GTE/15

INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL REPORT

(Revised)

FIFTEENTH MEETING OF THE GREPECAS SCRUTINY WORKING GROUP

(GTE/15)

Lima, Peru, 16 to 20 November 2015

INDEX

HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Fifteenth Meeting of the GREPECAS Scrutiny Working Group (GTE/15) was held at the premises of the ICAO South American Regional Office in Lima, Peru, from 16 to 20 November 2015.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. Oscar Quesada, Deputy Regional Director of the ICAO South American Office, opened the Meeting. He welcomed the participants, and highlighted the importance of reviewing the topics at the regional level, focusing on the need to reduce E-coded LHD reports mainly related to ATC to ATC transfer procedures, in order to enhance safety in the two Regions.

Furthermore, the Meeting acknowledged the presence of CARSAMMA experts, Messrs. Cezar Pereira Rosa, Ricardo Dantas Rocha and Reinaldo Brandão Taveira, and regretted the absence of IATA.

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

The Meeting agreed to hold its sessions from 0830 to 1500 hours, with appropriate breaks. The work was done with the Meeting as a Single Committee.

Mr. Julio Alexis Lewis Camarena, delegate from Dominican Republic, served as Rapporteur of the Scrutiny Working Group.

Mr. Roberto Arca, RO/ANS & SFTY of the ICAO South American Regional Office, Lima, acted as Secretary.

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: Presentation of the quantitative Vertical Collision Risk Calculation (CRM) for year 2014.

a) Presentation of the quantitative Vertical Collision Risk Calculation (CRM) for year 2014.
b) Presentation of recommendations of the Tenth Meeting of the Regional Monitoring Agencies (RMACG/10), supported by the International Civil Aviation Organization, held in Bangkok, Thailand, from 18 to 22 May 2015.
c) Results on 2014 quantitative safety assessment in Reduced Vertical Separation Minimum (RVSM) airspace.
d) Large Height Deviation (LHD) notification data by ANSPs and other reporting sources.

Agenda Item 2: Large Height Deviation (LHD) analysis.
a) Application of approved methodology by GREPECAS for qualitative safety assessment to reported LHD events.
b) Identifying trends.
c) GTE recommendations.
d) Qualitative LHD safety assessment methodology (SGSO/SMS).

Agenda Item 3: Lessons learned by CAR/SAM States to reduce LHDs.

Agenda Item 4: Review of the project on safety assessment in the RVSM airspace for CAR/SAM Regions.

Agenda Item 5: New Monitoring Agency implementation in the CAR/SAM Regions.

Agenda item 6: Other business.

ii-6 **ATTENDANCE**

The Meeting was attended by a total of 31 participants, from 5 States/Territory of the NACC Region (Cuba, Curaçao, Dominican Republic, Haiti and Jamaica) and 6 States of the SAM Region (Argentina, Chile, Ecuador, Panama, Peru and Venezuela), as well as 2 International Organizations (CARSAMMA and COCESNA). The list of participants is shown in page iii-1.

Agenda Item 1: Quantitative Vertical Collision Risk Calculation

a) Presentation of the quantitative Vertical Collision Risk Calculation (CRM) for year 2014

b) Presentation of recommendations of the Tenth Meeting of the Regional Monitoring Agencies Meeting (RMACG/10), supported by the International Civil Aviation Organization, held in Bangkok, Thailand, from 18 to 22 May 2015

c) Results on 2014 quantitative safety assessment in Reduced Vertical Separation Minimum (RVSM) airspace

d) Large Height Deviation (LHD) notification data by ANSPs and other reporting sources

1.1. Under this agenda item, the Meeting reviewed the following papers:

a) WP/02 - *Calculation of the vertical collision risk in the RVSM airspace of the CAR/SAM FIRs* (presented by CARSAMMA);
b) WP/03 - *Proposal of modification of the reference guide of the Scrutiny Working Group (GTE)* (presented by Peru); and
c) IP/03 - *Issues discussed during RMACG/10* (presented by CARSAMMA) (***Spanish only***).

Calculation of the vertical collision risk in the RVSM airspace of the CAR/SAM FIRs

1.2. The Meeting was informed of the analysis of the vertical collision risk in RVSM airspace in 2014 in the flight information regions (FIRs) of the Caribbean and South America. For this work, the vertical collision risk model (CRM) calculation methodology was used in RVSM airspace, as recommended by ICAO.

1.3. This RVSM safety assessment covers a period of twelve consecutive months.

1.4. Special attention should be paid to ensure that:

- All aircraft operating in reduced vertical separation minimum airspace are RVSM-certified;
- The aircraft certification is current;
- The target level of safety (TLS) of 5 x 10^{-9} fatal accidents per flight hour (for tracking height-keeping in a representative sample of aircraft) continues to be met;
- The use of RVSM does not increase the level of risk due to operational errors and contingency procedures;
- The introduction of RVSM does not increase the level of risk due to operational errors and flight contingencies, in accordance with a predefined level of statistical confidence;
- Additional effective safety measures are adopted to reduce collision risk and meet safety targets concerning operational errors and contingency procedures;
- There is evidence of stability of the altimetry system error (ASE);
- Air traffic control procedures continue to be effective.

