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GLOBAL STANDARDIZATION OF OPERATIONAL CONTROL IN THE ERA OF AI AND AUTOMATED FLIGHT PLANNING

(Presented by the International Federation of Airline Dispatchers Associations)

EXECUTIVE SUMMARY

The rapid integration of Artificial Intelligence and automation into flight operations presents significant safety risks due to global disparities in operational control standards and the erosion of human oversight. This paper calls for ICAO-led harmonization of dispatcher qualifications, AI governance, and human-centric frameworks to ensure that automation enhances—rather than replaces—the critical judgment and accountability of certified Flight Dispatchers worldwide.

Background information and possible updates

a) note IFALDA's observations regarding the ICAO's flight dispatcher provisions under Annex 6, Part I;
b) IFALDA feels AI encourages the need to develop enhanced Annex 6 SARPs providing definitive guidance on operational control personnel qualifications and standardized control tiers;
c) this would require revising or developing new USOAP Protocol Questions to assess State implementation of relevant Annex 1 and Annex 6 dispatcher provisions;
d) this would require the need to prioritize guidance for human oversight requirements in AI-assisted dispatch systems, aligned with emerging AI SARPs and risk management frameworks;
e) inevitably may require the human-readable format retention within the AIM and iWXXM programme to preserve dispatcher situational awareness; and
f) IFALDA will volunteer and support any working group involved in AI Dispatcher related functions.

Strategic Goals:	This working paper relates to *Every Flight is Safe and Secure*
Financial implications:	The activities referred to in this paper are expected to be undertaken with the resources available in the 2026-2028 Regular Budget and/or from extra-budgetary contributions as guided by the ICAO Business Plan 2026-2028
References:	Annex 6 – *Operation of Aircraft*, Part I – *International Commercial Air Transport — Aeroplanes* Doc 9750, *Global Air Navigation Plan* Doc 9854, *Global Air Traffic Management Operational Concept* Doc 9965, *Manual on Flight and Flow – Information for a Collaborative Environment*

1. INTRODUCTION

1.1 The International Federation of Airline Dispatchers Associations (IFALDA), formed in 1961, is a global professional Standards, non-labour association. IFALDA represents the professional and technical roles and responsibilities of flight dispatchers (FDs) and flight operations officers (FOOs) worldwide and in doing so, stands recognized by ICAO as an International Organization. As a global industry stakeholder, IFALDA continuously strives to promote evolving provisions for standards, procedures and guidance with respect to the function of FDs and FOOs worldwide, to the extent that they pertain to flight safety and efficiency. Specifically, IFALDA promotes the critical qualifications required under Annex 1, Chapter 4.6 and the function of FDs and FOOs as defined by ICAO Annex 6 — *Operation of Aircraft*, Part I – *International Commercial Air Transport — Aeroplanes*, Chapter 1.

1.2 There are several Member States today that have incorporated the role and titles of an FD into their State Regulatory and air operator certificate (AOC) requirements. The reality today is that while most ICAO Member States have included the term “flight dispatcher” in their State regulations, there appears to be significant variation in how the functions under the ICAO definition are interpreted and implemented. Further, air operator certificates (AOCs) are issued by States predicated on their air operators having a qualification and training program in place with qualified instructors and where specific subjects are covered (general and operator specific), whether the State chooses to issue licenses or not. However, there may be instances where the duties and functions of FDs as outlined under ICAO Annex 6, Part I have not been fully transposed into State regulations.

1.3 IFALDA observes a growing global reliance on automated flight planning systems to perform critical safety functions, including the interpretation of NOTAMs, meteorological data, and airspace constraints. In certain States, this has led to operational models where individuals performing dispatcher functions oversee exceptionally high volumes of flights—in some cases, hundreds per day—with limited capacity for meaningful human analysis of emerging risks and or threats. While ICAO Annex 6 affords States flexibility in implementing FOO/FD provisions, IFALDA is concerned that certain operational practices may not be fully aligned with the knowledge, training, and qualification benchmarks envisaged in Annex 6, Part I, Chapter 10, and Annex 1 — *Personnel Licensing* , Chapter 4. This misalignment is particularly critical where personnel are engaged in operational control functions without standardized licensing or competency assurance, potentially compromising the intended safety outcomes of Annex 6.

