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CHALLENGES OF IMPLEMENTING REMOTE AERODROME FLIGHT INFORMATION SERVICE (R-AFIS) IN THE FRAMEWORK OF THE GLOBAL AVIATION SAFETY PLAN: A FEASIBILITY AND IMPACT ANALYSIS

(Presented by Brazil)

EXECUTIVE SUMMARY

This Information Paper presents the aviation industry's evolution with new technologies such as the Remote Aerodrome Flight Information Service (R-AFIS), which aims to improve operational efficiency and safety at remote aerodromes. Brazil is in the first phase of the Flight Information Service (FIS) Project in Brasília, expanding the airspace structure and increasing accessibility according to ICAO's Global Air Navigation Plan. The integration of R-AFIS systems presents significant technical challenges but also offers substantial benefits, such as greater operational efficiency and safety. According to *Global Aviation Safety Plan* (GASP, Doc 10004), Chapter 3, *Challenges and priorities in safety planning*, which addresses the appropriate infrastructure to support safe operations, successful implementation depends on stakeholder collaboration, regulatory harmonization, and investment in training and technology. In addition to essential services, the basic building block (BBB) framework identifies the end users of these services and the necessary assets to provide these services (communications, navigation, and surveillance infrastructure), such as R-AFIS. The project aims to cover several locations in Brazil, promoting a proactive approach to harmonizing air traffic management systems.

1. INTRODUCTION

1.1 The aviation industry is constantly evolving, with the development of new technologies and systems to enhance safety and efficiency. One such advancement is the implementation of the Remote Aerodrome Flight Information Service (R-AFIS), a critical component of air traffic management aimed at improving the operational efficiency and safety of remote aerodromes. However, the implementation of R-AFIS presents several challenges that must be addressed to ensure its successful integration into the Global Aviation Safety Plan (GASP), as outlined in Chapter 3 of DOC 10004, which deals with appropriate infrastructure to support safe operations. In addition to the essential services, the BBB framework identifies the end users of these services, as well as the assets necessary to be deployed to provide these services (communications, navigation, and surveillance infrastructure), such as R-AFIS.

1.2 Brazil is experiencing its first phase of the Flight Information Service (FIS) Project in Brasilia, under the responsibility of CINDACTA I, where significant effort has been made to develop a robust solution capable of meeting system requirements. The FIS-BS Project, part of the SIRIUS Program and aligned with the International Civil Aviation Organization's (ICAO) Global Air Navigation Plan, aims to expand the airspace structure and increase accessibility to Brazilian airspace, primarily for visual flight rules in uncontrolled airspace. This project demonstrates a proactive approach to harmonizing air traffic management systems worldwide.

1.3 The adopted solution was to seek the integration of R-AFIS systems, as a solution from various companies such as TATIC from Saipher, SITTI, HOBECO VAISALA, integration with IP cameras, ATC, among others. This is a significant challenge in integrating existing air traffic management systems. The complexity of R-AFIS technologies, including Electronic Flight Progress Strips (EFPS) and automated communication systems, requires comprehensive training and expertise. However, recent developments, such as the transition from Air Traffic Controllers to military Communication Specialists to operate FIS-BS services, show great effort to adapt to these technological advancements.

1.4 Aiming to expand the Brazilian airspace structure, primarily for visual flight rules in uncontrolled airspace, the R-AFIS project will reach the following locations: Barbacena, Corumbá, Uruguaiana, Fernando de Noronha, Oiapoque, Vilhena, São José da Cacheira, Tiriós, Guajará-mirim, and Tabatinga. This project demonstrates a proactive approach to harmonizing air traffic management systems worldwide.

1.5 Despite these challenges, the benefits of improving R-AFIS are significant. R-AFIS increases operational efficiency by automating functions, simplifying processes, and enhancing the safety of air operations. It also improves situational awareness by providing real-time information to air traffic controllers and pilots, avoiding the risk of conflicts and incidents.

1.6 In conclusion, the implementation of R-AFIS in GASP presents challenges and opportunities for the aviation industry. Addressing these challenges through stakeholder collaboration, regulatory harmonization, and investment in training and technology will be crucial to fully leveraging R-AFIS as a source of global aviation safety and efficiency.

2. DISCUSSION

2.1 Challenges of integrating legacy systems

2.1.1 The integration of legacy systems with new automation systems, such as R-AFIS, represents a significant challenge in aviation. One of the main obstacles is the technical incompatibility between old equipment and new technologies. This disparity can hinder communication between systems, requiring customized and often complex solutions to ensure smooth operation. Additionally, adapting legacy systems to integrate them with R-AFIS may require software and hardware updates, as well as the reconfiguration of communication protocols, which increases the project's time and costs.

2.2 Communication failures and manual operation

2.2.1 The implementation of R-AFIS highlights the need to reduce reliance on manual operations, which are more susceptible to human error. In the current scenario, DTCEA technicians need to activate aids locally, which not only consumes a lot of time but also increases the workload and the possibility of errors due to communication failures. The integration of R-AFIS is expected to minimize these risks, allowing operations to be performed remotely and automatically, promoting greater efficiency and reliability.

2.3 Increased operational resilience

2.3.1 Operational resilience is a crucial goal in the management of aviation systems. The integration of R-AFIS with legacy systems promises to increase this resilience by automating processes, reducing the dependence on direct human intervention. In situations of adverse weather conditions, where manual intervention would be more frequent and critical, the automation provided by system integration can ensure continuous and stable operation, reducing the likelihood of operational failures and increasing the ability to respond to unforeseen events.

2.4 Human resource management

2.4.1 Efficiency in the use of human resources is another challenge faced in the implementation of R-AFIS. Requiring technicians to manually operate legacy systems can be an inefficient use of their time and skills. System integration would allow technicians to focus on more complex and strategic tasks, while routine and repetitive operations would be automated. This not only optimizes the use of human resources but also improves the morale and productivity of the technical team.

2.5 Adaptation and training

2.5.1 The implementation of an integrated system like R-AFIS requires a period of adaptation and training for the involved operators and technicians. The transition from manual operations to an automated system may encounter initial resistance and require comprehensive training programs. Proper training is essential to ensure that all users fully understand the new technologies and processes, reducing the risk of errors and increasing the effectiveness of the integrated system.

2.6 Cost and initial investment

2.6.1 The cost of integrating legacy systems with R-AFIS represents a significant financial challenge. The need for hardware and software updates, as well as the reconfiguration of existing systems, may require a high initial investment. However, in the long run, the benefits in terms of operational efficiency, failure reduction, and optimization of human resources may justify the investment. Economic feasibility analysis is crucial to ensure that initial costs are balanced with future gains in efficiency and safety.

2.7 System interoperability

2.7.1 Interoperability between R-AFIS and legacy systems is essential for successful integration. Ensuring that all technological components can communicate effectively requires a meticulous approach to systems engineering. Any failure in interoperability can cause operational delays or even critical failures, compromising the safety and effectiveness of operations. The implementation of compatible standards and protocols is essential to ensure successful and functional integration.

2.8 Sustainability and maintenance

2.8.1 The continuous maintenance of integrated systems is a challenge that cannot be underestimated. The combination of new and old technologies may require a detailed maintenance plan and dedicated resources to ensure that all components function efficiently and safely. The long-term sustainability of the system depends on the ability to perform updates and repairs without significant interruptions to operations. Additionally, preparing for the obsolescence of parts of legacy systems and introducing new components must be a constant consideration to ensure the viability and effectiveness of integration in the future.

3. CONCLUSION

3.1 The Meeting is invited to take note of the activities carried out by Brazil.

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