1.5. The Meeting noted that the methodological procedures used were based on ICAO standards, internationally accepted as the most appropriate for assessing RVSM airspace.

CAR/SAM RVSM airspace analysis

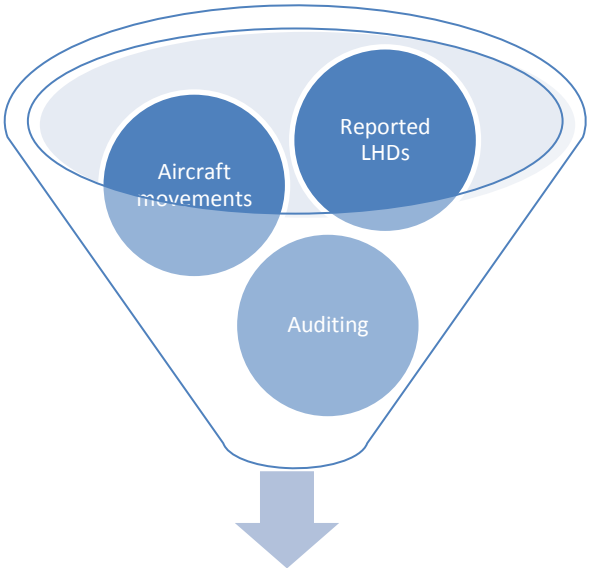
1.6. CAR/SAM RVSM airspace consists of 34 flight information regions (FIRs), which include the following States: Antigua, Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Guadeloupe, Guatemala, Guyana, French Guiana, Haiti, Honduras, Jamaica, Martinique, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, St. Barts, St. Kitts and Nevis, St. Lucia, St. Vincent, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

1.7. Each part of the airspace was treated as an isolated system, with its own statistical parameters.

1.8. The data used corresponded to 967.135:07 flight hours of aircraft in transit that used segments of 486 airways of the 34 (thirty-four) CAR/SAM FIRs, between flight levels 290 and 410.

1.9. As to the occurrence of vertical deviations (LHDs) reported in the CAR/SAM Regions, CARSAMMA received a total of 1,717 LHDs in 2014. Following the analysis and validation carried out through teleconferences with representatives of the ICAO Lima and Mexico Offices, the FIRs involved, IATA and CARSAMMA, 1,451 of these LHDs (scenario 1) were considered valid for calculating the vertical collision model (CRM), and 58 LHDs (scenario 2) were considered valid in the event "E" LHDs were not taken into account.

Data flow for calculating the vertical collision risk



Aircraft movement data collection

1.10. The sample data for estimating the pass frequency and the physical parameters, as well as the dynamics of a typical aircraft in the vertical collision risk assessment were collected from 1 to 31 December 2014.

1.11. Aircraft movement data received from the 34 CAR/SAM FIRs was processed and used to assess RVSM airspace safety, as recommended by ICAO. The number of flight hours used is shown in **Table 1**.

	Flight hours	%
CAR Region	119.326:02	12,34 %
SAM Region	847.809:05	87,66 %
CAR/SAM Regions	967.135:07	100,00 %

Table 1 – Total flight hours in the CAR/SAM Regions

Aircraft fleet

1.12. It is essential that 100% of the RVSM-approved aircraft meet RVSM requirements. However, during the safety assessment, CARSAMMA identified some aircraft that were not contained in its RVSM database and that had used this airspace in 2014.

1.13. This led to a global search supported by monitoring agencies from other ICAO Regions, through the exchange of information contained in their databases. In the end, it was noted that, in fact, some of these aircraft were not RVSM certified by a State, as described in **Table 2**.

STATE	FIR	DATE	DELIVERED	NON RVSM	% NON RVSM
Argentina	Cordoba – SACU	13/02/15	5.823	67	1,15
	Ezeiza – SAEU	13/02/15	3.702	38	1,03
	Mendoza – SAMV	13/02/15	4.170	156	3,74
	Resistencia – SARU	15/02/15	3.414	34	1,00
	Comodoro - SAVU	13/02/15	2.322	72	3,10
Bolivia	La Paz – SLLF	12/01/15	5.544	53	0,96
Brazil	Atlantico – SBAO	09/03/15	5.462	10	0,18
	Amazonica – SBAZ	13/02/15	39.328	213	0,54
	Brasilia – SBBS	12/02/15	38.450	111	0,29
	Curitiba – SBCW	13/02/15	65.532	337	0,51
	Recife – SBRE	13/02/15	25.130	66	0,26
Chile	Punta Arena – SCCZ	03/02/15	473	11	2,33
	Santiago – SCEZ	03/02/15	12.969	56	0,43
	Antofagasta – SCFZ	03/02/15			
	Isla de Pascua – SCIZ	03/02/15	180	1	0,56
	Puerto Montt – SCTZ	03/02/15	1.564	0	0,00
Colombia	Bogota – SKED	26/03/15	13.109	15	0,11
	Barranquilla – SKEC	26/03/15			
Ecuador	Guayaquil – SEFG	06/03/15	7.740	146	1,89
Guyana	Georgetown – SYGC	06/03/15	2.073	49	2,36

