ATM 3
Safety Reporting: ATM

1. Introduction

1.1. The reporting of aviation safety occurrences is important for several reasons:

(a) It allows the causes of occurrences to be investigated;

(b) Based on the findings of the investigation, action may be taken to prevent similar occurrences;

(c) Subsequent occurrence reporting will indicate whether the corrective action was successful;

(d) Important safety information uncovered as a result may be shared with other operators.

1.2. There are three main categories of safety occurrences:

(a) Accidents and Serious Occurrences;

(b) Incidents;

(c) Other Safety Occurrences.

1.3. The basic requirements for the reporting of all types of safety occurrence are laid down by ICAO. For air navigation service providers (ANSPs), these are amplified by EUROCONTROL and by national authorities.[1] Similar regulations are laid down by JAA and by national authorities for aircraft operators and manufacturers.

1.4. Reporting of safety occurrences of all categories is important because it allows an accurate picture of the safety situation to be built up so that timely and effective accident prevention measures can be taken. It is also a valuable tool to judge the effectiveness of such measures.

Accidents and Serious Incidents

1.5. Accidents and serious incidents are defined by ICAO[2] and must be reported. The only difference between an accident and a serious incident is in its result: a serious incident may be regarded as an accident that almost happened.

Incidents

1.6. Incidents are also defined by ICAO[2]. They are occurrences which fall short of the definition of Accident or Serious Incident, but which nevertheless affect, or could affect, the safety of the aircraft. These should be reported to the national authority in accordance with ESARR 2[3].

1.7. Appendix A to ESARR 2 contains a list of ATM-related occurrences which, as a minimum, must be reported and assessed. These include:

(a) Near collision where two aircraft are perceived to be too close to each other, due to:

– Separation minima infringement; or,

– Inadequate separation;

(b) Potential for collision or near collision due to:

– Aircraft deviation from ATC clearance; or,

– Aircraft deviation from ATM regulation;

(c) Aircraft deviation from published ATM procedures.

1.8. In practice, not all such incidents are reported, either because the controller or his management do not realise that they are reportable incidents, or because the controller fears some form of punishment.

1.9. Incidents have occurred where two aircraft operating within the same geographic area have

[1] See Section 6 of this briefing note for details of ICAO and EUROCONTROL regulations.

[2] ICAO Annex 13 Chapter 1

[3] EUROCONTROL Safety Regulatory Requirement ESARR 2 – Reporting and Assessment of Safety Occurrences in ATM;

been issued with the same transponder code. Such incidents have obvious relevance to the level bust issue and should always be reported and investigated.

1.10. Air traffic incidents and airborne collision avoidance system (ACAS) resolution advisories (RAs) should also be reported separately under the relevant incident reporting schemes.

Other Safety Occurrences

1.11. Some safety occurrences are not sufficiently serious to require reporting under a mandatory incident reporting system, but are nevertheless important. These lesser safety occurrences should be reported under a voluntary incident reporting system.[4]

2. Voluntary Incident Reporting System

2.1. A voluntary incident reporting system should be used for reporting all types of safety occurrence, whether or not there is a mandatory requirement to report them to the national aviation authority.

2.2. The total body of safety occurrences may be visualised as an iceberg where only the accidents, serious incidents, and some other reportable incidents are visible above the water line (See Figure 1).

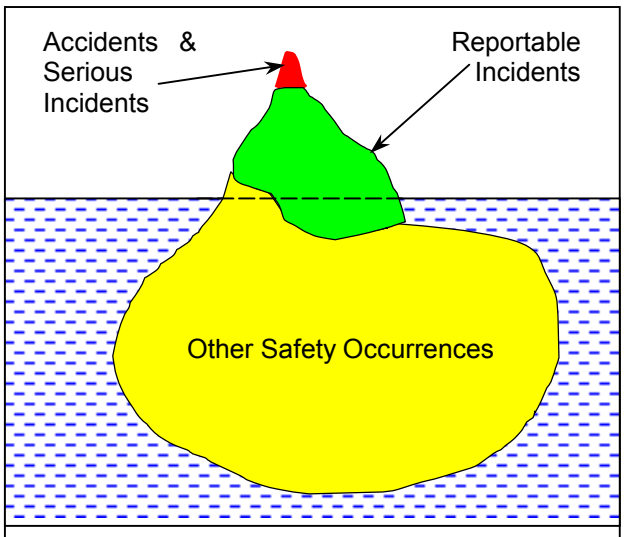

Figure 1 – The Incident Iceberg

2.3. Out of sight lies a large body of unreported incidents and safety occurrences of greater or lesser seriousness, many of which would be made visible by an effective voluntary safety incident reporting system.

