INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL REPORT

SEVENTH MEETING/WORKSHOP OF THE SCRUTINY WORKING GROUP

(GTE/7)

Lima, Peru, 16 to 19 March 2009

INDEX

HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Seventh Meeting/Workshop of the Scrutiny Working Group (GTE/7) was held at Suites del Bosque Hotel, in Lima, Peru, from 16 to 19 March 2009.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. José Miguel Ceppi, Regional Director of the ICAO South American Office, greeted the participants, and highlighted the importance of the issues to be dealt with, and thanked the Peruvian aeronautical authority, the FAA, and CSSI, Inc. for the permanent support offered to the regional activities.

Mr. Ernesto López Mareovich, General Director of Civil Aviation of Peru, welcomed the participants highlighting the importance of the matters to be dealt with have at a regional level, inaugurating the meeting/Workshop. Mr. Jorge Ráez, Central Manager, Air Navigation, CORPAC, S.A. and Mr. Carlos Stehli, Regional Deputy Director were also present during the opening ceremony.

ii-3 SCHEDULE, ORGANIZATION, WORKING METHODS, OFFICERS AND SECRETARIAT

The Meeting agreed to hold its sessions from 0800 to 1500 hours, with appropriate breaks. The work was done with the Meeting as a Single Committee.

Mr. Madison Walton, delegate from United States, served as Chairman of the Meeting and Rapporteur of the Scrutiny Working Group.

Mr. Jorge Fernández Demarco, RO/ATM/SAR Regional Office, Lima, acted as Secretary. He was assisted by Mrs. Stephanie Beritsky, from the FAA, USA, and by Mr. Alberto Orero, RO/ATM/SAR/AIM from the South American Regional Office.

ii-4 WORKING LANGUAGES

The working languages of the Meeting were Spanish and English, and its relevant documentation was presented in both languages.

ii-5 **AGENDA**

The following agenda was adopted:

Agenda Item 1: History of RVSM, Regional Monitoring Agencies and Scrutiny Groups

a) Roles and responsibilities
b) Overview of Target Levels of Safety

Agenda Item 2: GTE Overview

a) Review of Terms of Reference
b) Background
c) Composition
d) Objectives
e) Methodology
f) Reporting

Agenda Item 3: Large Height Deviation (LHD) Analysis

a) Application of GTE methodology to LHD events
b) Summarize parameter values
c) Identify operational trends

Agenda Item 4: Other business

ii-6 **ATTENDANCE**

The meeting was attended by 20 participants from 2 State of the CAR Region, Haiti and United States and 5 States of the SAM Region: Bolivia, Brazil, Chile, Colombia and Perú. The list of participants is shown in pages iii-1 to iii-4.

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Agenda Item 1: History of RVSM, Regional Monitoring Agencies and Scrutiny Groups
a) Roles and responsibilities
b) Overview of Target Levels of Safety

Roles and responsibilities

1.1 The meeting recalled the roles and responsibilities of the Caribbean and South American Regional Monitoring Agency (CARSAMMA), as well as the responsibilities of the Scrutiny Task Force (GTE), which main responsibility is to analyse and evaluate large-height deviations (LHD) of 90m (300ft) or greater which are reported by CAR/SAM States and International Organizations, in order to determine an estimate of flight time spent at a flight level other than cleared or planned.

Overview of Target Levels of Safety

1.2 Since RVSM implementation, in year 2005, CARSAMMA has provided the CAR/SAM Regions with continuous support in all aspects of monitoring system performance related to RVSM such as the development of an RVSM approval database, the collection and analysis of aircraft movement data in the referred airspace, collection and evaluation of LHD reports and finally in the RVSM airspace safety assessments applying internationally recognised assessment methods.

1.3 In view of the above, taking as a basis the information analysed in this meeting, as well as the rest of the data required, CARSAMMA is expected to carry out a new safety assessment in the CAR/SAM RVSM airspace, to be submitted to GREPECAS/16 Meeting.

Agenda Item 2: GTE Overview

a) Review of Terms of Reference
b) Background
c) Composition
d) Objectives
e) Methodology
f) Reporting

Actions adopted by GREPECAS/15 Meeting with regard to safety assessment on post-RVSM implementation

2.1 The Meeting noted the activities developed by GREPECAS/15, with regard to issues related with the Scrutiny Task Force (GTE) and especially CAR/SAM airspace safety assessments after three years of RVSM application, M and N errors, and finally on the methodology for data collection on technical vertical deviations.

2.2 With regards to the RVSM airspace safety assessment, the Meeting noted that GREPECAS/15, after reviewing the technical and operational errors combined, and how these operational errors introduce risk to RVSM operations in the CAR/SAM Regions, the Meeting agreed to replace GREPECAS Conclusion 13/61 with Conclusion 15/36 - *Measures to reduce operational errors in the ATC coordination loop between adjacent ACC.*, The Meeting adopted this conclusion in addition to keeping the programme for the prevention of ATC coordination loop errors between adjacent ATS units and additional measures associated with this prevention programme. Accordingly, in order to reduce LHDs caused by type M and N errors and to reach an acceptable level of safety, the Meeting through Conclusion 13/56 requested CAR/SAM States, Territories and International Organizations to apply on an urgent basis, among other measures, the error prevention programme as shown in Appendix F to the Report on Agenda Item 3 of the GREPECAS/15 and also encourages the implementation of the interface for data exchange among ATC units (AIDC).

2.3 The Group was advised that GREPECAS/15 considered that if M and N errors were not caused by RVSM operation, but by common transferring ATC procedures from on ATC unit to another and by lack of coordination by the transferring ATC unit, it would be convenient that SASP analyze the methodology used for safety assessments. Accordingly, the Meeting took note of the following GREPECAS Conclusion 15/37:

CONCLUSION 15/37 REVIEW OF THE METHODOLOGY USED FOR SAFETY ASSESSMENT

That ICAO review the methodology used for conducting post RVSM implementation safety assessments considering the fact that type M and N errors identified and used to perform this assessment may not be related to RVSM implementation.

2.4 The Meeting also noted that GREPECAS/15 was informed that ICAO, in conjunction with CARSAMMA and the Scrutiny Group (GTE) has scheduled a new training course cycle on safety assessment, which will be held in the NACC Office from 1 to 5 December 2008 and in the SAM Office in March 2009. However, no action was adopted on this respect.

Proposed revisions to the Caribbean and South American RVSM Grupo de Trabajo de Escrutinio (CAR/SAM RVSM GTE) Reference Guide

2.5 The Meeting recalled that the Sixth Meeting of GTE, held in Mexico City, Mexico, 8-12 December 2008, reviewed several occurrences of large height deviations involving negative facility-to-facility transfers. In an effort to facilitate the determination whether an event of this type qualifies as a large height deviation, additional methodology was proposed.

2.6 The Task Force agreed to establish a three-minute or greater inter-facility buffer zone which should be considered when evaluating large height deviation events involving negative transfers. This matter was reviewed by the Meeting and it was of the opinion that such buffer zone should be included within the GTE Reference Guide for its application during LHD analysis starting from the present meeting.

2.7 During GTE/5, the Meeting reviewed different situations to assist the determination whether an event qualifies as an LHD in which no definitive conclusion had been adopted. The Meeting thoroughly reviewed the different situations, and after a fruitful exchange of opinions, an agreement was reached on which of these situations should be considered LHD events and which should not. A summary of the different situations and its categorization are included as **Appendix A** to this part of the report. These cases shall be taken into account during the revision, assessment and classification of LHD Reports.

2.8 The Meeting noted that during GTE/5 it had been agreed that when the receiving FIR has radar coverage in the airspace of the transferring FIR, and it observes that the aircraft has a flight level different from that previously coordinated, which has not been reviewed, no LHD should be considered since the flight level discrepancy is acknowledged before entering its airspace. The Meeting agreed, however, that this situation is a risk for safety. An investigation should be made as a coordination incident, but not as an LHD. As it is reflected in the GTE/6 Meeting Report, this matter was not taken into consideration; therefore, and in order to improve the concept of inter-facility buffer zone, it was agreed to include a 20 NM distance in the GTE Reference Guide, as a distance-based buffer, thus incorporating time and distance criteria within this concept.

2.9 In reviewing the GTE Reference Guide, to further clarify the estimation of time spent at incorrect flight level with regard to controller intervention, it was noted that some changes should be made in the corresponding graphics.

2.10 In view of the above, the Meeting recalled that the GTE Reference Guide be amended, according to the decisions adopted by the Task Force, and to include the revised version as **Appendix B** to this part of the Report.

2.11 Finally, the Meeting analysed the Terms of Reference and Composition of the GTE Task Force, considering that the same respond to GREPECAS requirements, and should be maintained, without any changes. The Terms of Reference and Composition of the Scrutiny Task Force, are shown in the GTE Reference

APPENDIX A

ANALYSIS OF LHDs

NON-LHD

1.- RADAR COVERAGE IN THE ADJACENT AREA

When the receiving FIR has a radar coverage in the airspace of the transferring FIR and it is observed that the aircraft has a flight level different to the one previously coordinated, at least 20 NM before entering the FIR, which was not revised, it is not considered LHD, since the same is acknowledged before entering its airspace, it should be kept in mind that it is a risk for safety, but an investigation should be made as a coordination incident but not as an LHD.

2.- WITHOUT A RADAR COVERAGE IN THE ADJACENT AREA

When the receiving FIR has contact with the aircraft before it enters its airspace, and it is made aware of the aircraft´s change of flight level to more than 3 NM before entering the FIR, with respect to a level previously coordinated, we do not consider there is a LHD, because the FIR is made aware of this before it enters its airspace. We do have to bear in mind that there is a risk in safety, but an investigation must be conducted as a coordination incident and not as a LHD.

3.- LATERAL DEVIATION

When an aircraft reports a laterally deviated position of the original point of transfer, either through another route or because of a deviation requested by the crew for operational convenience, we do not consider there is a LHD given that the initial philosophy of the reports of large height deviations exclusively corresponds to vertical deviations and not to lateral ones. In this case, we must investigate this situation as a coordination incident between adjacent ACC.

4.- TRANSFER TIME ERROR

When an aircraft reports a longitudinal deviated position in time due to coordination error or to lack of review of the transfer time, this is not considered an LHD. In light of the initial philosophy of large height deviations reports, this would only cover vertical deviations and not to horizontal ones. In this case, we must investigate this situation as a coordination incident between adjacent ACC.

5.- LATERAL DEVIATION WITH RADAR COVERAGE IN THE ADJACENT AREA

When an aircraft flies into an airspace that was not included in its route due to an operational deviation, this is not considered an LHD. Since this is an operation error made by the ACC that is aware of the deviation and that failed to report it to the affected ACC, this event should be considered a coordination incident between adjacent FIRs.

LHD

6. WITHOUT RADAR COVERAGE

When an aircraft flies into a receiving FIR and reports a flight level different from the one previously coordinated, this is considered an LHD. We must take into account the time when the aircraft passes the FIR border and the corresponding ACC becomes aware of the traffic and takes an action regarding the deviation whether this action means leaving the aircraft at the level it is reporting or move the aircraft to a level at which it does not conflict with the FIR's traffic plan.

7. WITH RADAR COVERAGE BEFORE THE FIR BORDER

If communications failed, an aircraft is transferred to a certain flight level and then it goes into the accepting ACC's radar coverage at a different flight level, this is considered an LHD. We must take into account the time when the aircraft passes the transfer point border and the corresponding ACC becomes aware of the traffic and takes an action regarding the deviation and its traffic plan.

APPENDIX B / APÉNDICE B

International Civil Aviation Organization

CARIBBEAN AND SOUTH AMERICAN RVSM GRUPO DE TRABAJO DE ESCRUTINIO (CAR/SAM RVSM GTE)

REFERENCE GUIDE

MARCH 2009

1. Introduction

1.1. This reference guide is a consolidation of materials describing the construction, purpose and methodology of the CAR/SAM RVSM Grupo de Trabajo de Escrutinio (GTE). It is intended to be used as a basic reference for anyone interested in Scrutiny Group activity.

1.2. It is essential that regional authorities take into account all possible means of ascertaining and reducing the level of risk of collision resulting from operational errors that cause large height deviations (LHD). The CAR/SAM RVSM GTE is the primary group to evaluate and assess the operational aspects of large height deviations.

2. Background

2.1. System Performance Monitoring

2.1.1. Experience has shown that large height deviations, a deviation in the vertical dimension from the cleared flight level whereby established margins of separation may be eroded, of 90 m (300 ft) or greater in magnitude have a significant impact on operational and technical risk in RVSM airspace. The causes of such deviations have been found to be, but are not limited to:

a) an error in the altimetry or automatic altitude control system of an aircraft;

b) turbulence and other weather-related phenomena;

c) an emergency descent by an aircraft without the crew following established contingency procedures;

d) response to airborne collision avoidance system (ACAS) resolution advisories;

e) not following an ATC clearance, resulting in flight at an incorrect flight level;

f) an error in issuing an ATC clearance, resulting in flight at an incorrect flight level; and

g) errors in coordination of the transfer of control responsibility for an aircraft between adjacent ATC units, resulting in flight at an incorrect flight level.

The additional risk associated with operational errors and in-flight contingencies influence the outcome of RVSM safety assessments. A diagram illustrating the LHD contribution to the overall risk assessment is included in Appendix A.

2.1.2. System performance monitoring, as outlined in ICAO doc 9574, is necessary to ensure the continued safe use of reduced vertical separation minimum (RVSM) and that established safety goals are met. This activity includes monitoring the minimum risk of collision associated with operational errors and in-flight contingencies. The monitoring process is divided into two main categories:

a) Risk associated with the aircraft technical height-keeping performance (technical risk), and

b) The overall risk, i.e. risk due to all causes.

2.1.3. The monitoring process involves the collection and evaluation of operational data. Appropriate methodologies will need to be in place to process this data in order to enable comparison with regionally agreed overall safety objectives.

2.2. Regional Monitoring Agency (RMA) Roles and Responsibilities

2.2.1. ICAO Doc 9574 describes a five-step implementation process for introduction of the RVSM. Among other actions required, the implementation process calls for establishment of a regional monitoring agency (RMA) to act as the safety oversight body. The RMA is required to conduct regular comprehensive safety assessments in order to ensure that the Target Level of Safety (TLS) is met. That is, that the risk associated with the RVSM as estimated by ICAO risk modeling is less than the TLS value. In other words, the RMA determines if the estimated risk of collision, calculated in accordance with ICAO collision risk methodology, is less than the agreed TLS.

2.2.2. A critical component of RVSM safety assessment, as well as a system performance monitoring requirement, is the analysis of large height deviations.

2.2.3. It is the responsibility of the cognizant RMA to establish a program for identifying large height deviations and a mechanism for collecting and analyzing reports of such deviations. It is also the responsibility of the RMA to provide periodic reports of observed height deviations to the appropriate PIRG and/or its subsidiary bodies, in accordance with procedures prescribed by the PIRG.

2.2.4. The Caribbean-South American Monitoring Agency (CARSAMMA) is the regional monitoring agency (RMA) established by GREPECAS to conduct this work for the Caribbean and South American regions.

2.2.5. While the RMA will be the recipient and archivist for reports of large height deviations, it is important to note that the RMA alone cannot be expected to conduct all activities associated with a comprehensive program to detect and assess large height deviations.

2.3. Establishment of a Reduced Vertical Separation Minimum Scrutiny Group

2.3.1. To assist the RMA in analyzing LHDs, a body of experts has been established by GREPECAS. This group of operational, ATC, flight crew and safety experts is called a Scrutiny Group, Grupo de Trabajo de Escrutinio (GTE). The GTE Terms of Reference is included in Appendix B.

