

УДК 656.7:005.6:005.34

JEL Classification: L93, M14, M19, D81

DOI: 10.31767/nasoa.3-2026.13

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Building up an Integrated Compliance Management System for Aviation Companies: A Theoretical and Methodological Framework

The operation of aviation companies is subject to simultaneous control by international, European, and national norms regulating flight safety, risk management, internal control system, and normative compliance. However, ISO standards, ICAO documents, and EASA normative framework, regulating only selected components of these processes, do not propose a holistic approach to their integration in a single compliance management system of the aviation company.

The article's purpose is to substantiate a theoretical and methodological framework for an integrated compliance management system in aviation companies, and to propose its conceptual model. Results of a comparative analysis of the international normative framework for compliance management in aviation companies are given, with outlining its principal constraints on the integration of the normative compliance requirements. A conceptual model for the integrated compliance management system is proposed, where coordination of the processes assuring normative compliance is defined as the central component. The model combines corporate management, compliance risk management and compliance culture; it relies on compliance monitoring, Aviation Safety Management System (SMS), Quality Management System (QMS), and internal control. A matrix for distribution of functions between the system's entities, a matrix for assessment of compliance risks, and a set of key indicators for performance assessment of compliance management were designed to support the model's implementation.

The proposed approach enables for integration of international requirements on normative compliance, risk management and corporate management within an integrated organizational system, which is supposed to enhance the performance of aviation companies, minimize the compliance risks and lay a methodological foundation for further development of models for maturity assessment of compliance management systems.

Keywords: compliance management, aviation company, integrated compliance management system, corporate management, compliance risks, normative compliance.

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Теоретико-методичні засади формування інтегрованої системи комплаєнс-менеджменту на авіаційних підприємствах

Діяльність авіаційних підприємств здійснюється в умовах одночасної дії міжнародних, європейських і національних нормативних вимог, що регулюють безпеку польотів, управління ризиками, систему внутрішнього контролю та забезпечення нормативної відповідності. Водночас стандарти ISO, документи ICAO та нормативна база EASA регламентують лише окремі елементи цих процесів, не пропонуючи комплексного підходу до їх інтеграції в єдину систему комплаєнс-менеджменту авіаційного підприємства.

У статті обґрунтовано теоретико-методичні засади формування інтегрованої системи комплаєнс-менеджменту авіаційних підприємств і запропоновано її концептуальну модель. Надано результати порівняльного аналізу міжнародної нормативної бази у сфері комплаєнс-менеджменту авіаційних підприємств і визначено її основні обмеження щодо інтеграції вимог нормативної відповідності. Запропоновано концептуальну модель інтегрованої системи комплаєнс-менеджменту, де центральним елементом визначено координацію процесів забезпечення нормативної відповідності. Модель об'єднує корпоративне управління, управління комплаєнс-ризиками та комплаєнс-культуру, а її реалізацію забезпечують Compliance Monitoring, система управління безпекою польотів (SMS), система управління якістю (QMS) та внутрішній контроль. Для впровадження моделі розроблено матрицю розподілу функцій між суб'єктами системи, матрицю оцінювання комплаєнс-ризиків і систему ключових показників оцінювання ефективності комплаєнс-менеджменту.

Запропонований підхід забезпечує інтеграцію міжнародних вимог щодо нормативної відповідності, управління ризиками та корпоративного управління в межах єдиної організаційної системи, що сприяє підвищенню ефективності функціонування авіаційних підприємств, мінімізації комплаєнс-ризиків і створює методичне підґрунтя для подальшого розвитку моделей оцінювання зрілості систем комплаєнс-менеджменту.

Ключові слова: *комплаєнс-менеджмент, авіаційне підприємство, інтегрована система комплаєнс-менеджменту, корпоративне управління, комплаєнс-ризик, нормативна відповідність.*

Introduction. The aviation industry is currently operating under the increasing requirements on flight safety, quality of aviation services, transparency of corporate management, and compliance of international and national regulations. Aviation companies perform in high-risk environments where a violation of legal, technical or organizational requirements may cause financial losses, regulatory sanctions, threats to flight safety, degraded business reputation or competitiveness.

Given the aforementioned, the compliance of the aviation companies' operation with national law, international standards, certification procedures and internal corporate policies has acquired strategic importance. Compliance management no longer has a merely control function and turns into a core component of corporate management, aiming to assure normative compliance, compliance risks management and support the effective decision-making processes.

However, international practices, regulatory documents of ISO, ICAO, EASA in particular, lack a standardized approach to building up a compliance management system for aviation companies. Aviation Safety Management System (SMS), Quality Management System (QMS), internal audit, risk management and normative compliance schemes often operate autonomously, which complicates their coordination and reduces the effectiveness of compliance risk management.

