	Establish and maintain a good Instructor/Trainee relationship
3	Avoid negative training
4	Master the basics before moving into the complex
5	Manage malfunction training appropriately
6	Let the trainee make errors and improve fault analysis
7	Experience complex and emergency situations on the FSTD first
8	Promote the good flight safety practices
9	Make FSTD flight as realistic as possible
10	Make a demonstration first

# ACRONYMS, BIBLIOGRAPHY

## Acronyms

<b>AMC</b> Acceptable Means of Compliance	<b>LPC</b> License Proficiency Check
<b>ATO</b> Approved Training Organisation	<b>MCC</b> Multi-Crew Cooperation
<b>ATPL</b> Airline Transport Pilot Licence	<b>MCCI</b> Multi-Crew Cooperation Instructor
<b>CBT</b> Computer Based Trainer	<b>MET</b> Multi Engine Turbine
<b>CPL</b> Commercial Pilot Licence	<b>MP</b> Monitoring Pilot
<b>CPT</b> Cockpit Procedure Trainer	<b>MPH</b> Multi Pilot Helicopter
<b>CRM</b> Crew Resource Management	<b>NAA</b> National Aviation Authority
<b>DVE</b> Degraded Visual Environment	<b>OEB</b> Operational Evaluation Board
<b>EASA</b> European Aviation Safety Agency	<b>OPC</b> Operator Proficiency Check
<b>EHEST</b> European Helicopter Safety Team	<b>OTD</b> Other Training Devices
<b>FAA</b> Federal Aviation Administration	<b>PC</b> Proficiency Check
<b>FE</b> Flight Examiner	<b>PPL</b> Private Pilot Licence
<b>FFS</b> Full Flight Simulator	<b>PPT</b> Part Task Trainer
<b>FI</b> Flight Instructor	<b>SE</b> Senior Examiner
<b>FIE</b> Flight Instructor Examiner	<b>SEP</b> Single Engine Piston
<b>FM</b> Flight Manual	<b>SET</b> Single Engine Turbine
<b>FNPT</b> Flight and Navigation Procedures Trainer	<b>SFE</b> Synthetic Flight Examiner
<b>FSTD</b> Flight Simulation Training Device	<b>SFI</b> Synthetic Flight Instructor
<b>GM</b> Guidance Materials	<b>SPH</b> Single-Pilot Helicopter
<b>HMI</b> Human Machine Interface	<b>SOP</b> Standard Operational Procedures
<b>HMT</b> Helicopter Mission Trainer	<b>SRM</b> Single (Pilot) Resource Management
<b>MPH</b> Multi-Pilot Helicopter	<b>STI</b> Synthetic Training Instructor
<b>IMC</b> Instrument Meteorological Conditions	<b>TCAS</b> Traffic Collision and Avoidance System
<b>IFR</b> Instrument Flight Rules	<b>TEM</b> Threat and Error Management
<b>IOS</b> Instructor Operator Station	<b>TRE</b> Type Rating Examiner
<b>IR</b> Instrument Rating	<b>TRI</b> Type Rating Instructor
<b>IRE</b> Instrument Rating Examiner	<b>UAS</b> Undesired Aircraft State
<b>IRI</b> Instrument Rating Instructor	<b>VFR</b> Visual Flight Rules
<b>LC</b> Line Check	<b>VIPT</b> Virtual Interactive Procedure Trainer
<b>LOFT</b> Line Oriented Flight Training	<b>VMC</b> Visual Meteorological Conditions



# IMPRINT

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## Download the EHEST leaflets:

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