

**NINTH MEETING OF THE ASIA PACIFIC ACCIDENT INVESTIGATION GROUP (APAC-AIG/9)**

(27-28 October 2021 on Virtual Platform at 11.00 hrs. Bangkok Time UTC+7)

Agenda Item 4: Enhancing accident investigation capabilities**ASSISTING INVESTIGATION THROUGH AN INVESTIGATION MANAGEMENT SYSTEM**

(Presented by Australian Transport Safety Bureau)

SUMMARY

The ATSB recently built a new investigation management system for recording investigations and occurrences. This paper describes some of the functions and how it assists investigators through automation and other process. The paper will discuss linking common entities to show relationships, automation that reduces investigator workload, sequence of events and hypothesis testing, tracking safety recommendations, uploading from mobile devices and the associated occurrence database.

1. INTRODUCTION

1.1 The ATSB recently built a new investigation management system for recording investigations and occurrences (ATSB Investigation Management System or AIMS). The vision for the new system was to free up investigator time by removing work that computers can do. AIMS is used for all of the ATSB's investigation work from collecting and storage of evidence, allocating investigation tasks, scheduling, and recording of all investigation analysis and safety actions. Easy access and use of all recorded data was also important, as was a flexible system that would allow for future changes.

1.2 Built on a *Hubstream* platform, AIMS fulfils the above visions. This paper will present several areas AIMS assists the investigation, research and management of accidents and incidents:

- a) linking common entities to show relationships;
- b) automation that reduces investigator workload;
- c) built-in sequence of events with graphical displays;
- d) built-in hypothesis testing;
- e) tracking safety issues and safety recommendations;
- f) mobile phone compatibility; and
- g) occurrence database including pre-populating and integration of maps.

2. DISCUSSION

2.1 AIMS has 'out of the box' functionality to link entities. For example, when a communication (phone call or email) is recorded in AIMS, the person the communication involves is linked to. The platform then immediately shows the user other links to that person, which could be other communications, links to an investigation or to an occurrence in the database. In this way, the user is therefore shown there are other connections to that person in the database, which is of great advantage to the investigator.

2.2 The same linking functionality has been built into AIMS for organisations and aircraft. In this way, every time an organisation or an aircraft is involved in any part of an occurrence or investigation, the user can find its history in terms of its involvement with the ATSB.

2.3 Various automation has been built in to reduce administration time necessary for documenting investigation processes. Features that save time and effort, and ensure proper record keeping include:

- a) recording of emails;
- b) tracking requests for evidence;
- c) tracking physical evidence.

2.4 Sending emails can still occur using standard email apps, but simply including a common ATSB investigation mailbox in the CC and inclusion of the ATSB investigation reference number in the subject line, results in a copy of the email recorded in the AIMS investigation. Similarly, a response to that email will automatically be recorded in the investigation. Further, emails that contain an attachment will have that attachment uploaded and attached to the investigation. In this way, there is no double handling to ensure communications are appropriately recorded in the official investigation record.

2.5 Similarly, requests for evidence are sent via AIMS. Completing a simple form (who to request will be sent to, what evidence is required, and due date), will automatically email the recipient a form letter with these details, details about the investigation and the legal powers the evidence is requested under. Again, this communication is automatically recorded in the investigation, and replies to the email (and any attachments) are also recorded in the investigation. The status of the original request also changes to help track which evidence requests have been responded to. Like any communication, the process links to a person in AIMS (using their recorded details) so there is no need to fill in all details. It also provides another link to a person as per paragraph 2.1 above.

2.6 Physical evidence (wreckage etc.) is tracked via a QR code sticker. Scanning a new QR code makes a new record to document details about custody, history, location, owner etc, as well as linking to photos or other electronic evidence files. Scanning a QR code of an existing record shows the investigator all recorded details, so physical evidence can be easily identified.

2.7 The first step of investigation analysis is to determine a detailed sequence of events. AIMS has a built-in function where the investor can manually record details of each event to form a sequence. Alternatively, a spreadsheet can be imported. That way, recorded data (such as from a flight data recorder) can be imported and hundreds of events uploaded. A built in PowerBi report then shows the investigator both a graphical timeline view of the sequence, and if latitude and longitude details are recorded, a map view.

2.8 Using the ATSB investigation analysis methodology, hypothesis are tested using AIMS by recording argument reasons for and against, and linking evidence, and then recoding arguments for existence and contribution. Hypothesis that pass these tests become the findings of the investigation report. Further, the arguments used to prove existence and contribution then become the key text used in the investigation report Safety Analysis chapter to justify the findings in the Final report.

2.9 Similarly, findings that are considered as Safety Issues (an ongoing risk) are recorded, and proactive safety actions and safety recommendations linked to them are shown on a dashboard. This way, the investigation can track that all safety issues have safety actions, and record and track when those safety actions have been closed. Recorded findings, safety issues and safety actions in AIMS can also be converted to a document (via a SSRS report) to be able to be included the Final report. Further, management has easily visibility of the details of all safety issues, proactive safety actions, and safety recommendations across all investigations to ensure they are appropriately tracked and closed.

2.10 A mobile phone view of AIMS is also available, allowing incoming communications to be viewed, and contact details of people recorded in the system available for phone or email. In addition, investigators can upload photos and videos from their mobile phone straight to the relevant investigation.

2.11 Lastly, an extensive occurrence database has been built to record all aviation incidents and accidents (occurrences). These are linked to investigations, but also provide research opportunities via PowerBi analysis dashboards. Details reported to the ATSB from pilots and operators are automatically uploaded, with further coding by ATSB staff. However, one advancement with AIMS is that once date, time, latitude, longitude and altitude have been populated, weather and airspace data are automatically uploaded via an API. Maps also show the location of the occurrence, including bearing and distances from the nearest airport. Aircraft and aerodromes are linked to occurrences, as are organisations (operators) and people (pilots), providing further network linking opportunities.

2.12 In conclusion, the ATSB is using in-built Hubstream technology to support the way the ATSB conducts investigations. The importance of documenting investigations in an official database can consume a lot of time, and this system has been built to reduce this overhead to give investigators more time to investigate.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to note the content of the paper on ATSB's conduct of investigations.