Implementing Risk-Based Oversight In Aviation Personnel Licensing: A Comparative Analysis Of CAAT Practices And Global Standards

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Abstract:
This study examines the implementation of risk-based oversight (RBO) in the domain of aviation personnel licensing, with a specific focus on the Civil Aviation Authority of Thailand (CAAT). It explores how CAAT is transitioning from a compliance-based oversight model toward a more performance-informed, data-driven approach, in alignment with ICAO's Annex 1 and supporting guidance materials such as Doc 9374 and Doc 9379. Drawing on comparative practices from the European Union Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA), the research evaluates CAAT's institutional structures, digital surveillance systems, and risk profiling mechanisms. Key challenges are identified, including inconsistent application of risk criteria, limited automation in oversight planning, and gaps in inspector training. Despite these constraints, CAAT has made notable progress in adopting digital tools like EMPIC and developing targeted oversight protocols for examiners and training organisations. The paper concludes with strategic recommendations for enhancing CAAT's oversight maturity through improved regulatory standardisation, system integration, and cross-sector collaboration. The findings contribute to the broader discourse on global regulatory convergence, mutual licence recognition, and the future of aviation safety oversight.
Keywords*: Risk-based oversight, personnel licensing, CAAT, ICAO, aviation safety*

I. Introduction

Civil aviation authorities (CAAs) hold a critical mandate to ensure that personnel licensing systems uphold the highest standards of safety, competency, and international recognition. This responsibility is firmly rooted in the Chicago Convention (1944), which forms the legal foundation for international civil aviation governance. Among its provisions, Annex 1 – Personnel Licensing establishes the Standards and Recommended Practices (SARPs) for the issuance, supervision, and mutual recognition of licences for key aviation professionals, including pilots, air traffic controllers (ATCOs), and aircraft maintenance engineers.

Under this framework, States are obligated to ensure that all individuals involved in aviation operations—particularly those in international service—are properly qualified, competent, and continuously monitored in accordance with ICAO standards. ICAO supports States in fulfilling these obligations through key implementation manuals, including Doc 9374, which addresses language proficiency requirements under Annex 1 (Section 1.2.9), and Doc 9379, which outlines approval and surveillance processes for flight crew training organisations.

Doc 9374 provides comprehensive guidance for designing and validating English Language Proficiency (ELP) testing systems, accrediting language raters and interlocutors, and instituting quality assurance mechanisms. Doc 9379, on the other hand, details procedural requirements for the approval, auditing, and surveillance of Approved Training Organisations (ATOs), with emphasis on curriculum standards, instructor qualifications, and institutional oversight.

Complying with Annex 1 entails several strategic obligations. These include issuing licences in accordance with ICAO SARPs, monitoring and validating the quality of training systems, ensuring that personnel meet ICAO Level 4 English proficiency for radiotelephony communication, recognising foreign-issued licences only when compliant with ICAO provisions, reporting deviations from SARPs to ICAO, and maintaining continuous oversight of licence holders and approved organisations.

Traditionally, many States relied on compliance-based oversight models, where surveillance intervals were uniform and not adjusted based on risk. While administratively predictable, such models are resource-intensive and may overlook high-risk behaviours or systemic performance issues. In response, ICAO has encouraged States to implement risk-based oversight (RBO), a more responsive approach that aligns surveillance with quantifiable risk indicators such as historical compliance, operational complexity, and audit results.

The Civil Aviation Authority of Thailand (CAAT) is among the authorities transitioning to risk-based models in personnel licensing (PEL). As of March 2025, CAAT is responsible for overseeing 6,776 Aircraft Maintenance Engineer Licence (AMEL) holders, 1,630 Air Traffic Controller (ATC) licence holders, and 988 Flight Operations Officer (FOO) licence holders. Additionally, the authority supervises 104 certified flight examiners, 14 designated ATC assessors, and 592 on-the-job training (OJT) instructors for air traffic services. In the area of language proficiency, 27 certified English Language Proficiency (ELP) examiners operate under CAAT's purview. From an institutional standpoint, CAAT regulates 19 approved flight training organisations, 11 maintenance training organisations, and 2 ATC training organisations. There is also one delegated maintenance training organisation authorised to conduct AMEL skill tests, and five approved English language proficiency testing centres.