1.4 The European regulatory framework presents an illustrative case study in the global variability of operational control models. Under European Union Aviation Safety Agency (EASA) regulations, the primary responsibility for operational control is delegated to the pilot in command (PIC). While State authorities may permit operators to designate aspects of operational control to an FD or FOO, this remains an option rather than a standardized requirement. EASA ED Decision 2022/005/R, which mandates operator training based on ICAO Annex 1, the *Manual on Flight Operations Officers/Flight Dispatchers Competency-based Training and Assessment* (Doc 10106), and the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868) and the promulgation of these standards in operations manuals, represents a positive step. However, the absence of a region-wide mandate for licensed personnel to share operational control authority with the PIC—as is required in other major aviation jurisdictions—creates a fragmented landscape. This variability underscores the broader global challenge: without harmonized Standards and Recommended Practices (SARPs) that clearly define the role, qualifications, and authority of personnel supporting operational control, States will continue to implement significantly different standards, potentially leading to safety gaps in an increasingly automated and interconnected global airspace system.

1.5 The demonstrated safety efficacy of the FD role, as defined in Annex 6, has been further reinforced by the regulatory frameworks of Member States such as the United States and Canada. These States have factored-in the shared exercise of operational control between the licensed dispatcher and the Pilot in Command within their national regulations (e.g., Federal Aviation Administration (FAA) Part 121 and Transport Canada Subpart U/CARs 703/704). This model has proven highly effective in managing risk. Consequently, IFALDA suggests that the current ICAO SARPs in Annex 6, Part I—specifically the Standards in Chapters 3.1.3, 3.1.4, and 3.1.5 concerning the operator's responsibility for operational control, and Chapter 10 concerning FD/FOO requirements—present a critical opportunity for global harmonization. To achieve this, these provisions would benefit from enhanced promotion to illustrate their safety value and, crucially, from greater clarification. The existing requirement for operational control "appropriate to the level of complexity" lacks definitive guidance, creating ambiguity for States and operators. IFALDA proposes the development of clear, scalable tiers or criteria that define the necessary resources, personnel qualifications, and oversight mechanisms required for different levels of operational complexity, thereby transforming this principle into a measurable and actionable global standard.

1.6 This paper thus seeks to draw the attention of ICAO Member States to five primary concerns related to the implementation of dispatcher functions and operational control standards:

1.6.1 The implementation of the ICAO definition of a FD in Annex 6, Part I, Chapter 1 varies considerably among States, affecting the consistency of their roles and responsibilities. In certain cases, personnel designated by operators under methods of control may perform predominantly administrative duties rather than the comprehensive operational control functions intended by ICAO. This raises questions regarding whether such individuals receive training and licensing as FOO/FD under Annex 6, Chapter 10, that is commensurate with their assigned operational responsibilities.

1.6.2 In EASA States, GM1 ORO.GEN.110(c) may not be fully aligned with the ICAO definition of a flight dispatcher under Annex 6, Part I, particularly as the qualifications referenced may not be uniformly addressed. Although EASA stipulates training requirements to ensure compliance with SARPs, concerns remain regarding alignment with the qualification provisions under Annex 1. This is compounded by the fact that ICAO USOAP Protocol Questions are often broadly phrased, which may result in inadequate assessment of the true implementation of these standards.

1.6.3 Across many States, particularly in Europe, there is a growing reliance on automation in functions traditionally carried out by dispatchers. While automation can enhance operational efficiency, it is essential to evaluate whether these implementations preserve the necessary level of human oversight for analytical and decision-making tasks as outlined in Annex 6, Part I.

1.6.4 The rapid integration of Artificial Intelligence (AI) into flight operations introduces potential safety considerations, especially when applied to operational control. Although AI can improve data processing capabilities, limitations remain in its ability to replicate human judgment, cognitive intuition, and clear accountability—all vital elements in flight dispatch. Known issues such as AI "hallucinations," where incorrect but plausible information is generated, pose specific risks in safety-critical environments. ICAO may wish to consider developing guidance to ensure these risks are properly mitigated.

1.6.5 The industry shift from traditional TAC formats to XML-based messaging under aeronautical information management (AIM) and meteorological (MET) systems could affect a dispatcher's capacity to rapidly interpret operational information in a familiar, human-readable format.

