



HIGH-LEVEL SAFETY CONFERENCE 2010

Montréal, 29 March to 1 April 2010

Theme 3: Other safety issues

Topic 3.2: Safety initiatives arising from recent accidents

EQUIPPING AIRCRAFT WITH AIRBORNE IMAGE RECORDERS (AIR)

(Presented by the Interstate Aviation Committee²)

SUMMARY

This working paper presents information that is based on the findings of air accident and incident investigations and justifies the need to equip the aircraft cockpits as well as passenger cabins and cargo compartments with airborne image recorders (AIRs).

Action: The Conference is invited to:

- a) note the information presented in this working paper;
- b) agree that ICAO pursue as a matter of high priority a relevant review of Standards and Recommended Practices (SARPs); and
- c) confirm that the States will continue improving national regulations and procedures providing flight recorder data protection and preventing improper use of these data.

1. INTRODUCTION

1.1 Lack of objective (factual) information on the flight and cabin crew actions in the course of emergency situations in flight that the Interstate Aviation Committee (IAC) has encountered numerous times within the recent years during air accident investigations has a negative influence on the completeness of the analysis of such actions as well as on revealing faults in flight and cabin crew operations and training. In a number of cases this also hinders making recommendations to prevent aviation occurrences in the future and to reduce the severity of their consequences.

¹ English and Russian versions provided by the Interstate Aviation Committee (IAC)

² Interstate Aviation Committee (IAC) is the executive body of the interstate Agreement on Civil Aviation and Airspace Use (international agreement, the participants of which include Republic of Armenia, Azerbaijan Republic, Republic of Belarus, Georgia, Republic of Kazakhstan, Kyrgyz Republic, Republic of Moldova, the Russian Federation, Republic of Tajikistan, Turkmenistan, the Ukraine, Republic of Uzbekistan).

2. DISCUSSION

2.1 For a long time safety boards of various States have noted that airborne image recorders (AIRs) could provide additional valuable information about crew actions, equipment failures, settings, selections, etc. It should be also noted that much of the interaction within the cockpit is done by non-verbal means that are impossible to recover from the cockpit voice recorder (CVR) and flight data recorder (FDR) recordings only. The ICAO has not once been given relative recommendations on the basis of accident investigations.

2.2 At present ICAO documents including Annex 6 do not require mandatory equipment of aircraft with protected AIRs. However in its State Letter SP 55/4-09/56 of 17 August 2009 ICAO invited comments from States and international organizations on the subject of amending Annex 6 to include a Recommended Practice for future produced aircraft over 5 700 kg to be equipped with AIRs capable of capturing the general cockpit area.

2.3 The letter reads that in respect to these recorders, the Air Navigation Commission was aware that the subject was controversial, due to the lack of protection for recordings in some States. However, AIG 2008 recommended including image recordings and any part or transcripts from such recordings into the list of information for limited distribution in accordance with Standard 5.12, Annex 13. Additionally, Attachment E to Annex 13 contains legal guidance for protection of safety information.

2.4 On 9 July 2006 an A-310 F-OGYP conducting Flight S7 778 overrun the available runway on landing at Irkutsk airport (Russia), collided with obstacles and was destroyed and burnt. The investigation was conducted by the IAC with participation of the Bureau d'Enquêtes et d'Analyses (BEA) and National Transportation Safety Board (NTSB). The investigation revealed that after landing the flying pilot while acting on the reverse thrust lever of the right engine, inadvertently and in uncontrolled manner moved the throttle lever of the left engine, whose thrust reverser was deactivated, from "idle" to significant forward thrust position. The crew did not recognize the situation and failed to correct it.

2.5 Although the FDR and CVR data allowed revealing the erroneous deflection of the throttle to forward thrust, many factors that induced such deflection and lack of situational awareness (PF's posture and hand position, distribution of flight crew attention, possible distracting factors) could have been revealed only if there had been an image recording of the cockpit situation. The ICAO has been given a relative safety recommendation on the basis of the investigation findings.

2.6 In accordance with the description of air accident causes given in the Doc 9756, *Manual of Aircraft Accident and Incident Investigation*, Part IV — *Reporting*, paragraph 3.2: a cause is an act, omission, condition or circumstance which if eliminated or avoided would have prevented the occurrence **or would have mitigated the resulting injuries** or damage.

2.7 The current airworthiness standards of a number of States define certification requirements to aircraft emergency evacuation as well as to the availability and use of emergency equipment.

2.8 The existing flight and cabin crew training programs provide recurrent emergency operations training.

2.9 Thus one of the major accident investigation tasks is to analyze the causes of fatalities as well as to assess use of emergency equipment and the process of emergency evacuation on the whole. At the same time, the investigators actually lack objective information on the evacuation process. As a rule,

the only source of factual information in this case is explanations of the surviving passengers and crew members. It is obvious that such information is in most cases controversial and does not allow making an objective reconstruction of events and analyzing it.

2.10 The abovementioned accident with the A-310 resulted in 125 fatalities (120 passengers, 2 pilots and 3 flight attendants) of 203 people on board. The medical expertise revealed that all the crew members and 119 of 120 passengers died of severe poisoning with carbon monoxide accompanied with lack of oxygen in the breathed-in air. Thus, most people did not die because of the collision but as a result of secondary effects. The assessment of evacuation process was significantly hindered by the lack of objective data and controversial explanations of the surviving passengers and cabin crew.

2.11 Similar complications arose during the investigation of the Boeing 737-200 EX-009 accident on 24 August 2008 near Manas Airport (Kyrgyz Republic). The aircraft crashed during a visual approach manoeuvre. 64 of the 85 passengers on board died. Flight and cabin crew were injured. The medical expertise revealed that the passengers died as a result of thermal shock as they were in the closed smokeless atmosphere of the aircraft cabin heated to a very high temperature due to ground fire. The expertise did not reveal any intravital injuries that could have led to death or severe health distress.

2.12 The mentioned facts confirm that equipping passenger cabins with AIRs could significantly improve the investigation results by revealing all factors affecting the consequences and if required by developing relative recommendations to improve emergency training of flight crews and standards of airworthiness.

2.13 On 26 May 2008 a cargo plane An-12 RA-12957 aircraft crashed at Chelyabinsk airport (Russia) during an emergency landing. The investigation revealed that the accident was caused by loss of roll control resulting from aileron control linkage disintegration due to fire in the cargo compartment. As the cargo compartment was burnt out the investigation team could not determine the exact location and cause of the fire. An image recorder in the cargo compartment could have allowed to more precisely determine the exact location and cause of the fire.

3. CONCLUSION

3.1 The information provided in the paper confirms the necessity to equip cockpits, passenger cabins and cargo compartments with protected AIRs for the purposes of aircraft accident and incident investigations, as well as improving flight safety and survivability.

3.2 ICAO should pursue as a matter of high priority a review of relative SARPs.

3.3 States should continue amending national regulations and procedures to provide flight recorder data protection and prevent improper use of these data.