This extensive licensing and certification landscape illustrates the scale and complexity of the oversight activities required. The diversity of licence types, examiner roles, and training bodies necessitates a surveillance strategy that is both adaptive and prioritised according to risk exposure. With finite inspectorate resources, CAAT must allocate its surveillance efforts strategically to ensure comprehensive coverage while maintaining efficiency.

To meet this challenge, CAAT has introduced a number of reform measures. These include the development of internal risk matrices to calibrate oversight frequency based on examiner type, past audit performance, and organisational risk profiles. The integration of the EMPIC system has further enabled digital tracking of certification, compliance records, and planned inspections. Dedicated oversight protocols tailored to ATOs, LPTCs, and designated examiners have been introduced, drawing on quality assurance guidance from ICAO Doc 9374 and Doc 9379.

This study examines how CAAT and selected benchmark authorities operationalise risk-based oversight in the personnel licensing domain. It evaluates the degree to which national practices align with ICAO's legal and technical framework, identifies implementation and regulatory gaps, and proposes recommendations to improve the effectiveness, transparency, and global alignment of the oversight system. Framed through a comparative and policy-based lens, this study also highlights the importance of aligning national oversight performance with the requirements of mutual licence recognition, as enshrined in Article 33 of the Chicago Convention.

II. Literature Review

Obligations of States and the Role of Oversight in Personnel Licensing

The international legal foundation for aviation personnel licensing oversight originates from the Chicago Convention of 1944, which mandates that contracting States establish mechanisms to ensure the competence and ongoing surveillance of aviation professionals. In particular, Article 37 obliges States to implement ICAO Standards and Recommended Practices (SARPs)—especially those embedded in Annex 1: Personnel Licensing—while Article 33 requires mutual recognition of licences, contingent on compliance with these standards. Article 38, meanwhile, mandates the formal notification of any deviations from ICAO provisions, reinforcing the principle of global transparency and accountability.

These obligations establish the State's oversight role not simply as a bureaucratic function but as a vital safety assurance mechanism. ICAO Doc 9734, the Safety Oversight Manual, articulates this by positioning oversight as a structural component of a State's aviation safety system. Oversight ensures that personnel meet licensing criteria not just at the point of issuance but throughout the lifecycle of their certification through ongoing monitoring and revalidation.

Academic perspectives support this interpretation. For instance, Jenkins-Smith and Sabatier (1993) emphasise that weak oversight capacity is among the primary causes of policy implementation failure in regulatory environments. Similarly, Stolzer et al. (2016) argue that oversight mechanisms enhance procedural accountability, enabling authorities to proactively detect emerging risks. The role of oversight in fostering organisational learning is further underscored by Dekker (2011), who suggests that surveillance feedback loops strengthen system adaptability. Research by Grabowski and Roberts (2011) highlights how robust, continuous oversight is a distinguishing feature of high-reliability organisations. These views converge on the notion that oversight is not merely reactive or punitive but a central tool in cultivating regulatory resilience.

In the context of language proficiency, ICAO Doc 9374 provides States with operational guidance to ensure that pilots and air traffic controllers meet the minimum required Level 4 English proficiency, as outlined in Annex 1, Section 1.2.9. It offers frameworks for assessment design, examiner qualification, and quality assurance processes, underscoring that oversight in this domain must be grounded in both linguistic and regulatory competence. Similarly, Doc 9379 supports oversight of flight crew licensing systems by providing comprehensive procedures for the approval and surveillance of training organisations. Together, these ICAO instruments affirm that oversight, when properly implemented, not only upholds legal compliance but also strengthens international confidence in the safety and credibility of a State's licensing regime.

