International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
Sixth Meeting of the Air Traffic Management / Communications, Navigation and Surveillance Subgroup (ATM/CNS/SG/6) - ATM Committee
Boca Chica, Dominican Republic, 30 June-4 July 2008

Agenda Item 1: Safety Assessment Post RVSM Implementation

MEASURES RECOMMENDED BY THE SCRUTINY WORKING GROUP (GTE) TO ACHIEVE SAFETY OBJECTIVES APPROVED BY GREPECAS

(Presented by the Rapporteur of the Scrutiny Working Group (GTE))

SUMMARY

This Working Paper presents a summary of the analysis of the fifth meeting of the CAR/SAM Grupo de Trabajo de Escrutinio (GTE).

REFERENCES:

- Final Report of the Fifth Meeting/Workshop Of The Scrutiny Working Group (GTE/5)
- Caribbean and South American RVSM Grupo de Trabajo de Escrutinio Reference Guide

1. Introduction

1.1 When the decision was made to implement RVSM in the CAR/SAM Regions, an implementation process for introduction of the RVSM was carried out as outlined in ICAO Doc 9574. Part of the process calls for the establishment of a regional monitoring agency (RMA) to act as the safety oversight body for the Region, thus the CAR/SAM Regional Monitoring Agency (CARSAMMA) was established by GREPECS. The RMA is responsible for system performance monitoring and is required to conduct regular comprehensive safety assessments in order to ensure that the Target Level of Safety (TLS) is met. 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. A critical component of RVSM safety assessment, as well as a system performance monitoring requirement, is the analysis of large height deviations. This activity is carried out with the support of a Scrutiny Group (SG).

1.2 In addition to creating CARSAMMA as a Regional Monitoring Agency, GREPECAS deemed pertinent to create the CAR/SAM Scrutiny Group, otherwise known as the Grupo de Trabajo de Escrutinio (GTE). This group provides support to CARSAMMA with regard to LHD assessment.

1.3 The initial result of the Group's effort is to examine reports of large height deviations 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. 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.

1.1 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.

1.3 The Fifth Training Seminar/Meeting of the CAR/SAM Grupo de Trabajo De Escrutinio (GTE) was hosted by the ICAO Lima office. This Training Seminar/Meeting is Session 2 of 2. The first Training Seminar/Meeting was held in Merida, Mexico September 25-27, 2007. The following contains a summary of the Group's analysis.

2. Discussion

2.1 Review

2.1.1 The meeting recalled background information related with RVSM implementation at a global level and particularly in the CAR/SAM Regions, which lead to the creation of the Regional Monitoring Agency, as well as to the creation of Scrutiny Groups.

2.1.2 The Group reviewed GTE methodology and objectives, why is it necessary to evaluate and analyze large height deviations and how LHDs impact in the technical and operational risk assessment with regard to RVSM. The meeting also noted the ICAO collision risk model and the parameters contained in the model.

2.1.3 The delegate from CARSAMMA made a presentation on the monitoring agency and which actions have been taken from the beginning of their activities as well as those foreseen in a short term. In this connection, the meeting noted that CARSAMMA has been the focal point to obtain the necessary information in order to carry out safety assessments. During RVSM implementation, it had the assignment to monitor aircraft performance, as well as to evaluate large-height deviations occurrences.

2.1.4 With regard to the activities planned for 2008, the meeting noted, among other issues, that CARSAMMA developed a significant training activity to ATCOs from the Brazilian Control Centers and continued with air traffic movement data collection carried out in February 2008, which had been submitted to the Agency. Based on the experience obtained, it developed an executable CD-ROM which shall serve to train ATCOs in the CAR/SAM Regions, in filling the LHD report forms. A basic course of risk assessment between cruising levels aircraft is also being prepared, and shall be offered to CAR/SAM States and International Organizations.

2.1.5 The meeting also noted that CARSAMMA shall present a new CAR/SAM RVSM airspace safety assessment to the ATM/CNS/SG/6 to be held in July 2008, reason for which the activities to develop this task have been initiated. CARSAMMA will finally participate in the Special RMA meetings at a worldwide level, where among other matters, will analyze the lack of standardization of procedures established with States and how to monitor the operators requirements. It will have as additional objectives to harmonize the parameters used b the different RMAs to develop risk assessments and also to review RMA manual.