STATE	FIR	DATE	DELIVERED	NON RVSM	% NON RVSM
French Guiana	Cayenne – SOOO	14/04/15	1.166	44	3,77
Panama	Panama – MPZL	07/04/15	16.999	148	0,87
Paraguay	Asuncion – SGFA	21/01/15	1.991	18	0,90
Peru	Lima – SPIM	15/02/15	12.594	15	0,12
Suriname	Paramaribo – SMPM	30/03/15	2.119	5	0,24
Uruguay	Montevideo – SUEO	11/02/15	4.373	172	3,93
Venezuela	Maiquetia – SVZM	13/02/15	3.720	636	17,10
SUBTOTAL SAM	27	27	279.947	2.473	0,88
STATE	**FIR**	**DATE**	**DELIVERED**	**NO RVSM**	**% NO VSM**
Netherlands Antilles	Curaçao – TNCF	26/01/15	6.815	100	1,47
COCESNA	Central America – MHTG	02/02/15	14.052	120	0,85
Cuba	Havana – MUFH	15/02/15	20.258	21	0,10
Haiti	Port-Au-Prince – MTEG	12/01/15	3.246	77	2,37
Jamaica	Kingston – MKJK				
Dominican Republic	Santo Domingo – MDCS	15/02/15	7.735	105	1,36
Trinidad & Tobago	Piarco – TTZP	20/04/15	6.388	71	1,11
SUBTOTAL CAR	7	6	58.494	494	0,84
					R
TOTAL CAR/SAM	34	33	338.441	2.967	0,88

Table 2 –NON-RVSM flights in the CAR/SAM Regions
**absence of data is due to failure to deliver aircraft movement data*

1.14. Reports containing the list of non-RVSM aircraft identified in this analysis will be individually delivered to the civil aviation authorities attending this GTE/15 Meeting, so that they can make the necessary arrangements. The number of non-certified aircraft was presented to the Meeting of Monitoring Agencies held by ICAO in May of this year in Bangkok, Thailand - during which RMAs received a list of non-RVSM aircraft that had used this airspace.

Filtering the data received

1.15. Upon receiving the aircraft movement data, CARSAMMA proceeded to filter and process the data. **Table 3** below shows the results, and lists the aircraft that flew across the CAR/SAM FIRs, with their dimensions and percentage of flight hours, including a typical aeroplane, using a dimension based on the Vertical Risk Calculation Model.

ACFT Type	Length λx	Wingspan λy	Height λz	Flight hours	% Flight hours	Number of flights	% of flights
B752	0,025551	0,020788	0,00732	45.073:43:00	4,66%	16.690	6,14%
A319	0,018272	0,018413	0,0064	40.218:23:00	4,16%	19.407	7,14%
B738	0,021328	0,018521	0,00675	26.639:34:00	2,75%	15.243	5,61%
A320	0,020286	0,018413	0,0064	24.334:22:00	2,52%	14.371	5,29%
B763	0,029644	0,025702	0,00756	17.013:38:00	1,76%	15.857	5,84%
B733	0,017279	0,016199	0,00648	15.080:12:00	1,56%	12.992	4,78%
E190	0,019568	0,015507	0,00571	11.942:57:00	1,23%	15.216	5,60%
A332	0,031749	0,032559	0,0094	7.969:46:00	0,82%	9.589	3,53%
B737	0,018898	0,011852	0,00675	7.370:32:00	0,76%	10.681	3,93%
B734	0,019708	0,015605	0,005994	7.810:40:00	0,81%	8.691	3,20%
B772	0,034395	0,032883	0,00999	7.202:07:00	0,74%	9.521	3,50%
B739	0,021328	0,018521	0,006749	6.220:50:00	0,64%	8.630	3,18%
B77W	0,034395	0,034989	0,01004	4.630:17:00	0,48%	6.076	2,24%
A321	0,024033	0,018413	0,0064	3.415:18:00	0,35%	5.357	1,97%
A343	0,034341	0,032559	0,0091	3.225:25:00	0,33%	3.395	1,25%
B732	0,016199	0,015659	0,006479	2.520:51:00	0,26%	1.605	0,59%
B788	0,030778	0,032397	0,00918	2.058:22:00	0,21%	2.268	0,83%
A346	0,040659	0,03426	0,00934	1.977:26:00	0,20%	2.304	0,85%
B744	0,038175	0,034773	0,01048	1.763:45:00	0,18%	2.075	0,76%
B77L	0,034395	0,034989	0,01004	1.562:05:00	0,16%	1.915	0,70%
B762	0,026188	0,025702	0,00756	1.317:20:00	0,14%	2.004	0,74%
MD11	0,033261	0,028077	0,00947	1.249:39:00	0,13%	1.463	0,54%
B764	0,033153	0,028024	0,00756	1.129:10:00	0,12%	1.720	0,63%
B735	0,016793	0,015605	0,005994	1.090:54:00	0,11%	2.622	0,97%
A318	0,016982	0,018413	0,00678	816:32:00	0,08%	2.410	0,89%
Otras				723.514:45:00	74,81%	79.557	29,29%
Acft Típica	**0,02629432**	**0,02395292**	**0,00775704**				
Total				**967.135:07:00**	**100**	**271.659**	**100**