Legal and Institutional Frameworks for Licensing Oversight

The legal backbone of personnel licensing oversight lies in Annex 1, which outlines the standards governing the issuance, renewal, validation, and mutual recognition of aviation licences. Under these provisions, States must ensure that licensed personnel are physically and mentally fit, demonstrate technical proficiency, and meet language proficiency standards—especially for international operations requiring radiotelephony communications.

ICAO has issued a series of documents to support States in implementing these responsibilities. Doc 9734 introduces the Eight Critical Elements (CEs) of a safety oversight system, with CE-6 (Licensing) and CE-7 (Surveillance) being directly relevant to personnel licensing. Doc 9374 focuses specifically on the implementation of language proficiency standards, offering methodological guidance on examiner standardisation and system quality control. Meanwhile, Doc 9379 serves as a procedural manual for establishing and maintaining oversight of training systems, including Approved Training Organisations (ATOs). Complementing these is Doc 9859, which advances the principle of safety risk management and promotes the integration of risk-based oversight (RBO) within a broader State Safety Programme (SSP).

Together, these instruments comprise an integrated framework designed to ensure both regulatory alignment and operational effectiveness in licensing oversight. They recognise that achieving regulatory equivalence is not merely a matter of transposing international standards into national law, but requires institutional capacity, technical expertise, and system-wide coordination.

National and Regional Models of Oversight Practice

At the national level, Thailand has progressively aligned its licensing oversight framework with ICAO SARPs. The Civil Aviation Authority of Thailand (CAAT) has developed a regulatory structure anchored in TCAR PEL Part FCL, which defines procedures for the issuance and surveillance of pilot licences. In support of this, CAAT has implemented policies for the certification and monitoring of flight examiners, approval and auditing of ATOs and Language Proficiency Testing Centres (LPTCs), and structured surveillance protocols using tools such as Direct Observation (DO), File Audit (FA), Personnel Interviews (PI), and Training Verification (TR).

A key enabler of this oversight framework is the deployment of the EMPIC system, a digital platform that tracks surveillance histories, risk profiles, and corrective actions. Complementing this is CAAT's internally developed risk matrix, which assigns oversight intervals based on examiner profile, compliance history, and organisational affiliation.

Internationally, oversight systems have evolved towards harmonisation and data integration. EASA employs a Risk-Based Oversight (RBO) model operationalised through the RPBO platform, which dynamically adjusts inspection intervals based on performance data, system maturity, and organisational risk factors. Similarly, the FAA's System Approach for Safety Oversight (SASO) uses digital workflows and risk indicators to guide the frequency and focus of inspections. These models demonstrate that successful oversight depends not only on rule compliance but on the ability to use data effectively to inform decision-making, resource allocation, and regulatory responsiveness.

From Compliance-Based to Risk-Based Oversight

Traditionally, oversight has been applied in a fixed-cycle, compliance-driven format, whereby surveillance intervals were predetermined and applied uniformly across all licence holders and organisations. While simple to administer, this model assumes homogeneity in risk exposure and can misdirect limited oversight resources, failing to capture higher-risk behaviours or emerging performance anomalies.

The concept of risk-based oversight (RBO), increasingly endorsed by ICAO and embedded in Doc 9859, offers a corrective to these limitations. RBO involves tailoring the frequency, depth, and nature of surveillance activities to reflect an entity's compliance history, operational complexity, and demonstrated risk factors. It reflects a shift from reactive enforcement to proactive risk mitigation.

Implementation of RBO is already underway in several jurisdictions. EASA utilises performance metrics to adjust inspection cycles dynamically, while the FAA's SASO integrates historical and contextual risk indicators into surveillance planning algorithms. CAAT, though still in an early phase, has adopted RBO principles through its internal risk matrix and related oversight protocols.