2.2 Methodology Analysis

2.2.1 A delegate from Colombia presented different scenarios that were analyzed by the meeting for the purpose of defining LHD criteria that would facilitate the work of the Scrutiny Group. The established criteria will assist the GTE in determining whether a reported height event qualifies as an LHD. The results of the analysis carried out by the meeting and the conclusions adopted for each scenario are included in **Appendix A**. After the analysis was carried out, the meeting considered that the scenarios which no agreements were reached should be evaluated in further meetings.

2.2.2 The GTE examined all occurrences of large height deviations of 90m (300ft) or greater reported to CARSAMMA during the period of January 2007 to December 2007. A total of 205 reports were evaluated. The details of each report are included in **Appendix B**

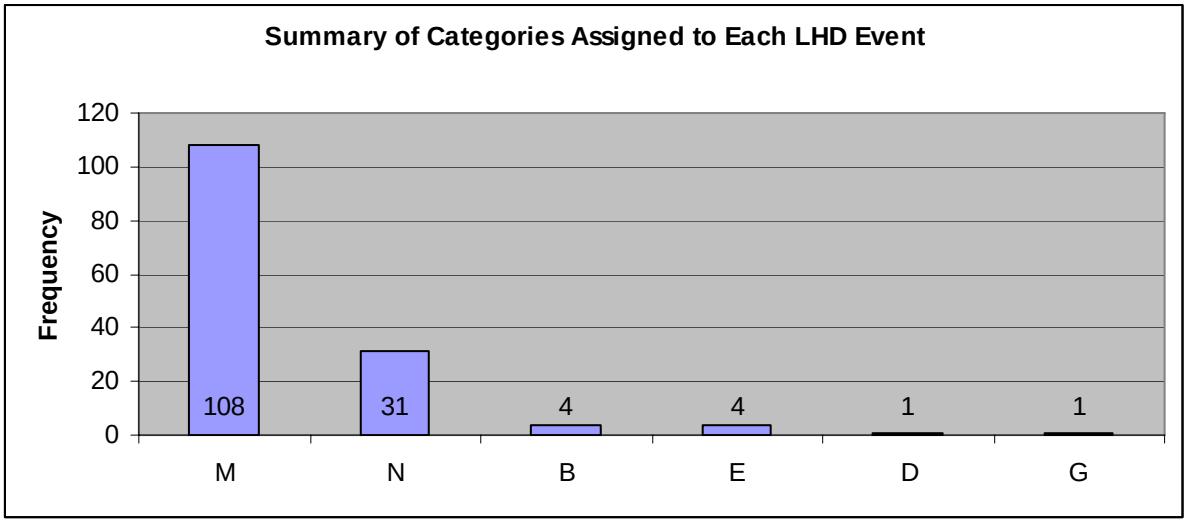
2.2.3 The Group assigned an estimate of flight time spent at incorrect flight level, deviation magnitude, number of levels crossed and an event category to each event. These values are the primary contributors to the estimate of operational risk for operations in Reduced Vertical Separation Minimum (RVSM) airspace.

2.2.4 An initial analysis revealed that the reporting FIR, Asuncion, was utilizing the LHD Reporting Form for purposes other than reporting an LHD event. Since the inclusion of these reports will skew the calculations of this analysis, the reports were extracted. It was noted that, although the reports did not pertain to the current GTE analysis, the reports will be reviewed and evaluated by CARSAMMA. Additionally, it was recommend that the administration take the necessary actions, so that personnel in charge of collecting recording such information would receive training to facilitate the identification and filling of the LHD event form.

2.2.5 Also, that reports received by Ecuador are used to report other incidents different to those related with LHD, and for this reason the meeting requested CARSAMMA to consult with the Ecuadorian administration regarding all LHD reports submitted during the period January-December 2007 and to review if times shown in the same are accurate.

2.2.6 Previous analyses revealed that a significant number LHD events categorized as Code “M” and Code “N” were associated with the Dakar FIR. A total of 19 events were observed accounting for approximately 13% of the reported LHDs. The Group agreed that these reports required further investigation. The current analysis identified nine reports categorized as Code “M” and Code “N” that were associated with Dakar accounting for approximately 6% of qualifying LHDs. The Secretariat informed the Group that this matter would be evaluated during the Fourteenth Meeting of the Improvement of Air Traffic Services over the South Atlantic (SAT/14) to be held in Montevideo, Uruguay, 7 to 9 May 2008.

