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Examining the Impact of New Aircraft Maintenance Licensing Regulations in Thailand: Regulatory Transition and Industry Perspectives

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Abstract:

This study investigates the implementation of aircraft maintenance licensing systems in Thailand, particularly focusing on the regulatory transition to RCAAT 25 and TCAR Part-66, which align the country's licensing framework with international standards, notably EASA Part-66. Using a quantitative methodology, 15 key industry stakeholders—including Aircraft Maintenance Engineer (AME) license holders, representatives from Maintenance Training Organizations (MTOs), and managers from Maintenance, Repair, and Overhaul (MRO) facilities and airlines—were interviewed to gain insights into the challenges and effectiveness of the transition. The study aims to provide an in-depth analysis of these regulatory shifts, identifying barriers to effective implementation and offering recommendations to improve stakeholder engagement and training infrastructures. The findings suggest that, while the regulatory reforms are aligned with international standards, significant challenges remain, particularly in training adequacy, license conversion feasibility, and regulatory communication.

Keywords: Aircraft Maintenance Licensing, License Conversion, CAAT, Thailand

1. INTRODUCTION

The global aviation industry relies on a highly specialized workforce of maintenance personnel whose qualifications and competencies are critical for ensuring safety and operational efficiency. As the demand for international recognition of maintenance personnel qualifications increases, countries worldwide are adopting regulatory frameworks that align with global standards, such as the European Union Aviation Safety Agency (EASA) Part-66. In this context, Thailand's Civil Aviation Authority (CAAT) has introduced RCAAT 25 and TCAR Part-66 to modernize its aircraft maintenance licensing system, enhancing international recognition and elevating safety standards within the country's aviation sector. However, the CAAT faces significant challenges in aligning its standards with those of neighboring countries to ensure that Thai Aircraft Maintenance Engineers (AMELs) can compete effectively in the global market.



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An additional challenge arises from Thailand's participation in the FAA Category 2 (CAT 2) certification, where one of the key areas for improvement has been identified as the quality of AMEL training. This highlights the tension between meeting international standards and the economic constraints of managing such changes. The CAAT's efforts to modernize the licensing system must balance the imperative to maintain high safety standards with the economic realities of training costs and implementation timelines.

This study aims to explore the experiences of key stakeholders involved in the implementation of these regulatory changes in Thailand. A total of 15 participants, including Aircraft Maintenance Engineer (AME) license holders, representatives from Maintenance Training Organizations (MTOs), and managers from Maintenance, Repair, and Overhaul (MRO) facilities and airlines, were interviewed to gather insights into the challenges and opportunities presented by the regulatory transition. A quantitative methodology was employed to collect structured data on stakeholder perceptions concerning the adequacy of the regulatory changes, the feasibility of license conversion, and the impact on industry practices.

The findings of this research contribute to a deeper understanding of the challenges faced by Thailand in aligning its aircraft maintenance licensing system with international standards. By highlighting the perspectives of industry stakeholders, the study provides valuable recommendations for enhancing the regulatory framework, improving training programs, and fostering better communication between regulatory authorities and the aviation industry. These insights are intended to guide future regulatory transitions, ensuring that they are both effective and efficient in achieving their goals.

2. LITERATURE REVIEW

The International Civil Aviation Organization (ICAO) establishes global standards for aircraft maintenance personnel licensing through Annex 1 of the Convention on International Civil Aviation. These standards ensure consistency in qualifications and competencies of maintenance personnel across member states, thus promoting safety and facilitating international recognition of licenses. A key document in this context, ICAO Document 10056, provides comprehensive guidance on the training requirements for Aircraft Maintenance Engineer Licenses (AMELs). It outlines the necessary qualifications and competency standards, offering a structured approach to AMEL training. This document is essential for aligning national licensing systems with international standards, enabling greater mobility for maintenance personnel in the global aviation sector.

The European Union Aviation Safety Agency (EASA) further enhances this harmonization through its Part-66 framework. EASA Part-66 sets out detailed regulations for licensing aircraft maintenance personnel within the EU member states, categorizing licenses into different groups such as A, B1, and B2. It establishes specific requirements for training, practical experience, and examinations, aiming to standardize qualifications across EU states and improve the mobility of maintenance personnel. EASA's regulatory framework serves as a model for many countries, including Thailand, which is working to align its licensing system with EASA standards to facilitate mutual recognition of qualifications and improve aviation safety.