Academic literature supports this regulatory evolution. Studies such as Transition Towards Performance-Based Oversight – Stimuli and Effects and Hazard Analysis of Safety Oversight Reports Using NLP Topic Modelling illustrate how targeted oversight can improve resource efficiency and mitigate systemic risks. The concept of "Trust, but Verify", widely cited in the literature, encapsulates the balance between data-driven surveillance and inspector discretion, ensuring that oversight is both intelligent and adaptive.

Oversight Gaps and Global Challenges

The Effective Implementation (EI) score developed under ICAO's USOAP Continuous Monitoring Approach (CMA) provides a standardised benchmark to evaluate a State's oversight capabilities. Within the personnel licensing domain, the EI score reflects how well a State implements Annex 1 provisions, maintains a functioning oversight system, ensures the quality of training and licensing entities, and applies surveillance in accordance with documented procedures.

As of May 2, 2025, ICAO reports a global average EI score of 75.3% in the PEL area, suggesting broad compliance among ICAO member States. Thailand's score, however, stands at 50.65%, highlighting a significant implementation gap. This disparity reflects challenges in institutional capacity, regulatory harmonisation, and technical integration.

The most frequently cited deficiencies globally fall under CE-6 (Licensing) and CE-7 (Surveillance). Many developing States, including Thailand, face common challenges such as outdated oversight procedures, insufficient inspector training, underdeveloped digital tools, and reactive surveillance planning. These factors hinder not only regulatory performance but also international recognition of licensing systems.

Nevertheless, Thailand has made tangible progress. The adoption of EMPIC, development of risk-based profiling, and creation of dedicated oversight protocols for LPTCs and ATOs demonstrate CAAT's strategic intent to modernise its oversight approach. However, persistent issues—such as inconsistent risk interpretation, limited automation, and fragmentation across surveillance units—continue to constrain the system's effectiveness.

The current EI score serves not only as a performance indicator but also as a call to action. It reinforces the need for further institutionalisation of RBO principles, greater investment in inspector development, and a more integrated approach to licensing oversight. For Thailand and similar States, bridging this implementation gap is essential to ensuring international credibility and aviation safety continuity.

III. Methodology And Method

This study adopts a qualitative, policy-focused approach to explore the implementation of risk-based oversight (RBO) in aviation personnel licensing, with Thailand's Civil Aviation Authority (CAAT) serving as the primary case study. The methodological structure is divided into three analytical themes: data sources, analytical process, and scope and limitations.

Data Sources and Reference Materials

The research draws upon a wide array of authoritative international and national sources. Central to the analysis are the Standards and Recommended Practices (SARPs) established under ICAO's Annex 1 – Personnel Licensing, which serve as the benchmark for evaluating licensing frameworks across States. These are supplemented by ICAO's procedural and implementation guidance documents, including Doc 9734 – Safety Oversight Manual, which defines the eight critical elements of a State's oversight system; Doc 9379, which provides procedures for managing licensing systems; Doc 9374, which supports States in implementing language proficiency testing; and Doc 9859, which introduces a safety management philosophy that underpins risk-based oversight principles.

National-level regulatory materials include Thailand's TCAR PEL Part FCL, which defines licensing requirements and examiner appointment procedures, as well as CAAT's internal manuals outlining surveillance activities related to examiners, Language Proficiency Testing Centres (LPTCs), and the integration of the EMPIC system into oversight processes. These national frameworks are examined in tandem with digital oversight applications, including CAAT's use of a risk matrix to determine surveillance intervals.

For comparative benchmarking, the study refers to international oversight models from EASA and the FAA. EASA's Risk-Based Oversight (RBO) Manual and RPBO platform provide digital tools and methodological guidance for risk scoring and inspection planning across Member States. The FAA's Order 8000.95 and System Approach for Safety Oversight (SASO) serve as a reference for standardised, data-driven oversight approaches used in the United States. Additionally, performance data from the ICAO Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) were used to assess Thailand's relative standing. Particular focus was given to Effective Implementation (EI) scores in the Personnel Licensing (PEL) area, with data accessed as of May 2, 2025. Academic literature on aviation oversight, regulatory implementation, and performance-based regulation provided theoretical and contextual depth.