2.2.7 The following chart provides a summary of the number of categories assigned to each event. M and N continue to be the top two categories which account for approximately 93% of the reported LHDs. A table of event categories is included in **Appendix C**. This chart emphasizes that errors are not caused by RVSM operation, common procedures in aircraft transference from one ATC unit to another is the largest contributor. For this reason, new corrective actions at short and mid term were proposed; therefore, GREPECAS/13 considered that these measures are additional to those contained in Conclusion 13/61, “Measures to reduce operational errors in the ATC coordination loop between adjacent ACCs” (**Appendix D**). GREPECAS encouraged States and International Organizations to implement a safety management system and, as technology permits, to gradually implement ATS Inter-facility data communication (AIDC).



2.2.8 Note was also taken of other FIRs that have also presented a greater incidence of events classified as "M" and "N":

- Guayaquil and Bogotá;
- Guayaquil and Lima;
- Bogotá and Panamá Oceanic;
- Barranquilla and Panamá Oceanic;
- Maiquetía and Curaçao;

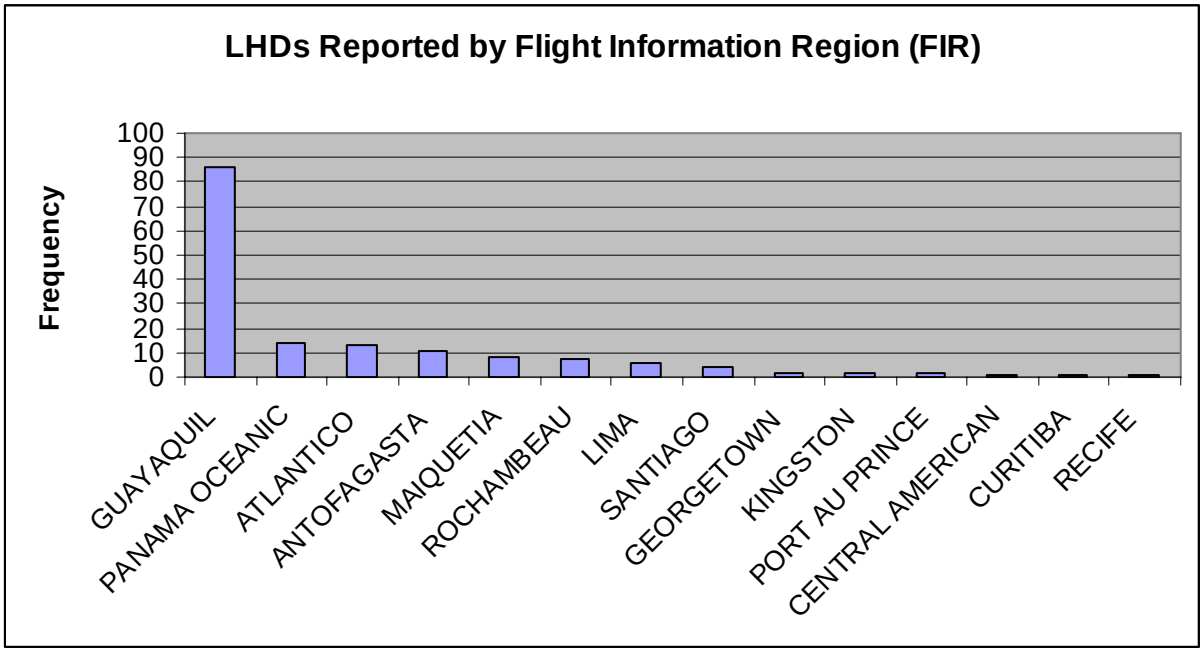
In fewer cases:

- Lima and Antofagasta
- Panamá Oceanic and Kingston.

2.2.9 With respect to coordination errors, the meeting recalled that many letters of operational agreement (LOAs) between ACCs had a procedure for the transference of ground/air communications, which establishes that such transference of communications of an aircraft shall be transferred FIVE (5) minutes before the estimated hour in which the aircraft shall reach the transference point for each ATS route.