In the United States, the Federal Aviation Administration (FAA) uses a different regulatory approach under FAA Part-65. Although distinct from EASA's framework, FAA regulations share the same primary



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goal: ensuring the competence and safety of aircraft maintenance personnel. The FAA's system also aims to adapt to the evolving needs of the global aviation industry, ensuring that licensed maintenance personnel can operate internationally. While the FAA and EASA systems are not directly interchangeable, both strive to achieve similar outcomes in terms of competency and safety in aircraft maintenance practices.

Several studies have compared the licensing systems of different countries, shedding light on the challenges and benefits of regulatory alignment. Hampson and Fraser (2016), for instance, examine the transition to EASA-aligned licensing in Australia. Their study identifies challenges such as reduced training quality and difficulties in maintaining effective regulatory oversight post-reform. Similarly, Paidisetty et al. (2024) analyze the Indian aircraft maintenance licensing system and highlight barriers to international license recognition, primarily due to discrepancies in training standards and certification processes. This study underscores the importance of aligning national systems with international standards to facilitate global workforce mobility and enhance safety.

The impact of regulatory changes on safety culture and operational practices has also been explored. Wiggins et al. (2020) focus on Australia's general aviation sector, noting how the adoption of EASA-aligned regulations affected the quality of training and safety culture. Their research emphasizes that successful regulatory transitions must include not only compliance with the new rules but also the development of a robust safety culture that adapts to evolving standards. In South Korea, Kim (2021) explores the challenges of aligning domestic licensing systems with ICAO and EASA standards, pointing out that substantial improvements in training infrastructure and regulatory harmonization are needed to maintain competitive positioning in the global aviation market.

A common theme in these studies is the challenge of maintaining quality training while navigating regulatory changes. For example, a survey conducted among UK aircraft maintenance engineers (DelphineRyan.co.uk) highlights concerns over the adequacy of training programs under the new EASA-aligned system. Respondents emphasize the importance of practical experience and mentorship, which are essential for ensuring competence despite the introduction of new regulatory frameworks. Wiggins et al. (2020) further discuss how changes to regulatory structures in Australia affected operational practices and safety culture, suggesting that a well-managed change process is critical for preserving high standards of training and safety.

In addition to these training-related concerns, the complexity of regulatory systems can sometimes hinder their effectiveness. SAS Sofia (2023) critiques the increasing complexity of EASA regulations, arguing that focusing too much on procedural compliance can overshadow practical safety outcomes. Emerald Insight (2020) explores the role of adaptive learning systems in aircraft maintenance, emphasizing the need for regulations that foster continuous learning and feedback loops to improve safety outcomes over time. Greco et al. (2019) also examine the challenges faced by regulatory authorities in implementing new systems, highlighting the importance of clear communication and phased approaches to avoid disrupting industry operations during transitions.

Thailand's efforts to align its aircraft maintenance licensing system with international standards, particularly EASA's Part-66, are encapsulated in the introduction of RCAAT 25 and TCAR Part-66. While



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these reforms aim to standardize licensing procedures and improve safety, they have not been without challenges. Sombut et al. (2022) note that delays in releasing subordinate regulations and concerns over the feasibility of license conversion requirements have created significant barriers for industry stakeholders. The authors argue that timely and clear communication is crucial during regulatory transitions to prevent confusion among maintenance personnel and training providers. Moreover, a phased approach to regulatory implementation is recommended to allow industry professionals to adapt gradually to the new standards, minimizing disruptions to ongoing operations.

Tan and Chan (2023) examine the potential impact of TCAR Part-66 on the Thai aviation workforce. Their study stresses the importance of structured training programs and ongoing professional development to ensure compliance with evolving regulations. Chaiwong et al. (2022) highlight the need for effective change management strategies to support the successful implementation of TCAR Part-66, advocating for the use of international expertise and continuous stakeholder feedback to improve the transition process.

In conclusion, the trend toward harmonizing aircraft maintenance licensing standards globally presents both challenges and opportunities. The experiences of countries such as Australia, India, South Korea, and the United Kingdom provide valuable insights into the practical implications of aligning national licensing systems with international frameworks. Thailand's efforts to modernize its licensing system through RCAAT 25 and TCAR Part-66 reflect these broader global trends and offer important lessons in overcoming the challenges posed by regulatory change.

