



International Civil Aviation Organization
Asia and Pacific Office

ICAO

Eleventh Meeting of the Asia Pacific Accident Investigation Group (APAC-AIG/11)

(Singapore, 16 – 17 August 2023)

Agenda Item 4: Enhancing Accident Investigation Capabilities

CLASSIFICATION OF OCCURRENCES USING ARTIFICIAL INTELLIGENCE (AI)

(Presented by Singapore)

SUMMARY

This paper provides information on the TSIB's pioneering effort to implement an artificial intelligence (AI) software application (App) that can assist with the classification of aviation occurrences.

1. INTRODUCTION

1.1 ICAO's definition of accident in Annex 13 to the Convention on International Civil Aviation is fairly clear. However, with regard to serious incidents, Annex 13 says that it is an occurrence involving circumstances indicating that there was a high probability of an accident. There is relatively little guidance to help accident investigation authorities (AIAs) decide whether an incident should be classified as a serious incident. As a result, AIAs may classify serious incident differently, and there may even be inconsistency among individuals within the same AIA when deciding whether an incident should be classified as a serious incident. To minimise classification variations due to differing human opinions, it is desirable to have a method that can achieve consistent classification.

1.2 With the advent of artificial intelligent (AI) in recent times, the TSIB has explored using AI to aid in classifying aviation occurrences. This novel approach uses machine learning (ML) models that can provide an accurate and consistent classification result after being trained on a database consisting of incidents and serious incidents examples. For ease of use, the user can access the AI App from a website.

2. DISCUSSION

2.1 The creation of an AI App for occurrence classification provides the investigators with a tool for consistently classifying occurrences to supplement the classification methodology in Annex 13. AI technology enables the identification of patterns and relationships in data sets that would be difficult or impossible for humans to discern, thus providing new insights from existing data and adding accuracy and speed to the classification process.

2.2 The ML models need to be first trained on a globally diverse database consisting of incidents and serious incidents examples sourced from a collection of AIAs. After learning from the database, the ML models would be able to provide a classification that would be based on a global opinion of what constitute an incident or a serious incident. When used in conjunction with an existing

event risk-based classification tool (e.g. Attachment C of Annex 13), an AI-driven classification system can provide additional guidance to support the classification as its classification result would have been a globally based consensus.

2.3 Using AI technology to aid in the classification of occurrences, particularly serious incidents, would have several benefits such as:

- a) complementing existing event risk-based classification tools to provide additional verification on the classification result;
- b) providing classification consistency and removing human biases and subjectivity in occurrence classification;
- c) ensuring that serious incidents are not mis-classified as simply incidents and allowing AIAs to focus investigation resources on correctly identified serious incidents so as to facilitate the learning of valuable safety lessons.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

- a) appreciate the emerging use of AI in classification tasks and AI tool's applicability in providing occurrence classification guidance that can be both accurate and consistent; and
- b) learn from the TSIB's AI App example where AI technology can complement the existing event risk-based classification process, and explore other possible implementations of AI technology in other investigation related tasks.

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