2.2.10 In view of the above, and as a prevention method to minimize the impact that the lack of an effective coordination of aircraft transference might have in safety, the meeting agreed that States should take the corresponding actions, so that ACCs apply the communications procedure aforementioned. In cases where current LOAs do not contemplate these 5 minutes for the communications transference, the meeting deemed pertinent that ACCs involved, if applicable, review and incorporate such procedure.

2.2.11 The following chart provides a summary of the frequency of LHDs reported by flight information region (FIR). The top six reporting FIRs contributed approximately 88% of the reported LHDs.



3.0 Suggested Actions

3.1 The Meeting is invited to:

a) note the information in this paper;

b) encourage States, Territories and International Organizations to support the measures outlined in GREPECAS Conclusion 13/61, *"Measures to reduce operational errors in the ATC coordination loop between adjacent ACCs"* (Appendix D); and

c) encourage States, Territories and International organizations to send their representatives to the CAR/SAM GTE/6 planned to be held in September 2008 in the CAR region and to CAR/SAM GTE/7 planned to be held in March 2009 in the SAM region. When exact dates and locations are determined, notices will be sent from the applicable ICAO Regional Office.

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APPENDIX A

ANALYSIS OF THE LARGE HEIGHT DEVIATIONS (LHD)
(PRESENTED BY COLOMBIA)

No LHD

1.- RADAR COVERAGE IN THE ADJACENT AREA

When the receiving FIR has a radar coverage in the airspace of the transferring FIR and observes that the aircraft has a flight level different to the one previously coordinated, which was not reviewed, we do not consider there is a LHD, because the FIR was only made aware of it before it entered its airspace. We must take into consideration that there is a risk in safety, but we must investigate it as a coordination incident and not as an LHD.
Conclusion: The meeting “agreed” that in this scenario it is not 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.

Conclusion: Taking into consideration objections expressed by most of the participants, no agreement was reached in this scenario. For this reason, it was considered that further analysis is required by the Working Group.

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.

Conclusion: Taking into consideration objections expressed by most of the participants, no agreement was reached in this scenario. For this reason, it was considered that further analysis is required by the Working Group.

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.

Conclusion: The meeting “agreed” that in this scenario it is not an LHD.

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 3C-2 Appendix C to the Report on Agenda Item 3 GTE/5 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.

Conclusion: The meeting “agreed” that in this scenario it is not an LHD.

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.

Conclusion: The meeting “agreed” that in this scenario it is not an LHD.

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.

Conclusion: The meeting “agreed” that in this scenario it is not an LHD.

8. LATERAL DEVIATION WITHOUT RADAR COVERAGE IN THE ADJACENT LEVEL

When an aircraft flies into an airspace that was not included in its route due to an operational deviation, and there is no news of the deviation until the aircraft is already in the affected airspace, this is considered an LHD. Besides being an operational error made by the ACC that is aware of the deviation and that failed to coordinate with the affected ACC, this event directly impacts on the corresponding FIR as a traffic in an airspace putting at risk the RVSM airspace. This event should be considered a coordination incident between adjacent FIRs.

Conclusion: Taking into consideration the objections expressed by some participants, no agreement was reached in this scenario.

