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A scientific examination of fleet air international's management system: Safety performance and regulatory compliance in early 2025

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Original article

Abstract

This study critically examines the evolution and effectiveness of Fleet Air International (FAI), a commercial airline operator's Management System within the context of contemporary aviation safety regulation and operational demands. Emphasizing empirical data collected from internal event reports in January 2025, this research analyzes safety event trends, the management of organizational changes, audit outcomes, and corrective action efficacy. The work situates FAI's system against regulatory frameworks including (EU) Regulation 965/2012 and Regulation 1321/2014. It also provides evidence-based insights into risk assessment and mitigation strategies. The study concludes with recommendations to enhance safety performance indicators and procedural compliance, contributing to the broader field of aviation safety management.

Keywords

- aviation safety management
- Fleet Air International
- safety performance indicators
- regulatory compliance
- change management
- corrective action

Authors contributions

A – Preparation of the research project
B – Assembly of data for the research undertaken
C – Conducting of statistical analysis
D – Interpretation of results
E – Manuscript preparation
F – Literature review
G – Revising the manuscript

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None declared.

Introduction

The aviation industry demands rigorous safety management systems (SMS) that comply with evolving regulatory standards and respond effectively to operational challenges [1]. The aim of this study is to evaluate the effectiveness of FAI's Safety Management System (SMS) during the first quarter of 2025, using empirical data from internal safety reports, regulatory inspections, and event risk management analyses. Methods include Event Risk Management System (ERMS) analysis, review of Management of Change (MOC) processes, and Safety Risk Assessment (SIRA) evaluations.

This paper presents a focused scientific investigation into Fleet Air International's Management System, examining its performance during early 2025. Drawing upon EU regulatory mandates—specifically (EU) Regulation 965/2012 Annex III - ORO.GEN.200(a)(3) [2] and Regulation 1321/2014 Annex II and Vc [3]—the study assesses the system's capability to identify, analyze, and mitigate safety risks.

Theoretical framework

Reason's Swiss Cheese Model explains how latent organizational weaknesses and active failures can align to cause incidents. FAI's SMS focuses on identifying and mitigating these latent conditions, in line with requirements in EU Regulation 965/2012 Annex III [2].

High Reliability Organization (HRO) Theory highlights a culture of continuous vigilance and learning, which FAI demonstrates by increasing event reporting and audit responsiveness.

Risk Management per EU regulations requires rigorous initial and residual safety risk assessments to guide mitigation efforts [3].

Management of Change (MOC) is critical when introducing operational changes, such as Low Visibility Operations (LVO), to prevent unintended safety impacts.

Continuing Airworthiness oversight under EU Regulation 1321/2014 ensures aircraft structural integrity and maintenance compliance [3].

Safety event analysis and risk trends

Analysis of January 2025 data reveals five safety-related occurrences involving aircraft types A320 and B737, logged in FAI's Event Risk Management System (ERMS) [4], with one event categorized as having an unacceptable initial safety risk assessment (SIRA). This event was associated with a Safety Assessment of Foreign Aircraft (SAFA) finding (LBA/D-2025-0102 C01) [4] and remains under detailed investigation.

The data migration from legacy MS Access databases to ERMS in January 2025 [5] may explain part of the increase in reported events. Safety Performance Indicators (SPIs) used for risk quantification are described in FAI's SPI Framework report [6].

Table 1. Safety event analysis and risk trends

High mortality of life cargo		
Event identification	Seq	201
	Category	Occurence
	ID	ORS/2025/01/1
Description / Hazard		At 10:45 UTC crew arrived to LHSM. Loading started after half an hour finished at around 12:50 UTC. Crew got all doc related to carried cargo (chickens), including their weight, number, vaccination and health. All loading was done with great care, Crew started taxi at 13:25 UTC, all time till engines started door was open for ventilation. All light temperature was around 20–23 deg C and engineer was in cargo section all flight. Crew arrived In DAAG at 16:45 UTC, offloading was done without delay After offloading handlers take chickens for their inspection and after several minute reported that chicken mortality was high. Crew wait at the aircraft till 19:20 UTC, at the hotel crew get just at 20:00.
Action status		Open
Area		ENV
Risk level and quantification	Cat	N/A
	Method	ERCS
	Initial	A
	Residual	A
SAFA/SACA/SANA Inspection report		
Event identification	Seq	202
	Category	Finding
	ID	LBA/D-2025-0102 A01
Description / Hazard		Small delaminiation on CM1 and CM2 No. 2 window, see pictures.

