

ELEVENTH AIR NAVIGATION CONFERENCE

Montreal, 22 September to 3 October 2003

**Agenda Item 2: Safety and security in air traffic management
(ATM)**

2.3 Safety regulation

:

DEVELOPMENT OF GLOBAL RUNWAY INCURSION RISK MANAGEMENT INFORMATION

(Presented by the United States)

SUMMARY

Demand for aviation to perform at increasing levels of safety excellence has never been higher. Integral to advancing safety performance is the reduction of collision risk associated with runway incursions. An international approach will lead to effective global solutions. Specifically, standardized runway incursion information is recommended as an essential step towards achieving global risk reduction and improving risk management of runway incursions.

Action by the conference is in paragraph 3.

1. INTRODUCTION

1.1 A remarkable safety record has been achieved in air travel. This record of success is a tribute to the pilots, air traffic controllers, aircraft mechanics, airport personnel, airplane and airport equipment designers and scores of others who work to ensure the safety of the world's air travelers. However, despite high levels of proficiency, errors that result in runway incursions still occur. History has demonstrated that errors inherent in hundreds of millions of operations have produced runway incursions and created opportunity for aircraft collisions. A global strategy is needed to reduce the number and risk of runway incursions worldwide. This paper further defines the unified approach to increase runway safety outlined in the International Civil Aviation Organization (ICAO) Global Aviation Safety Plan (GASP) by recommending standardization of: the definition of a runway incursion, a runway incursion severity and error type categorization taxonomy, and a runway incursion database.

1.2 The United States Federal Aviation Administration (FAA) anticipates harmonization with ICAO regarding runway incursion risk reduction. The benefits to harmonization include:

- a) development of better global runway incursion trend information to support a wider range of risk identification; and
- b) improvement of global risk management.

The FAA recognizes that increased international focus is critical to managing this safety challenge.

1.3 The FAA supports the move towards standardized global runway incursion information. In order to meet that goal, the FAA recommends the following as a minimum set of essential tasks:

- a) develop a common definition of a runway incursion;
- b) develop a common categorization taxonomy of runway incursion severity, error type and/or factors that contribute to incursions; and
- c) develop a common runway incursion database with a standardized set of data.

2. DISCUSSION

2.1 **Definition.** The following runway incursion definition is in use by the United States:

“Any occurrence in the airport runway environment involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of required separation with an aircraft taking off, intending to take off, landing, or intending to land.”

2.1.1 As has been illuminated on several occasions by many of the world’s aviation organizations, there are numerous other definitions for a runway incursion in use around the world. As a result, much data regarding runway incursions is not readily comparable on an international scale. The FAA recognizes that alternative definitions may be more appropriate for global use. The above definition is offered for discussion.

2.2 **Categorization of runway incursions.** In the United States, runway incursions have historically been categorized by error type (i.e. operational error, pilot deviation, vehicle/pedestrian deviation), but not by the degrees of severity of the outcome. In 2001, aviation analysts with expertise in air traffic control, airports, flight standards, human factors, and system safety were convened to analyze runway incursions that occurred in the United States from 1997 through 2000 with respect to severity. This work provided the foundation for the combined categorization of runway incursions by both severity and error type that is in use today.

2.2.1 **Categorization by severity.** Many operational factors are considered in determining the severity of a runway incursion (see Figure 1). These include:

- a) speed and performance of the aircraft involved;
- b) distance between parties (horizontal and/or vertical);
- c) type and extent of evasive action;

- d) visibility conditions;
- e) airport geometry and surrounding terrain;
- f) time of day; and
- g) runway surface conditions.

2.2.2 Categorization by degree of risk is helpful to both define and measure the risk related to runway incursions. The FAA recognizes that other severity categorization alternatives may exist which may be more appropriate for global use. This categorization (below) is offered as a basis for discussion.

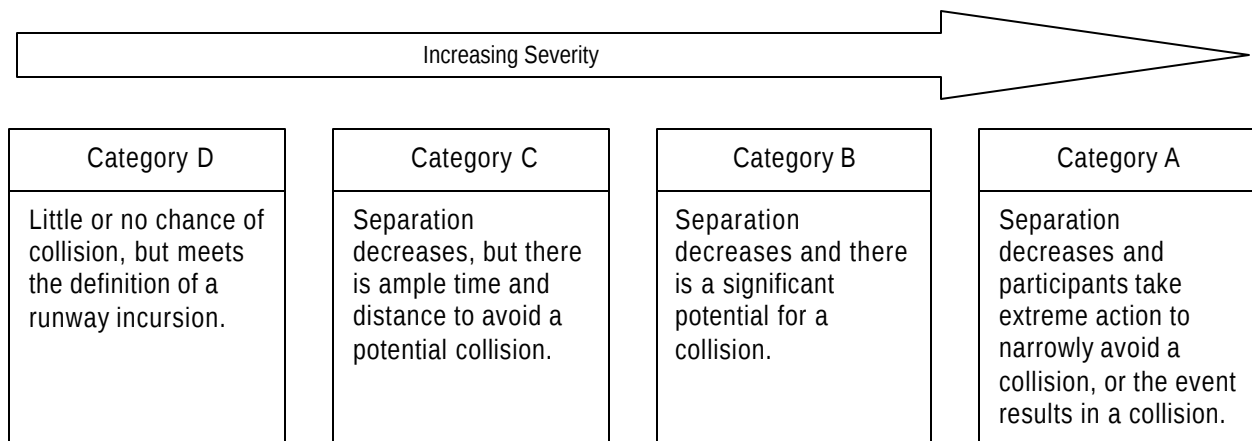


Figure 1. The runway incursion severity categories in use by the United States

2.2.3 **Categorization by error type.** Historically, the FAA has investigated runway incursions and attributed the occurrence to one of the following error types: operational error, pilot deviation or vehicle/pedestrian deviation (see Figure 2). Categorization by error type is helpful to both define and measure the risk related to runway incursion. The FAA recognizes that other categorization alternatives exist which may be more appropriate for global use. The categorization below is offered as a basis for discussion.

Operational Errors	Pilot Deviations	Vehicle/Pedestrian Deviations
An operational error (OE) is an action of an Air Traffic Controller (ATC) that results in: ➤ Less than the required minimum separation between two or more aircraft, or between an aircraft and obstacles (obstacles include vehicles, equipment, and personnel on runways) ➤ An aircraft landing or departing on a runway closed to aircraft	A pilot deviation (PD) is an action of a pilot that violates any Federal Aviation Regulation. For example, a pilot fails to obey air traffic control instructions to not cross an active runway when following the authorized route to an airport gate.	A vehicle or pedestrian deviation (VPD) includes pedestrians, vehicles or other objects interfering with aircraft operations by entering or moving on the runway movement area without authorization from air traffic control.

Figure 2. The runway incursion error type categories in use by the United States

2.3 **Database.** Development of a common database with a standardized set of data for runway incursions is recommended as an essential step toward global risk reduction. The fact that a serious runway incursion is a relatively rare event for any single aviation authority presents challenges for statistical analysis. A global database would expand the sample set for different types of incursions and allow for more powerful statistical analyses. Such a database would also facilitate identification of global trends, and effective mitigation strategies for specific types of risks.

3. ACTION BY THE CONFERENCE

3.1 The conference is invited to agree to the following recommendation:

Recommendation 2/ — Development of global runway incursion risk management information

That ICAO:

- a) develop a common definition of a runway incursion;
- b) develop a common categorization taxonomy of runway incursion severity, error type and/or factors that contribute to incursions; and
- c) develop a common runway incursion database with a standardized set of data.

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