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APPENDIX B

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
1/12/2007	B737	410	2000	90	M	PANAMA OCEANIC
1/18/2007	B763	390	10000	90	M	SANTIAGO
1/20/2007	B735	360	2000	10	M	SANTIAGO
2/6/2007	E190	300	0	90	N	PANAMA OCEANIC
2/8/2007	F900	370		0		ASUNCION
2/9/2007	B762	380	2000	90	M	PANAMA OCEANIC
2/12/2007	E190	340	-4000	90	M	PANAMA OCEANIC
2/19/2007	A346	360	0	0		ASUNCION
2/20/2007	A340	370	0	0		ASUNCION
2/25/2007	B752	340	-2000	90	M	PANAMA OCEANIC
3/4/2007	C141	310	0	30	N	GUAYAQUIL
3/7/2007	B763	360	0	0		ASUNCION
3/16/2007	B772			90	N	MAIQUETIA
3/16/2007	B772				M	MAIQUETIA
3/16/2007	B763				M	MAIQUETIA
3/16/2007	B767	390	2000	90	M	MAIQUETIA
3/16/2007	B752	370	2000	90	M	MAIQUETIA
3/17/2007	A343	310	0	0		ASUNCION
3/20/2007	B767	370	0	30	N	GUAYAQUIL
3/21/2007	B762	390				ASUNCION
3/27/2007		390				ASUNCION
4/4/2007	A313	330		0		ASUNCION
4/7/2007	B772	410		0		ASUNCION
4/11/2007	B762	380	2000	90	M	GUAYAQUIL
4/11/2007	B763	390	0	90	N	GUAYAQUIL
4/12/2007	B763	390		0		ASUNCION
4/12/2007	F2TH	410		0		ASUNCION
4/15/2007	B737	390	0	0	M	GUAYAQUIL
4/19/2007	DC10	410	0	90	M	GUAYAQUIL
4/22/2007	B737	360				ASUNCION
4/22/2007	A343	290				ASUNCION
5/3/2007	B732	350	0	90	N	GUAYAQUIL
5/5/2007	B738	390	0	0		GUAYAQUIL
5/7/2007	B763	350	0	0	M	GUAYAQUIL
5/10/2007	B763	400	0	0	M	GUAYAQUIL
5/11/2007	F100	340	2000	90	M	GUAYAQUIL
5/14/2007	B763	350	2000	90	M	GUAYAQUIL
5/16/2007	C5	370	0	0	M	GUAYAQUIL
5/17/2007	B763	390	0	90	N	GUAYAQUIL
5/19/2007	C5	300	0	0	M	GUAYAQUIL
5/20/2007	B764	330	0	90	N	GUAYAQUIL
5/22/2007	C650	410	0	0	M	GUAYAQUIL
5/25/2007	B763	340	-2000	90	M	GUAYAQUIL
5/29/2007	MD11	400	0	90	N	GUAYAQUIL
5/29/2007	B737	360				ASUNCION
6/13/2007	B762	330	-6000	90	M	GUAYAQUIL

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
6/13/2007	B722	360	4000	90	M	GUAYAQUIL
6/16/2007	B744	360	2000	2560	M	ATLANTICO
6/17/2007	B737	410	2000	90	M	GUAYAQUIL
6/18/2007	B737	390	2000	90	M	GUAYAQUIL
6/20/2007	B763	370	2000	90	M	GUAYAQUIL
6/24/2007	A320	350	2000	90	M	GUAYAQUIL
6/25/2007	B744	360	2000	960	M	ATLANTICO
6/26/2007	B763	390	0	0	M	GUAYAQUIL
6/29/2007	B762	370				ASUNCION
7/4/2007	A319	350	0	90	M	GUAYAQUIL
7/5/2007	DC10	320	0	0	M	GUAYAQUIL
7/7/2007	B763	340	0	0	M	GUAYAQUIL
7/7/2007	B752	370	0	90	N	GUAYAQUIL
7/8/2007	B763	370	0	0	M	GUAYAQUIL
7/9/2007	B732	350		0		ASUNCION
7/10/2007	A320	350	0	0	M	GUAYAQUIL
7/11/2007	A320	330	0	0	M	GUAYAQUIL
7/12/2007	B767	320		0		ASUNCION
7/16/2007	B762	360	0	90	N	GUAYAQUIL
7/16/2007	B738	370	0	90	N	GUAYAQUIL
7/19/2007	H25B	380		0		ASUNCION
7/21/2007	LJ35	370				ASUNCION
7/22/2007	B752	370	4000	90	M	GUAYAQUIL
7/22/2007	B763	350	2000	90	M	GUAYAQUIL
7/22/2007	B763	360	2000	90	M	GUAYAQUIL
7/22/2007	DC10	300	6000	90	M	GUAYAQUIL
7/23/2007	B732	320	2000	90	M	GUAYAQUIL
7/27/2007	B752	370	2000	90	M	GUAYAQUIL
7/27/2007	A319	380	2000	90	M	GUAYAQUIL
7/27/2007	A320	330	0	0	M	GUAYAQUIL
7/28/2007	B732	390	0	90	N	GUAYAQUIL
7/30/2007	B732	340	0	0	M	GUAYAQUIL
8/5/2007	A306	310	2000	90	M	GUAYAQUIL
8/8/2007	F100	340	2000	60	M	GUAYAQUIL
8/11/2007	MD83	340	2000	180	M	GUAYAQUIL
8/12/2007	B738	370	2000	180	M	GUAYAQUIL
8/16/2007	B763	340	-4000	180	M	GUAYAQUIL
8/17/2007	B763	350	2000	120	M	GUAYAQUIL
8/20/2007	B737	360	2000	60	M	GUAYAQUIL
8/23/2007	A319	370	2000	120	M	GUAYAQUIL
8/30/2007	E190	370	2000	60	M	GUAYAQUIL
9/1/2007	B744	350	2000	80	M	ATLANTICO
9/1/2007	A320	350	2000	30	M	ANTOFAGASTA
9/3/2007	A332	390	2000	90	M	ATLANTICO
9/5/2007	MD81	340	2000	90	M	PANAMA OCEANIC
9/6/2007	B763	340	2000	90	M	PANAMA OCEANIC
9/7/2007	B752	370	0	90	N	PANAMA OCEANIC