Action status		Open
Area		CAM
Risk level and quantification	Cat	3
	Method	SIRA
	Initial	3C
SAFA/SACA/SANA Inspection report		
Event identification	Seq	203
	Category	Finding
	ID	LBA/D-2025-0102 A05
Description / Hazard		Checklist do not conform with the checklist details In the Operations. Manual and/or Flight Manual: paper QRH rev. 28 MAR 2024 vs EFB QRH crew, both available to rev 12 DEC 2024, see picture.
Action status		Open
Area		FLT
Risk level and quantification	Cat	2
	Method	SIRA
	Initial	2D
SAFA/SACA/SANA Inspection report		
Event identification	Seq	204
	Category	Finding
	ID	LBA/D-2025-0102 A23
Description / Hazard		No evidence of identification nor monitoring of significant defect: small delamination on CM1 and CM2 No. 2 window, see pictures.
Action status		Open
Area		CAM
Risk level and quantification	Cat	2
	Method	SIRA
	Initial	2C
SAFA/SACA/SANA Inspection report		
Event identification	Seq	205
	Category	Finding
	ID	LBA/D-2025-0102 C01
Description / Hazard		Loose and,or missing fastener on secondary or primary structure elements with major influence on safety; R/H engine: 5 consecutive loose fasteners on engine cowling inboard panel, see pictures The inspecting authority requests that the operator uploads AMM/SRM dispatch limits with regard to the finding via the ramp inspection tool In accordance with Ch. 6.4.9 of the EASA Ramp Inspection Manual
Action status		Open
Area		MNT
Risk level and quantification	Cat	1
	Method	SIRA
	Initial	4B

Where: CAM—Cabin Maintenance; FLT—Flight Operations; ENV—Environmental; ERCS—Event Risk Classification System; SACA—Safety Assessment of Commercial Aircraft; SANA—Safety Assessment of Non-Commercial Aircraft; QRH —Quick Reference Handbook; EFB—Electronic Flight Bag; AMM—Aircraft Maintenance Manual; SRM—Structural Repair Manual.

Source: Authors' own elaboration.

Event identification and risk quantification

The documented safety events range from operational occurrences with direct impact on cargo safety to findings from regulatory inspections highlighting structural and procedural deficiencies. Notably:

- **High Mortality of Live Cargo (Event 201, aircraft type A320):** The incident involving significant mortality of live chickens during transport underscores latent risks in cargo handling and environmental control within the aircraft's cargo compartment. Despite careful loading procedures, continuous ventilation, and monitoring during the flight, a high mortality rate was reported post-flight. This points to potential gaps in environmental safeguards, animal welfare protocols, or even temperature control effectiveness during flight operations. The event is classified as "Open" with an environmental risk that, although not quantitatively specified (N/A under Category), is treated with the highest safety risk category "A" for both initial and residual risk, emphasizing the critical nature of this hazard [4].
- **SAFA/SACA/SANA Findings (Events 202–205, aircraft types A320 and B737):**
  1. Small delamination on cabin windows (Events 202, 204) – SIRA moderate risk (3C, 2C).
  2. Checklist nonconformity (Event 203)—SIRA 2D.

3. Loose fasteners on R/H engine cowling (Event 205) – SIRA 1, residual risk 4B [4].

Several findings highlight structural and procedural vulnerabilities:

- Small delamination on critical cabin windows (Events 202 and 204) represents latent structural weaknesses that, if unaddressed, could compromise aircraft integrity and passenger safety. The initial safety risk assessments (SIRA) rate these as moderate risk (3C and 2C), indicating a need for timely corrective action and enhanced monitoring.
- Checklist nonconformity (Event 203) between paper and electronic Flight Manuals signals procedural inconsistency that can lead to operational errors. Rated as 2D in SIRA, this underlines the importance of document control and crew adherence to updated procedures.
- Loose fasteners on the right-hand engine cowling (Event 205) with a SIRA of 1 and residual risk of 4B reflect a serious maintenance concern. Engine cowling integrity is critical for flight safety, and repeated loose fasteners suggest systemic maintenance or quality control issues that must be urgently remedied.

