

EASA PART 21 & CS-25 INTEGRATION IN CAMO OPERATIONS

Technical Risk Mitigation, Certification Oversight, and Asset Preservation Strategies

EXECUTIVE SUMMARY

Modern continuing airworthiness management demands systematic alignment between design certification baselines and operational maintenance execution. As commercial aircraft operations increasingly rely on third-party leasing structures, the technical integrity of aircraft documentation, structural repair records, and modification data directly impacts asset valuation and regulatory compliance.

This whitepaper details the operational, regulatory, and financial mechanics governing the interface between EASA Part 21 (Design & Production) and EASA Part-M/Part-CAMO operations. By analyzing CS-25 certification parameters, Instructions for Continued Airworthiness (ICAW) integration pathways, Operational Suitability Data (OSD) structures, and lease transition risk vectors, this document provides a technical blueprint for engineering managers, CAMO directors, and leasing personnel seeking to minimize asset degradation and optimize operational compliance.

1. REGULATORY CONTEXT & WORKFLOW OVERVIEW

The legal framework of European civil aviation safety, anchored by Regulation (EU) 2018/1139, establishes a clear distinction between design/production oversight (Part 21) and continuing airworthiness management (Part-CAMO). However, operational compliance requires continuous technical integration across these regulatory domains.

EASA PART 21 / CAMO INTERFACE WORKFLOW ARCHITECTURE

1. EASA Part 21 Subpart J (DOA): CS-25 Certification Baseline, STCs & Repair Approvals, ICAW Generation
2. EASA Part 21 Subpart G (POA): EASA Form 1 Release, Physical Manufacturing Data
 - ↓ (Engineering Transfer & Validation)
3. CAMO CONTINUING AIRWORTHINESS ENGINEERING: ICAW Integration into MPD/AMP, Subpart P Permit to Fly Protocol, OSD & EWIS EZAP Baseline Management
 - ↓ (Compliance Verification)
4. ASSET PRESERVATION & COMPLIANCE: Smooth Lease Transitions, Protection of Aircraft Market Value

EASA Part 21 Subparts and Operational Touchpoints

- **Subpart J (Design Organisation Approval - DOA):** Originates Type Certificates (TC), Supplemental Type Certificates (STCs), major/minor repair designs, and fundamental ICAWs. The CAMO must validate that all technical modification data originates from a recognized Subpart J holder or direct EASA approval.
- **Subpart G (Production Organisation Approval - POA):** Governs part manufacturing under approved design data. The CAMO must ensure components received for installation carry valid EASA Form 1 release certificates with appropriate Block 12 engineering notes.
- **Subpart M (Repairs):** Mandates the classification and approval architecture for structural and system repairs. Minor repairs are executed via DOA privileges; major repairs require explicit EASA data sign-off.
- **Subpart P (Permit to Fly):** Defines the legal and technical process for flying an aircraft that temporarily departs from standard airworthiness conditions. Under M.A.711(c), the CAMO coordinates flight conditions, structural safety limits, and regulatory authorization (EASA Form 20b).

2. TECHNICAL RISK VECTORS

1. ICAW Ingestion and Maintenance Program Alignment

Instructions for Continued Airworthiness (ICAW) issued by STC design holders often fail to reach the operator's maintenance planning system. When an STC modification occurs, the associated ICAW mandatory inspection tasks, life limits, or special tooling rules must be integrated directly into the Aircraft Maintenance Program (AMP). Missing an ICAW task invalidates the aircraft's Airworthiness Review Certificate (ARC) and exposes the asset to unmonitored structural or system degradation.

2. CS-25 Certification Baselines (CS 25.1309, EWIS, Flammability)

Large transport category aircraft certified under CS-25 depend on specific design assumptions:

- **CS 25.1309 (System Safety):** Systems are designed to ensure that catastrophic failure conditions are extremely improbable. Uncontrolled minor engineering alterations can compromise system redundancy.
- **CS-25 Subpart H (EWIS):** Electrical Wiring Interconnect Systems require strict physical separation and dedicated inspection routines (EZAP). Improper wiring installation during cabin upgrades introduces fire and system failure hazards.
- **CS 25.853 (Flammability):** Cabin interior refurbishment components must possess complete vertical/horizontal burn test reports. Uncertified interior materials compromise passenger safety and breach fundamental certification limits.

3. Operational Suitability Data (OSD) Ingestion

Operational Suitability Data isolates mandatory elements that complement initial design certifications. CAMO teams must ingest OSD elements concerning maintenance certifying staff qualifications, minimum equipment lists (MEL), and continuous engineering updates directly into operational maintenance baselines.

4. Back-to-Birth (BTB) Traceability Deficits

Life-Limited Parts (LLPs) and critical structural components require continuous, verifiable record chains from manufacturing release down to present installation. Incomplete documentation during maintenance events breaks the legal chain of custody, requiring costly part replacements or reverse engineering validations.