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
12/18/2007	A342	370	2000	1320	M	ATLANTICO
12/18/2007	B737	320	-1000	90	M	ATLANTICO
12/19/2007	A320	340	2000	15	M	GUAYAQUIL
12/19/2007	B763	330	-2000	15	M	GUAYAQUIL
12/20/2007	B763	330		10	N	GUAYAQUIL
12/20/2007	MD11	360	2000	30	M	GUAYAQUIL
12/20/2007	B722	340	2000	30	M	PORT AU PRINCE
12/21/2007	B763	380				ASUNCION
12/21/2007	A343	350	1000	90	M	ATLANTICO
12/23/2007	A332	380	2000	90	M	GEORGETOWN
12/23/2007	A332	360		90	M	ATLANTICO
9/11/2007	H25A	294	400	110	E	CURITIBA
9/11/2007	B752	390				ASUNCION
9/11/2007	A310	330	0	0		ASUNCION
9/11/2007	F100	330	0			ASUNCION
9/12/2007	A346	380		0		ASUNCION
9/13/2007	A343	380		0		ASUNCION
9/13/2007	B763	390				ASUNCION
9/13/2007	B752	340	2000	90	M	PANAMA OCEANIC
9/14/2007	B763	340	-2000	30	M	ANTOFAGASTA
9/15/2007	B738	390	-2000	90	M	GEORGETOWN
9/16/2007	B763	340				ASUNCION
9/16/2007	B763	360	-2000	48	M	LIMA
9/22/2007	B763	330		0		ASUNCION
9/22/2007	A343	350	4000	90	B	ATLANTICO
9/27/2007	B763	310				ASUNCION
9/27/2007	H25B	410	0	90	N	PANAMA OCEANIC
9/28/2007	B732	370	0	0	M	MAIQUETIA
9/28/2007	B772	360				ASUNCION
9/28/2007	MD11	330	2000	60	M	MAIQUETIA
9/28/2007	B721			90	N	MAIQUETIA
9/29/2007	E190	390	4000	90	M	GUAYAQUIL
9/29/2007	B737	380	0	0		GUAYAQUIL
9/29/2007	A320	370	0	0		GUAYAQUIL
9/30/2007	A319	364	400	0	E	CENTRAL AMERICAN
10/1/2007	B738	350	2000	30	M	LIMA
10/2/2007	A320	330	-2000	30	M	ANTOFAGASTA
10/2/2007	B772	340	0	0		ROCHAMBEAU
10/3/2007	B737	380	2000	90	M	PANAMA OCEANIC
10/3/2007	A320	360	0	90	D/N	KINGSTON
10/6/2007	B763	350	2000	30	M	LIMA
10/9/2007	B752	410	2000	90	M	GUAYAQUIL
10/10/2007	B767	340	-2000	90	G	ASUNCION
10/10/2007	B737	390	1000	90	B	KINGSTON
10/11/2007	A343	320	0	180	N	ROCHAMBEAU
10/12/2007	B763	380				ASUNCION
10/12/2007	B763	350	0	600	N	GUAYAQUIL