2.4. All air traffic controllers and assistant controllers should be encouraged to report safety occurrences of which they become aware, in addition to those for which there is a mandatory requirement, for example:

(a) A level bust almost occurred; the aircraft deviated from its cleared altitude but the critical limit of 300 feet (or 200 feet in RVSM airspace) was not reached;

(b) The pilot failed to read back a clearance for confirmation; or,

(c) Similar callsigns could have given rise to confusion.

2.5. Controllers should also be encouraged to report occurrences where they could be considered to be at fault, whether or not a level bust resulted, for example:

(a) The controller issued an incorrect clearance, which was subsequently corrected; or,

(b) The controller issued a correct clearance which was read back incorrectly, but was not corrected by the controller.

2.6. In the first case, occurrences are usually reported to the Flight Safety department, which reviews the reports and takes appropriate formal reporting action if necessary. The Flight Safety department may also decide to instigate an investigation if appropriate.

2.7. To be effective, a voluntary incident reporting system must have the full support of employees. This implies that:

(a) Employees must not be punished on the basis of evidence contained in voluntary reports where occurrences would not otherwise have come to light;

(b) The confidentiality of reporters must be protected;

(c) Reporters must be confident that the incident reporting scheme is worthwhile and that their reports are acted on.

2.8. ICAO Annex 13[5] states a fundamental principle that should guide all incident reporting:

The sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability.

[4] ICAO Annex 13 Chapter 8 paragraph 8.2

[5] ICAO Annex 13 Chapter 3 Paragraph 3.1.

2.9. ESARR 2[6] takes a similar line, stating that:

> *…reporting and assessment, which must be in a non-punitive environment, has the potential to act as an effective contribution to accident and serious incident prevention.*

2.10. Usually, a computer database is the most effective means of managing a safety incident reporting system.

2.11. Schemes exist for the sharing of the information contained in such databases while at the same time preserving the confidentiality of the reporter.

2.12. EUROCONTROL policy on confidentiality is contained in guidance material to ESARR 2.[7]

3. Just Reporting Policy

3.1. Full and free incident reporting is fundamental to the establishment of a strong safety culture within an air traffic system. For this to exist, controllers must be confident that they will be treated fairly following an incident report.

3.2. The person reporting an occurrence should be protected from punishment where a genuine error was made that would not otherwise have been discovered, to the extent that this is possible within the law and national aviation regulations.

3.3. The confidentiality of reporters must also be protected so that they are not exposed to humiliation as a result of their reports being made public.

3.4. Managers should bear in mind that operational errors may occur for a number of reasons which are as much the responsibility of the air traffic system as of the controller himself. It is important that they should learn of these system failures and correct them to prevent future unsafe situations. The following are typical examples:

(a) The structure or wording of operating procedures may be unsatisfactory;

(b) Training methods may be inadequate;

(c) A culture may exist where good procedures and sound training are often disregarded;

(d) Equipment design or layout may make a mistake more likely.

3.5. The voluntary reporting policy should be prepared in consultation with representatives of the controllers unions. It is recommended that the policy should be endorsed by the senior Air Traffic Controller, inserted in the airport Operations Manual and brought to the attention of all controllers and management.

3.6. A draft statement containing the essential elements of a just reporting policy is shown below.

Draft Statement of Just Reporting Policy

The safety of operations is a paramount responsibility of air traffic management and personnel and is in the interests of air transport users, the air traffic management system and its employees; it is therefore important that any event that affects air safety is reported fully, freely and in a timely manner.

The purpose for encouraging any person concerned to report any event or incident that might affect safety is to establish facts and cause and thereby prevent further occurrence; it is not to apportion blame or liability.

The identity of any person making such a report will not be disclosed unless required to do so by the national authority or by law.

Normally, disciplinary action will be contemplated only in those instances in which it is considered that the employee concerned has acted recklessly, or omitted to take action, in a way that is not in keeping with training, responsibilities and/or experience.