Risk levels and methods:

- SIRA (Safety Initial Risk Assessment): 1–5 scale, higher number = higher risk [6].
- ERCS (Event Risk Classification System): categories A–D for residual risk [6].

Risk trends and management implications

The mix of findings and occurrences demonstrates a complex risk landscape, combining both latent conditions (structural defects, procedural inconsistencies) and active failures (cargo mortality, maintenance lapses). The initial risk assessments show some events with high initial risk, while residual risk evaluations indicate the potential for these risks to persist if not effectively mitigated.

This pattern aligns with Reason's Swiss Cheese Model, where multiple layers of defense—structural integrity, procedural compliance, maintenance rigor, and operational monitoring—must be robust and coordinated to prevent accident causation. The identified gaps in structural monitoring (window delamination), documentation control (checklists), and maintenance (fasteners) represent "holes" in these defenses that require immediate attention.

The high mortality of live cargo event also highlights the challenge of managing specialized cargo safely within standard operational frameworks, necessitating enhanced risk controls tailored to biological cargo handling and environmental conditions.

Regulatory compliance and continuous improvement

The open status of these events and findings emphasizes the importance of continuous monitoring and follow-up. Compliance with EU regulations, particularly Regulation (EU) 965/2012 [2] for operations and Regulation (EU) 1321/2014 [3] for continuing airworthiness, requires that FAI not only identifies these risks but implements effective corrective actions, monitors residual risk reduction, and documents outcomes transparently.

The requirement from the inspecting authority for uploading AMM/SRM dispatch limits reflects regulatory oversight's role in ensuring maintenance standards meet safety thresholds. FAI's engagement with these findings through corrective action plans and risk reassessments is a positive indicator of an evolving safety culture aligned with High Reliability Organization (HRO) principles [10].

Recommendations for enhancing safety risk management

Enhanced Environmental Controls for Live Cargo: Review and upgrade ventilation, temperature monitoring, and welfare protocols for live animal transport to prevent recurrence of high mortality events [4].

1. **Structural Defect Monitoring and Maintenance:** Increase frequency and rigor of inspections focused on window integrity and fastener security, with rapid remediation of any defects [5, 6].
2. **Documentation and Procedural Harmonization:** Implement strict controls to synchronize paper and electronic manuals, ensuring crews access and follow the latest procedures consistently [8, 9].
3. **Risk Indicator Refinement:** Utilize data from these events to refine Safety Performance Indicators (SPIs) that better predict and preempt risk escalations [6].
4. **Audit and Regulatory Liaison:** Maintain close cooperation with regulatory bodies to ensure findings are addressed promptly and that corrective measures comply with evolving standards [10, 12].

The analysis of safety events and risk trends at Fleet Air International reveals a dual challenge: managing complex operational hazards while continuously improving structural and procedural safeguards. While the increase in reported issues may partly reflect improved detection and transparency, the presence of unresolved structural and procedural findings calls for focused corrective efforts.

By embedding these insights within a structured Safety Management System, supported by regulatory frameworks and safety theories, FAI can strengthen its defenses against accident causation, enhance operational safety, and foster a proactive safety culture. This approach is vital for sustaining compliance, protecting lives and assets, and achieving long-term operational excellence.

Table 2 illustrates the monthly progression of events with unacceptable SIRA scores from October 2024 to January 2025 (see Appendix 1 for more details).

Table 2. Monthly distribution of events with unacceptable initial safety risk assessment (Oct 2024 – Jan 2025)

Month	Number of unacceptable SIRA events
October 2024	5
November 2024	21
December 2024	25
January 2025	26

Source: Authors own elaboration based on [5, 6].

The observed increase may reflect enhanced reporting accuracy following migration from MS Access to ERMS in January 2025”, or emerging operational risks. [5]. Alternatively, it may indicate emerging operational risks requiring further mitigation. This dual interpretation underscores the necessity for continuous refinement of Safety Performance Indicators (SPIs) to accurately delineate risk levels and foster targeted safety interventions [6].