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
10/13/2007	B763	370	2000	300	M	GUAYAQUIL
10/13/2007	B772	390				ASUNCION
10/14/2007	A306	310	2000	90	M	GUAYAQUIL
10/14/2007	B763	329	100	2760	E	GUAYAQUIL
10/15/2007	B752	369	100	2760	E	GUAYAQUIL
10/15/2007	IL96	320				ASUNCION
10/17/2007	A319	360	0	0		GUAYAQUIL
10/23/2007	B752	360	0	90	N	PANAMA OCEANIC
10/25/2007	B757	370				ASUNCION
10/25/2007	B773	360	0	0		ROCHAMBEAU
10/26/2007	B744	400	0	90	N	ANTOFAGASTA
10/27/2007	B752	390	2000	90	M	GUAYAQUIL
10/27/2007	B744	330	2000	90	M	ATLANTICO
10/28/2007	B763	340	2000	30	M	ANTOFAGASTA
10/30/2007	B767	350	2000	30	M	LIMA
10/31/2007	B732	340	0	0		GUAYAQUIL
11/1/2007	A343	380				ASUNCION
11/7/2007	B737	380				ASUNCION
11/9/2007	B763	370				ASUNCION
11/11/2007	B732	340	2000	30	B	SANTIAGO
11/16/2007	B762	370	4000	90	M	GUAYAQUIL
11/16/2007	B763	350	2000	30	M	ANTOFAGASTA
11/17/2007	MD11	340	2000	90	M	GUAYAQUIL
11/18/2007	B767	350	2000	30	M	LIMA
11/18/2007	B767	330	-2000	30	M	LIMA
11/19/2007	B735	320	2000	10	B	SANTIAGO
11/20/2007	A320	350	0	90	N	GUAYAQUIL
11/21/2007	A319	350	0	0		GUAYAQUIL
11/22/2007	A343	400				ASUNCION
11/23/2007	B767	370	0			ASUNCION
11/23/2007	B752	380	2000	90	M	PANAMA OCEANIC
11/24/2007	A332	350	0	90	N	GUAYAQUIL
11/24/2007	B763	340	0	90	N	PANAMA OCEANIC
11/24/2007	E190	360	2000	90	M	GUAYAQUIL
11/24/2007	A320	350	0	0		GUAYAQUIL
11/25/2007	B737	380				ASUNCION
11/25/2007	A340	380				ASUNCION
11/27/2007	B763	320	0	0		GUAYAQUIL
11/29/2007	DC10	350	0	3600	N	ATLANTICO
11/29/2007	DC10	350	0			RECIFE
11/30/2007	B763	340	2000	15	M	ROCHAMBEAU
11/30/2007	A346	360	2000	15	M	ROCHAMBEAU
12/1/2007	B763	360	2000	30	M	GUAYAQUIL
12/3/2007	A342	360	2000	180	M	ATLANTICO
12/3/2007	A332	390	2000	120	M	ATLANTICO
12/5/2007	F100	340	2000	20	M	GUAYAQUIL
12/6/2007	B763	330				ASUNCION

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
12/9/2007	B763	330	2000	20	M	GUAYAQUIL
12/10/2007	B742	310	-2000	90	M	ANTOFAGASTA
12/10/2007	CL60	410				ASUNCION
12/12/2007	H25A	400	0	15	N	ROCHAMBEAU
12/14/2007	B763	340	2000	30	M	ANTOFAGASTA
12/15/2007	HS54	350	0	30	N	GUAYAQUIL
12/16/2007	B767	350				ASUNCION
12/16/2007	B737	390	2000	20	M	GUAYAQUIL
12/17/2007	A321	330	0	20	N	GUAYAQUIL
12/24/2007	B763	370	0	15	N	ROCHAMBEAU
12/25/2007	B738	390	8000	30	M	PORT AU PRINCE
12/25/2007	A320	340	2000	30	M	ANTOFAGASTA
12/26/2007	E190	330	-2000	15	M	GUAYAQUIL
12/27/2007	B763	370	0	90	N	ANTOFAGASTA
12/27/2007	B762	400	4000	20	M	GUAYAQUIL
12/27/2007	A320	360	2000	30	M	ANTOFAGASTA
12/28/2007	B777	400				ASUNCION
12/29/2007	B747	400		0		ASUNCION