3. Composition

3.1. The Scrutiny Group requires a diverse set of subject-matter experts. The Group is composed of subject matter experts in air traffic control, aircraft operations and maintenance, regulation and certification, data analysis, and risk modeling from the involved regions.

3.2. In the CAR/SAM regions, the following organizations are represented in the Scrutiny Group:

a) The Caribbean and South American Monitoring Agency (CARSAMMA)

b) The Federal Aviation Administration (FAA)

c) Dirección Générale de l'Aviation Civile (DGAC)

d) International Federation of Air Line Pilots' Associations (IFALPA)

e) Corporación Centroamericana de Servicios de Navegación Aérea (COCESNA)

f) Corporación Peruana de Aeropuertos y Aviación Comercial S.A. (CORPAC S.A.)

3.3. Scrutiny Groups in other regions have recommended the formation of a Scrutiny Sub-Group. Participation in the Sub-Group is by subject matter experts and specialists. The Sub-Group is responsible for executing the preparatory work for the Scrutiny Group including the analysis and categorization of selected large height events. The Scrutiny Group shall govern the decisions proposed by the Sub-Group. Sub-Group members are drawn from the Scrutiny Group.

4. Objectives

4.1.1. The Scrutiny Group’s work contributes directly to the requirement to provide on-going assessment of factors which affect the estimate of collision risk in RVSM airspaces.

4.1.2. The initial result of the Group’s effort is to examine the “event” reports and produce an estimate of time spent at a flight level other than cleared. This estimate is used as a primary input used in the preparation of an estimate of the operational risk for

the implementation of Reduced Vertical Separation Minimum (Appendix A). The Group examines both technical risk (affected by reliability and accuracy of the avionics within the aircraft) and operational risk (affected by the human element) in the development of the safety assessment.

4.1.3. Once the Group has made its initial determination, the data are reviewed to look for performance trends. If any adverse trends exist, the Group may make recommendations for reducing or mitigating the effect of those trends as a part of the RVSM implementation. Subsequently, the Group will meet to examine the post-implementation record of performance and to assure that operational errors are kept to a minimum. This information is used to assure that the airspace being examined continues to satisfy the requirements of the target level of safety, which is necessary to support continued RVSM operations. New procedures or other mitigation strategies to reduce occurrences of large height deviations may evolve out of this process.

5. Data Collection

5.1.1. It is the responsibility of the relevant RMA, CARSAMMA, to establish procedures for the collection of information concerning large height deviations of 90m (300ft) or greater in magnitude

5.1.2. The primary source for reports of LHDs is the ATC units. Surveillance data collected by ATC units provides the basis for identifying large height deviations. ATC units should be required to submit monthly reports of large height deviations to the cognizant RMA.

5.1.3. CARSAMMA, with the advisement of the GTE, created a LHD reporting form designed to capture the information necessary to accurately assess large height deviations. The form is available in three different languages, Portuguese, Spanish, and English and is accessible on CARSAMMA's web site at the following location: http://www.cgna.gov.br/CARSAMMA/siteUSA/inicial.htm . A sample of this form is included in Appendix C.

5.1.4. Accessibility of LHD reporting materials is essential to encourage the reporting of events by all parties involved in the provision of air traffic services.

5.1.5. The GTE will explore all sources for reports of large height deviations such as State databases of air safety incident reports and voluntary reporting safety databases.

5.1.6. When analyzing reports of large height deviations, the primary concern of the GTE is the impact of such events on the collision risk and on the overall safety of the system. Data collected by the GTE is used for analysis purposes only and all LHD events reviewed by the GTE are de-identified. Confidentiality will be maintained.

6. Data Review and Evaluation

6.1.1. The methodology employed by the GTE is to examine existing databases as well as other sources and analyze events resulting in a large height deviation of 300ft or greater within FL290-FL410. These events are usually the result of Air Traffic Control (ATC) loop errors (the undiscovered misunderstanding of a clearance), instances wherein a controller fails to capture an inaccurate read-back, an altitude over or undershoot, turbulence situations, emergencies, errors in coordination, weather complications or response to an ACAS resolution advisory. The largest source of reports useful for these purposes comes from the established regional safety reporting systems. However, in many instances these reports are designed for other purposes so they may lack the clarity on information that would be desirable to the GTE. Thus, the experience of the members of the Scrutiny Group is essential in order to infer the effect, if any; the events have on risk in the airspace. All data sources undergo an initial review using key RVSM parameters and all reports of interest are extracted for further evaluation.

7. Methodology

7.1.1. The GTE is tasked with the responsibility of analyzing all reports of interest and assigning parameter values, as defined in the GTE LHD White Paper (Appendix D), that consist of cleared flight level, event flight level, levels crossed, final flight level, duration at unplanned flight level and total vertical deviation. Since the reports are not tailored for the needs of the Scrutiny Group, these values are not typically clearly defined. The GTE must rely on the expert judgment and operational experience of its members to assign these values.

7.2. Identifying Large Height Deviations

7.2.1. The GTE will evaluate all reports of interest and, based upon established GTE methodology, identify any altitude variation of 90m (300ft) or greater from the assigned or planned altitude. If a qualified deviation is identified, the event is categorized as a large height deviation.

7.2.2. When evaluating altitude variation events of 90m (300ft) or greater, it is not always clear that the event qualifies as a large height deviation. Appendix E provides examples of events that qualify as LHDs and events that do not.

7.2.3. Additional values are considered when evaluating events involving a negative transfer where the pilot provides a boundary crossing estimate several minutes prior to entering the adjacent FIR. Typically this type of event would not be included in the LHD analysis. Further analysis revealed that one can not assume that even though the incoming aircraft data are displayed on the radar, that the controller identified the potential coordination error. Some group members have noted that although the accepting FIR received notification prior to the aircraft crossing the boundary, there is a period of time where the controller is unable to remediate the event prior to the error occurring; an agreed “buffer” duration value is considered to account for controller

reaction time. In other words, if the boundary crossing estimate is provided before the agreed "buffer" duration or distance, then the event is not considered to be an LHD; if the estimate is received equal to or less then the established buffer value than the event is an LHD. The agreed "buffer" value is 3 minutes or 20nm and is termed the Inter-facility Buffer Zone. The buffer value should be used as a guideline and each event should be evaluated individually. Figure 1 included in Appendix D illustrates the buffer concept.

7.3. Parameter Values

7.3.1. Cleared Flight Level

7.3.1.1. The flight level at which the pilot was cleared or currently operating. For example, aircrew accepts a clearance intended for another aircraft and ATC fails to capture the read back error or aircrew conforms to a flawed clearance delivered by ATC.

7.3.1.2. This parameter, in some cases, will require expert judgment and operational experience to assign a value. The Scrutiny Group must take into consideration the controller's plan versus the cleared flight level.

7.3.2. Event Flight Level

7.3.2.1. The event flight level is the flight level of error or the incorrect altitude of operation for an identifiable period of time without having received an ATC clearance

7.3.3. Duration at Unplanned Flight Level

7.3.3.1. The greatest exposure to risk is the time spent level at a flight level other than the cleared level. This parameter value contributes significantly to the calculation of operational risk.

7.3.3.2. The duration at unplanned flight level is the length of time that an aircraft was level at an altitude (flight level) that was not cleared, or planned, by air traffic control. Duration is recorded in one second increments.

7.3.3.3. The calculation of duration begins once the aircraft is level at a flight level other than the cleared level or planned level by ATC, and terminates once ATC initiates remedial action.

Figure 1 illustrates a large height deviation that has a duration value larger than zero. The duration calculation begins and point A and terminates and point B.

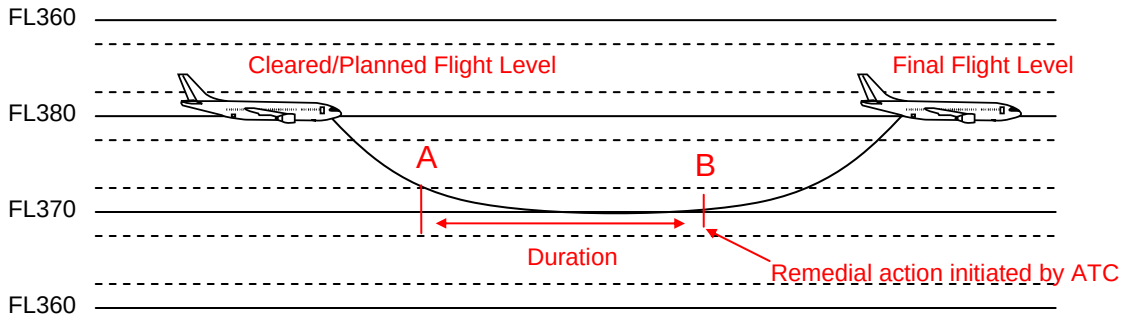


Figure 1.

7.3.3.4. It is important to note that not all large height deviations result in the aircraft being level at a flight level other than that cleared or planned by ATC; therefore, some events are assigned a duration value of zero.

7.3.3.5. It is also important to note the duration value determined or assigned by the GTE of LHDs that occur in a radar environment will vary significantly from that of a non-radar environment.

7.3.3.6. In most cases, LHD reports reviewed by the GTE lack the information necessary to calculate the time spent at incorrect flight level. Thus, the experience of the members of the Scrutiny Group is essential to provide in-depth analysis of each event

7.3.3.7. If the Scrutiny Group is unable to determine the time spent at incorrect flight level, a default value is assigned.

7.3.3.8. The GTE identified the need to establish a default duration value to assign to those events where there is not enough information included in the report to determine the time spent at incorrect flight level. Two default values were established, one for a radar environment and one for a non-radar environment. The default values are included in the GTE LHD White Paper, Appendix D.

7.3.4. Total Vertical Deviation

7.3.4.1. Total vertical deviation is the distance in feet between the altitude of current operation prior to the deviation and the point at which the aircraft is once again under ATC supervision. A deviation that resulted in an increase of altitude will be recorded as a positive number and a deviation that resulted in a decrease of altitude will be recorded as a negative number.

7.3.4.2. Figures 2 and 3 illustrate two large height deviations of different magnitudes. The first example, Figure 2, illustrates a large height deviation with a magnitude of 1000ft. The second example, Figure 3, illustrates a large height deviation with a magnitude of 1300 ft.

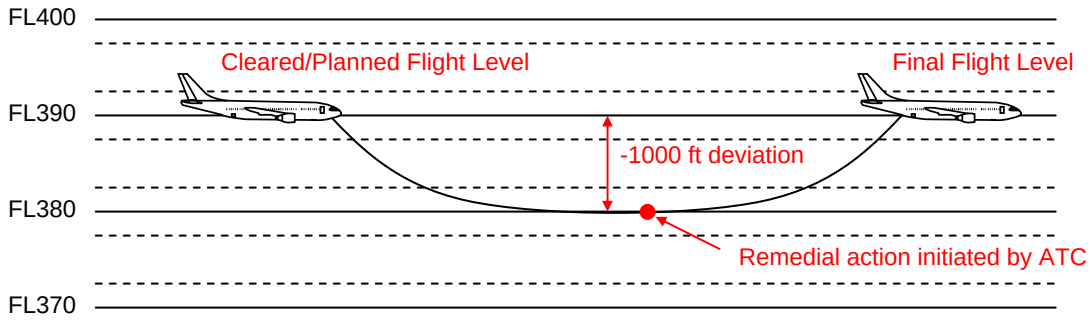


Figure 2.

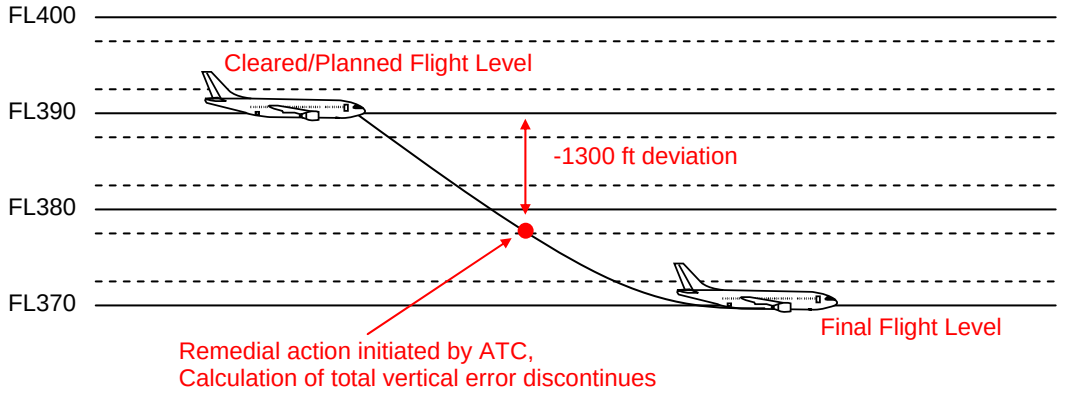


Figure 3.

7.3.5. Levels Crossed

7.3.5.1. The total number of flight levels between the point that the aircraft exits the cleared flight level and is once again under ATC supervision is calculated to determine the number of levels crossed. For example, in the examples provided in figures 2 and 3 in section 7.2.4.2, one level was crossed.

7.3.5.2. The Scrutiny Group must consider the hazard zone when calculating the number levels crossed. The hazard zone is also referred to as the buffer zone.

7.3.5.3. The hazard zone is the minimum physical distance of defined dimensions to accommodate:

a) Variations in an aircraft's flight path due to air movements, etc.;

b) The size of the aircraft;

c) An additional "miss" distance

7.3.5.4. The value of the hazard zone was determined to be ± 90 m (300ft). A brief explanation of the considerations underlying this value is included in paragraph 2.3.6.7 in the *Air Traffic Services Planning Manual (Doc 9426)*. The explanation is also included in Appendix F

7.3.5.5. This buffer zone criterion shall be used to determine that a specific level is occupied by an aircraft. In the LHD illustrated in figure 4, the aircraft penetrates the buffer zone but does not reach the next flight level. Applying the criterion described in paragraph 7.2.5.4, the total number of levels crossed in this example is 1.

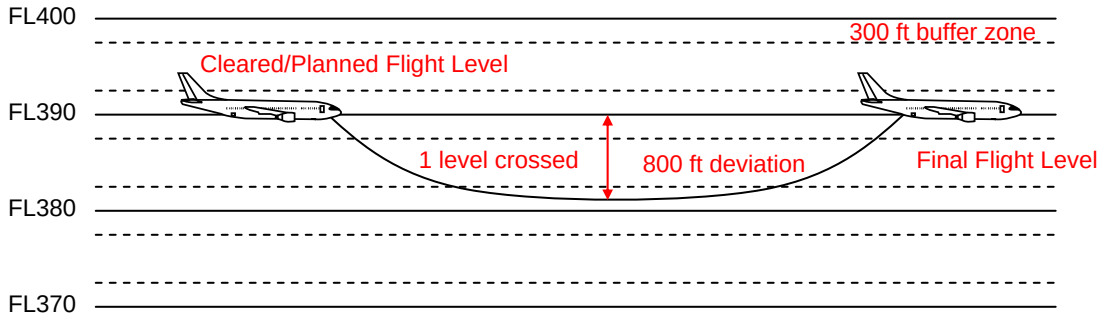


Figure 4

7.3.6. Levels Final

7.3.6.1. The final flight level is the cleared flight level after the error/deviation.

7.3.6.2. Some reports of large height deviations do not contain the final flight level. When this information is not available in the LHD report, the Scrutiny Group relies on operational expert judgment to determine the final flight level. The final flight level of the large height deviation illustrated in figure 5 is 370.