For the Ukrainian aviation companies these problems are even more pressing due to the need for harmonizing international management systems with the EU requirements and operational adaptations as part of the integration to the Single European Sky. This necessitates elaborating an integrated system for compliance management in the aviation company, which would combine requirements of ISO 37301, ICAO provisions on flight safety control, EASA Compliance Monitoring schemes, and risk-based approach to compliance management. Once implemented, this system will help increase the corporate management performance, reduce compliance risks, and enhance the organizational resilience of aviation companies.

Literature review. Recent researchers interpret compliance as a component of the integrated corporate management system (Governance, Risk and Compliance, GRC) combining corporate management, risk management, internal control, and assurance of normative compliance. Theoretical foundations of GRC are highlighted by A. Papazafeiropoulou, K. Spanaki [1]. Results of a systematic review by A. Kalia, S. Gill [2], bibliographic research of S. Singhanian et al. [3] and I. Avianti, S. Handoyo [4], while confirming the increasing research interest to integration of corporate management, risk management and compliance, demonstrate that industry-specific GRS models remain underdeveloped.

Problems related with the implementation of compliance management in the civil aviation were explored by A. A. Gasimov [5, 6], who substantiated the need for integration of flight safety management, quality management, and corporate management system. The integrated approach was further developed by J. Meeûs, W. Dewulf, R. Macário [7, 8], who demonstrated that aviation companies were using several management systems operating mostly in an autonomous manner, thus complicating their effective interactions.

Selected aspects of corporate management, safety culture, flight safety control systems and risk-based management are highlighted in H. Khadivar, P. Fardnia, T. Walker [9], G. Kartal, G. Bayramoğlu [10], T. Hoang [11], R. B. Rodrigues, M. C. da Silva [12]. However, researchers tend to address compliance as either a separate component of management systems or a scheme to assure conformity with normative requirements.

The literature review shows that the problem of building up a holistic compliance management system adapted to the operative specifics of aviation companies remains unresolved, thus justifying the need in further studies in this field.

The purpose of the article is to substantiate a theoretical and methodological framework for building up a compliance management system for aviation companies, and to propose an integrated model for its operation with reliance on international standards and risk-based approach.

Research objectives include analysis of theoretical foundations of compliance management and international requirements to compliance in the aviation industry; determining the characteristic features of compliance management in aviation companies, its underlying principles and company-specific compliance risks; elaborating a model for the integrated compliance management system, with determining tools for its practical implementation.

Research results. Compliance is interpreted in the current management theory as an integrated system for assuring the conformity of the organization's activities with the requirements of the national law, international standards, industry standards, international policies, and corporate principles [2, 13]. Contrary to the traditional approach, current compliance management covers not only control over the observation of specific requirements, but also compliance risk management, internal control, audit and continual improvements of management processes.

The conceptual framework for building up a compliance management system is ISO 37301:2021 [13], which sets its operative requirements and relies on risk-based approach. However, operative features of aviation companies are ones that need accounting for industry-specific requirements. ICAO documents [14, 15] regulate the operation of Aviation Safety Management System (SMS), whereas normative acts of EASA [16, 17] set the requirements for compliance monitoring, internal audit and control over the compliance of business operation with certification terms.

Although the abovementioned approaches are interlinked, they regulate autonomous areas of management and do not form an integrated system for compliance management in the aviation company. Aviation companies perform

in a way that SMS, QMS, internal audit, risk management and normative conformity schemes tend to operate as autonomous subsystems, thus complicating their coordination and reducing the effectiveness of compliance risk management.

In view of the above said, compliance management in the aviation company should be approached as an integrated management system combining the requirements of three international organizations (ICAO, EASA, ISO) on flight safety control, corporate management principles, internal control, and risk-based management. This approach ensures the coherence of managements processes, helps detect and minimize compliance risks in a timely manner, enhance the effectiveness of corporate management and organizational resilience of the company.

We, therefore, propose to define compliance management of the aviation company as an integrated management system aiming to assure the conformity of company operation with the requirements of international and national aviation law, international standards, corporate policies and internal procedures through regular identification, assessment, monitoring and minimization of compliance risks.

A distinctive feature of aviation companies is the concurrent conformity with multiple international, European, national and internal corporate requirements, which necessitate a centralized compliance risk management and coordinated effort of structural units. In this context, compliance management should be interpreted as an integrating corporate management subsystem ensuring the implementation of an integrated compliance policy.

A central component of the proposed system is compliance risk management. Because a conventional classification of compliance risks for aviation companies does not exist, we propose a grouping of risks by functional purpose of these companies (Table 1).