Table 3 - Aircraft that flew RVSM in the CAR/SAM FIRs
(Dimension measurements are expressed in nautical miles)

Data processing

1.16. Some products can already be obtained from the first data processing step of the risk calculation programme, such as the ratio between the number of LHDs and the characteristic of the aircraft population that used the airways in RVSM levels. Some of these products are listed in this chapter.

1.17. **Segments most frequently flown in CAR/SAM FIRs**

1.17.1 **Table 4** below shows an index where the number of LHDs that occurred in an airway segment was divided by the total number of aircraft movements in that same segment.

State	FIR	Total movements	Fix A	Airway	Fix B	Movements in the segment (7)	% of movements	Number of LHDs	LHF/ (7)
Antilles	Curaçao	21.188	DUSAN	UA315	PENKO	1.023	5%	20	1,96%
Argentina	Cordoba	18.981	PORKA	UL550	OPTIR	1.001	5%	-	-
	Ezeiza	6.161	ROKER	UL550	ROS	502	8%	-	-
	Mendoza	9.390	TOSOR	UA306	RYD	930	10%	4	0,43%
	Resistencia	10.316	MCS	UW64	KORTA	876	8%	4	0,46%
	Comodoro	7.488	MIGUS	UA570	VIE	819	11%	2	0,24%
Bolivia	La Paz	25.401	MEVOT	UA304	MOSGO	933	4%	-	-
Brazil	Atlantico	15.558	BUGAT	UL206	REGIS	752	5%	-	-
	Amazonica	39.328	ACARI	UZ52	NEBAN	405	1%	2	0,49%
	Brasilia	14.731	ETIGU	UM409	REINA	831	6%	-	-
	Curitiba	25.146	OGNAV	UZ10	TBE	1226	5%	-	-
	Recife	15.059	POSMU	UZ36	MARSU	703	5%	-	-
Chile	Punta Arena	431	SATIN	UT100	PNT	416	97%	-	-
	Santiago Antofagasta	9.502	VISEK	UL531	NEBEG	980	10%	-	-
	Isla Pascua	177	MORSA	UL348	VINAP	64	36%	-	-
	P. Montt	1.447	NIA	UT112	ICO	741	51%	-	-
Cocesna	Central América	43.960	PENSO	UB753	PIKRO	1.165	3%	6	0,52%
Colombia	Bogota Barranquilla	13.109	AGUJA	UA319	NESMO	405	3%	13	3,21%
Cuba	Havana	44.824	URSUS	UA301	UCA	4.783	11%	3	0,06%
Ecuador	Guayaquil	4.505	VAKUD	UL780	UGUPI	1.489	33%	55	3,69%
Guyana	Georgetown	7.256	TIM	UA312	KOXAM	983	14%	2	0,20%
French Guiana	Cayenne	1.628	MAVKO	DCT	GOGSO	305	19%	4	1,31%
Haiti	Port-au-Prince	11.485	MEDON	UA315	JOSES	1.492	13%	25	1,68%
Jamaica	Kingston	-	-	-	-	-	-	15	-
Panama	Panama	19.457	BUFEO	UA317	BITOR	1.132	6%	1	0,09%
Paraguay	Asuncion	1.732	REPAM	UA556	SAMGU	283	16%	-	-