Although data content remains consistent, alterations in presentation may influence operational efficiency and situational awareness during time-sensitive decision-making. Additional concerns include the reliability of automated transcription of data into XML, often by private systems.

1.6.6 The Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) uses an evidence-based system to evaluate the effectiveness of safety oversight. However, IFALDA notes that the current Protocol Questions may not sufficiently assess the implementation of Annex 6 dispatcher standards—especially those pertaining to qualification and training under Chapters 10.1 and 10.3—or the critical function of operational control delegated by the airline postholder to the Pilot in Command. Refining these assessment criteria could better guide States in adhering to these provisions.

2. DISCUSSION

2.1 IFALDA maintains that the delegation of operational control responsibility solely to the PIC creates a potential single point of failure, particularly when air-to-ground (A/G) communications are compromised. This risk is critically amplified by the pilot's continued operational reliance on these same, potentially compromised, communication channels for receiving vital inflight updates—including evolving weather, NOTAMs, and other safety-critical information. This stands in stark contrast to the operational reality of the FD on the ground, who maintains continuous, redundant access to a vast corpus of real-time data. The PIC, while in command, is operationally isolated from this dynamic information environment and must rely on a complex, and potentially fragile, logistical relay process for updates.

2.2 ICAO provisions, notably in Annex 6, require dispatchers to be specifically qualified to ‘synthesize’ complex and dynamic flight safety information. This integration demands a high level of specialized skill, operational experience, and competency in human factors, including threat and error management (TEM), applied throughout all phases of flight operations. The core analytical and decision-making functions essential to this role include, but are not limited to:

a) comprehensive evaluation of all safety-related information, including NOTAMs;

b) continuous monitoring of all flights under their purview;

c) detailed analysis of MET, weather forecasts and evaluation of meteorological trends;

d) assessment of wide-area weather phenomena and their associated operational risks (e.g., tropical storms, blizzards, volcanic ash);

e) identification of available and suitable approach procedures at all destination and alternate and enroute airports;

f) analysis of technical aircraft and runway data and its impact on performance;

g) consideration of flight and duty time limitations for the flight crew;

h) application of the operator’s specific fuel policy;

i) evaluation of ground handling procedures and their implications;

j) assessment of weight and balance limitations; and

k) management of the ATC flight plan, air traffic flow management and slot coordination process.

2.3 ICAO Annex 6, Part I, paragraph 4.6 explicitly assigns dispatchers responsibilities for supporting flight crews during preparation and in-flight phases, including the initiation of emergency procedures as specified in operator manuals. While the Annex does not mandate a specific licensing regime, it obligates States to ensure that personnel performing these duties are properly qualified, as per Annex 1, to effectively support, brief, and assist the Pilot-in-Command.

2.4 To comply with these provisions, States currently have two principal options regarding the qualification of dispatchers:

a) implementing a formal licensing system in accordance with Annex 1; or

b) accepting documented proof of qualification through State-approved training programmes that demonstrably meet the knowledge and skill objectives outlined in Annex 1.

2.5 Tragic accidents, including AF447, MH370, and MH17, have underscored the increasingly critical role of dispatchers/FOOs in modern aviation safety. In response, ICAO provisions for normal tracking (2018) and the Global Aeronautical Distress and Safety System (GADSS) (2023) specifically require operators to implement dispatch systems capable of:

a) providing PICs with all necessary in-flight safety information; and

b) during emergencies:

1) executing established emergency procedures without creating conflicts with ATC instructions; and

2) communicating essential safety information, including any critical amendments to the active flight plan.

2.6 IFALDA has observed operational practices in certain regions where operators utilize FOOs/FDs for operational control functions, yet questions persist regarding full alignment with the operational control functions envisioned in the Annex 6 definition or the qualification depth stipulated in Annex 1. Specific concerns include operational models where individual dispatchers are responsible for overseeing hundreds of flights daily, a practice that inherently limits the time available for the comprehensive, individual analysis of each flight’s unique safety determinants. This operational pattern raises substantive questions regarding adherence to the analytical and briefing proficiency required under Annex 1, paragraph 4.6.