Table 1

A classification of compliance risks for the aviation company

Group of risks	Description
Regulatory	Non-compliance with the requirements of ICAO, EASA, State Aviation Service of Ukraine, terms of certification
Flight safety	Non-compliance with SMS procedures, violation of exploitation requirements, inadequate hazard control
Operational	Violation of technological processes for ground services, technical exploitation, production procedures, etc.
Quality-specific	Non-compliance with the requirements of the quality management system, internal standards and procedures
Financial and economic	Penalties, financial losses, ineffective resource utilization due to non-compliance with normative requirements
Legal	Violation of contract obligations, labor, tax, anti-corruption law
Environmental	Non-compliance with environmental standards, requirements on waste management, noise exposure, pollution
Reputational	Declining trust on the side of passengers, partners, regulators, adverse media influence

Source: developed by the author with reference to [13–17]

Such classification of compliance risks creates a framework for building up an integrated system for compliance management in the aviation company

and formulating its operative principles: integration, risk orientation, preventiveness, autonomy of the compliance function, responsibility of management, continual improvements and transparency.

Although ISO, ICAO and EASA admittedly regulate selected aspects of normative compliance in aviation companies, they do not offer a holistic scheme for their integration into a corporate management system. The mainstream international documents laying down the normative base for compliance management in the aviation company are shown in Table 2.

Table 2

A comparative characteristic of the normative documents shaping the compliance management system in the aviation company

Document title	Regulatory focus	Significance for compliance management
ISO 37301:2021	Compliance management system	Laying down general principles of normative compliance
ISO 31000:2018	Risk management	Specifying approaches to compliance risk assessment
ICAO Annex 19	Flight safety control	Setting requirements to SMS and safety risk management
ICAO Doc 9859	Safety Management Manual	Regulating practical implementation of SMS
Regulation (EU) 2018/1139	Basic EASA regulations	Setting general requirements on aviation safety and surveillance
Part-ORO / Part-CAMO / Part-145 / Part-ADR	Compliance Monitoring	Setting requirements on monitoring of compliance across aviation-related activities

Source: developed by the author with reference to [13–17]

Our analysis of the documents shown in Table 2 confirms that the current international normative framework regulates selected components of compliance management, but it does not set a scheme for their integration into a holistic system for corporate management in the aviation company. To bridge this gap, we propose a model for the integrate compliance management system in the aviation company (Figure).

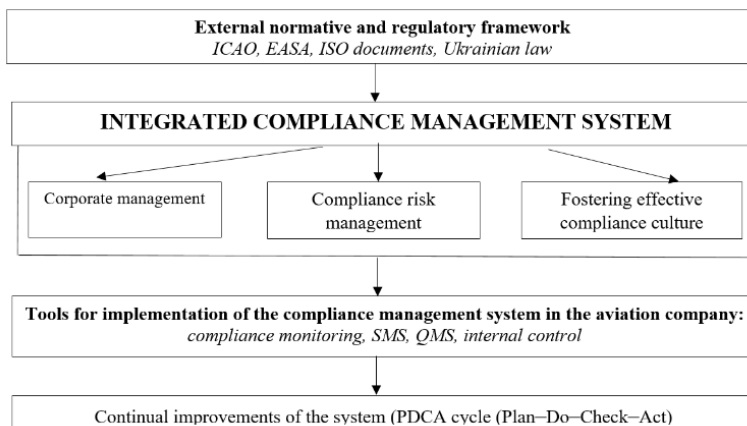


Fig. A model of the compliance management system in the aviation company

Source: developed by the author with reference to [13–17]

The proposed model builds on the hierarchical principle. Its efficiency is determined by the external normative and regulatory framework created by ISO standards, ICAO documents, normative acts of EASA, and the Ukrainian law, setting the operative requirements for the aviation company.

The central component of this model is an integrated compliance management system performing the coordinating function and ensuring the coherence of compliance management processes within the corporate management. Unlike the traditional approach, compliance here is interpreted as not only a function of control, but as an integrating scheme for interactions of overall management, risk management and internal control systems.

The functional basis of this model consists of three interlinked components: corporate management, compliance risk management, and compliance culture. They are implemented through compliance monitoring, SMS, QMS and internal control systems that are responsible for monitoring of compliance, detection of non-compliance, and taking adjustment measures.

The model is focused on continual improvements by PDCA cycle (Plan– Do–Check–Act), which allows for its adaptation to normative amendments, enhancement of the corporate management performance, and reduction of compliance risks.

In order to get this model implemented, we have built a matrix for distribution of functions within the compliance management system of the aviation company (Table 3), which sets the responsibilities of principal entities for carrying out key functions and ensures coordination of their activities.