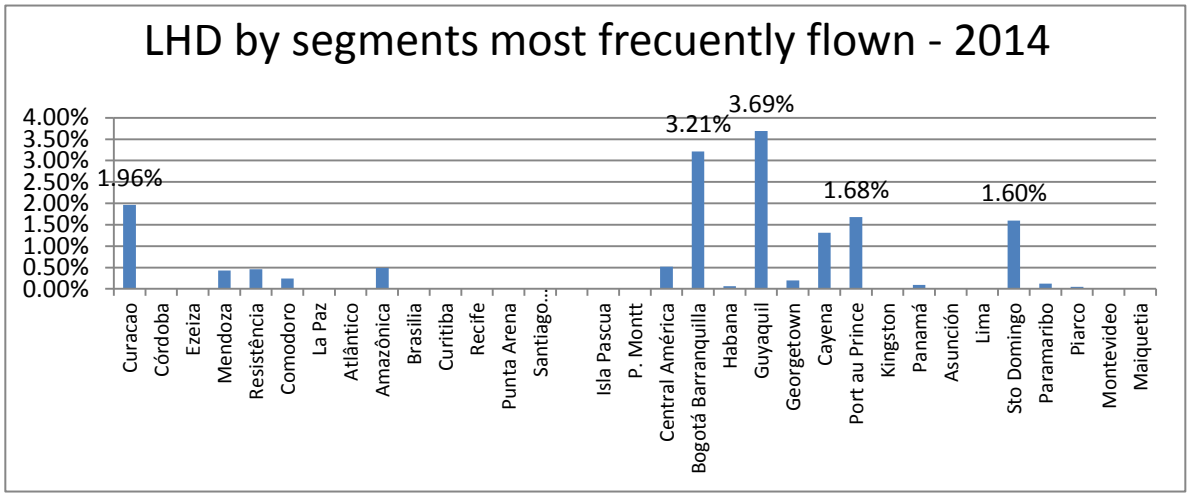
Peru	Lima	35.194	ATOGO	UG436	BTE	1.705	5%	-	-
Dominican Republic	Sto Domingo	17.670	VESKA	UA315	KATIN	1.378	8%	22	1,60%
Suriname	Paramaribo	1.493	KOXAM	UA312	ACARI	834	56%	1	0,12%
Trinidad & Tobago	Piarco	10.718	PELMA	UG449	PERRY	2.102	20%	1	0,05%
Uruguay	Montevideo	11.607	ISALA	UN741	OGLAP	1.102	9%	-	-
Venezuela	Maiquetia	24.159	ENPUT	UA567	STB	608	3%	-	-

Table 4 – LHD index by airway segment

1.17.2. In Table 4, out of a total of 180 LHDs and 31,968 movements, the average index is 0.56%.

1.17.3. The following graph shows the estimated rate in the most frequently flown airway segments in the CAR/SAM Regions. The airway segments with the highest rate are:

- VAKUD/UGUPI – UL780 - GUAYAQUIL FIR (SEFG) ECUADOR;
- AGUJA/NESMO – UA319 - BARRANQUILLA FIR (SKEC) COLÔMBIA;
- DUSAN/PENKO – UA315 - CURAZAO FIR (TNCF) NETHERLANDS ANTILLES;
- MEDON/JOSES – UA315 - PORT-AU-PRINCE FIR (MTEG) HAITI; and
- VESKA/KATIN – UA315 - STO. DOMINGO FIR (MDCS) DOMINICAN REPUBLIC.



Graph 1 – LHDs by airway segment

1.17.4. The indices show that there is a higher incidence of LHDs in these segments, although the FIRs in which the events occurred are not necessarily responsible.

1.18. The following three LHDs illustrate the situations that occur in RVSM airspace, which probably have led to an extremely unsafe level of the collision risk index.

LHD 192 - FIR exposed to the risk: CENTRAL AMERICA - Day: 9 February 2014

Report #:	192	POSITION:	LIXAS	*AMERICAN*	LIXAS	MODE C:	NO	HT LHD:	2.000
DATE:	09/02/2014	HOUR:	07:12	FLIGHT ID: AAL940	REGISTRATION:	N765AN	CLRD FL:	340	DURATION: 1.800
ROUTE:	UZ512 - SCEL (SANTIAGO) / KDFW (DALLAS FORT WORTH)				ACFT TYPE:	B772	EVENT FL:	360	CODE: E1
REPORTING UNIT:	CENTRAL AMERICA	FIR ERROR :	GUAYAQUIL		IMC / VMC:	V	XFL SAME:	1	XFL OPS 1
OTHER ACFT (2ª):				#N/D	DISTANCE:	0	POSITION 2ª ACFT:	0	FL 2ª ACFT: 0
CAUSE:	ERROR OPERACIONAL EN EL CICLO DE COORDINACIÓN ATC				STATUS RVSM:	APPROVED	GTE TIME:	1.800	GTE CODE: B
ACC GUAYAQUIL PASO ESTIMADO LIXAS 07:12 FL340 PERO NO PASO CAMBIO DE NIVEL A FL360. AAL940 NOTIFICO RADIM 07:43 FL360, SE RECLAMO A GUAYAQUIL ACC Y DIJERON QUE ELLOS LO TENIAN A FL340 Y NO PUDO EXPLICAR QUE PASO O QUIEN LO ASCENDIO A FL360.									
PROBABILIDAD:	4	DURACIÓN:	3	GRAVEDAD: 4	RADAR / ADS:	10	WEATHER:	0	OTRO TRAFICO: 0
VALOR DEL RIESGO:	58	ACCIÓN MITIGADORA:	REQUIERE MONITOREO Y GESTIÓN						