Analytical Process

The study's analysis was structured across four interconnected stages. The first phase involved a documentary review, whereby ICAO, CAAT, EASA, and FAA regulatory texts were systematically analysed to extract information about oversight requirements, policy structures, and operational mandates specific to

personnel licensing. This step established a comprehensive understanding of the international and domestic regulatory frameworks applicable to the study.

The second phase consisted of a regulatory mapping exercise. CAAT's licensing oversight functions were mapped against ICAO's Critical Elements (CE-6: Licensing and CE-7: Surveillance) to assess the degree of structural and functional alignment. This helped identify both areas of compliance and gaps in procedural consistency or institutional readiness.

In the third phase, a comparative benchmarking analysis was conducted to evaluate the extent to which CAAT's system reflects practices adopted by mature oversight authorities. EASA's RBO system and the FAA's SASO model were used as comparators to highlight divergences and inform potential improvements in CAAT's model.

The fourth and final phase involved a gap analysis, synthesising ICAO USOAP EI scores, published audit summaries, and CAAT's internal practices. This process aimed to identify institutional bottlenecks, resource shortfalls, or policy inconsistencies that may hinder the implementation of risk-based oversight in Thailand's personnel licensing domain.

Scope and Limitations

This study is limited in scope to the domain of personnel licensing oversight, focusing primarily on flight crew, air traffic controllers, maintenance licensing, and language proficiency systems. Other areas of civil aviation oversight—such as airworthiness, operations, or economic regulation—were not examined. While international benchmarks were referenced throughout the study, its conclusions are based on a single-State case (Thailand), which may constrain broader generalisation, particularly for States with significantly different institutional profiles.

Furthermore, the study relies exclusively on publicly accessible documentation, including national regulations, ICAO manuals, and audit reports. Although the research was designed to reflect current regulatory practices accurately, the absence of direct interviews with CAAT personnel or access to internal surveillance records limits the empirical depth and restricts the study's ability to explore informal implementation practices or undocumented systemic constraints.

Nevertheless, the combination of documentary analysis, international benchmarking, and institutional mapping provides a robust and methodologically sound foundation for understanding how risk-based oversight is conceptualised and applied within the personnel licensing domain. The methodology offers both a diagnostic framework for evaluating oversight effectiveness and a platform for identifying opportunities to align national practices with international standards.

IV.   Data Analysis And Findings

This section presents an analysis of how the Civil Aviation Authority of Thailand (CAAT) has progressed in implementing risk-based oversight (RBO) in the personnel licensing domain. Drawing on comparative insights from EASA and the FAA, and grounded in the framework established by ICAO's Critical Elements (particularly CE-6 and CE-7), the findings are organised into four thematic areas: risk profiling and planning, oversight execution and scheduling, institutional implementation challenges, and comparative system potential.

Risk Profiling and Surveillance Planning

CAAT has taken initial steps to move away from uniform, compliance-driven oversight and toward a more differentiated model through the use of a structured internal risk matrix. This matrix integrates various indicators—such as examiner type, prior audit results, organisational affiliation, and recent activity levels—to inform risk-based surveillance priorities and determine the minimum frequency of oversight. While the matrix demonstrates conceptual alignment with risk-informed oversight principles advocated in ICAO Doc 9859, the system's practical application remains largely dependent on manual data inputs and inspector interpretation. The absence of automated scoring mechanisms limits the matrix's responsiveness and weakens its ability to support real-time decision-making.