In considering the event or incident, favourable account will be taken of the fact that an employee has complied with his responsibilities to co-operate and to report the circumstances of the event/incident.

3.7. Managerial staff at all levels must actively support the company reporting policy and must be seen to do so.

3.8. At first, employees may be suspicious and it may take some time to build up a sufficient level of trust so that they feel confident that the company will honour the spirit of its policy statement.

3.9. A single case of apparent injustice can undermine or even destroy the confidence of employees. It is therefore recommended that when any form of discipline is contemplated, the matter should be discussed with the employees' representatives (controller's union, etc.)

4. Automatic Safety Data Gathering

4.1. Human reporting will always be limited by what can be achieved. Either due to human limitations

[6] ESARR 2 paragraph 2.3.
[7] ESARR2 Guidance to ATM Safety Regulators – EAM2/GUI2: Publication and Confidentiality Policy.

(e.g. a level bust not detected by the controller), or because the controller does not feel compelled to report certain occurrences, non-reporting will exist. But far more importantly the limitations originate from human factor aspects such as "loss of face" with respect to management and/or colleagues.

4.2. A potential solution to some of these limitations is an automatic safety data gathering (ASDG) system which ensures consistent capture of predefined events.

4.3. The basic principle of ASDG for an ATM system is to:

(a) Connect passively to (and not interfere with) live operational ATM data streams;

(b) Perform an independent analysis and correlation of the data; and,

(c) Detect and store information relating to safety occurrences.

4.4. Alternatively, an ASDG tool could use stored information recorded from an on-line system, or synthetic data from simulations.

4.5. An ASDG tool automatically collects data on flights when triggered by a set of pre-defined criteria. There are two types of trigger:

(a) Reception of ground or airborne system alerts;

(b) Calculation mechanisms built into the tool.

4.6. There are significant issues of professional confidentiality and liability associated with the introduction of ASDG. It is therefore crucial to put in place appropriate procedures that address these issues and ensure an appropriate use of the tool.

4.7. Such systems as the UK SMF (Separation Monitoring Function) or the EUROCONTROL ASMT (Automatic Safety Monitoring Tool) already exist or are in the course of development. The UK tool was supported by both management and controllers. They considered it to be an assurance for everyone that full transparency of the system is achieved.

5. Sharing Information

5.1. Schemes exist and are under development for the sharing of safety information within and between ANSPs. These schemes are important because:

(a) They allow the true dimension of a potential safety issue to become apparent;

(b) They allow controllers and managers to learn that their experiences are not unique – that others have similar experiences;

(c) They permit controllers and managers to learn from the successful preventive measures taken by others;

(d) The effectiveness of national or regional safety measures can be assessed.

5.2. Sharing of information with aircraft operators should also be encouraged as it allows operators and controllers to gain better understanding of the particular problems each experiences.

5.3. In the case of specific air traffic incidents, discussion between operators and the relevant air traffic control service is likely to lead to the best preventative measures being developed.

5.4. The Global Analysis and Information Network (GAIN)[8] is an industry led initiative that promotes and facilitates the voluntary collection and sharing of safety information by and among users in the international aviation community to improve safety.

5.5. GAIN is still under development. However, the Safety Trend Evaluation Analysis & Data Exchange System (STEADES)[9] established by IATA is currently in operation and offers a practical and economical way of sharing information between operators.

5.6. At present, the use of STEADES is confined to airlines; but it is intended to expand the service to embrace other agencies in the future.

6. Regulation

6.1. *ICAO Annex 13* deals mostly with the reporting and investigation of accidents and serious incidents, but Chapter 8 concentrates on accident prevention measures. In particular, it:

(a) requires states to establish mandatory incident reporting systems to facilitate the collection of

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[8] GAIN is an industry led initiative that promotes and facilitates the voluntary collection and sharing of safety information by and among users in the international aviation community to improve safety;

[9] STEADES is the only global safety event database providing analysis of events, with the goal of reducing accident potential and, therefore, costs. It is based on an open, non-punitive, reporting system which is compatible with other reporting systems. STEADES will form an essential part of any Safety Management System.

information on actual or potential safety deficiencies

(b) recommends that states should establish a voluntary incident reporting system to facilitate the collection of information that may not be captured by a mandatory incident reporting system

(c) makes important recommendations concerning the use of incident databases, the analysis of data and the exchange of information with other states.