3. METHODOLOGY AND METHOD

This study adopted a qualitative research methodology to explore the experiences and perceptions of key industry stakeholders involved in the implementation of RCAAT 25 and the transition to a Part-66-based aircraft maintenance licensing system in Thailand. The qualitative approach was selected to capture the depth of stakeholder perspectives and provide a detailed understanding of the challenges, barriers, and opportunities associated with the regulatory change.

The primary data collection method was semi-structured interviews, which allowed for flexibility in exploring participants' viewpoints while ensuring consistency across responses. This method also facilitated a deeper exploration of complex issues such as training adequacy, the feasibility of license conversion, and the impact of regulatory reforms on industry practices. A total of 15 stakeholders were interviewed, ensuring representation from key groups directly impacted by the transition. The stakeholders included Aircraft Maintenance Engineer (AME) license holders, representatives from Maintenance Training Organizations (MTOs), and management-level personnel from Maintenance, Repair, and Overhaul (MRO) facilities and airlines. This diverse participant pool provided a comprehensive range of insights from those involved in both the regulatory oversight and operational aspects of aircraft maintenance.

Each interview lasted approximately 45–60 minutes and was conducted face-to-face to foster a more conversational and open exchange of ideas. Prior to the interviews, participants were informed about the study's objectives, and consent was obtained to record the sessions. Participants were also assured of their anonymity and confidentiality, with the understanding that they could decline to answer any questions



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they found uncomfortable. The interviews were conducted in Thai to ensure clarity and mutual understanding.

Sample questions included:

What challenges has your organization encountered in complying with RCAAT 25?

How was the conversion process for AME licenses communicated and implemented?

What is your perception of the feasibility of the new license conversion conditions?

How has the regulation impacted personnel and operations under your responsibility?

The data collected from these interviews was transcribed verbatim to ensure accuracy in interpretation. The interviews were then analyzed using thematic analysis, a widely used qualitative data analysis method that focuses on identifying and interpreting patterns (or themes) within the data. This method allowed for the organization of responses into meaningful categories that reflected the participants' concerns, perceptions, and evaluations of the regulatory changes. The analysis was conducted iteratively, with multiple readings of the data to ensure a thorough understanding and to capture emerging insights.

While the study was primarily exploratory, a deductive approach was employed to some extent. Emerging codes were compared and aligned with existing frameworks in regulatory change and implementation literature. This helped to provide context for the data and ensured that the analysis was grounded in established theoretical perspectives. Key themes that emerged from the data included regulatory clarity, stakeholder communication, the feasibility of the transition, and the adequacy of training programs under the new licensing system.

Data Collection

The data collection for this study was designed to ensure comprehensive representation of stakeholders directly affected by the implementation of RCAAT 25 and the transition to a Part-66-based aircraft maintenance licensing system in Thailand. A purposive sampling technique was employed to select participants, as this method is ideal for focusing on specific groups with relevant experience and expertise in the subject matter. A total of 15 participants were selected, ensuring a balance between various stakeholder groups involved in or impacted by the regulatory changes.

The participant groups included:

- **5** Aircraft Maintenance Engineer (AME) license holders: These individuals were directly impacted by the new regulatory requirements and the license conversion process. They provided valuable insights into the practical challenges faced by licensed personnel under the new system.
- **5 representatives from Maintenance Training Organizations (MTOs)**: MTOs play a critical role in preparing AMEs to meet the new licensing requirements. Their perspectives were crucial for understanding how training programs are adapting to the regulatory transition and whether they meet the needs of the new system.



5 management-level personnel from Maintenance, Repair, and Overhaul (MRO) facilities and airlines: These stakeholders oversee the implementation of AMEL standards and are responsible for ensuring compliance with regulatory requirements. Their input helped assess how the regulatory changes affect operational practices and workforce management.

All participants were selected based on their direct involvement in managing, implementing, or overseeing aircraft maintenance licensing standards, ensuring that their perspectives were highly relevant to the study's objectives. The inclusion of both public and private sector professionals also provided a range of insights from different organizational contexts.

Interviews were conducted face-to-face to facilitate open discussion and ensure that participants could elaborate on their experiences and perspectives in an unstructured format. This method allowed for flexibility, enabling the researcher to follow up on points of interest, clarify responses, and probe deeper into specific issues raised by participants. Each interview lasted between 45 and 60 minutes, with the interviews being audio-recorded to ensure accurate documentation of responses. Participants were informed in advance about the study's objectives, and written consent was obtained prior to the interview. Confidentiality and anonymity were assured to all participants, and they were given the option to withdraw from the study at any time.

