61ST CONFERENCE OF DIRECTORS GENERAL OF CIVIL AVIATION ASIA AND PACIFIC REGION

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AGENDA ITEM 3: AVIATION SAFETY

RESPONSIBLE USE OF ARTIFICIAL INTELLIGENCE IN AVIATION WILDLIFE HAZARD MANAGEMENT

Presented by the World Birdstrike Association (WBA)

INFORMATION PAPER

SUMMARY

AI is increasingly used in wildlife monitoring for detection, identification, tracking, analysis and forecasting. While offering significant benefits to WHM, its use in aviation safety requires a risk-based framework for validation, accuracy, human oversight, accountability and continuous performance monitoring before AI outputs are relied upon for operational or safety decisions.

RESPONSIBLE USE OF ARTIFICIAL INTELLIGENCE IN AVIATION WILDLIFE HAZARD MANAGEMENT

1. INTRODUCTION

1.1 Artificial Intelligence and automated monitoring technologies are developing rapidly and offer significant opportunities to improve the collection, analysis and interpretation of wildlife data at aerodromes. AI can assist in detecting wildlife, identifying species, counting individuals and flocks, analysing movement patterns, identifying hotspots and supporting predictive risk assessment.

1.2 However, wildlife monitoring for aviation is safety-related. Detecting an object or classifying a species is not, by itself, equivalent to understanding the risk that wildlife presents to aircraft operations. Risk may depend on species, number, mass, behaviour, altitude, direction of movement, location relative to runways and flight paths, season, weather and aircraft operations.

1.3 As AI capability increases, consideration is therefore required as to the level of automation that is appropriate for WHM and the assurance needed before AI-generated information is used to support aviation safety decisions.

2. DISCUSSION

2.1 AI has the potential to strengthen WHM by increasing monitoring coverage, processing large volumes of data, identifying patterns that may not be immediately visible to human observers and providing earlier warning of changing wildlife risk. Nevertheless, AI systems also have limitations. These may include false positives, false negatives, incorrect species classification, reduced performance under different weather or lighting conditions, limitations in training data, model bias, data drift and degradation of sensor or model performance over time.

2.2 A system trained in one geographical region may not necessarily perform to the same standard in another region where wildlife species, habitats, climate and behavioural patterns differ. Airports and regulators therefore need confidence that AI systems have been validated under the environmental and operational conditions in which they will be used.

2.3 Particular attention should be given to: accuracy and validation; acceptable false-positive and false-negative rates; performance by day, night, season and weather condition; regional and species bias; explainability and traceability of AI outputs; human oversight; management of software and model changes; cybersecurity and data governance; continuous performance monitoring; and accountability where AI-generated information contributes to an operational decision.

2.4 The level of assurance should reflect the level of automation and the safety consequence of an incorrect output. AI may be used at different levels, including AI-assisted species identification, AI-supported analysis, predictive risk forecasting and automated alerting. Fully autonomous operational action would require a substantially higher level of assurance than a system that provides information for review by trained WHM personnel.

2.5 A practical safety principle for WHM is therefore: Detect - Validate - Interpret - Decide - Act - Review. AI should augment competent professional judgement rather than automatically replace human oversight where outputs can influence aviation safety.

2.6 Existing cross-sector AI governance frameworks provide useful principles for trustworthy and responsible AI, including risk management, validity and reliability, transparency, explainability, accountability, security and human oversight. However, aviation WHM has specific operational requirements that warrant further consideration within the aviation context.

2.7 The question is therefore no longer simply whether AI will be used in WHM, but how aviation ensures that AI used to support safety decisions is trustworthy, validated and appropriately governed. A WHM-specific assurance framework could address Safety, Accuracy, Validation, Human Oversight, Explainability, Data Governance, Cybersecurity, Accountability and Continuous Performance Monitoring.

2.8 WBA considers that further work involving Member States, regulators, aerodromes, WHM practitioners, researchers and technology providers would assist in establishing common principles for responsible AI use in WHM and avoiding inconsistent or unverified reliance on automated systems. WBA is willing to work collaboratively with Member States and relevant stakeholders to develop and apply a proportionate, risk-based approach to AI in WHM, including consideration of validation, human oversight, assurance and continuous performance monitoring according to the safety consequence of an incorrect AI output.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to note the information contained in this Paper.

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