In contrast, EASA's Member States benefit from the functionality of the RPBO platform, which supports semi-automated risk profiling by drawing on compliance data, operational trends, and institutional history. Likewise, the FAA's SASO framework enables Flight Standards District Offices (FSDOs) to integrate examiner activity levels, operational complexity, and enforcement history into their surveillance planning processes. These comparative models illustrate the value of digital tools in improving consistency and efficiency in risk profiling— capabilities CAAT is still working to develop.

Oversight Execution and Scheduling

CAAT structures its oversight through five principal modalities: direct observation, file audits, interviews with personnel and candidates, training record verification, and facility inspections. These activities are scheduled annually, though their frequency may be revised in response to safety concerns, complaint triggers, or emerging audit findings. The risk matrix provides a planning reference for prioritisation; however, in practice, resource constraints often lead to deviations from established oversight schedules. Lower-risk entities may experience extended intervals between inspections, while higher-risk cases may not receive sufficiently frequent attention.

Oversight models in EASA and the FAA show greater reliance on automated scheduling systems. For instance, the FAA's SASO platform generates task checklists and timelines based on risk categorisation, thereby ensuring a consistent and systematic oversight cadence. Similarly, EASA's RPBO allows for continuous risk re-evaluation, enabling more agile adjustment of oversight frequencies. Compared to these systems, CAAT's current approach is relatively static and heavily reliant on inspector discretion, which may compromise the risk-based intent of the model.

Structural Constraints in Implementation

Despite the structural foundation laid by CAAT for implementing risk-based oversight, several persistent challenges have limited the operationalisation of these reforms. A key constraint is the partial integration of digital tools. Although EMPIC has been deployed across the Personnel Licensing Office and provides a functional repository for surveillance data, the system's advanced features—such as automated task generation, alert systems, and dynamic risk linkage—are not fully operational. As a result, oversight planning continues to rely on external manual processes and fragmented datasets.

Further complicating implementation is the inconsistency in how risk assessment criteria are interpreted across inspector teams. A lack of formalised, recurrent training in RBO methodology has resulted in variability in oversight judgement and decision-making. Additionally, enforcement intensity is not uniform across oversight domains. While surveillance of ATOs tends to follow more rigorous and structured protocols, oversight of Language Proficiency Testing Centres (LPTCs) and individual examiners often lacks the same level of depth or frequency, contributing to fragmented regulatory performance.

These challenges echo common findings in ICAO USOAP audits, particularly among developing States, where digital infrastructure is underdeveloped, inspector capacity is stretched thin, and regulatory change management lacks coordination. In Thailand's case, these constraints continue to undermine the consistency and scalability of the RBO model envisioned by CAAT.

Comparative System Potential and Maturity

Although implementation challenges persist, the Civil Aviation Authority of Thailand (CAAT) has demonstrated tangible progress in shifting from a traditional, static oversight model to a more dynamic and digitally supported framework. The introduction of the EMPIC system and the development of a national risk matrix represent key structural advancements. These tools enable CAAT to systematically log examiner credentials, track audit findings, and monitor ongoing compliance with training and licensing standards. This evolving infrastructure provides a foundation upon which more sophisticated, risk-informed surveillance strategies can be developed.

However, a comparative analysis reveals that CAAT's current approach remains at an intermediate stage of maturity when benchmarked against more advanced oversight systems. For example, the European Union Aviation Safety Agency (EASA) employs its Risk-Based Oversight (RPBO) platform to visualise risk data in real time and dynamically allocate inspection resources. Similarly, the Federal Aviation Administration (FAA) integrates operational, geographical, and historical compliance indicators through its System Approach for Safety Oversight (SASO) to guide oversight planning in a highly adaptive manner. These systems exemplify mature, data-driven oversight frameworks that extend beyond basic risk scoring to include automated task assignment, performance trend analysis, and real-time regulatory responsiveness. In contrast, while CAAT has introduced foundational risk-based oversight elements, their operational application remains uneven. The absence of integrated alert systems, predictive analytics, and unified oversight protocols across personnel licensing domains limits the scalability and consistency of CAAT's current system. To progress toward a fully institutionalised and internationally aligned RBO framework, further investment is needed in inspector training, cross-domain regulatory harmonisation, and the full integration of digital surveillance technologies.