3. FINANCIAL AND LEASE TRANSITION PROTECTION MATRIX

Incomplete technical oversight during ongoing operations results in severe financial exposure during aircraft lease transitions or asset sales:

Transition Vulnerability Vector	Technical Operational Root Cause	Financial & Regulatory Exposure	Strategic Mitigation Protocol
Unvalidated STC Modifications	Modifications installed without formal DOA Subpart J approval package verification.	\$2.0M to \$4.5M USD penalty / transition delay; potential grounding by aviation authorities.	Implement strict engineering validation gates requiring DOA/EASA certification packages prior to physical installation.
Missing ICAW Task Integration	Supplemental maintenance requirements omitted from operator's AMP.	ARC suspension; mandatory retroactive structural/system inspections; operational downtime.	Establish automated cross-referencing between engineering modification files and AMP task card generation workflows.
Defective EWIS Separation	Cabin reconfigurations violating CS-25 Subpart H wiring isolation rules.	Costly cabin tear-downs; re-wiring tasks; non-compliance findings during redelivery audits.	Mandate EZAP evaluations for all electrical structural modifications prior to maintenance release.

Incomplete LLP Traceability	Missing EASA Form 1 certificates or historical operating logs for life-limited parts.	Mandatory premature component replacement; severe reduction in asset value.	Enforce continuous digital records audits and standardized BTB verification protocols upon part receiving.
Flawed Subpart P Execution	Ferry flights conducted without fully approved flight conditions or valid Permit to Fly.	Direct regulatory fine; invalidation of hull insurance coverage; administrative enforcement action.	Pre-define CAMO Subpart P flight condition workflows in coordination with DOA and authority channels.

4. WORKFORCE SKILL MATRIX & ACTIONABLE IMPLEMENTATION CHECKLIST

To secure compliance across engineering, technical records, and maintenance planning, organizations must systematically develop key technical competencies.

Organizational Competency Roadmap

- **Phase 1: Competency Gap Audit** — Evaluate team knowledge on Part 21, CS-25, and ICAW protocols.
- **Phase 2: Targeted Upskilling** — Enroll engineering & records personnel in specialized training courses.
- **Phase 3: Operational Procedure Integration** — Embed STC validation, EZAP checks, and BTB audits into daily SOPs.
- **Phase 4: Continuous Enterprise LMS Oversight** — Track regulatory updates & recertifications via Sofema Altitude LMS.

Actionable Implementation Checklist

- [] **Audit Modification Records:** Cross-examine all active STCs against the Aircraft Maintenance Program to ensure 100% of generated ICAWs are actively tracked and executed.
- [] **Standardize Subpart J Verification:** Establish a mandatory engineering review checklist requiring proof of EASA validation for foreign STCs or minor design modifications.
- [] **Enforce EWIS/EZAP Compliance:** Incorporate CS-25 Subpart H wiring separation and inspection routines into all internal cabin modification work scopes.
- [] **Formalize Subpart P Readiness:** Develop internal Standard Operating Procedures (SOPs) for defining flight conditions under M.A.711(c) and securing Permits to Fly (EASA Form 20b) rapidly and safely.

[] **Implement Continuous BTB Record Audits:** Transition technical records management from reactive lease-return reviews to continuous digital audits performed during every component installation.

5. TECHNICAL TRAINING OVERVIEW & ENTERPRISE LMS INTEGRATION

Sofema Aviation Academy provides technical training designed to bridge regulatory knowledge gaps across commercial aviation operations.

Course Details: EASA Part 21/CS25 Review for CAMO Staff

- **Delivery Format:** Online (Self-Paced learning)
- **Program Duration:** Equivalent to a 2-day intensive classroom training
- **Investment:** 135.00 EUR per delegate
- **Assessment & Certification:** 20 Multiple Choice Questions (MCQ) exam with a 70% passing threshold; formal certificate issued upon completion.
- **Target Audience:** CAMO Managers, Technical Engineers, Maintenance Planners, Technical Records Specialists, Quality Auditors, and Leasing Asset Specialists.

Key Syllabus Coverage

- EASA Part 21 Subpart G (POA), Subpart J (DOA), and Subpart M (Repairs) Oversight
- Maintenance Oversight & CS-25 Compliance Parameters
- CS 25.1309 Safety Assessment Principles & Hazard Analysis
- CS-25 Subpart H EWIS & EZAP Management
- Operational Suitability Data (OSD) & ICAW Integration Pathways
- Flammability (CS 25.853), Fatigue, Damage Tolerance & Crashworthiness Standards
- Part 21 Subpart P Procedures & Permit to Fly (EASA Form 20b) Execution

Enterprise LMS Integration via Sofema Altitude

For corporate fleets, MROs, and large CAMO organizations managing technical personnel across multiple locations, Sofema Altitude delivers enterprise-grade LMS capabilities:

- Automated compliance tracking and recurrent training scheduling.
- Customized corporate learning pathways aligned with organizational SOPs.
- Real-time executive dashboards for monitoring team qualifications and audit readiness.
- Flexible corporate account management with volume pricing options.

Enrollment & Corporate Inquiries

Take Control of Your Organization's Regulatory Competence Today.

- Direct Website Enrolment: **Sofema Aviation Academy Web Portal**
- Corporate & Enterprise Inquiries: **team@sassofia.com**