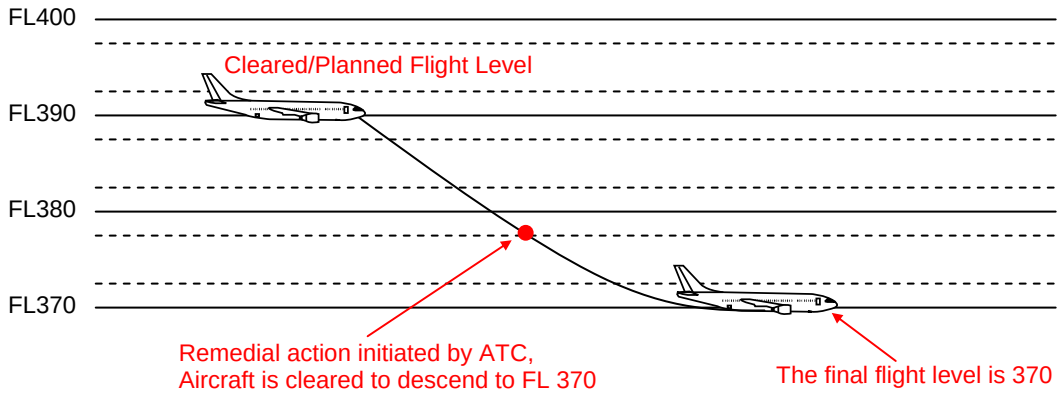


Figure 5.

7.3.7. Rate of Climb or Descent

7.3.7.1. The rate of climb or descent of an aircraft crossing through an uncleared level also contributes to the estimate of operational risk. In most cases, this parameter value is not included in reports of large height deviations. The GTE must rely on operational expert judgment to determine the rate of climb or descent.

7.3.7.2. The GTE established climb and descent rate default values. The default values are included in the GTE LHD White Paper (Appendix D)

7.3.8. Event Category

7.3.8.1. Classification of each LHD event is necessary for risk assessment purposes and for the identification of adverse trends. Each LHD event is assigned an error type code that identifies the type of event that caused the deviation. The error codes are categorized as operational or technical for consideration in the Collision Risk Model (CRM). A complete list of the error codes is included in table 1.

Table 1. Error Codes

A	Failure to climb/descend as cleared
B	Climb/descend without ATC clearance
C	Entry into airspace at an incorrect flight level
D	Deviation due to turbulence or other weather related cause
E	Deviation due to equipment failure
F	Deviation due to collision avoidance system (TCAS) advisory
G	Deviation due to contingency event
H	Aircraft not approved for operation in RVSM restricted airspace
I	ATC system loop error; (e.g. pilot misunderstands clearance message or ATC issues incorrect clearance)
J	Equipment control error encompassing incorrect operation of fully
K	Incorrect transcription of ATC clearance or re-clearance into the FMS
L	Wrong information faithfully transcribed into the FMS (e.g. flight plan followed rather than ATC clearance or original clearance followed instead of re-clearance)
M	Error in ATC-unit-to-ATC-unit transition message
N	Negative transfer received from transitioning ATC-unit
O	Other
P	Unknown

7.4. Analysis

7.4.1. It is the responsibility of the GTE to summarize their findings and analyze the data with the goal of identifying adverse trends and assess the overall risk.

7.4.2. The benefits of analyzing LHD data over time

7.4.2.1. Maintaining a cumulative summary of analyzed LHD events will allow the GTE to determine the following:

a) The frequency of occurrence

b) Whether errors appear to occur systematically or randomly in time

c) Time between each event

d) Effect of airspace changes, if any, since RVSM implementation

7.4.3. Identify trends

7.4.3.1. The cumulative LHD summary is also used to identify adverse trends. The Scrutiny Group will evaluate grouped event categories and determine whether one particular event type occurs more often than another. This particular analysis can also be applied to geographic regions.

7.4.3.2. The Scrutiny Group will also identify operational trends that may be revealed in the data. If any exist, the Group may make recommendations for reducing the effect of those trends.

7.5. Remedial Recommendations

7.5.1. If adverse trends are identified, the Scrutiny Group will submit recommendations for remedial actions to ensure that operational errors are kept to a minimum and that the airspace being examined continues to satisfy the requirements of the target level of safety, which is necessary to support continued RVSM operations.

7.5.2. It is important to bear in mind that height deviations, as a consequence of operational errors and in-flight contingencies, occur in all airspace irrespective of the separation minimum. The purpose of this monitoring activity is to ensure that operations in RVSM airspace do not induce an increase in the risk of collision from these events and that the total vertical risk does not exceed the agreed overall safety objectives. The actions and measures proposed to reduce risk should not be exclusive to RVSM airspace.

7.6. Reporting

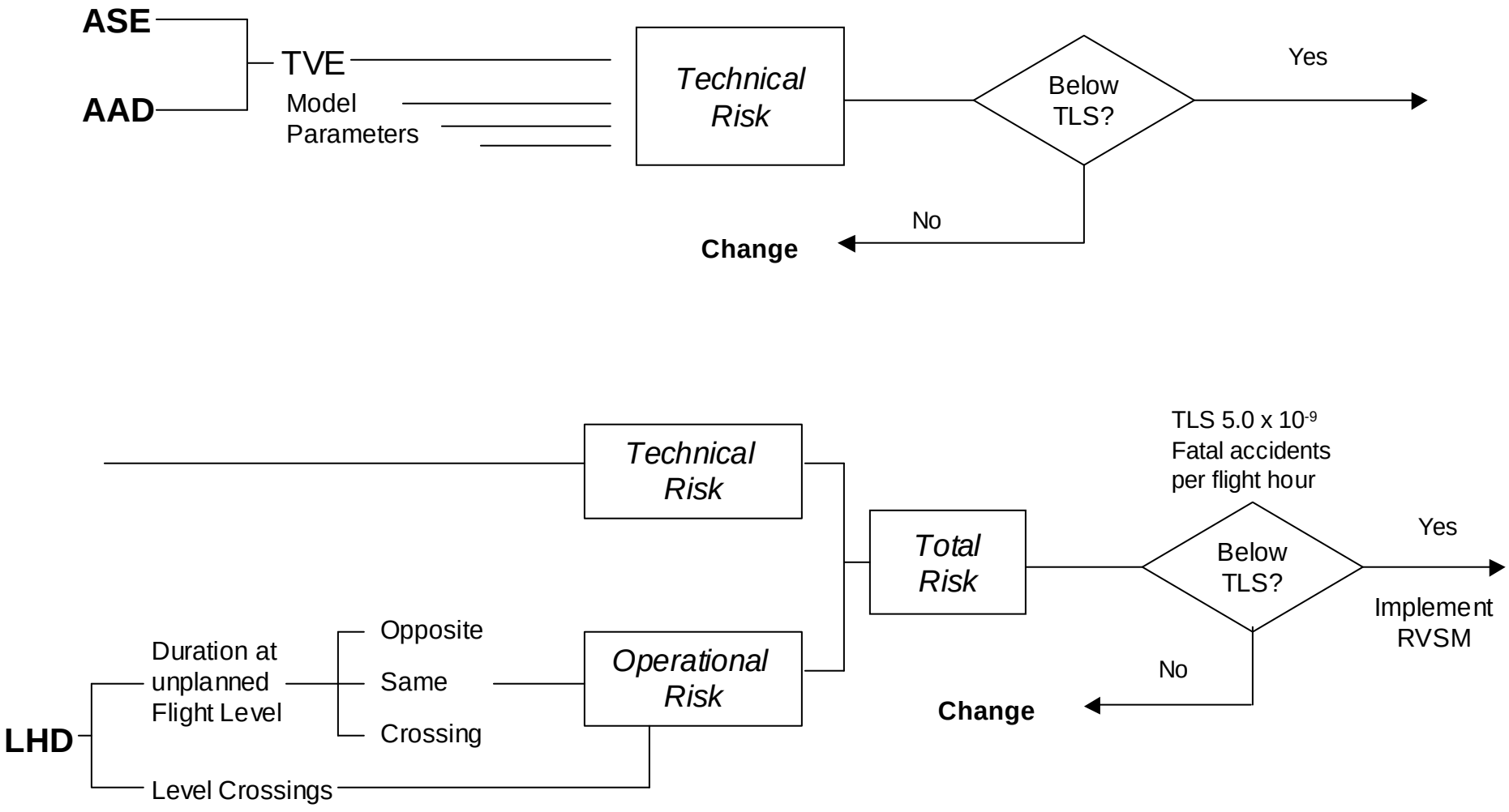
7.6.1. The Scrutiny Group reports annually to the RMA the results of its operational analysis including the identification of performance trends, summary of categories and estimation of duration at incorrect flight level, and recommended measures to reduce the risk in RVSM airspace. The RMA will incorporate the analysis of the Scrutiny Group in its report to the ICAO Regional Planning Group (GREPECAS) for the CAR/SAM regions.

7.7. Meeting Frequency

The Scrutiny Group should meet regularly so that adverse trends due to operational errors that cause large height deviations can be identified quickly and remedial actions can be taken.

Appendix A

RVSM Dataflow and Decision-Making Process Highlighting Scrutiny Activities



Appendix B

Terms of Reference of the CAR/SAM RVSM Grupo de Trabajo de Scrutinio (RVSM/GTE)

a. To assemble subject matter experts, as needed, in air traffic control, aircraft operations and maintenance, regulation and certification, data analysis and risk modeling;

b. To analyze and evaluate large height deviations of 300 ft or greater as defined by ICAO Doc 9574;

c. To coordinate the assembly and review of large height deviation data with the Regional Monitoring Agency;

d. To produce an estimate of flight time away from the cleared flying level to be used a primary input in the preparation of an estimate of risk by the Regional Monitoring Agency;

e. To identify large height deviation trends and to recommend remedial actions in order to improve safety;

f. To report results to GREPECAS through the ATM/CNS subgroup;

g. To accomplish other tasks as directed by GREPECAS;

h. Participate in the Regional Aviation Safety Group – Panamerican (RASG-PA) to harmonize regional safety initiatives.

Composition: 1 State/Organization from the CAR Region, 1 State/Organization from the SAM Region, United States, CARSAMMA, COCESNA, IATA, IFALPA, IFATCA.

Appendix C

CARSAMMA
Caribbean and South American Monitoring Agency

The information contained in this form is confidential and will be used for safety analysis purposes only.

ALTITUDE DEVIATION FORM

Report to the CARSAMMA of an altitude deviation of 300ft or more, including those due to TCAS, Turbulence and Contingency Events

Today's date:	Reporting Unit:		
INCIDENT DETAILS			
Operator Name:	Call Sign:	Aircraft Type:	Mode C Displayed:
Date of Occurrence:	Time UTC:	Occurrence Position (lat/long or Fix):	
Cleared Route of Flight:			
Cleared Flight Level:	Estimated Duration at Incorrect Flight Level (seconds):		Observed Deviation (+/- ft):
Other Traffic Involved:			
Cause of Deviation (*brief title*): (Examples: ATC Loop Error, Turbulence, Weather, Equipment Failure)			

AFTER SEPARATION RESTORED:		
Observed/Reported Final Flight Level*: *Please indicate the source of information – ModeC/Pilot	Mark the appropriate box Is the FL above the cleared level: ❑ Is the FL below the cleared level: ❑	Did this FL comply with the ICAO Annex 2 Tables of Cruising Levels? ❑ Yes ❑ No

NARRATIVE

Detailed Description of Incident
(*Please give your assessment of the actual track flown by the aircraft and the cause of the deviation.*)

CREW COMMENTS (IF ANY)

When complete please forward the report(s) to:

Management Center Of Air Navigation Caribbean and South American Monitoring Agency (CARSAMMA)
Av. Brig. Faria Lima, 1941
São José dos Campos, SP
Cep: 12227-000 Brazil
Telephone: (55-12) 3904-5004 or 3904-5010
Fax: (55-12) 3941-7055
E-Mail: carsamma@cgna.gov.br

Appendix D

Grupo de Trabajo de Scrutinio (GTE) Large Height Deviation (LHD) White Paper

Description of Criteria

Note: *The following terms, expressions and definitions are not approved by the ICAO's Council and should be used for analysis of Large Height Deviation purpose only.*

Cleared Flight Level – the flight level at which the pilot was cleared or currently operating (eg, Aircrew accepts a clearance intended for another aircraft and ATC fails to capture the read back error or aircrew conforms to a flawed clearance delivered by ATC)

Reference Flight Level – The altitude that would have provided at least the minimum separation (vertical or horizontal) required

That flight level from which the Height Deviation is calculated; this level may be different from the Cleared Flight Level and must often be determined by the Scrutiny Group operational experts from the data in the Large Height Deviation report

Event Flight Level – the flight level of error, the incorrect altitude of operation for an identifiable period of time without having received an ATC clearance

Height Deviation – any altitude variation of 300ft or greater from the assigned altitude, these variations can be the result of turbulence, equipment malfunction, ATC loop errors, etc.

ATC Loop Errors – any incident where there is a misunderstanding between the pilot and the controller, failure to properly coordinate altitude information or unable to maintain situational awareness

Total Deviation – the total amount of feet between the altitudes of current operation prior to the deviation and the point at which the aircraft is once again under ATC supervision, a deviation that resulted in an increase of altitude will be recorded as a positive number, a deviation that resulted in a decrease of altitude will be recorded as a negative number

Hazard Zone – 300ft buffer zone above and below each flight level (Diagram 1-A)

Inter-facility Buffer Zone - A period of time used to determine whether a facility-to-facility coordination error should be considered a large height deviation. The current value established by the GTE is 3 minutes or 20nm. In other words, if the boundary crossing estimate is provided before the agreed "buffer" duration/distance then the event is not considered to be an LHD; if the estimate is received equal to or less then the established buffer value than the event is an LHD. The buffer value should be used as a

guideline and each event should be evaluated individually. Figure 1 illustrates the "buffer" concept.

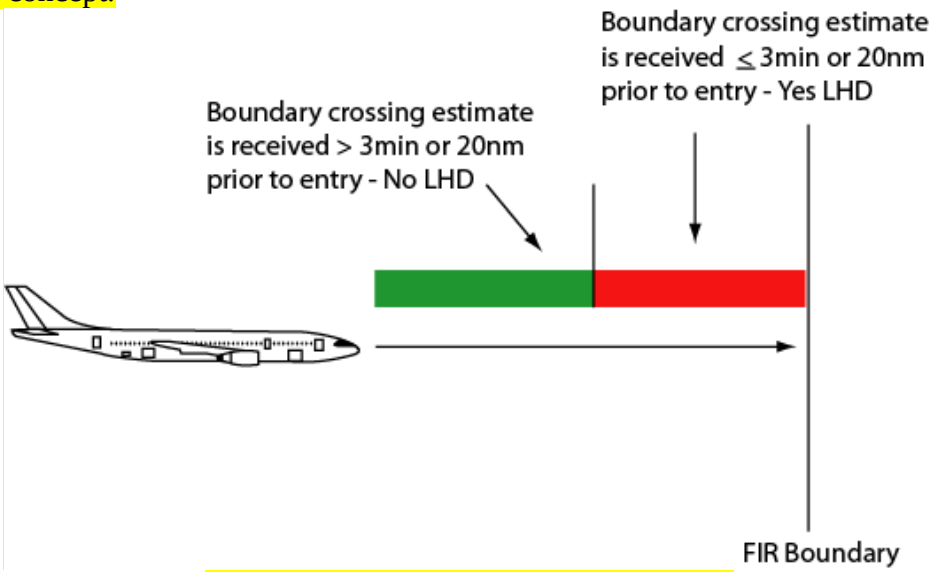


Figure 1 Inter-facility Buffer Zone Illustration

Duration - length of time that an aircraft was level at an altitude that was not cleared by air traffic control, duration will be recorded in one second increments (Diagram 1-A), if the Scrutiny Group is unable to determine the time spent at incorrect flight level, a default value is assigned. The default values are included in Table 1.