LHD 576 - FIR exposed to the risk: MONTEVIDEO - Day: 22 April 2014

Report #:	576	POSITION:	3400S 03200W	*IBERIA*	SUEOSAEU6	MODE C:	NO	HT LHD:	0
DATE:	22/04/2014	HOUR:	17:40	FLIGHT ID: IBE6842	REGISTRATION:	ECJCY	CLRD FL:	0	DURATION: N/A
ROUTE:	AORRA - FHAW (ILLAS ASCENCION)				ACFT TYPE:	A346	EVENT FL:	350	CODE: E2
REPORTING UNIT:	MONTEVIDEO	FIR ERROR :	EZEIZA		IMC / VMC:		XFL SAME:	0	XFL OPS 0
OTHER ACFT (2ª):				#N/D	DISTANCE:	0	POSITION 2ª ACFT:	0	FL 2ª ACFT: 0
CAUSE:	ATC LOOP ERROR				STATUS RVSM:	APPROVED	GTE TIME:	3.000	GTE CODE: E2
NO SE RECIBIO TRANSFERENCIA DE LA FIR EZEIZA NI COMODORO RIVADAVIA. LA INFORMACION FUE RECIBIDA POR LA FIR SBAO. *** CARSAMMA: DEL PUNTO DE ENTRADA HASTA EL PUNTO EN QUE LA AERONAVE LLAMA ATLANTICO SON 3.000 SEGUNDOS VOLADOS EN ESPACIO AEREO DE MONTEVIDEO. ***									
PROBABILIDAD:	3	DURACIÓN:	3	GRAVEDAD: 3	RADAR / ADS:	10	WEATHER:	5	OTRO TRAFICO: 0
VALOR DEL RIESGO:	51	ACCIÓN MITIGADORA:	REQUIERE MONITOREO Y GESTIÓN						

LHD 588 - FIR exposed to the risk: ANTOFAGASTA – Day: 25 April 2014

Report #:	588	POSITION:	KONRI	*TRANS PERU*	KONRI	MODE C:	NO	HT LHD:	0
DATE:	25/04/2014	HOUR:	11:46	FLIGHT ID: TPU904	REGISTRATION:	N492TA	CLRD FL:		DURATION: 240
ROUTE:	UL550 - SAEZ / SPIM				ACFT TYPE:	A320	EVENT FL:	340	CODE: E2
REPORTING UNIT:	ANTOFAGASTA	FIR ERROR :	CORDOBA		IMC / VMC:		XFL SAME:	0	XFL OPS 0
OTHER ACFT (2ª):				#N/D	DISTANCE:	0	POSITION 2ª ACFT:	0	FL 2ª ACFT: 0
CAUSE:	AUSENCIA DE COORDINACIÓN				STATUS RVSM:	APPROVED	GTE TIME:	240	GTE CODE: E2
A LAS11:46 TPU904 NOTIFICA EM POSICION KONRI A FL340 SIN TRANSFERENCIA POR PARTE DE CORDOBA ACC. EL TRANSITO ES VISUALIZADO POSTERIOR A LA NOTIFICACION, 20 NM AL NW DE KONRI.									
PROBABILIDAD:	3	DURACIÓN:	3	GRAVEDAD: 3	RADAR / ADS:	10	WEATHER:	5	OTRO TRAFICO: 0
VALOR DEL RIESGO:	51	ACCIÓN MITIGADORA:	REQUIERE MONITOREO Y GESTIÓN						

Collision risk safety assessment (CRM)

1.19. This section analyses the results of the safety assessment of RVSM airspace in CAR/SAM FIRs.

1.20. The internationally accepted collision risk methodology (CRM) has been used for the safety assessment of RVSM airspace in the Caribbean and South America.

1.21. At this stage of the data analysis, massive use is made of IT to obtain the end results of the collision risk model. A brief description is made of how the data derived from the aircraft movement sample is used and combined, together with the validated LHD data.

1.22. The filtered aircraft movement data was combined with the LHD data issued in 2014 for the FIRs under study. This data was compiled and analysed during the monthly teleconferences held with the experts of the FIRs involved, the officials of the ICAO Lima and Mexico Regional Offices and of CARSAMMA. IATA also partcipates in these teleconferences as guest consultant.

1.23. During the teleconferences, the LHD is validated and parameter values are merged and inserted in the REICH Collision Risk Model general formula shown in the next chapter.

