

EASA Flight Simulation Training Devices (FSTDs) Oversight Under Part ORA

Introduction: Effective oversight under EASA Part-ORA requires a synchronized approach between compliance monitoring, organizational independence, and the technical qualification of Flight Simulation Training Devices (FSTDs).

Evaluating these requirements involves balancing regulatory standards against operational realities across three core areas.

Primary Reference Material

EASA Part-ORA (Annex VII)

- **Code / Standard:** ORA.GEN.200 & AMC1 ORA.GEN.200(a)(6)
 - **Key Area of Focus:** Management System structure, CMP setup, auditor independence, direct access to Accountable Manager.
- **Code / Standard:** ORA.FSTD.100, 105, 110 & 240
 - **Key Area of Focus:** FSTD management system, continuous 12-month MQTG testing, AD/SB modification tracking, and 5-year record keeping.

EASA CS-FSTD (Issue 1)

- **Code / Standard:** Subparts B, C, D & E
- **Key Area of Focus:** FSTD Capability Signature (FCS), Validation Data Roadmap (VDR), objective test tolerances, and functions/subjective test criteria.

ARINC Report 433-1

- **Key Area of Focus:** Standard Measurements for Flight Simulation Quality (metrics for reliability, availability, and defect tracking).

EASA Part-ORA ORA.GEN.200(a)(6): Establishes the compliance monitoring function with a direct feedback loop of findings to the Accountable Manager (AM).

- **AMC1 ORA.GEN.200(a)(6) Point (c):** Defines CMM responsibilities, requiring direct access to the AM, prohibiting dual-role appointments with nominated post-holders under ORA.GEN.210(b), and mandating audit independence.
- **GM1 ORA.GEN.200(a)(6) & GM1 ORA.FSTD.100:** Clarifies role independence, management of contracted/external auditors, and qualifications required for FSTD compliance oversight.
- **GM2 ORA.FSTD.100 (Section 2):** Provides the standardized audit checklist for verifying CMM nomination, corporate access, and functional separation.

Auditing the Management System & CMP for Continuous Aircraft Replication

Auditing the Management System and Compliance Monitoring Programme (CMP) under EASA Part-ORA ensures that a Flight Simulation Training Device (FSTD) continuously replicates the designated aircraft type and variant throughout its operational lifecycle.

Organizations must execute the complete Master Qualification Test Guide (MQTG) progressively over a 12-month evaluation cycle to verify ongoing hardware and software fidelity.

Note of Caution - Audits may evaluate ATO training syllabi and FSTD qualification certificates in isolation, missing discrepancies where approved training programs rely on uncertified FSTD features.

- Establish an active configuration control system that systematically tracks Airworthiness Directives (ADs) and Service Bulletins (SBs) from both the State of Design and State of Registry.
- Incorporate regular subjective "fly-out" audits conducted by qualified Type Rating Instructors/Examiners (TRIs/TREs) into the Compliance Monitoring Programme (CMP).

Challenges: The main challenge in performing effective oversight is preventing the audit from becoming a simple administrative check.

- Auditors must evaluate technical processes, ensuring that software version drift is prevented, hardware/software modifications are verified through internal acceptance testing, and root-cause analysis is performed for recurring defects.
- Maintaining continuous alignment between the FSTD and an evolving fleet configuration when frequent avionics updates or aerodynamic data package revisions occur.
- Internal and external audits frequently degrade into superficial paperwork reviews, failing to detect underlying QTG trend deviations, transport delay degradation, or software version drift.

Key Criteria for Auditing the CMP & Management System

12-Month Recurrent Qualification Test Guide (QTG) Rerun:

- Auditors must verify that the operator executes the complete set of objective tests contained in the Master Qualification Test Guide (MQTG) progressively over every 12-month period.
- Results must be dated, analyzed, evaluated, and compared against the baseline aircraft validation data.

Configuration Management & Modification Tracking: The CMP must maintain a robust process to monitor Airworthiness Directives (ADs) from both the Aircraft State of Design and the State of Registry, as well as manufacturer Service Bulletins (SBs).

- Audits verify whether aircraft modifications affecting handling, systems, or avionics are evaluated and reflected in the FSTD hardware/software.

Subjective Fly-Out Evaluations: Audits must confirm that routine subjective fly-outs are conducted across the audit year by qualified Type Rating Instructors/Examiners (TRIs/TREs) who hold current type experience.

- These tests evaluate real-time handling, cueing (motion, visual, sound, vibration), and system responses in normal, abnormal, and emergency conditions.

Defect Tracking & Technical Log Control: The system must feature an operational technical log where unserviceability's, deferred defects, and development work are documented, interpreted, and closed within defined timeframes.

Record Retention and Traceability: Initial qualification records (initial MQTG, evaluation reports) must be retained for the lifetime of the device.

- Recurrent QTG runs, subjective test reports, technical logs, and CMS audit reports must be kept for a minimum of 5 years.

Benchmarking Standards & Quality Metrics

- **ARINC Report 433 Standard:** Serves as the primary acceptable means to measure and benchmark FSTD performance. Audits evaluate metrics including FSTD operational availability rate, total open defects, defect closure timelines, training session interrupt rates, and training session compliance ratings.
- **Proof-of-Match (POM) & Tolerances:** Objective test data must meet the specific numerical tolerances or Correct Trend and Magnitude (CT&M) criteria mandated in CS-FSTD Subpart D to prove alignment with actual flight test data.
- **Validation Data Roadmap (VDR):** Used to trace every simulation model parameter back to validated aircraft flight test data or engineering simulation data.