Table 1. Duration Default Values

Radar	**Non-Radar**
90 s	90 s

Levels Crossed – the total number of flight levels between the point that the aircraft exits the cleared flight level and is once again under ATC supervision (Diagram 1-A)

Levels Final – the cleared flight level after the error/deviation

Code – a category and a subcategory assigned to each event (Diagram 1-B)

Rate of Climb or Descent – the climb and descent values are included in Table 2.

Table 2 Climb and Descent Values

Rate of Descent		**Rate of Climb**	
Drift	1000 ft per minute	Minimum	500
Normal	1500+ ft per minute	Normal	750
Rapid	2500+ ft per minute	Expedite	1250

Diagram 1-A

RVSM Flight Levels

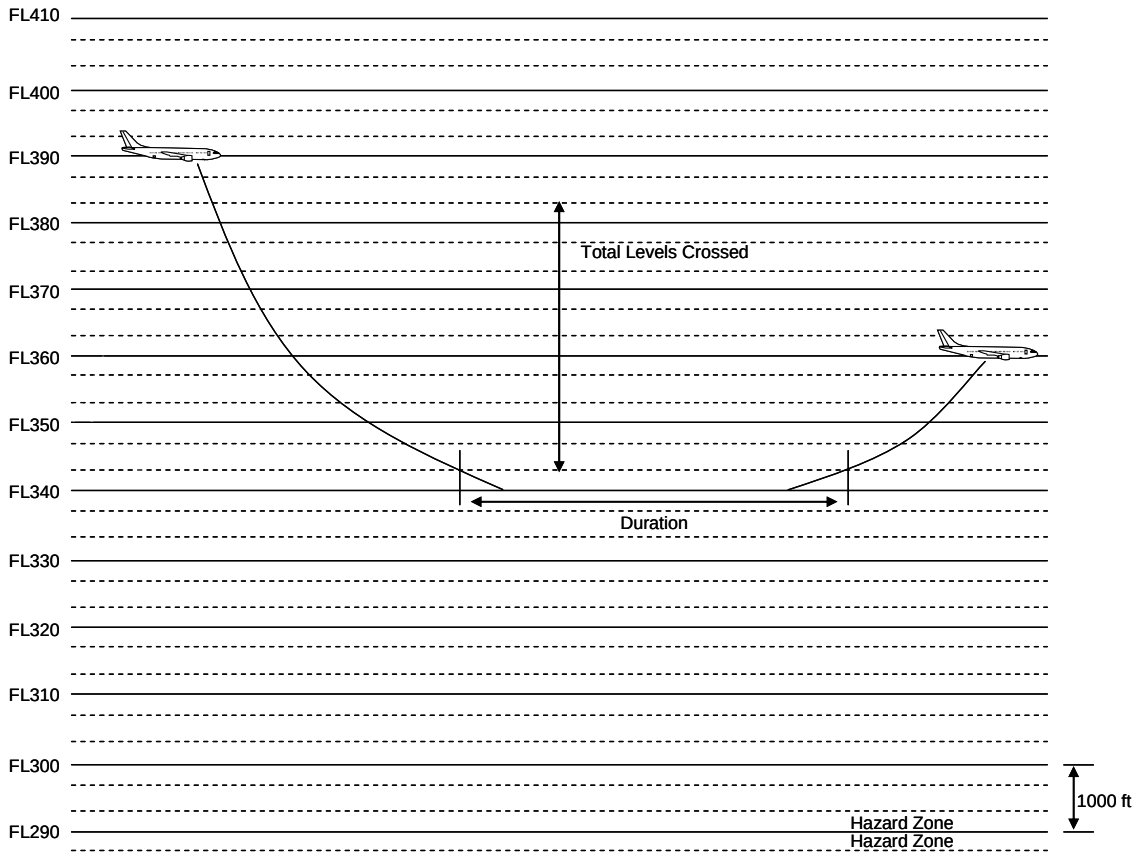


Diagram 1-B

Error Codes

Code	Cause of Large Height Deviation
A	Failure to climb/descend as cleared
B	Climb/descend without ATC clearance
C	Entry into airspace at an incorrect flight level
D	Deviation due to turbulence or other weather related cause
E	Deviation due to equipment failure
F	Deviation due to collision avoidance system (TCAS) advisory
G	Deviation due to contingency event
H	Aircraft not approved for operation in RVSM restricted airspace
I	ATC system loop error ; (e.g. pilot misunderstands clearance message or ATC issues incorrect clearance)
J	Equipment control error encompassing incorrect operations of fully functional FMS or navigation system (e.g. by mistake the pilot incorrectly operates INS equipment)
K	Incorrect transcription of ATC clearance or re-clearance into the FMS
L	Wrong information faithfully transcribed into the FMS (e.g. flight plan followed rather than ATC clearance or original clearance followed instead of re-clearance)
M	Error in ATC-unit-to-ATC-unit transition message
N	Negative transfer received from transitioning ATC-unit
O	Other
P	Unknown

APPENDIX E

EXAMPLES OF EVENTS THAT QUALIFY AS LHDS AND EVENTS THAT DO NOT

NON-LHD

1.- RADAR COVERAGE IN THE ADJACENT AREA

When the receiving FIR has a radar coverage in the airspace of the transferring FIR and it is observed that the aircraft has a flight level different to the one previously coordinated, which was not revised, it is not considered LHD, since the same is acknowledged before entering its airspace, it should be kept in mind that it is a risk for safety, but an investigation should be made as a coordination incident but not as an LHD.

2.- WITHOUT A RADAR COVERAGE IN THE ADJACENT AREA

When the receiving FIR has contact with the aircraft before it enters its airspace, and it is made aware of the aircraft´s change of flight level with respect to a level previously coordinated, we do not consider there is a LHD , because the FIR is made aware of this before it enters its airspace. We do have to bear in mind that there is a risk in safety, but an investigation must be conducted as a coordination incident and not as a LHD.

3.- LATERAL DEVIATION

When an aircraft reports a laterally deviated position of the original point of transfer, either through another route or because of a deviation requested by the crew for operational convenience, we do not consider there is a LHD given that the initial philosophy of the reports of large height deviations exclusively corresponds to vertical deviations and not to lateral ones. In this case, we must investigate this situation as a coordination incident between adjacent ACC.

4.- TRANSFER TIME ERROR

When an aircraft reports a longitudinal deviated position in time due to coordination error or to lack of review of the transfer time, this is not considered an LHD. In light of the initial philosophy of large height deviations reports, this would only cover vertical deviations and not to horizontal ones. In this case, we must investigate this situation as a coordination incident between adjacent ACC.

5.- LATERAL DEVIATION WITH RADAR COVERAGE IN THE ADJACENT AREA

When an aircraft flies into an airspace that was not included in its route due to an operational deviation, this is not considered an LHD. Since this is an operation error made by the ACC that is aware of the deviation and that failed to report it to the affected ACC, this event should be considered a coordination incident between adjacent FIRs.

LHD

6. WITHOUT RADAR COVERAGE

When an aircraft flies into a receiving FIR and reports a flight level different from the one previously coordinated, this is considered an LHD. We must take into account the time when the aircraft passes the FIR border and the corresponding ACC becomes aware of the traffic and takes an action regarding the deviation whether this action means leaving the aircraft at the level it is reporting or move the aircraft to a level at which it does not conflict with the FIR's traffic plan.

7. WITH RADAR COVERAGE BEFORE THE FIR BORDER

If communications failed, an aircraft is transferred to a certain flight level and then it goes into the accepting ACC's radar coverage at a different flight level, this is considered an LHD. We must take into account the time when the aircraft passes the transfer point border and the corresponding ACC becomes aware of the traffic and takes an action regarding the deviation and its traffic plan.

Appendix F

2.3.6.7 *Accuracy of SSR Mode C data*

2.3.6.7.1 The use of SSR Mode C data must take account of the following errors affecting accuracy:

a. Correspondence error, reflecting discrepancies between level information used and the level information encoded for automatic transmission. The maximum value of this error has been accepted to be f ± 38 m (125 ft) (95 per cent probability) (cf. ICAO Annex 10, Volume I, Part I, 3.8.7.12.2.5);

b. Flight technical error, reflecting inevitable deviations by aircraft from intended levels as a reaction to flight control operations, turbulence, etc. This error, when related to manually flown aircraft, tends to be larger than that for aircraft controlled by automatic pilots. The maximum value of this error used so far, based on a 95 per cent probability, is ± 60 m (200 ft) (cf. *Report of COM/OPS Divisional Meeting (1966),* Item 9, page 9-35, 4.2). However, it should be noted that a number of factors contributing to this value have been improved since.

2.3.6.7.2 The mathematical combination of the non-related errors in a) and b) above results in a value of ± 72 m (235 ft) (based on a 95 per cent probability) and it is therefore believed that a value of f ± 90 m (300 ft) constitutes a valid decision criterion to be applied in practice when:

a. Verifying the accuracy of SSR Mode C data;
b. Determining the occupancy of levels.

Agenda Item 3: Large Height Deviation (LHD) Analysis

a) **Application of GTE methodology to LHD events**
b) **Summarize parameter values**
c) **Identify operational trends**

3.1. Under this part of the agenda, the Meeting examined all occurrences of 90m (300 ft) large-height deviations (LHD) provided by CARSAMMA and informed by CAR/SAM States in the period July to December 2008. The comments and actins arisen from the revision of such reports is shown in **Appendix A** to this part of the report.

3.2. The task carried out by the meeting was intense, reviewing 338 events. The Meeting reviewed among other data, the flight estimate times in incorrect flight levels, large-height deviations (LHD) in each one of the reports, flight levels crossed in these deviations, and revised the causes of each one of them. These values will be used to estimate the operational risk of operations carried out in the RVSM airspace under responsibility of CARSAMMA.

3.3. In the analysis made, it could be noted that, based on the opinions of the subject matter experts that the data provided by Ecuador, corresponding to the Guayaquil FIR contained unrealistic durations, some errors particularly with regard to the estimated time in which aircraft maintains incorrect flight levels. Consequently, CARSAMMA shall review the reports from Ecuador and will adjust times as previously mentioned.

3.4. Also, note was taken that a significant number of LHD events continues to be received as “M” and “N” errors from the Piarco, Rochambeau, and Atlántico Centres, related with the lack of coordination with Dakar FIR. The Secretariat shall coordinate this matter with the corresponding ICAO Regional Offices, in order to try to reduce “M” and “N” errors.

3.5. It could also be noted that a significant number of coordination errors has occurred between Maiquetía and Piarco ACC. In this connection, CARSAMMA shall make a specific analysis of this situation, in coordination with the corresponding ICAO Regional Offices.

3.6. Two LHD events were identified. One of them pertains to the AFI Region; therefore, CARSAMMA shall send such event to the South Atlantic Regional Monitoring Agency (SATMA) and the other one shall be sent to the North Atlantic Monitoring Agency, so that both are assessed and classified by these RMAs.

3.7. The working group took note with satisfaction several category "M" or "N" LHD reports of that were "self-disclosed" by the ATC facility which originated the error. The Group is encouraged to follow this example and to the application of the Safety Management System concept, which will enable safety levels agreed for the Region.

3.8. The meeting requested CARSAMMA that, as of January 2009, a preliminary scrutiny of the reports received, be made. Thus, if necessary, the parties involved in the LHD report may be requested to provide more information to enable a clear report, which shall facilitate the assessment and categorization of the event.

3.9. While the GTE has defined from the beginning of its activities certain criteria for the assessment and classification of LHD, after the experience obtained from LHD assessments, the need to establish more specific criteria, to carry out this task would seem necessary.. In this connection, it was proposed that a Working Group make an analysis of this matter, through the use of electronic means available, defining additional criteria to the one already being used used, and to submit them for revision by the GTE/8 Meeting. In view of the above, the Meeting created the Working Group with delegates from CARSAMMA, Bolivia, Colombia and Peru.

3.10. **Appendix B** to this part of the report shows the statistical material prepared by CARSAMMA to inform the Meeting.

APÉNDICE / APPENDIX A

REVISIÓN DE LHDs PROPORCIONADOS POR CARSAMMA E INFORMADOS POR ESTADOS CAR/SAM EN EL PERIODO JULIO A DICIEMBRE DE 2008

REVISION OF (LHD) PROVIDED BY CARSAMMA AND INFORMED BY CAR/SAM STATES IN THE PERIOD JULY TO DECEMBER 2008

I. NOTAS GTE

- CADA LHD ES UNA ADVERTENCIA DE PELIGRO
- DEFINIR CON PRESICION CUAL ES EL PELIGRO ¿DONDE ESTA?
- 93% SON DE TIPO **N** Ó **M** ERRORES QUE SE DAN INDEPENDIENTEMENTE DE LA IMPLANTACION RVSM; ES DECIR, SON PREEXISTENTES.
- MEDIDAS CORRECTIVAS PARA LOS ESTADOS Y PROVEEDORES Y DGAC DOC. 1361 Y 1536 Y 1537 DE GREPECAS
- SON POCOS LOS ESTADOS Q HAN IMPLEMENTADO LAS MISMAS (URGENCIA DE QUE LO HAGAN)
- CIRCULAR INTERNA DE SKBO / UNIDAD DE FLUJO = MEDIDAS CORRECTIVAS NO COMO METODOS RECOMENDADOS SINO COMO NORMA.
- CONDICIONES DE INFRAESTRUCTURA COM, EQP, ETC.
- INSTRUCCIÓN - CAPACITACION = INCLUSION EN CURSOS DE REFRESCO PARA ATCOS (PILOTOS) IMPORTANCIA DE LOS LHD´S
- 338 REPORTES: RESULTADOS DE ESCRUTINIO:

n	76
m	134
no lhd	104
a	4
e	5
h	3
j	1
b	3
l	1
f	1
d	4
i	2
TOTAL	338

TOTAL EVENTOS ANALIZADOS		
ERROR TIPO N	76	22%
ERROR TIPO M	134	39%
NO LHD	104	33%
OTROS	24	6%
TOTAL	338	100%

61% ***DE LOS EVENTOS ANALIZADOS SON DE TIPO M Y N.***

- DESDE Q LA MAYORIA DE LHDS SON **M** Y **N.** ES CLARO QUE HAY ALGO QUE ESTA MAL, QUE ESTA FALLANDO, Y QUE NECESITA INMEDIATA CORRECCIO. **LA TENDENCIA SIGUE** IGUAL A LO REVISADO EN GTE5 Y GTE6.

II. FACTORES Q INFLUYEN EN LOS ERRORES TIPO N Y M.

ERROR N= NO TRANSFERENCIA
ERROR M= NO REVISION DE NIVEL

EL PROBLEMA ESTA EN LA COORDINACION O COMUNICACIÓN ENTRE ACC´S (A VECES NO EXISTE, NO HAY Y OTRAS ES ERRADA) = PELIGRO.