CRM parameter estimates

$$N_{ax} = 2P_y(0)P_z(0)\left(\frac{\overline{|\dot{x}(m)|}}{2\lambda_x} + \frac{\overline{|\dot{y}_0|}}{2\lambda_y} + \frac{\overline{|\dot{z}_0|}}{2\lambda_z}\right)\frac{2\lambda_x}{\overline{|\dot{x}(m)|}}\frac{1}{T}\sum_s E(s)Q(s)$$

Figure 1 - REICH Collision Risk Model general formula

1.24. The material and amount of the source used for estimating the values of each parameter of the internationally accepted collision risk model (CRM) used for assessing the safety of the RVSM airspace are summarised in **Table 5**.

Parameter	Description	Value
λ_x	Mean length of the aircraft sample	0,02629432 nm
λ_y	Mean extent of the aircraft sample	0,02395292 nm
λ_z	Mean height of the aircraft sample	0,00775704 nm
$\overline{\|V\|}$	Mean speed of the aircraft sample (absolute)	463,1245 kt/h
$\overline{\|\Delta V\|}$	Relative same-direction speed of the aircraft sample (absolute)	30,25444 kt/h
$\overline{\|\dot{y}\|}$	Mean speed relative to the transverse approach of the aircraft sample (absolute)	13 kts
$\overline{\|\dot{z}\|}$	Mean relative vertical speed during loss of vertical separation of the aircraft sample (absolute)	1,5 kts
$P_z(0)$	Probability that two aircraft with the same nominal level overlap laterally in the aircraft sample	0,353416

Table 5 - CRM parameter estimates

Demonstration of the technical feasibility of RVSM in the CAR/SAM Regions

1.25. This involves assessing the results of the values of the parameters of the REICH Collision Risk Model:

- Pass frequency N_x;
- Probability of vertical overlap ***Pz (1000)***; and
- Probability of lateral overlap P_y ***(0)***.

To demonstrate this, the following objectives were established:

- Generate confidence in the compliance with the technical TLS; and
- Certify ASE stability.

System performance specifications

1.26. Pass frequency, N_x - This is the parameter of the airspace where the aircraft is exposed to the vertical collision risk. The equivalent pass frequency was estimated taking into account aircraft flying in the same direction and in opposite directions, as shown in **Table 6**.

Pass frequency	Same direction	Opposite direction	Equivalent	Flight time (h)
CAR Region	0,00278103	0,05379315	**0,053793156**	119,326:02
SAM Region	0,01215089	0,07857791	**0,078577917**	847,809:05
CAR/SAM Regions	0,00746596	0,06618553	**0,066185537**	967,135:07

Table 6 - CAR/SAM pass frequency

1.27. Values are related to the CAR/SAM airspace system. It should be noted that the pass frequency shown in Table 6 (**0,066185537**) was calculated on the basis of total filtered flight hours in the 34 CAR/SAM FIRs.

- The estimated value of ***Pz (1000)*** used in our calculations was **2,46 x 10^{-8}**.
- The estimated value of **Py (0)** calculated for 2014 is **0,045606**. Bearing in mind that the lateral overlap probability **Py (0)** shall not exceed **0,05800** according to ICAO Doc 9574 (Ref. 1), the lateral overlap probability obtained for 2014 is normal.

Estimating the total collision risk

1.28. **Table 7** contains the sets of physical and dynamic parameters estimated in the REICH Collision Risk Model, as well as the follow-up to the main parameters for the CAR/SAM FIRs. All parameters were determined based on the airspace of each region being considered as an isolated system.

	Ez (same)	ΔV (same)	Ez (0p)	ΔV (op)	Ez (cross)	V
CAR	0,045382	22,91634	0,016077	934,4065	0,059224	457,5213
SAM	0,052684	37,59253	0,022186	897,1633	0,043942	468,7277
CAR/SAM	0,049033	30,25444	0,019132	915,7849	0,051583	463,1245

Table 7 – Physical and dynamic parameters

Conclusions of the safety assessment (CRM)

1.29. Total Collision Risk (scenario 1 - all LHDs) - The estimated values of the Operational Risk are presented in **Table 8**, which result from processing all LHDs received and validated in 2014, plus the files containing aircraft movements in RVSM airspace, as processed in the specific CRM software.

Region	Technical risk	Operational risk	Total risk
CAR	0,0150 E^{-09}	1,84 E^{-09}	1,86 E^{-09}
SAM	0,0585 E^{-09}	1,79 E^{-09}	1,85 E^{-09}
CAR/SAM mean	**0,0508 E^{-09}**	**1,80 E^{-09}**	**1,85 E^{-09}**

Table 8 – Total vertical collision risk (scenario 1)

1.29.1. The technical risk of the CAR/SAM FIRs **satisfies** the goal of not exceeding **2.5 x 10^{-9} fatal accidents per flight hour** due to loss of standard vertical separation of 1 000 ft and all other causes.