Management of Change (MOC) and procedural developments

No significant MOC events were recorded during the study period, although FAI prepared an LVO application for the Hungarian Civil Aviation Authority (HU CAA) in January 2025 [7]. Updates to the Organization Management Manual (OMM) and Operations Manual are planned to be implemented [8, 9].

These preemptive procedural enhancements exemplify the dynamic nature of aviation management systems. Such systems must adapt swiftly to technological advancements and regulatory shifts [9]. The structured approach to documenting and implementing change reflects best practices in organizational safety culture.

Audit findings and corrective actions

Following HU CAA operational audit, a Corrective Action Plan (CAP) was initially submitted in December 2024 and later revised in January 2025 to include more rigorous root cause analysis [10]. The root cause methodology currently applied is described in internal FAI training materials [11].

The Management System Review Action Plan guided both the implementation of corrective measures and the monitoring of residual risks [12].

Discussion

FAI’s management system upgrades have positively contributed to safety oversight. The increasing number of events with unacceptable SIRA requires further investigation to determine whether it is due to improved detection or emerging hazards.

The integration of SPIs within the ERMS framework [6] represents a significant advancement in quantifying and managing safety risks. Future research should focus on validating these indicators against operational outcomes and refining them to better predict and prevent adverse events.

Conclusion

Fleet Air International’s Safety Management System (SMS) demonstrates a clear trajectory toward greater maturity and transparency. This is evidenced by a marked rise in reporting unacceptable initial safety risks and by proactive efforts to comply with evolving regulatory requirements. This trend reflects a dual phenomenon. On the one hand, enhanced detection capabilities achieved through the implementation of improved reporting and risk management systems, such as the centralized Event Risk Management System (ERMS) [4], have significantly increased event visibility and data quality. On the other hand, this increase also reveals the identification of genuine, complex operational risks that demand targeted mitigation strategies.

The analysis of safety events and risk trends at Fleet Air International further highlights a combined challenge that the organization must continuously address: effectively managing multifaceted operational hazards while simultaneously improving structural integrity and procedural safeguards. Notably, operational occurrences such as the high mortality of live cargo during transport underscore latent environmental and procedural vulnerabilities that require reassessment and enhancement of cargo handling protocols. Concurrently, findings from regulatory audits—including structural defects like window delamination and recurring maintenance issues such as loose fasteners on the engine cowling—expose unresolved latent conditions that could compromise airworthiness if left uncorrected. Procedural inconsistencies, such as discrepancies between paper and electronic flight manuals, compound these challenges by increasing the potential for human error.

By aligning its SMS with the stringent requirements of EU Regulations 965/2012 [2] and 1321/2014 [3], Fleet Air International not only ensures regulatory compliance but also embeds industry best practices into its operational framework. The integration of established safety theories—such as Reason's Swiss Cheese Model, which emphasizes the importance of identifying and sealing latent organizational failures, and High Reliability Organization (HRO) principles that promote continuous vigilance and learning support the development of a resilient, adaptive safety culture. This culture is essential for proactively identifying hazards before they escalate into incidents.

Furthermore, the continued optimization of Safety Performance Indicators (SPIs) [6] and the adoption of predictive analytics will be critical for FAI to anticipate emerging risks and implement effective interventions. The operator's iterative approach to audit feedback [10] and corrective action plans [11, 12] demonstrates a commitment to continuous improvement, reinforcing the dynamic nature of the SMS within a complex regulatory and operational environment.

This study contributes practical and empirical insights into SMS implementation, emphasizing the intricate interplay between data-driven safety monitoring and responsive management. It reveals that while increased event reporting marks progress in transparency and detection, it simultaneously uncovers persistent structural and procedural vulnerabilities that necessitate focused corrective measures. Embedding these insights within a structured and theory-informed SMS enables Fleet Air International to strengthen its defense layers against accident causation, enhance overall operational safety, and foster a proactive safety culture.

Ultimately, this comprehensive approach is vital not only for sustaining regulatory compliance but also for protecting human lives and valuable assets, thereby ensuring long-term operational excellence and resilience in an increasingly complex and demanding aviation landscape.

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