2.1 POSIBLES FACTORES O CAUSAS:

1. LAS PERSONAS = ATCOS (DISTRACCION, VOLUMEN DE TRANSITO, MALAS PRACTICAS, ERRORES DE COLACION, ESCUCHA Y TRANSCRIPCION, INCUMPLIMIENTO DE REGLAMENTOS …ETC)
2. PROCESOS INTERNOS O PROCEDIMIENTO DE TRANSFERENCIA DE CADA ACC (REGLAMENTACION)(ESTANDARIZAR)
3. CARTAS ACUERDO (NO TODAS ESTAN BIEN) URGE MEJORAR LAS MISMAS
4. EL EQUIPAMIENTO

2.2 CUADRO DE ACCIONES CORRECTIVAS

FACTORES	ACCION CORRECTIVA	EVALUAR
PERSONAS	• CAPACITAR • REALIZAR SIMULACION Y PRACTICAS	**INDICADORES**
PROCESOS INTERNOS	• REGLAMENTAR-NORMAR. • ESTABLECER PROCEDIMIENTOS CLAROS • ESTANDARIZAR • ESTABLECER MEDIOS DE VERIFICACION DE TRANSFERENCIAS • REALIZAR ENTRENAMIENTO Y SIMULACION.	**INDICADORES**
CARTAS ACUERDO	• TOMAR ACUERDOS QUE DISMINUYAN EL RIESGO	**INDICADORES**
EQUIPAMIENTO	• MEJORAR INFRAESTRUCTURA (RADAR – COM) • USAR AFTN (COMO PRECURSOR DEL ENLACE DE DATOS)	**INDICADORES**

EN CONSIDERACION A LO DICHO POR CARASAMMA: "ACCIONES CORRECTIVAS ESTAN EN FUNCION A:

- **TIPO DE ERROR**
- **NUMERO DE NIVELES CRUZADOS Y,**
- **DURACION DEL EVENTO**

TODAS LAS MEDIDAS QUE SE TOMEN DEBEN ESTAR ORIENTADAS A REDUCIR, MITIGAR, ELIMINAR, EL RIESGO QUE DEVIENE DE LOS ERRORES M y N:

1. CAMBIO DE FRECUENCIA (NO DE RESPONSABILIDAD) 5MIN ANTES DEL PTO DE TRANSFERENCIA. (IMPLICA EL INGRESO AL BUFFER ZONE O ZONA DE AMORTIGUAMIENTO; REDUCIENDO EL RIESGO PARA LAS ACFTS)

2. NECESIDAD DE COMUNICAR DESVIOS LATERALES Y DE HORA.

3. NECESIDAD DE EFECTUAR REVISIONES CONTINUAS PARA ESTABLECER PRECISION EN LAS TRANSFERENCIAS.

4. SE HAGA VERIFICACION CON LAS TRIPULACIONES O CONFORMIDAD DEL PILOTO RESPECTO AL NIVEL DE VUELO. "POR EJEMPLO: LPE 357 MANTENIENDO FL 350 COMUNIQUE CON…"

5. NECESIDAD DE QUE AEROPUERTOS PROXIMOS AL PUNTO DE TRANSFERENCIA COORDINEN PREVIAMENTE EL VUELO.

6. LIMITAR O CONDICIONAR LOS CAMBIOS DE NIVEL A LA AQUIESCENCIA DEL FIR PROXIMO.

7. APROVECHAR LA REUNION DEL 13 AL 17 DE ABRIL REUNION TRILATERAL. PARA REVISION DE CARTAS ACUERDO.

8. TRABAJAR LISTA DE CONSIDERACION DE LHDS. POR EMAIL. CAUSAS MAS COMUNES Y DEFINIR LHDS.

Report #:1	n	Report #:31	no lhd	Report #:61	n		Report #:91	m	Report #:121	m	Report #:151	n			
Report #:2	n	Report #:32	m	Report #:62	n		Report #:92	n	Report #:122	no lhd	Report #:152	n			
Report #:3	m	Report #:33	m	Report #:63	m		Report #:93	a	Report #:123	m/b	Report #:153	n			
Report #:4	a/e/h	Report #:34	n	Report #:64	m		Report #:94	m	Report #:124	m	Report #:154	m			
Report #:5	d	Report #:35	n	Report #:65		RCF	Report #:95	no lhd	Report #:125	no lhd	Report #:155	no lhd			
Report #:6	m	Report #:36	n	Report #:66	m		Report #:96	m	Report #:126	m	Report #:156	no lhd			
Report #:7	n	Report #:37	no lhd	Report #:67	e/j		Report #:97	no lhd	Report #:127	m	Report #:157	m			
Report #:8	n	Report #:38	m	Report #:68	no lhd		Report #:98	no lhd	Report #:128	no lhd	Report #:158	m			
Report #:9	a	Report #:39	m	Report #:69	m		Report #:99	m	Report #:129	m	Report #:159	n			
Report #:10	n	Report #:40	no lhd	Report #:70	n		Report #:100	no lhd	Report #:130	no lhd	Report #:160	no lhd			
Report #:11	m	Report #:41	n	Report #:71	m		Report #:101	m	Report #:131	m	Report #:161	n			
Report #:12	no lhd	Report #:42	n	Report #:72	no lhd		Report #:102	m	Report #:132	l	Report #:162	n/f			
Report #:13	no lhd	Report #:43	n	Report #:73	m		Report #:103	a/e	Report #:133	no lhd	Report #:163	no lhd			
Report #:14	no lhd	Report #:44	n	Report #:74	no lhd		Report #:104	n	Report #:134	m	Report #:164	n			
Report #:15	m	Report #:45	m	Report #:75	no lhd		Report #:105	n	Report #:135	n	Report #:165	m			
Report #:16	no lhd	Report #:46	no lhd	Report #:76	m		Report #:106	m	Report #:136	n	Report #:166	n			
Report #:17	no lhd	Report #:47	no lhd	Report #:77	no lhd		Report #:107	m	Report #:137	no lhd	Report #:167	m			
Report #:18	no lhd	Report #:48	m	Report #:78	no lhd		Report #:108	no lhd	Report #:138	no lhd	Report #:168	m			
Report #:19	no lhd	Report #:49	n	Report #:79	no lhd		Report #:109	m	Report #:139	m	Report #:169	n			
Report #:20	n	Report #:50	no lhd	Report #:80	no lhd		Report #:110	a	Report #:140	b	Report #:170	m			
Report #:21	m	Report #:51	no lhd	Report #:81	no lhd		Report #:111	h	Report #:141	no lhd	Report #:171	no lhd			
Report #:22	m	Report #:52	no lhd	Report #:82	no lhd		Report #:112	no lhd	Report #:142	m	Report #:172	m			
Report #:23	m	Report #:53	m	Report #:83	no lhd		Report #:113	n	Report #:143	m	Report #:173	m			
Report #:24	e	Report #:54	m	Report #:84	n		Report #:114	m	Report #:144	no lhd	Report #:174	n			
Report #:25	m	Report #:55	n	Report #:85	no lhd		Report #:115	no lhd	Report #:145	m	Report #:175	n			
Report #:26	no lhd	Report #:56	m	Report #:86	m		Report #:116	no lhd	Report #:146	m	Report #:176	n			
Report #:27	m	Report #:57	m	Report #:87	no lhd		Report #:117	m	Report #:147	m	Report #:177	d			
Report #:28	n	Report #:58	m	Report #:88	no lhd		Report #:118	n	Report #:148	m	Report #:178	no lhd			
Report #:29	n	Report #:59	m	Report #:89	no lhd		Report #:119	m	Report #:149	m	Report #:179	m			
Report #:30	m	Report #:60	no lhd	Report #:90	m		Report #:120	m	Report #:150	m	Report #:180	m			

tot parc	**n**	**7**	**n**	**9**	**n**	**3**	**n**	**5**	**n**	**2**	**n**	**12**	**totalp1**	**38**	
	m	**9**	**m**	**12**	**m**	**9**	**m**	**13**	**m**	**17**	**m**	**11**		**71**	
	no lhd	**8**	**no lhd**	**8**	**no lhd**	**16**	**no lhd**	**8**	**no lhd**	**9**	**no lhd**	**6**		**55**	
	a	**1**	**a**	**0**	**a**	**0**	**a**	**2**	**a**	**0**	**a**	**0**		**3**	
	e	**2**	**e**	**0**	**e**	**1**	**e**	**1**	**e**	**0**	**e**	**0**		**4**	
	h	**1**	**h**	**1**	**h**	**0**	**h**	**1**	**h**	**0**	**h**	**0**		**3**	
	j	**0**	**j**	**0**	**j**	**1**	**j**	**0**	**j**	**0**	**j**	**0**		**1**	
									b	**1**	**b**	**0**		**1**	
									l	**1**	**l**	**0**		**1**	
											f	**1**		**1**	

Report #:181	m	Report #:200	n	Report #:219	n		Report #:237	m	Report #:255	m	Report #:273	n			
Report #:182	no lhd	Report #:201	m	Report #:220	n		Report #:238	n	Report #:256	no lhd	Report #:274	n			
Report #:183	m	Report #:202	m	Report #:221	m		Report #:239	d	Report #:257	e	Report #:275	n			
Report #:184	m	Report #:203	m	Report #:222	no lhd		Report #:240	no lhd	Report #:258	no lhd	Report #:276	m			
Report #:185	m	Report #:204	m	Report #:223	m		Report #:241	no lhd	Report #:259	i	Report #:277	no lhd			
Report #:186	m	Report #:205	no lhd	Report #:224	m		Report #:242	m	Report #:260	m	Report #:278	no lhd			
Report #:187	m	Report #:206	no lhd	Report #:225	n		Report #:243	m	Report #:261	m	Report #:279	n			
Report #:188	n	Report #:207	n	Report #:226	no lhd		Report #:244	n	Report #:262	no lhd	Report #:280	m			
Report #:189	m	Report #:208	no lhd	Report #:227	m		Report #:245	no lhd	Report #:263	no lhd	Report #:281	d			
Report #:190	no lhd	Report #:209	m	Report #:228	n		Report #:246	n	Report #:264	no lhd	Report #:282	m			
Report #:191	n	Report #:210	n	Report #:229	m		Report #:247	no lhd	Report #:265	no lhd	Report #:283	n			
Report #:192	m	Report #:211	m	Report #:230	no lhd		Report #:248	no lhd	Report #:266	no	Report #:284	no lhd			

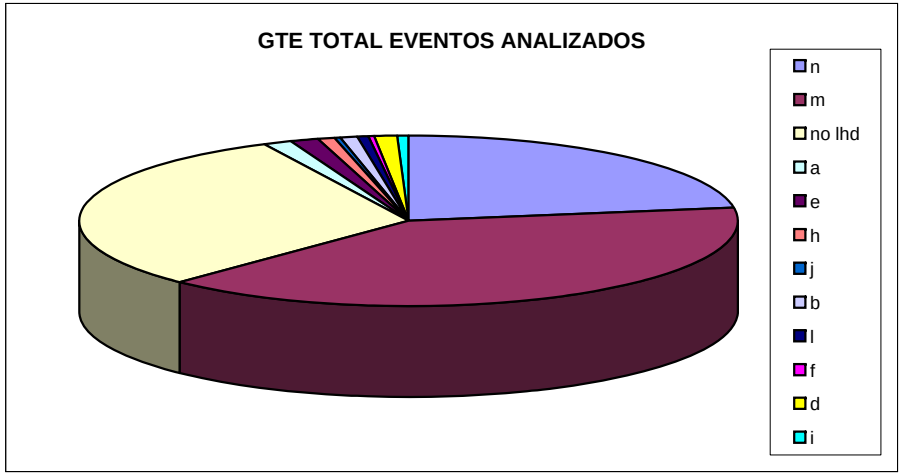
Report #:193	m	Report #:212	n	Report #:231	m	Report #:249	no lhd	Report #:267	m	Report #:285	no lhd								
Report #:194	no lhd	Report #:213	m	Report #:232	m	Report #:250	m	Report #:268	m	Report #:286	n								
Report #:195	no lhd	Report #:214	m	Report #:233	no lhd	Report #:251	m	Report #:269	no lhd	Report #:287	no lhd								
Report #:196	d	Report #:215	m	Report #:234	m	Report #:252	m	Report #:270	n	Report #:288	m								
Report #:197	no lhd	Report #:216	n	Report #:235	no lhd	Report #:253	no lhd	Report #:271	no lhd	Report #:289	no lhd								
Report #:198	no lhd	Report #:217	no lhd	Report #:236	no lhd	Report #:254	no lhd	Report #:272	no lhd	Report #:290	m								
Report #:199	no lhd	Report #:218	n																

tot parc	n	2	n	6	n	4	n	3	n	1	n	6	total p2	22
	m	9	m	9	m	8	m	6	m	5	m	5		42
	no lhd	7	no lhd	4	no lhd	6	no lhd	8	no lhd	9	no lhd	6		40
	a	0	a	0	a	0	a	0	a	0	a	0		0
	e	0	e	0	e	0	e	0	e	1	e	0		1
	h	0	h	0	h	0	h	0	h	0	h	0		0
	j	0	j	0	j	0	j	0	j	0	j	0		0
	b	0	b	0	b	0	b	0	b	0	b	0		0
	l	0	l	0	l	0	l	0	l	0	l	0		0
	f	0	f	0	f	0	f	0	f	0	f	0		0
	d	1	d	0	d	0	d	1	d	0	d	0		2
	i	0	i	0	i	0	i	0	i	1	i	0		1

Report #:291	m	Report #:312	m/b	Report #:333	n		
Report #:292	m	Report #:313	m	Report #:334	no lhd		
Report #:293	no lhd	Report #:314	m	Report #:335	no lhd		
						definir parametro de desvio para acft no certificada	
Report #:294	m	Report #:315		Report #:336	n	report315	rvsm
Report #:295	n	Report #:316	n	Report #:337	no lhd		
Report #:296	m	Report #:317	m	Report #:338	n		
Report #:297	m	Report #:318	m				
Report #:298	no lhd	Report #:319	m				
Report #:299	no lhd	Report #:320	n				
Report #:300	n	Report #:321	b/m				
Report #:301	no lhd	Report #:322	n				
Report #:302	n	Report #:323	m				
Report #:303	n	Report #:324	m				
Report #:304	m	Report #:325	m				
Report #:305	f	Report #:326	no lhd				
Report #:306	n	Report #:327	m				
Report #:307	m	Report #:328	m				
Report #:308	no lhd	Report #:329	n				
Report #:309	n	Report #:330	n				
Report #:310	m	Report #:331	n				
Report #:311	m	Report #:332	n				

tot parc	n	6	n	7	n	3	tp3	16
	m	9	m	12	m			21
	no lhd	5	no lhd	1	no lhd	3		9
	a	0	a	1	a			1
	e	0	e		e			0
	h	0	h		h			0
	j	0	j		j			0
	b	0	b	2	b			2
	l	0	l		l			0
	f	0	f		f			0
	d	0	d		d			0
	i	0	i		i			0