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APPENDIX C

ERROR CATEGORIZATION 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

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APPENDIX D

GREPECAS
Conclusion 13/61 - MEASURES TO BE ADOPTED TO REDUCE OPERATIONAL ERRORS IN THE COORDINATION LOOP BETWEEN ADJACENT CONTROL CENTRES

That States/Territories/International Organizations, in order to reduce operational errors in the coordination loop between adjacent ATS units, urgently adopt, inter-alia:

a. the preventive and corrective measures shown in Appendix D to this part of the report; and

b. additionally, the following short term measures, inter-alia: meetings to emphasize the importance of coordinations and accurate communications; review of the current coordination procedures; increase the supervision and monitoring of operational positions; and any other measure particularly required.

ERROR PREVENTION PROGRAMME IN THE COMMUNICATIONS BETWEEN ADJACENT ACCs

There are many initiatives that can be pursued to prevent operational errors from occurring. However, there are five primary areas, which can directly contribute to its prevention: **communications, phraseology, supervision, teamwork, and ATC proficiency**. In an effort to accomplish the goal of reducing communication errors between adjacent Area Control Centres and thus reduce or minimize the occurrence of large-height deviations, the following objectives should be included in the prevention programme:

The authority shall:

a. identify individual, procedural, and/or equipment deficiencies used in air traffic services;
b. promptly correct individual, procedural, and/or equipment deficiencies which affect coordinations with adjacent and ATS units. This can be achieved through:

- guidance on procedures to be followed;
- implementation of read-back/hear-back programmes;
- training in the filling of LHD forms;
- increase and/or closer monitoring of ATCOs performance;
- immediate coordination programme after a re-authorization or change in flight level;
- changes in procedures and/or corrections/amendments of equipment.

c. ommunicate performance expectations to ATS supervisors and controllers;
d. ensure the ATS unit maintains a summary of and have information letters on operational errors, causal factors and trends, and incorporate them into training;
e. monitor and evaluate voice recordings (all ATS operational personnel);
f. take initiatives to improve communications among all ATS personnel to create an atmosphere conducive to sharing information;
g. exercise strict monitoring in ATC units;

h. ATS supervisors should:

- communicate performance expectations to controllers, stressing the importance of operational control position discipline, awareness, teamwork, the use of proper phraseology, proper coordination procedures, control position relief briefings and utilization of a position relief checklist;
- take prompt follow-up actions when controller performance does not meet with expectations;
- inform on individual and team accountability, and the consequences for not meeting expectations;
- provide efficient and consistent oversight of the ATS unit operation, and use effective resource management to ensure proper and timely assignment of personnel to promote the safe, orderly, and expeditious handling of air traffic;
- ensure that distractions and noise levels in the ATS unit are kept at a minimum;
- require all personnel to maintain a high degree of professionalism, teamwork, control position discipline, and awareness at all times in the ATS unit environment; and require that each controller knows, applies, and adheres to the appropriate requirements in the performance of his/her operational duties and responsibilities;
- promote an open flow of communications with all ATS personnel, allowing them to provide input to programme;
- place emphasis on hear-back/read-back errors during team meetings.

i. ATC personnel should:

- apply read-back/hear-back procedures when carrying out ATC coordinations;
- keep ATS supervisors advised of traffic problems and equipment limitations; - make suggestions for ATS unit improvements and/or prevention of operational errors;
- maintain situational awareness;
- extend the extra effort to assist busier control position(s);
- continuously review their own operating techniques and ATS unit procedures to effect the highest quality of performance;
- promptly report all ATS incidents to the operational supervisor or other appropriate ATS authority for proper follow-up investigation;
- utilize memory aids.

VOICE RECORDING EVALUATIONS

Voice recording reviews should be conducted to ensure proper phraseology, good operating practices, and adherence to the standards set forth in ICAO provisions, and national/local directives and practices. Voice recording reviews should be conducted as follows:

a. the ATS unit should ensure that voice recording reviews are conducted at least semi-annually on all ATS operational personnel;

he ATS supervisor should review the voice recording, document comments and develop an action plan for documenting performance deficiencies; and the ATS supervisor and the controller should review and discuss the voice recording

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