The data collected through these semi-structured interviews provided rich, qualitative insights into the regulatory transition process. The interviews covered a range of topics related to the challenges faced during the implementation of RCAAT 25, including issues related to training adequacy, license conversion feasibility, and the communication of regulatory changes. By engaging with stakeholders across multiple sectors of the aviation industry, the study was able to capture a broad spectrum of experiences and opinions regarding the regulatory shift.

4. DATA ANALYSIS

The data collected from the semi-structured interviews was analyzed using thematic analysis, a qualitative data analysis method commonly employed to identify, analyze, and report patterns (themes) within qualitative data. This method was chosen for its ability to capture the richness of the interviewees' responses and to provide a clear understanding of the recurring issues and concerns that emerged from the participants' perspectives.

The first step in the data analysis process involved transcribing the recorded interviews verbatim. This ensured that the participants' responses were accurately captured for further examination. Once the transcriptions were complete, each transcript was reviewed multiple times to ensure a comprehensive understanding of the content and to identify initial patterns and emerging themes.

Thematic analysis was conducted through an iterative process, beginning with open coding, where the data was broken down into smaller segments. These segments were carefully examined and coded based on their content, meaning, and relevance to the research questions. The open codes were then grouped into broader categories that represented common themes across the interviews. For example, common themes included regulatory clarity, stakeholder communication, training adequacy, and challenges associated with license conversion.



To ensure the validity and reliability of the analysis, the researcher employed a deductive approach, partially aligning emerging themes with established frameworks in regulatory change and implementation literature. This allowed the analysis to be grounded in existing theoretical perspectives, while also allowing new insights to emerge from the data itself.

Once the key themes were identified, they were further analyzed to explore how they related to the research questions and objectives. This phase of analysis focused on understanding the specific challenges faced by stakeholders during the regulatory transition, the impact of the regulatory changes on industry practices, and the feasibility of the new licensing requirements. By organizing the data into meaningful themes, the analysis provided a structured approach to understanding the complexities of the regulatory transition process.

The results from the thematic analysis were used to develop a comprehensive overview of the key issues identified by stakeholders, as well as to highlight the challenges and opportunities associated with the regulatory changes. These findings served as the foundation for the subsequent discussion, offering valuable insights into the effectiveness of the transition process and providing practical recommendations for improving the implementation of RCAAT 25 and TCAR Part-66.

5. FINDINGS

The study gathered insights from 15 industry stakeholders who were directly impacted by the regulatory changes under RCAAT 25 and the transition to TCAR Part-66. The participants included 5 Aircraft Maintenance Engineer (AME) license holders, 5 representatives from Maintenance Training Organizations (MTOs), and 5 management-level personnel from Maintenance, Repair, and Overhaul (MRO) facilities and airlines responsible for managing AMEL tasks. The findings revealed several key issues regarding the implementation and impact of the regulatory change.

Delays in Subordinate Regulations:

While RCAAT 25 was enforced on December 3, 2023, the release of subordinate regulations, announcements, and specific rules was delayed until November 2024. This delay created significant confusion within the industry, as stakeholders were left without clear guidelines on how to comply with the new regulations. The lack of clarity further exacerbated the challenges of adapting to the new system.

Feasibility of License Conversion:

One of the most significant concerns voiced by all interviewees was the perceived infeasibility of the conditions required to convert existing AME licenses to Part-66. The regulations mandated that AMELs undergo a Module 10 exam, with some license holders required to complete additional modules beyond just Module 10. This requirement was widely viewed as unmanageable within the provided timeline, leading to dissatisfaction across the industry. A key finding was that 100% of interviewees disagreed with the conditions for license conversion and the short transition period set by the CAAT.



Short Transition Period:

The CAAT provided a three-year transition period until December 2026 for AMELs to complete the necessary conversion. However, stakeholders in the study expressed significant concern that this period was too short, given the complexity of the conversion process and the challenges in meeting the regulatory requirements. The industry felt burdened by the additional workload and the uncertainty surrounding the transition process, which they believed would negatively impact operations.