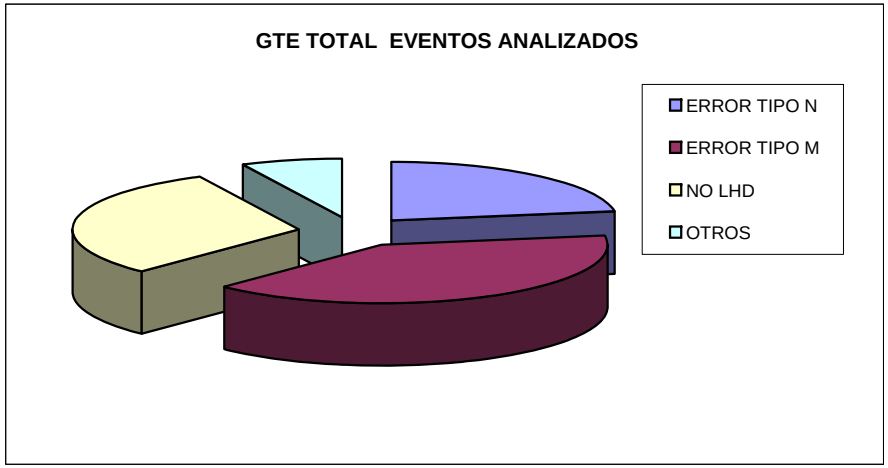
	tp1	tp2	tp3	total
n	38	22	16	76
m	71	42	21	134
no lhd	55	40	9	104
a	3	0	1	4
e	4	1	0	5
h	3	0	0	3
j	1	0	0	1
b	1	0	2	3
l	1	0	0	1
f	1	0	0	1
d	2	2	0	4
i	1	1	0	2
			total	338

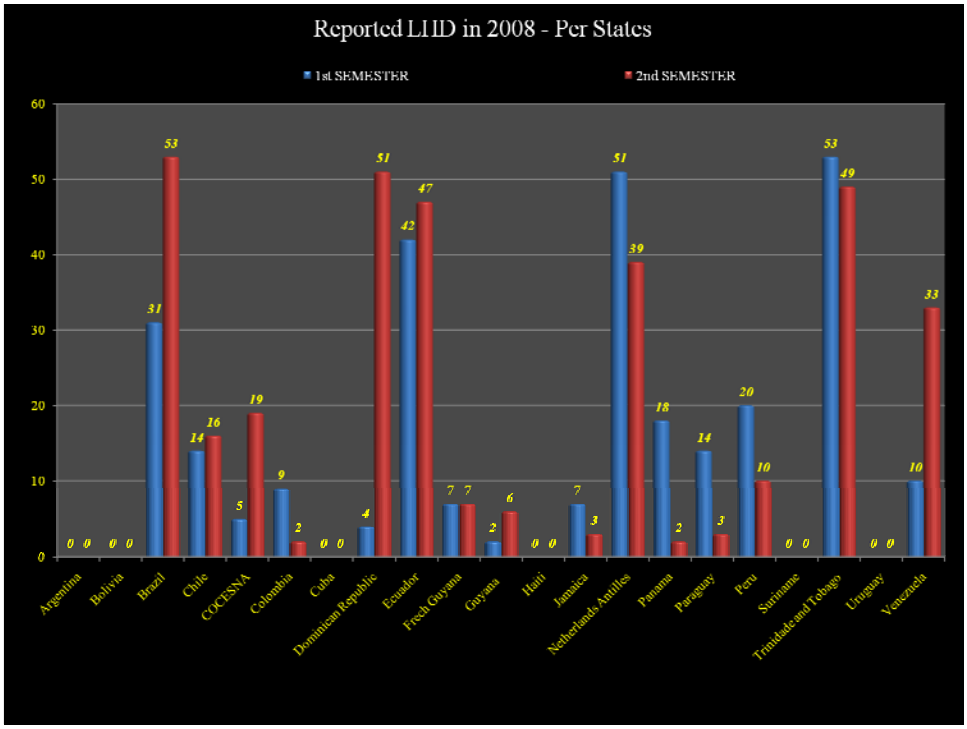


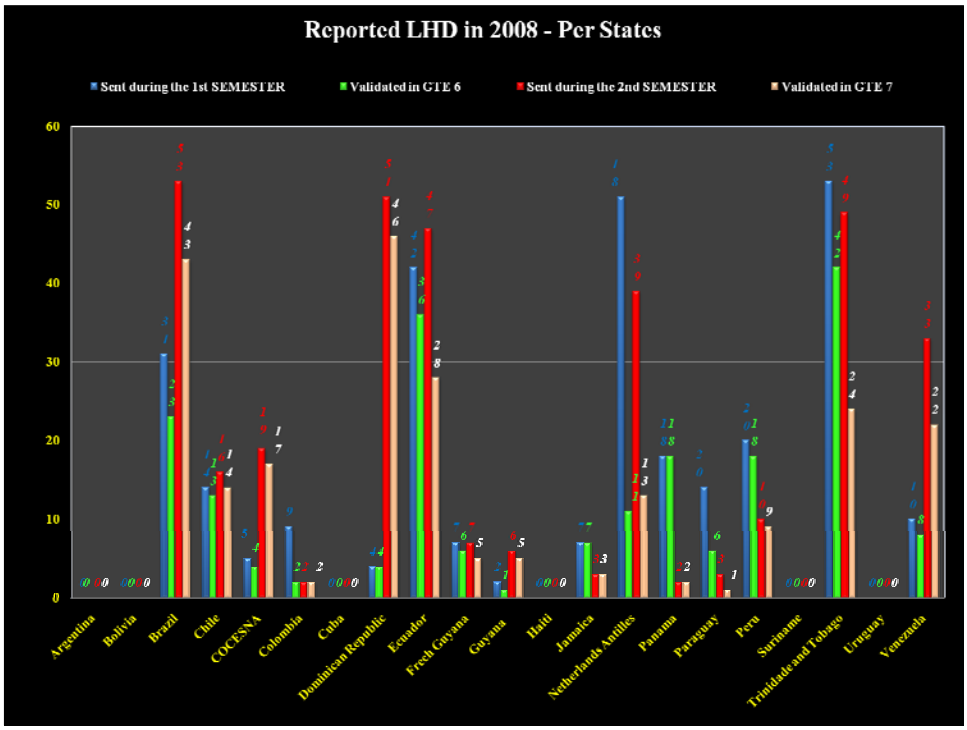
n	76
m	134
no lhd	104
a	4
e	5
h	3
j	1
b	3
l	1
f	1
d	4
i	2
TOTAL	338

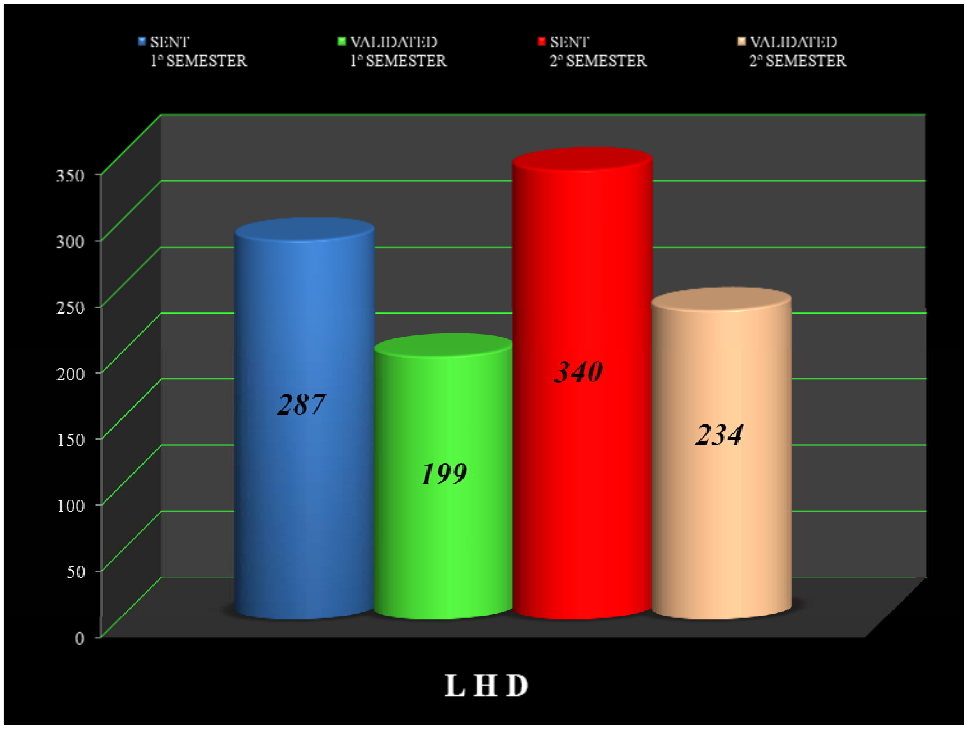
TOTAL EVENTOS ANALIZADOS		
ERROR TIPO	76	22%
ERROR TIPO	134	39%
NO LHD	104	33%
OTROS	24	6%
TOTAL	338	100%

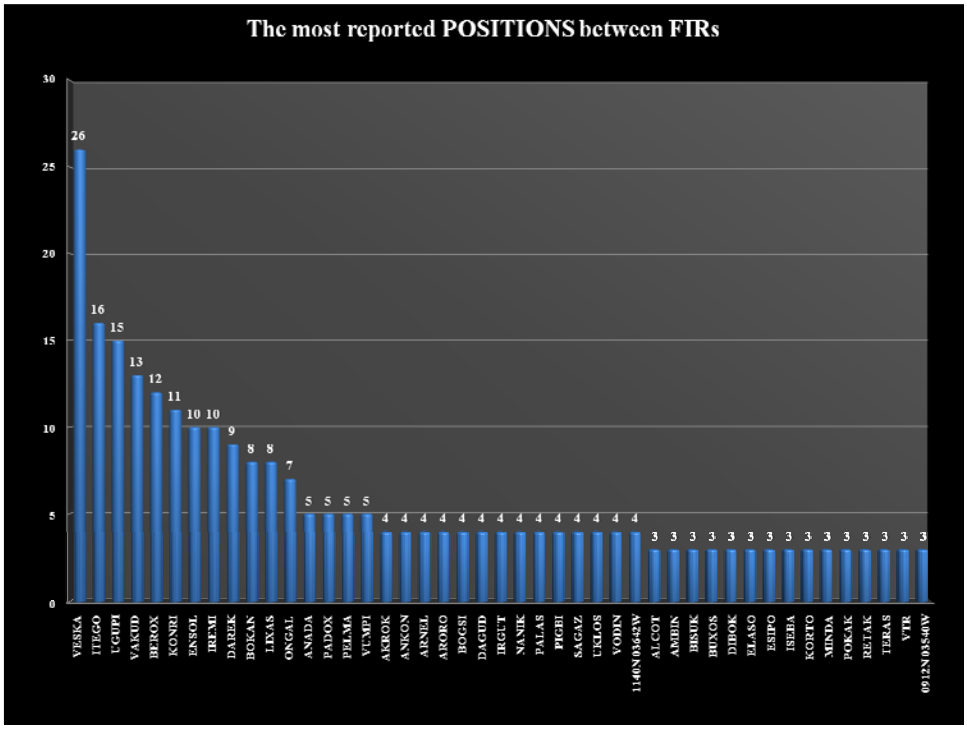
61% DE LOS EVENTOS ANALIZADOS SON DE TIPO M y N

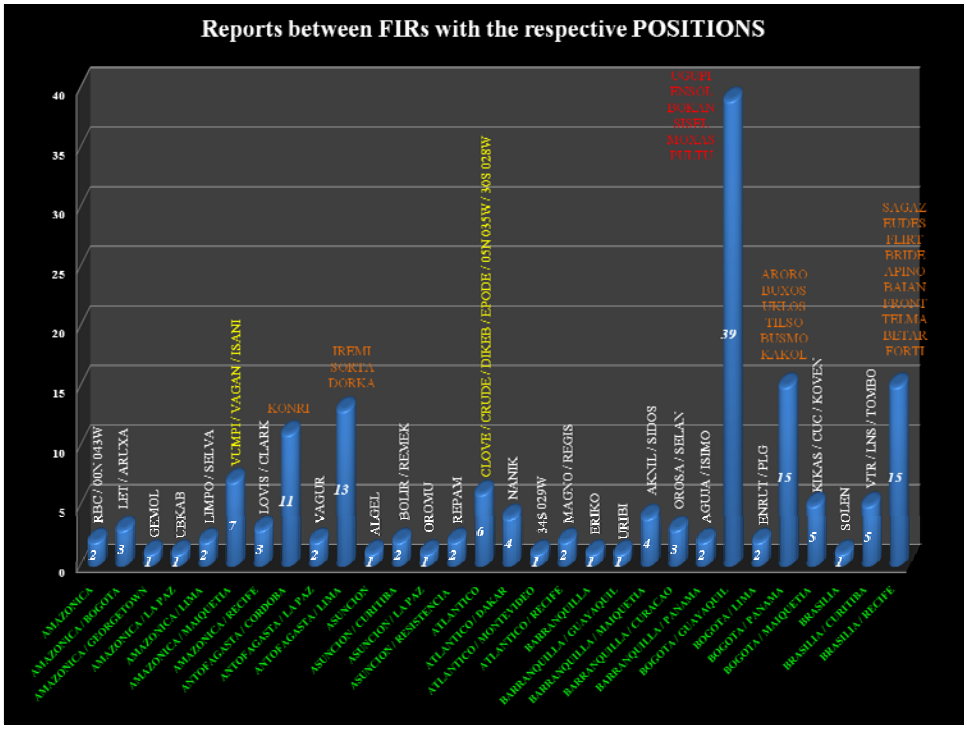


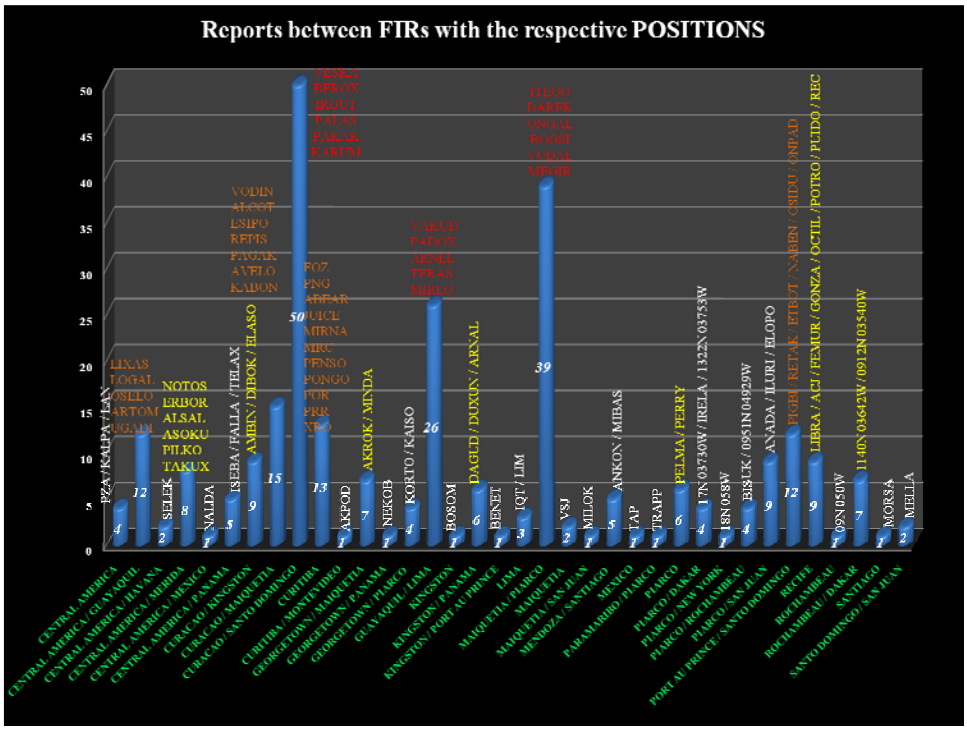

Reported LHD in 2008 - Per States
1st SEMESTER
2nd SEMESTER
60
50
40
30
20
10
0
0 0
0 0
31
53
14
16
5
19
9
2
0 0
4
51
42
47
7 7
2
6
0 0
7
3
51
39
18
2
14
3
20
10
0 0
53
49
0 0
10
33
Argentina
Bolivia
Brazil
Chile
COCESNA
Colombia
Cuba
Dominicam Republic
Ecuador
Fresch Guyana
Guyana
Haiti
Jamaica
Netherlands Antilles
Panama
Paraguay
Peru
Suriname
Trinidade and Tobago
Uruguay
Venezuela