Verifying the Role and Independence of the Compliance Monitoring Manager (CMM)

Formally establish the CMM's direct, unimpeded reporting line to the Accountable Manager (AM) to ensure safety and compliance issues receive immediate executive backing.

- Strictly enforce operational segregation, ensuring the CMM does not hold nominated post-holder responsibilities under ORA.GEN.210(b) and is entirely excluded from daily FSTD engineering or maintenance tasks.

Note - In smaller or non-complex Approved Training Organizations (ATOs), resource constraints often create pressure for key personnel to assume dual operational and compliance roles.

Performance of Oversight Issues: Competent authorities and auditors may overlook "pseudo-independence," where a CMM technically reports to the AM on paper but functionally answers to operational heads or performs hands-on simulator maintenance.

- Establishing structural independence and an uninhibited reporting path for the Compliance Monitoring Manager (CMM) which is essential under EASA Part-ORA to prevent operational biases from compromising FSTD oversight.

Core Verification Criteria

Direct Reporting Line: The CMM must possess direct access to the AM to ensure compliance issues, unrectified simulator defects, or systemic failures bypass operational hierarchies and receive immediate executive resolution.

Operational Separation: The CMM must not perform routine simulator maintenance, execute Master Qualification Test Guide (MQTG) runs, or handle day-to-day engineering tasks.

Important Notes

Audit Objectivity: AMC1 ORA.GEN.200(a)(6) strictly requires that compliance audits and inspections be carried out by personnel who are not responsible for the specific function, procedure, or maintenance activity being audited.

- **Look for - Formalized Terms of Reference:** Issue explicit job descriptions signed by the AM that prohibit the CMM from performing hands-on FSTD maintenance or holding nominated operational post-holder positions.
- **Technical vs. Compliance Skill Gaps:** Finding compliance professionals who understand detailed FSTD standards (e.g., transport delay, visual/motion cueing, software version drift) without being embedded in daily simulator engineering operations.
- **Independent Internal/External Auditors:** If the CMM possesses technical engineering responsibilities in non-complex setups, contract independent external auditors or cross-train non-maintenance staff to audit the FSTD maintenance department under CMM supervision.

"Paper-Only" Independence: Organizations may present an independent reporting line on an organizational chart, while in practice the CMM answers functionally to operational or maintenance heads.

Mandatory Executive Feedback Reviews: Conduct structured quarterly management evaluations between the CMM and AM to review metric tracking (e.g., open defects, recurrent QTG performance, and maintenance compliance) independently of engineering management.

Aligning Management System Oversight with Training Program Requirements (Best Practices):

- Maintain an up-to-date Equipment Specification List (ESL) that maps syllabus exercises directly to the FSTD Capability Signature (FCS) and feature fidelity levels defined in CS-FSTD.
- Ensure the overarching Management System continuously validates that the device meets specific training credits, such as Zero Flight-Time Training (ZFTT) or Upset Prevention and Recovery Training (UPRT).

- Mismatches between training syllabus additions and FSTD capabilities, particularly when new training mandates require higher feature fidelity levels (e.g., full-stall aerodynamic models) that the existing device basis lacks.
- Audits may evaluate ATO training syllabi and FSTD qualification certificates in isolation, missing discrepancies where approved training programs rely on uncertified FSTD features.

Core Criteria for MANAGEMENT SYSTEM and Training Program Mapping

- **FCS & ESL Alignment:** Compliance monitoring must verify that the FSTD's Capability Signature (FCS) and Equipment Specification List (ESL) fully support all maneuvers and procedures in the approved training manual.
- **Change Management Integration:** The MANAGEMENT SYSTEM must enforce documented change management procedures under ORA.GEN.130/135 so aircraft fleet modifications or FSTD software updates trigger an immediate review of training task validity.
- **Task-to-Fidelity Cross-Referencing:** Auditors must cross-examine training syllabi against CS-FSTD feature fidelity minimums.
 - Under CS-FSTD Issue 1 (CS FSTD.QB.005, Table 2), the minimum FSTD Capability Signature (FCS) for UPRT mandates **Specific (S)** fidelity for Flight Deck, Controls, Aircraft Systems, Handling, Motion, Navigation, Weather, and Terrain, but explicitly requires **Representative (R)** fidelity (not Level S) for **Visual Cueing (VIS)**, **Sound Cueing (SND)**, and **Vibration Cueing (VIB)**.
- **Uncertified Training Credits:** Delivering specialized training modules—such as Zero Flight-Time Training (ZFTT), Performance-Based Navigation (PBN), or Night Vision Imaging Systems (NVIS)—on devices whose FCS or ESL lacks the required feature fidelity level.
- **Software Version Drift:** FSTD software updates or aerodynamic model revisions that alter system logic or aircraft handling without MANAGEMENT SYSTEM re-verification against approved course syllabi.

Best Practices for MANAGEMENT SYSTEM Alignment

- **Dynamic Capability Matrix:** Maintain a live compliance matrix mapping every syllabus exercise directly to specific ESL items and FCS feature levels.
- **Joint Compliance Audits:** Conduct combined MANAGEMENT SYSTEM audits involving both flight instructors (TRIs/TREs) and simulator maintenance engineers to evaluate subjective handling alongside QTG data.
- **Automated Change Triggers:** Implement automated change control workflows requiring CMM sign-off whenever an aircraft fleet modification, Service Bulletin, or training syllabus revision occurs.