6.2. ICAO Annex 11 Section 2.26 requires States to implement systematic and appropriate air traffic service (ATS) safety management programmes to ensure that safety is maintained in the provision of ATS within airspaces and at aerodromes.

6.3. This section deals with the establishment of acceptable levels of safety and safety objectives These should be established on the basis of regional air navigation agreements.

6.4. This section also requires that an ATS safety management programme shall, *inter alia*:

(a) identify actual and potential hazards and determine the need for remedial action;

(b) ensure that remedial action necessary to maintain an acceptable level of safety is implemented; and

(c) provide for continuous monitoring and regular assessment of the safety level achieved.

6.5. ESARR 2 requires that each State shall ensure that:

(a) A formal means of safety occurrence reporting and assessment is implemented for all ATM-related occurrences that pose an actual or potential threat to flight safety, or can compromise the provision of safe ATM services, which as a minimum complies with the list of ATM-related occurrences as defined in Appendix A 2; and,

(b) Provisions exist for any person or organisation in the aviation industry to report any such occurrence or situation in which he or she was involved, or witnessed, and which he or she believes posed a potential threat to flight safety or compromised the ability to provide safe ATM services. Such provisions shall not be restricted to the reporting of aircraft accidents or serious incidents, since other types of occurrences could reveal the same types of hazards as accidents or serious incidents.

6.6. ESARR 2 Guidance Material EAM 2/GUI 1 describes the severity classification scheme for safety occurrences in ATM.

6.7. ESARR 2 Guidance Material EAM 2/GUI 2 deals with publication and confidentiality policy.

6.8. ESARR 3 deals with the use of safety management systems by ANSPs.

6.9. ESARR 4 deals with risk assessment and mitigation in ATM.

6.10. Air traffic managers should refer to national legislation to determine how their national authorities have interpreted ICAO Annexes 11 and 13 and EUROCONTROL ESARRs.

7. Resources

Other Level Bust Briefing Notes

7.1. The following Level Bust Toolkit Briefing Note contains information to supplement this discussion:

OPS 7 – Safety Reporting: Aircraft Operators.

Access to Resources

7.2. Most of the resources listed may be accessed free of charge from the Internet. Exceptions are:

ICAO documents, which may be purchased direct from ICAO;

Certain Flight Safety Foundation (FSF) Documents, which may be purchased direct from FSF;

Certain documents produced by the Joint Aviation Authorities, which may be purchased from JAA.

Regulatory Resources

7.3. Documents produced by regulatory authorities such as ICAO, EUROCONTROL, JAA and national aviation authorities are subject to amendment. Reference should be made to the current version of the document to establish the effect of any subsequent amendment.

ICAO Annex 11 – Air Traffic Services;

ICAO Annex 13 – Accident & Incident Reporting;

ICAO Doc 9156 – Accident/Incident Reporting Manual;

ICAO Doc 9422 – Accident Prevention Manual;

EUROCONTROL ESARR 2 – Reporting and Assessment of Safety Occurrences in ATM and associated guidance material;

EUROCONTROL ESARR 3 – Use of Safety Management systems by ATM Service Providers;

ESARR 4 – Risk Assessment and Mitigation in ATM.

Training Material – Safety Letters

EUROCONTROL Safety Letter – Level Bust: a Shared Issue?

EUROCONTROL Safety Letter – Reducing Level Bust;

EUROCONTROL Safety Letter – En Route to Reducing Level Bust;

Other Training MateriaL

NASA ASRS Database Report Set – 50 Altitude deviations;

UK CAA CAP 382 – Mandatory Occurrence Reporting Scheme;

UK CAA CAP730 – Safety Management Systems for Air Traffic Controllers.

EUROCONTROL Second Level Bust Workshop:

Analysis of the Risks of Level Bust;

Level Bust: An Empirical Approach.

Other Resources

NASA: Murphi Busts an Altitude;

UK Airprox Board Report: 2001/2;

UK Airprox Board Report: 2002/1.

This briefing note has been prepared by the Safety Improvement Sub-Group (SISG) of EUROCONTROL to help prevent level busts. It is one of 14 briefing notes that form a fundamental part of the European Air Traffic Management (EATM) Level Bust Toolkit.

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