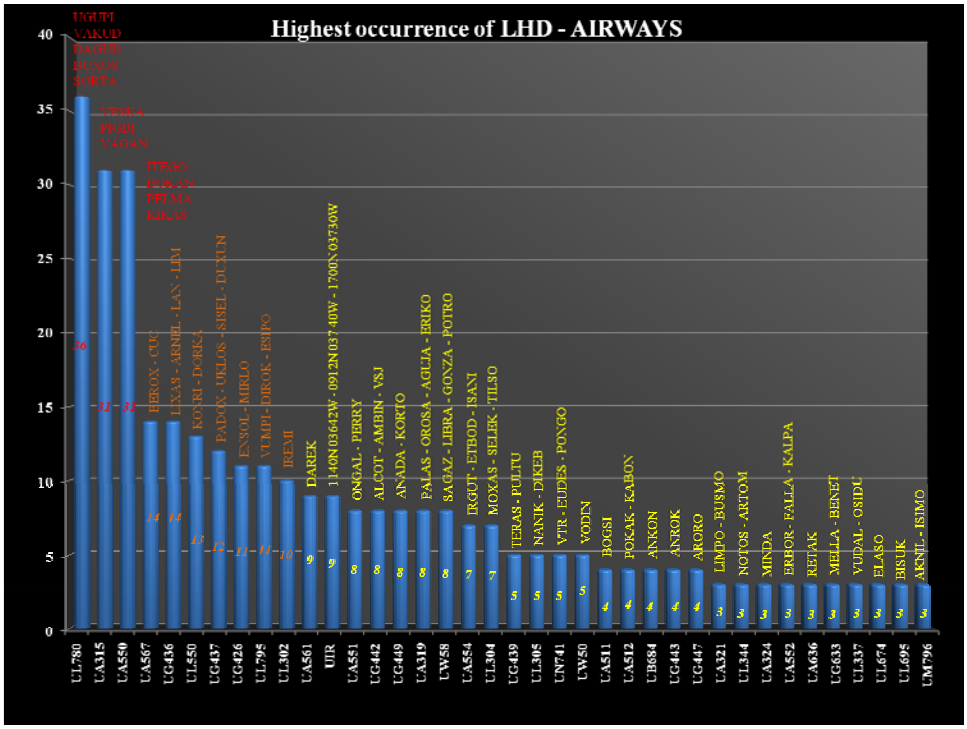

Reported LHD in 2008 - Per States
Sent during the 1st SEMESTER
Validated in GTE 6
Sent during the 2nd SEMESTER
Validated in GTE 7
60
50
40
30
20
10
0
Argentina
Bolivia
Brazil
Chile
COCESNA
Colombia
Cuba
Dominican Republic
Ecuador
Fresch Guyana
Guyana
Haiti
Jamaica
Netherlands Antilles
Panama
Paraguay
Peru
Suriname
Trinidade and Tobago
Uruguay
Venezuela


SENT
1° SEMESTER
VALIDATED
1° SEMESTER
SENT
2° SEMESTER
VALIDATED
2° SEMESTER
350
300
250
200
150
100
50
0
287
199
340
234
L H D


The most reported POSITIONS between FIRs
30
25
20
15
10
5
0
26
16
15
13
12
11
10 10
9
8 8
7
5 5 5 5
4 4 4 4 4 4 4 4 4 4 4 4 4 4
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
VESKA
ITEGO
UGUPI
VAKUD
BEROX
KONRI
ENSOL
IREMI
DAREK
BOKAK
LIKAS
ONGAL
ANADA
PADOX
PELMA
VUMPI
AKROK
ANKON
ARNEL
ARORO
BOGSI
DAGUD
IRGUT
NANIK
PALAS
PIGBI
SAGAZ
UKLOS
VODIN
1140N05642W
ALCOT
AMBIK
BISUK
BIXOS
DIBOK
ELASO
ESIPO
ISEBA
KORTO
MINDA
POKAK
RETAK
TERAS
VTR
0912N03540W


Reports between FIRs with the respective POSITIONS
0
5
10
15
20
25
30
35
40
2
3
1
1
2
7
3
11
2
13
1
2
1
2
6
4
1
2
1
1
4
3
2
39
2
15
5
1
5
15
RBC / 00N 043W
LET / ARUXA
GEMOL
UBKAB
LIMPO / SELVA
VUMPI / VAGAN / ISANI
LOVIS / CLARK
KONRI
VAGUR
IREMI
SORTA
DORKA
ALGEL
BOLIR / REMEK
OROMU
REPAM
CLOVE / CRUDE / DIKEB / EPODE / 05N 035W / 30S 028W
NANIK
34S 029W
MAGNO / REGIS
ERIKO
URIBI
AKNIL / SIDOS
OROSA / SELAX
AGUIA / ISIMO
UGUPI
ENSOL
DOKAN
SISET
MOXAS
PUTTU
ENRUT / PLG
ARORO
BUXOS
UKTAS
TILSO
BUSMO
KAKOL
KIKAS / CUC / KOVEX
SOLEN
VTR / LNS / TOMBO
SAGAZ
FUDES
FLIRT
BRIDE
APINO
BATAN
FRONT
TELMA
BETAR
FORTI
AMAZONICA
AMAZONICA / BOGOTA
AMAZONICA / GEORGETOWN
AMAZONICA / LA PAZ
AMAZONICA / LIMA
AMAZONICA / MAIQUETIA
AMAZONICA / RECIFE
ANTOFAGASTA / CORDOBA
ANTOFAGASTA / LA PAZ
ANTOFAGASTA / LIMA
ASUNCION
ASUNCION / CURITIBA
ASUNCION / LA PAZ
ASUNCION / RESISTENCIA
ATLANTICO
ATLANTICO / DAKAR
ATLANTICO / MONTEVIDEO
ATLANTICO / RECIFE
BARRANQUILLA
BARRANQUILLA / GUAYAQUIL
BARRANQUILLA / MAIQUETIA
BARRANQUILLA / CURACAO
BOGOTA / GUAYAQUIL
BOGOTA / LIMA
BOGOTA / PANAMA
BOGOTA / MAIQUETIA
BRASILIA
BRASILIA / CURITIBA
BRASILIA / RECIFE


Reports between FIRs with the respective POSITIONS
0
5
10
15
20
25
30
35
40
45
50
4
12
2
8
1
5
9
15
50
13
1
7
1
4
26
1
6
1
3
39
2
1
5
1
6
4
1
1
9
12
9
1
7
1
2
PZA / KALPA / LAX
LIXAS
LOGAL
OSELO
ARTOM
UGADI
SELEK
NOTOS
ERBOR
ALSAL
ASOKU
PILKO
TAKUX
VALDA
ISEBA / FALLA / TELAX
VODIN
ALGOT
LSIPO
REPIS
PAGAK
AVELO
KALBON
AMBIN / DIBOK / ELASO
CURITIBA
FOZ
PNG
ATIBAR
UICL
MIRNA
MRC
PENSO
PONGO
IOR
PRR
XT-0
AKPOD
AKROK / MENDA
NEKOB
KORTO / KAISO
VAKUD
PATON
ARNEL
TERAS
MIRLO
BOSOM
DAGLD / DUXUN / ARNAL
BENET
IQT / LIM
ITLUGO
DARPE
ONGAL
BOOST
VUDAL
MEGIR
VSJ
MILOK
ANKON / MIBAS
TAP
TRAPP
PELMA / PERRY
1TN 03730W / IRELA / 1322N 03753W
1SN 058W
BIRUK / 0951N 04929W
AVADA / ILURI / ELOPO
PIGEL
RETAK / ETBET / NABEN / CSILU / QNPAD
LIBRA / AZI / FEMUR / GONZA / OCTIL / POTRO / PLUTO / REC
09N 050W
11 40N 03642W / 09 12N 03540W
MORSA
MELLA
CENTRAL AMERICA
CENTRAL AMERICA / GUAYAQUIL
CENTRAL AMERICA / HAVANA
CENTRAL AMERICA / MERIDA
CENTRAL AMERICA / MEXICO
CENTRAL AMERICA / PANAMA
CURACAO / KINGSTON
CURACAO / MAIQUETIA
CURACAO / SANTO DOMINGO
CURITIBA
CURITIBA / MONTEVIDEO
GEORGETOWN / MAIQUETIA
GEORGETOWN / PANAMA
GEORGETOWN / PIARCO
GUAYAQUIL / LIMA
KINGSTON
KINGSTON / PANAMA
KINGSTON / PORT AU PRINCE
LIMA
MAIQUETIA / PIARCO
MAIQUETIA / SAN JUAN
MENDOZA / SANTIAGO
MEXICO
PARAMARIBO / PIARCO
PIARCO
PIARCO / DAKAR
PIARCO / NEW YORK
PIARCO / ROCHAMBEAU
PIARCO / SAN JUAN
PORT AU PRINCE / SANTO DOMINGO
RECIFE
ROCHAMBEAU
ROCHAMBEAU / DAKAR
SANTIAGO
SANTO DOMINGO / SAN JUAN


Highest occurrence of LHD - AIRWAYS
UGUPI
VAKUD
TAGED
BUXOS
SORPA
VESKA
PEGBI
TAGAN
ITEGO
BOKAN
PELMA
KIKAS
0
5
10
15
20
25
30
35
40
UL780
UA315
UA550
UA567
UG436
UL450
UG437
UG426
UL795
UL302
UA561
UIR
UA551
UG442
UG449
UA319
UW58
UA554
UL304
UG439
UL305
UN741
UW50
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UL674
UL695
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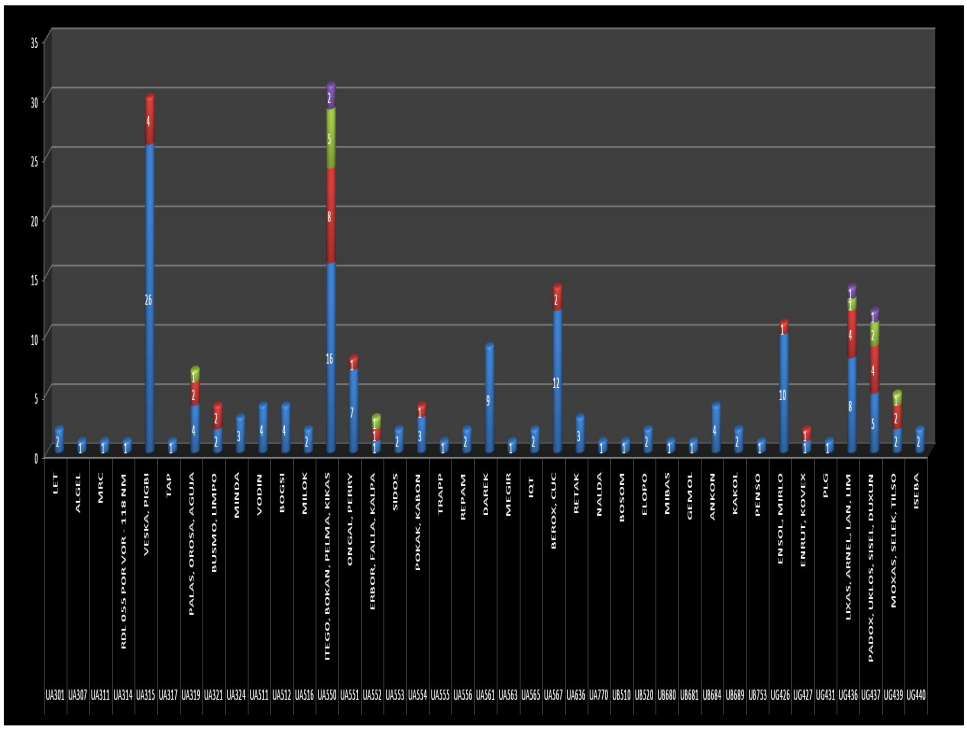
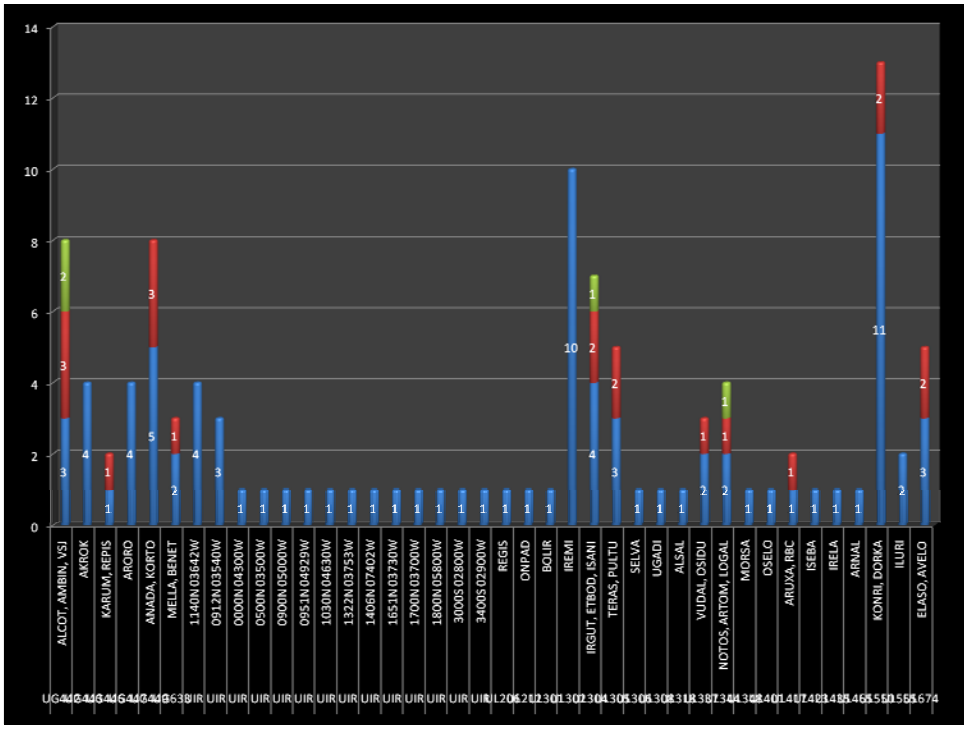
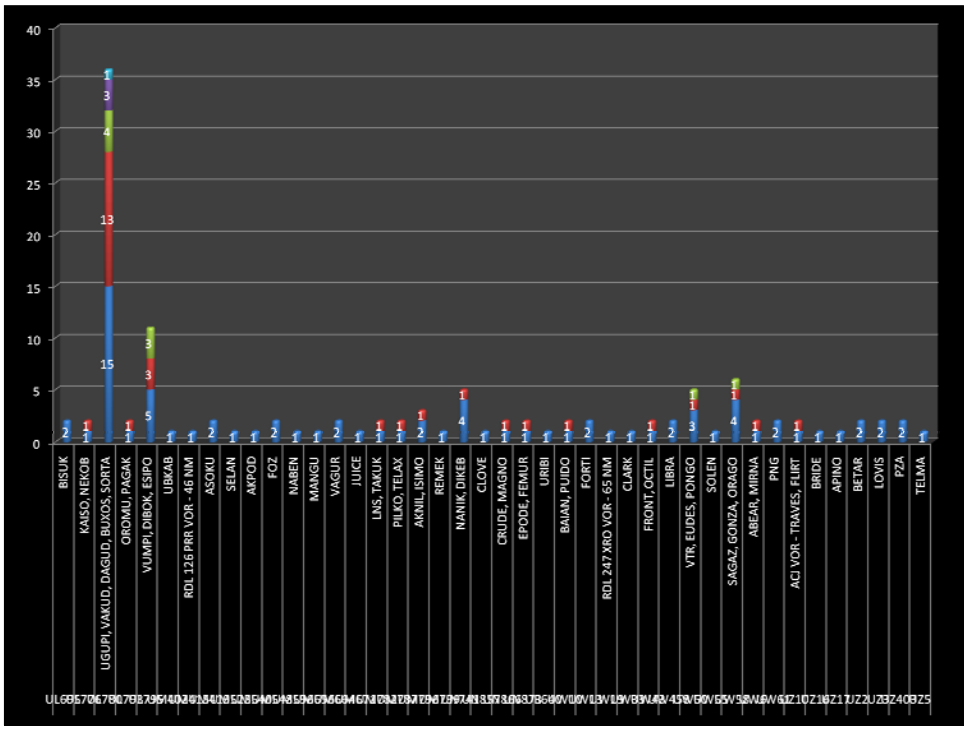