Table 3

A general matrix for distribution of functions within the compliance management system of the aviation company

Compliance management functions	Administration	Compliance unit	SMS / QMS	Internal audit	Structural units
Compliance policy setting	Approval	Supervision	Participation	Coordination, control	Information provision
Identification and assessment of compliance risks	Coordination, control	Supervision	Participation	Coordination, control	Participation
Compliance monitoring and internal audits	Coordination, control	Supervision	Participation	Participation	Information about results
Taking adjustment measures	Coordination, control	Supervision	Participation	Coordination, control	Implementation
Analysis of the system's performance and improvements	Approval	Supervision	Participation	Coordination, control of execution	Information provision
Internal audits	Coordination, control	Participation	Participation	Supervision	Information provision

Source: developed by the author with reference to [13–17]

The proposed matrix formalizes the distribution of functions and responsibilities between the entities within the compliance management system, ensures coordination of their effort, and creates an organizational background for the efficiency of the integrated compliance management system in the aviation company.

An important component of the integrated system is compliance risk management. In view of this, we have built a matrix for compliance risk assessment (Table 4), which relies on estimating the probability of violations and the graveness of their effects. It conforms to the risk-based approach set in ISO 31000:2018 and ISO 37301:2021, and enables for prioritizing the measures specific to risk management.

Table 4

A matrix for compliance risk assessment in the aviation company

Effects of violations	Low probability	Medium probability	High probability
Insignificant	Low risk	Low risk	Medium risk
Medium	Low risk	Medium risk	Significant risk
Essential	Medium risk	Significant risk	High risk
Critical	Significant risk	High risk	Critical risk

Source: developed by the author with reference to [13–17]

Based on the assessment results, compliance risks are divided into five levels: low, medium, significant, high, and critical, with each determining a corresponding level of administrative response – from monitoring to taking urgent adjustment measures.

Also, we have proposed a set of key indicators for performance assessment of the integrated compliance management system (Table 5), covering its main functional purposes: normative compliance, compliance risk management, compliance monitoring, compliance culture, organizational support, and improvements of the system.

Table 5

A set of indicators for performance assessment of the compliance management system in the aviation company

Functional purpose	Indicator	Description
Normative compliance	The level of compliance with obligatory normative requirements	It measures the compliance of aviation company's activities with the requirements of ICAO, EASA, national law, and internal normative documents
Compliance risk management	The level of compliance risks	It shows the results of identification, assessment and minimization of compliance risks
Compliance monitoring	The efficiency of internal monitoring	It measures the timeliness of identification of non-compliances and carrying out adjustment actions

Continuation of the Table 5

Organizational support	The level of compliance policy implementation	It shows the performance of corporate management system and the fulfilment of normative procedures
Compliance culture	The level of awareness and engagement of the staff	It measures the effectiveness of staff training and the compliance with corporate ethics principles
Continual improvements	The efficiency of system's improvements	It shows the efficiency of procedures' revision, system's amendments and its adaptation to new normative requirements

Source: developed by the author with reference to [13–17]

We propose that performance assessment of the compliance management system be conducted by six interlinked functional purposes corresponding with the structural components of the integrated model. This set of indicators, specifically designed for performance assessment of compliance management as an integrating component of corporate management, does not duplicate assessment criteria of SMS and QMS.

Using this set of indicators allows for a comprehensive assessment of the system's status, with identifying flaws requiring improvements and providing information support to management decisions. Hence, the proposed model for the integrated compliance management combines international standards, risk-based approach and corporate management schemes, creating a framework for performance enhancement and minimization of risks in the aviation company.

Conclusions. The operation of aviation companies is subject to concurrent normative requirements of various origin, designed to regulate flight safety, risk management, internal control system, and normative compliance. Yet, ISO standards, ICAO documents, and EASA normative framework regulate selected requirements, without providing a holistic approach to their integration in a single compliance management system of the aviation company.

The proposed model for the integrated compliance management system in the aviation company combines compliance risk management, normative compliance, compliance culture, and tools of compliance monitoring, SMS, QMS and internal control. Its implementation relies on a proposed matrix for distribution of functions, a matrix for compliance risk assessment, and a set of key performance indicators. The practical importance of research results is their applicability for aviation companies when improving their management systems, enhancing the effectiveness of normative compliance, and minimizing compliance risks. Future research will be focused on elaborating a model for maturity assessment of the compliance management in aviation companies (CMM-AE).

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Надійшла до редакції / Received on: 14.07.2026

Прорецензована / Reviewed on: 28.07.2026

Підписана до друку / Signed for printing on: 28.08.2026

Оприлюднена / Published on: 31.08.2026

Cite this article:

Oliinyk, L. L. (2026). Building up an Integrated Compliance Management System for Aviation Companies: A Theoretical and Methodological Framework. *Scientific Bulletin of the National Academy of Statistics, Accounting and Audit*, 3, 160–170. DOI: 10.31767/nasoa.3-2026.13