V. Discussion

Misalignment Between Policy Rollout and Implementation Support

The findings of this study reveal a significant misalignment between the enforcement of RCAAT 25 and the availability of supporting regulatory instruments. While the primary regulation was enforced on December 3,

2023, key subordinate regulations, announcements, and detailed rules were delayed until November 2024, leaving industry stakeholders without essential guidance for nearly a year. This delay in the release of critical implementation information created confusion across the sector, hindering stakeholders' ability to prepare adequately for the regulatory shift. The absence of clear regulatory support at the time of enforcement led to widespread frustration, as maintenance personnel, training organizations, and operators struggled to comply with the new system without proper direction. This misalignment underscores the necessity of providing comprehensive and timely resources during regulatory transitions, especially when such shifts require significant operational adjustments.

Jenkins-Smith and Sabatier (1993) discuss how delays in the provision of supporting materials can undermine the success of policy reforms. They emphasize the need for aligned timelines between the rollout of regulations and the availability of operational guidance. The findings of this study are consistent with this observation, as the lack of clear, detailed guidance impeded stakeholders' ability to transition smoothly, amplifying the challenges faced by the aviation industry.

Perceived Infeasibility of Conversion Conditions

A key concern expressed by all participants was the perceived infeasibility of the conditions for converting existing AME licenses to Part-66. The requirement for AMELs to complete Module 10 exams, and in some cases, additional modules, was widely viewed as overly burdensome, particularly within the three-year transition period provided. This concern highlights broader issues in professional transitions, where new systems' technical requirements fail to adequately account for the experience and qualifications of existing personnel.

The participants' dissatisfaction aligns with the literature on professional transitions, which underscores the importance of recognizing prior learning and ensuring that new requirements do not undermine the skills and qualifications that professionals have already attained (Bohlinger, 2008). The findings suggest that regulatory changes should better acknowledge the competencies of existing personnel, preventing the invalidation of their previous qualifications. The emotional burden of perceived qualification invalidation, combined with the technical challenge of completing additional modules, created a significant barrier to the successful adoption of the new licensing system.

Communication Versus Clarity

Although CAAT communicated the regulatory changes prior to enforcement, stakeholders reported that the communication lacked critical details. Participants noted that while they were informed of the changes, the specific conditions for license conversion and the practical steps required for compliance were unclear. This lack of detailed, actionable communication contributed to the difficulties encountered by AMEL holders and other stakeholders during the transition.

Kotter (1996) argues that effective change management requires not only informing stakeholders of changes but also providing them with the tools, schedules, and clear expectations needed to navigate those changes successfully. In this case, while communication from CAAT existed, it did not provide the level of specificity necessary for stakeholders to adapt effectively. The findings of this study indicate that future regulatory changes should prioritize providing detailed guidance and clear conversion pathways, particularly when transitioning to complex new systems.

Agreement with Policy Intent, Not Process

Despite widespread agreement with the broader goal of aligning Thailand's aircraft maintenance licensing system with international standards, participants expressed significant dissatisfaction with the execution of the transition. While they supported the alignment with EASA Part-66, the implementation process was criticized for its lack of clarity, the unmanageable license conversion requirements, and the insufficient support provided to industry stakeholders during the transition phase.

Fullan (2007) emphasizes the importance of effective scaffolding in the successful implementation of reforms. In this case, although the intent behind the regulatory change was broadly supported, the implementation process failed to provide the necessary scaffolding to ensure its success. The industry's frustration underscores the importance of not only having strong policy goals but also ensuring that the process of transitioning to those goals is well-supported with clear instructions, realistic timelines, and appropriate resources.