0
5
10
15
20
25
30
35
LET
ALGIL
MRC
RDL055 POR VOR - 338 NM
VESKA, PIGBI
TAP
PALAS, OROSA, AGUJA
BUSMO, UMPO
MINDA
VODIN
BOGSI
MILOK
ITEGO, BOKAN, PELMA, KIKAS
ONGAL, PERRY
ERBOR, FALLA, KALPA
SIDOS
POKAK, KABON
TRAPP
REPAM
DAREK
MEGIR
IGT
BEROX, CUC
RETAK
NALDA
BOSOM
ELOPO
MIRAS
GENGL
ANKON
KAKOL
PENSO
ENSOL, MIRLO
ENRUT, KOVEX
PLG
LIXAS, ARNEL, LAN, LIM
PADOX, UKLOS, SISIL, DUXUN
MOXAS, SELEK, TILSO
ISEBA
UA301 UA307 UA311 UA314 UA315 UA317 UA319 UA321 UA324 UA511 UA512 UA516 UA550 UA551 UA552 UA553 UA554 UA555 UA556 UA561 UA563 UA565 UA567 UA636 UA770 UB510 UB520 UB680 UB681 UB684 UB689 UB753 UG426 UG427 UG431 UG436 UG437 UG439 UG440


ALCOT, AMBIN, VSJ
AKROK
KARUM, REPIS
ARORO
ANADA, KORTO
MELLA, BENET
1140N 03642W
0912N 03540W
0000N 04300W
0500N 03500W
0900N 05000W
0951N 04929W
1030N 04630W
1322N 03753W
1406N 07402W
1651N 03730W
1700N 03700W
1800N 05800W
3000S 02800W
3400S 02900W
REGIS
DNPAD
BOLIR
IREMI
IRGUT, ETBOD, ISANI
TERAS, PULTU
SELVA
UGADI
ALSAL
VUDAL, OSIDU
NOTOS, ARTOM, LOGAL
MORSA
OSELO
ARUXA, RBC
ISEBA
IRELA
ARNAL
KONRI, DORKA
ILURI
ELASO, AVELO


BISUK
KAISO, NEKOB
UGUPI, VAKUD, DAGUD, BUXOS, SORTA
OROMU, PAGAK
VUMPI, DIBOK, ESIPO
UBKAB
RDL 126 PRR VOR - 46 NM
ASOKU
SELAN
AKPOD
FOZ
NABEN
MANGU
VAGUR
JUICE
LNS, TAKUK
PILKO, TELAX
AKNIL ISIMO
REMEK
NANIK, DIKEB
CLOVE
CRUDE, MAGNO
EPODE, FEMUR
URIBI
BAIAN, PUIDO
FORTI
RDL 247 XRO VOR - 65 NM
CLARK
FRONT, OCTIL
LIBRA
VTR, EUDES, PONGO
SOLEN
SAGAZ, GONZA, ORAGO
ABEAR, MIRNA
PNG
ACI VOR - TRAVES, FLIRT
BRIDE
APINO
BETAR
LOVIS
PZA
TELMA

Agenda Item 4: Other business

4.1 The Colombian delegate explained to the Meeting the procedures that his administration shall apply for the utilization and handling of LHD within ATC units. The circular presented has the objective to establish the reporting procedure of LHD deviations to CARSAMMA and standardise the reports being originated in the Barranquilla and Bogotá ACCs.

4.2 The circular covers aspects related with background information on RVSM implementation within the CAR/SAM Regions airspace, the creation of CARSAMMA and the safetly levels agreed. It makes reference to the collision risk model, the applications of measures to reduce operational errors in the ATC coordination cycle between adjacent ACCs and the assignment to the Colombian Flow Unit for LHD reporting management.

4.3 CARSAMMA made some comments and revisions to the circular, and the meeting agreed that the revised version of the circular be attached as **Appendix A** to this part of the report, with the aim that other States and International Organizations may take such document as reference.

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REFERENCE: MATTERS RELATED WITH RVSM AND LHD INFORMATION

1. OBJECTIVE

The purpose of this circular is to establish the procedure of report of LHD deviations to CARSAMMA and to standardize the reports that should be originated both for Barranquilla FIR and for Bogotá, FIR, which will be responsibility of the Colombia Flow Unit.

2. HISTORY

When the decision was taken to implement RVSM within CAR/SAM Regions airspace within the framework of GREPECAS and without the consent of Colombia who manifested its disposition to carry out the same activity, the CAR/SAM Regional Monitoring Agency (CARSAMMA) was created, that has among their main functions the periodic monitoring of the System Performance, in conformity with ICAO RVSM Manual (Doc 9574), to allow the continuous and safe use of RVSM, as well as to verify whether the target level safety (TLS) established for the CAR/SAM Regions; a reference document that may be applied it is Doc 9689 AN/953 "Manual on Airspace Planning Methodology for the Determination of Separation Minima " especially Chapters 5 and 6.

3. COLLISION RISK MODEL

The quantitative methods for estimation of risk, in support of operational decisions related to the viability of RVSM reduction comprise two elements:

1. estimation of the risk, which consists on elaborating methods and techniques that allow to estimate the real risk level of an activity and that is currently under SMS criteria.

2. evaluation of the risk, that is to say, risk level, taking into consideration as the maximum admissible value for a safe system, which for RVSM is named as target level of safety (TLS), which considers other risk sources as replies to alerts of anti-collision system onboard; the emergency descents; and the operational errors in the emission or application of air traffic control (ATC) instructions, then determines the mere risk of the RVSM.

The monitoring of this level of risk corresponds the CARSAMMA for which requires two essential information, the monthly collection of large-height deviations (LHD), according to the procedure settled down by GREPECAS to gather that information, and secondly the data collection of aircraft movement in the upper airspace FL 290 to FL 410 in CAR/SAM the Flight Information Regions.

After three years of RVSM application, the CAR/SAM airspace safety assessment was presented during the last GREPECAS meeting, making evident that approximately 93% of the large-height deviations (LHD) are caused by errors in message coordination from an ATC unit to another (type M) and to errors due to lack of coordination between the ATC transferring units (type N). It was recognized that these

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errors cause events LHD regardless of the vertical separation applied, and are not caused by RVSM operation.

Likewise, that vertical collision risk, due to the combination of technical altitude errors and operational errors, estimated in number of fatal accidents per hour of flight, is above the desired target level of safety (TLS); which is 5×10^{-9}. For the CAR Region, the level is 12.3×10^{-9}, for the SAM Region the level is 34.9×10^{-9} and for both CAR/SAM Regions, is of 28.9×10^{-9}. To lower risk values, corrective actions are necessary, to eliminate the type M and type N errors.

3. MEASURES TO REDUCE OPERATIONAL ERRORS IN THE ATC COORDINATION CYCLE BETWEEN ADJACENT ACCs

GREPECAS formulated a conclusion that incorporates within the monitoring duties of the Flow Unit by means of this administrative act, given the impact that operational errors in the ATC coordination cycle have between adjacent ACCs, including:

a) The CFMU will verify the application, among other measures, of error prevention programme in the coordination cycle between adjacent ACCS which guide is shown in the Appendix, in order to reduce the LHD caused by errors in the air traffic coordination messages between ATC units, to reach an acceptable operational safety level

b) it will Contribute in the interphase progressive implementation data exchange among ATC units.

c) it will coordinate the necessary assistance to ICAO by means of the DSNA and the group of international projects.

4. RESPONSIBILITIES

To effective date of this circular one, the Colombia Unit of Flow assumes the responsibility of the administration of this information, its distribution, documentation and the records preservation. To this end, Bogotá and Barranquilla ACCs will provide the information contained in their files and shall immediately inform as soon as an LHD incident presented in the format established to this end.

When the Unit of Flow receives an LHD and registers it, it should contact the adjacent ATC in order to identify the origin of the problem and other circumstances. Course will also be given to the quality assurance programme for the pertinent SMS records, and to carry out a follow-up of each LHD, as well as to take care of statistics on of how is the process working, including its trend.

If the Flow Unit receives an LHD report from an adjacent State, it should carry out this assessment internally, so that when the event is identified, actions to handle it within SMS environment are taken.

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REFERENCE: MATTERS RELATED WITH RVSM AND LHD INFORMATION

The information collected and analyzed be sent to CARSAMMA to the e-mail: carsamma@cgna.gov.br with a copy to the group of international projects: sparis@aerocivil.gov.co and to the ICAO Lima Regional Office to: jf@lima.icao.int.

The compliance of this circular will be appreciated.

Validity: This circular one goes into effect starting from February 16 2009.
Expiration: Permanent
Replace: it doesn't apply

Signed by:

_____
T.C. DONALL H. CARDINAL RED TASCON
General Subdirector

It elaborated: _____ Mauricio Corredor - Colombia Unit Flow
_____ Sergio Paris Mendoza - International Projects

It revised: _____ Engineer José Fermin Boy - Director of Telecommunications and Air Navigation. Aids
_____ T.C. Héctor Luis Carrascal V. - Director of Services to the Air Navigation.

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APPENDIX

ERRORS PREVENTION PROGRAMME OF IN THE COMMUNICATION CYCLE BETWEEN ADJACENT ACCs SUGGESTED BY GREPECAS

Many initiatives exist that may be followed to prevent the occurrence of operational errors. However, there are five main areas that may directly contribute to this prevention: communications, phraseology, supervision, team work and ATC competence. In an effort to get the goal of reducing communication errors among adjacent ACCs and thus reduce or to minimize the occurrence large-height deviations (LHD), the following objectives should be included with the error prevention programme of each facility:

a) to identify individual deficiencies, procedural and/or of air traffic services staff,
b) to rapidly correct individual deficiencies procedural and/or of air traffic services staff, which affect the coordination with the ACCs of adjacent FIRs and ATS units of the own State. This may be achieved through:
   - guidance on procedures to be followed,
   - read-back implementation programmes,
   - training in LHD forms fill-in,
   - increase and/or closer monitoring of the ATCOs performance;
   - immediate coordination programme after a new clearance or flight level change;
   - changes in procedures, and/or corrections/changes of the staff
c) to communicate performance expectations to ATS supervisors and controllers;
d) to assure that the ATS unit maintains a summary and has debriefing meetings on of the operational errors, causal factors and tendencies, and to incorporate these in training;
e) to monitor and evaluate voice recordings (whole operative ATS staff);
f) to take initiatives to improve the communications among all ATS staff to create a favourable atmosphere to share information;
g) to exercise a rigorous supervision in the ATC units;
h) the ATS supervisors should:
   - communicate the performance expectations to the controllers, making emphasis in the importance of the discipline in the operational control position, conscience awareness, team work, use of appropriate phraseology, appropriate coordination procedures, debriefing meetings for the control position switching and the use of a control list of shifts;
   - to take immediate follow-up actions when the performance of a controller doesn't fulfil the expectations;
   - to inform about individual and team responsibilities, and the consequences of not fulfilling the expectations;
   - to provide efficient and consistent surveillance of the ATS unit operation, and to use an effective administration of resources to assure the appropriate personnel assignment to foster safe, orderly and expeditious air traffic management;

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REFERENCE: MATTERS RELATED WITH RVSM AND LHD INFORMATION

- to assure that the distractions and the noise levels in ATS stays to the minimum;
- to request that all staff keep in ATS units, a high proficiency level, team work, discipline in the control position, and awareness, and to require that each controller to know, apply, and stick to appropriate requirements in the performance of his obligations and operational responsibilities;
- to promote a communication flow open with all ATS staff, allowing them to provide contributions to the programme;
- to put emphasis in read back errors during the team meetings.

i) ATC staff should:

- apply read back procedures when carrying out ATC coordination;
- keep informed the ATS supervisor on air traffic problems and team limitations;
- make suggestions for the improvements in ATS units and/or operational errors prevention;
- keep awareness of those errors that are occurring,
- demand extra effort to assist to the position or busier control positions;
- continuously revise their own operation techniques and procedures of the ATS unit, to achieve the highest quality in performance;
- immediately every ATS incident to the operational supervisor and to other appropriate ATS authorities to carry out the follow-up of adequate information;
- use materials to refresh memory.

EVALUATIONS OF VOICE RECORDING:

The revisions of voice recording should be made to ensure the use of appropriate phraseology, appropriate operational practices, in accordance to the standards established in ICAO regulations, and/or guidelines and national/local methods. The recording voice revisions should be made as followings:

a) the ATS units should make sure that the recordings revisions be made at least twice a year to all ATS staff;
b) the ATS supervisor should revise the voice recording, the comments of the document and develop an action plan to document the deficiencies in performance; and
c) the ATS supervisor and the controller will revise and to discuss the voice recording.

SUGGESTED ACTIONS AS SHORT-TERM SOLUTIONS

a) That States, authorities, territories and international organizations continue with their excellent compliance of requirements to monthly report LHD to CARSAMMA; and
b) That States, authorities, territories and international organizations distribute a copy of error messages type "M" in the transfer messages between ATC units and type "N", "the transference message of the transferring ATC unit was not received" received from LHD reports between ATC units, only to the ACCs involved, besides CARSAMMA;

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c) When from shared reports a tendency is identified, States, Territories and International Organizations will share the information and they will meet bilaterally to develop a solution to the cause of LHD identified.

d) since some ACCs are adjacent to the international oceanic airspace, SAM and NACC offices are requested to notify the corresponding adjacent ICAO regional offices (EUR/NAT, WACAF) about the subsequent submission of LHD report by the adjacent ACC, and urge CAR/SAM units in charge of sending the reports to interact in a positive manner.

ACTIONS SUGGESTED AS MEDIUM TERM SOLUTIONS

a) In an effort to eliminate the error type "M" which contributes the LHD in a major intensity, the solution is the implementation of a quality assurance management programme, based on the safety management concepts described in Annex 11, Amendment 44.

b) The progressive implementation of data communications between ATS facilities (AIDC) shall improve airspace safety, and would reduce type "M" errors. Nevertheless, it is a mid-term project that involves a considerable expense; therefore CAR/SAM States are urged to make the necessary arrangements to request the World Bank the necessary funds to improve such automation systems.