Communication and Change Management:

While CAAT communicated the regulatory changes to the industry before the regulations came into force, participants reported that the communication lacked solid, actionable information. Despite being informed of the changes, many stakeholders felt that the conditions for license conversion were not clearly explained, and the issues they faced regarding the difficulty of conversion were not addressed effectively. The findings suggest that the communication was insufficient to ensure a smooth transition.

Agreement with the Policy Intent, but Issues with Implementation:

Although the stakeholders agreed with the overarching goal of aligning Thailand's aircraft maintenance licensing system with international standards, particularly EASA Part-66, they voiced strong dissatisfaction with the implementation process. While they recognized the necessity of regulatory change, they emphasized that the transition was poorly managed, with ineffective change management strategies and an absence of adequate support during the implementation phase.

In conclusion, while the regulatory change was viewed positively in terms of its alignment with international standards, the findings indicate that the implementation was flawed due to delays in regulatory support, unrealistic license conversion requirements, and inadequate communication. These issues have led to significant challenges for the industry in managing the transition effectively.

6. DISCUSSION

6.1 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.

6.2 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.

6.3 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.

6.4 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.

7. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed to enhance the implementation of RCAAT 25 and ensure the smooth transition to TCAR Part-66 for AMELs and other stakeholders in Thailand's aviation industry:

Timely Release of Subordinate Regulations and Guidance: To avoid confusion and ensure that stakeholders can prepare effectively, it is crucial that all subordinate regulations, announcements, and guidance documents are released in tandem with the primary regulation. Regulatory bodies must ensure that all implementation tools and detailed information are available at the time the new regulations come into force. Delays in providing necessary support only exacerbate the difficulties faced by the industry and prolong the adjustment period.

Phased Implementation of License Conversion: The conversion conditions required for AMELs under the new regulations should be reevaluated. A phased approach to the license conversion process would allow for a more gradual adaptation to the new system, particularly for experienced personnel who may find the additional training modules challenging. Recognizing prior qualifications and allowing for more flexible conversion conditions would facilitate a smoother transition and prevent feelings of invalidation among AMEs.

Clear and Detailed Communication: Communication from regulatory bodies should be clear, actionable, and comprehensive. Stakeholders need more than just general announcements about regulatory changes; they require specific instructions on how to comply, including timelines, requirements, and available resources. CAAT should ensure that communication is two-way, allowing stakeholders to ask questions and receive timely answers. Establishing a system for continuous feedback throughout the transition process will ensure that issues are addressed as they arise.

Stakeholder Engagement and Support: Effective stakeholder engagement is essential to the success of any regulatory transition. Regulatory authorities should actively involve industry stakeholders in the process of designing and refining new regulations. Additionally, providing training, support, and consultation services throughout the transition period will help stakeholders adapt to the new system. This will ensure a smoother implementation and enhance overall compliance with the regulatory changes.

Continuous Monitoring and Adjustment: The implementation of RCAAT 25 and TCAR Part-66 should be continuously monitored to identify any ongoing challenges or gaps in the process. Regular feedback from stakeholders should be used to make adjustments as needed to the regulatory framework and support



structures. This approach will help to ensure that the transition remains effective and responsive to the needs of the aviation industry.

8. CONCLUSION

This study aimed to examine the implementation of RCAAT 25 and the transition to a Part-66-based aircraft maintenance licensing system in Thailand, focusing on the experiences of key stakeholders. The findings highlighted several critical challenges, including delays in the release of subordinate regulations, the perceived infeasibility of the license conversion requirements, and the inadequacy of communication and support from the regulatory authorities. While stakeholders agreed with the broader goal of aligning Thailand's licensing system with international standards, the implementation process was seen as flawed, particularly in terms of clarity, timing, and industry engagement.

The recommendations outlined in this study are intended to guide future regulatory transitions, ensuring that they are well-supported, transparent, and responsive to the needs of all stakeholders. By improving communication, providing adequate support, and recognizing prior learning, regulatory bodies can facilitate smoother transitions and ensure that regulatory reforms achieve their intended outcomes without placing undue burden on industry stakeholders.

Ultimately, the success of regulatory change depends not only on the intention to align with international standards but also on the practical execution of that change. As the aviation industry continues to evolve, regulatory authorities must prioritize effective implementation strategies to ensure that all stakeholders can adapt efficiently and continue to uphold the high safety and operational standards that are central to global aviation.

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