2.7 Concerning the implementation of the USOAP Continuous Monitoring Approach (CMA), IFALDA identifies that key Annex 6, Part I provisions warrant more explicit inclusion within audit protocols to enhance the effectiveness of State safety oversight. These include, but are not limited to:

a) chapters 3.1.4 and 4.2.1.3; and

b) Appendix 2, Section 4.3, Attachment D 3.3 v), and Chapters 10.1 and 10.3.

Current USOAP protocols may not sufficiently examine the mechanisms by which States ensure that dispatcher qualification and training standards are met, particularly in assessing whether approved training programmes adequately develop the analytical and decision-making competencies mandated by Annex 6.

2.8 The integration of Artificial Intelligence (AI) into flight operations presents significant opportunities alongside considerable safety considerations:

a) while potentially valuable for processing large datasets, current AI systems cannot fully replicate essential human capabilities in:

1) assessing nuanced or ambiguous operational risks;

2) managing novel or unforeseen situations do not present in training data; and

3) Exercising clear accountability for safety-critical decisions;

b) the inherent lack of transparency in AI decision-making processes (the "black box" phenomenon) may compromise the required level of understanding and trust for their application in safety-critical functions; and

c) AI “hallucinations” - wherein systems generate plausible but factually incorrect outputs—present a profound risk in dispatch functions, where absolute accuracy is paramount for safety.

2.9 The ongoing industry transition to AIM/iWXXM XML-based messaging formats may inadvertently impact the efficacy of human oversight by:

a) requiring dispatchers to interpret critical information, including flight plans and subsequent updates, through data formats that are primarily machine-readable rather than optimized for human cognitive processing;

b) creating potential dependencies on automated interpretation systems to parse and display data; and

c) potentially degrading situational awareness during time-critical decision-making time windows, particularly during the transition & adaptation of these new paradigms.

3. CONCLUSION

3.1 In conclusion, IFALDA respectfully submits that the current global implementation of flight dispatcher and Flight Operations Officer roles, characterized by significant variance in State oversight and qualification standards, presents a critical opportunity for enhanced regulatory harmonization. The Association strongly advocates for the global standardization of qualifications and

training requirements, in full alignment with the objectives and provisions of Annex 1 and Annex 6, to ensure a consistent and robust level of safety worldwide.

3.2 To achieve this imperative, IFALDA stands ready to provide its full cooperation and subject matter expertise to assist ICAO and its Member States in the development of the necessary Standards, Recommended Practices, and guidance material to effectively address these critical safety considerations.

3.3 Specifically, IFALDA will make suggestions to consider the following:

a) *Enhance USOAP effectiveness*. Update relevant USOAP Continuous Monitoring Approach (CMA) Protocol Questions to ensure a more comprehensive and effective assessment of State implementation of Annex 1 (Chapter 4) and Annex 6 (Chapters 3, 4, and 10) SARPs pertaining to flight dispatcher qualifications and operational control functions.

b) *Clarify operational control tiers*. Develop detailed guidance material that defines specific levels of operational control, with associated resource and qualification requirements, appropriate to differing scales and complexities of operation. This would provide States with clearer implementation guidance, moving beyond the current principle-based language.

c) *Strengthen personnel qualification guidance*. Revise relevant OPS provisions in Annex 6 to provide clearer, more definitive guidance on the qualification and competency requirements for all personnel exercising operational control functions.

d) *Safeguard human oversight*. Ensure that ongoing development of SARPs for artificial intelligence applications in flight operations incorporates requirements for human-centric design and validated human override capabilities for all safety-critical dispatch functions, utilizing a performance-based risk assessment framework to determine appropriate levels of human engagement and threat-error management.

3.4 Regarding emerging technologies, IFALDA further recommends the development of ICAO Guidance to address associated risks & ensure flight safety remains paramount:

a) *Preserve human factors in data exchange*: Mandate the retention of human-readable message formats, or their functional equivalent, alongside any XML-based implementations (e.g., eFPL, AIM/iWXXM) to maintain dispatcher situational awareness and support time-critical decision-making.

b) *Mitigate ‘Novel’ technology risks*: Develop comprehensive training frameworks to ensure dispatchers are proficient in the oversight, limitations, and potential failure modes of AI systems, including the management of risks such as AI "hallucinations."

c) *Uphold accountability*: Establish clear and unambiguous accountability frameworks for safety-critical decisions made with AI assistance, ensuring the ultimate responsibility and authority remains with certified human personnel.

— END —