VI.   Recommendations

To address the gaps identified in the implementation of risk-based oversight (RBO) in Thailand's personnel licensing system, the following recommendations are proposed.

First, CAAT should strengthen its digital oversight infrastructure by fully implementing EMPIC's risk profiling and task automation functionalities. This requires both technical upgrades and capacity building to ensure inspectors and analysts can apply the system's tools consistently and proactively.

Second, a national inspector development strategy should be established. This should include defined career paths for technical specialisation in flight crew licensing, air traffic control, and aircraft maintenance oversight. Structured training—ideally endorsed by ICAO—and participation in international regulatory exchange programmes would help increase inspector competency and alignment with CE-4 and CE-6.

Third, CAAT should prioritise harmonisation of surveillance procedures across all personnel licensing domains. Developing unified audit checklists, consistent scoring frameworks, and standardised reporting formats would improve traceability, reduce subjectivity, and enable more reliable trend analysis.

Fourth, greater emphasis must be placed on cooperation with external stakeholders, including Approved Training Organisations (ATOs), Maintenance Training Organisations (MTOs), Language Proficiency Testing Centres (LPTCs), and designated examiners. Workshops, regular consultation forums, and collaborative audits could enhance mutual understanding, promote industry readiness, and ensure that safety objectives are collectively owned.

Fifth, the Thai government's active support is critical to CAAT's ability to implement RBO successfully and improve its Effective Implementation (EI) score. This support should include increased funding for personnel and systems, legal reform acceleration mechanisms, and cross-ministerial recognition of aviation safety as a national strategic priority. By framing oversight reform as a whole-of-government effort, Thailand can more effectively address ICAO's Critical Elements (particularly CE-6 and CE-7) and elevate its international standing.

Sixth, CAAT should continue efforts to bridge the digital maturity gap between regulator and operator. Many stakeholders still lack the IT capabilities to participate effectively in data-driven surveillance activities. CAAT can play a catalytic role through targeted capacity-building initiatives, digital onboarding support, and phased implementation strategies.

Finally, CAAT would benefit from sustained regional cooperation through ICAO APAC mechanisms, regional safety oversight organisations (RSOOs), and benchmarking with mature authorities such as EASA and FAA. Participation in multilateral working groups, technical assistance programmes, and oversight harmonisation initiatives will further enhance CAAT's regulatory maturity and position it to lead in the ASEAN region.

VII. Conclusion

This study examined the implementation of risk-based oversight (RBO) in Thailand's personnel licensing system, with specific attention to international standards, national regulatory practices, and comparative benchmarks from EASA and the FAA. While the Civil Aviation Authority of Thailand (CAAT) has taken steps toward adopting RBO principles—through internal risk matrices, system digitalisation via EMPIC, and regulatory reform—the full realisation of these principles in practice remains incomplete.

Key implementation challenges were identified, including gaps in inspector training, inconsistent application of risk criteria, underutilisation of automation, limited regulatory harmonisation, and chronic staffing shortages. In addition, recent regulatory transitions—such as the introduction of TCAR PEL Parts FCL, 66, ATCO, ORA, and 147—have further complicated the oversight environment. These reforms, though necessary, have added procedural burdens at a time when CAAT's human and technical resources remain constrained.

Comparative insights suggest that States that successfully implement RBO tend to invest in long-term capacity development, system integration, and the strategic use of performance data. ICAO documentation and USOAP audit findings reinforce this view, highlighting the importance of aligning oversight tools with institutional capabilities and evolving safety risks.

Ultimately, RBO in personnel licensing is not merely a compliance mechanism—it is a systemic transformation that requires clarity of policy, maturity of process, and consistency of execution. When properly institutionalised, it enables civil aviation authorities to focus their oversight resources where they matter most, while reinforcing global confidence in the integrity and safety of the licensing system. For CAAT, success in this area will depend not only on internal reform, but also on sustained collaboration across the aviation sector, continuous learning, and adaptive regulatory leadership.

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