- The operational risk does not have a predetermined limit according to ICAO Doc 9574.
- In the case of the FIRs under study, the estimated total risk is **1.85 x 10^{-9}** below the TLS, which is **5.0 x 10^{-9}.**

CAR/SAM RVSM airspace Estimated flight hours = 967 135:07 hours			
Source of risk	**Estimated risk**	**TLS**	**Remark**
Technical risk	**0,0508 x 10^{-9}**	**2,5 x 10^{-9}**	**Below**
Operational risk	**1,80 x 10^{-9}**	**-**	**-**
Total risk	**1,85 x 10^{-9}**	**5,0 x 10^{-9}**	**Below**

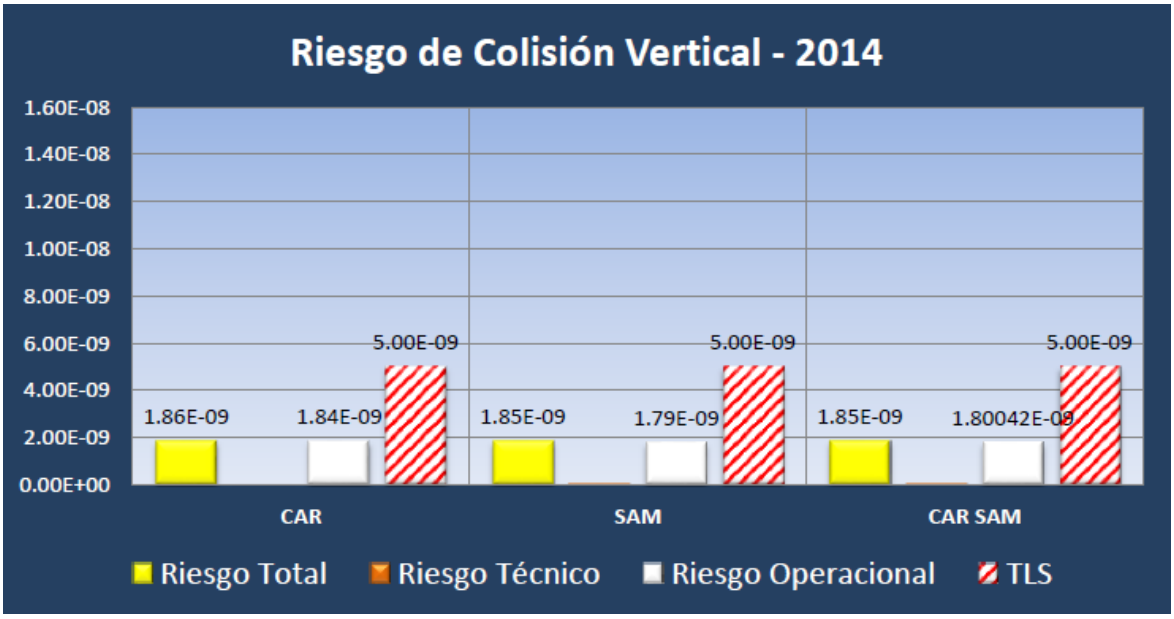


Table 9 and Graph 2 - Annual risk estimates for the CAR/SAM FIRs in RVSM airspace

1.30. Collision risk (scenario 2 - without E-coded LHDs) - The estimated values of the operational risk -excluding all E-coded LHDs- and processed in the specific CRM software, are shown in **Table 10**.

Region	Technical risk	Operational risk	Total risk
CAR	0,0150 E^{-9}	0,379 E^{-9}	0,394 E^{-9}
SAM	0,0585 E^{-9}	0,0581 E^{-9}	0,117 E^{-9}
CAR/SAM mean	**0,0508 E^{-9}**	**0,115 E^{-9}**	**0,166 E^{-9}**

Table 10 - Vertical collision risk (scenario 2)

1.30.1. The technical risk of the CAR/SAM FIRs satisfies the goal of not exceeding 2,5 x 10^{-9} fatal accidents per flight hour due to loss of standard vertical separation of 1 000 ft and all other causes.

- The operational risk does not have a predetermined limit according to ICAO Doc 9574.
- In the case of the FIRs under study, the estimated total risk is 0,166 x 10^{-9} below the TLS, which is 5,0 x 10-9.

CAR/SAM RVSM airspace Estimated flight hours = 967 135:07 hours			
Source of risk	**Estimated risk**	**TLS**	**Remark**
Technical risk	**0,0508 x 10^{-9}**	**2,5 x 10^{-9}**	**Below**
Operational risk	**0,115 x 10^{-9}**	**-**	**-**
Total risk	**0,166 x 10^{-9}**	**5,0 x 10^{-9}**	**Below**

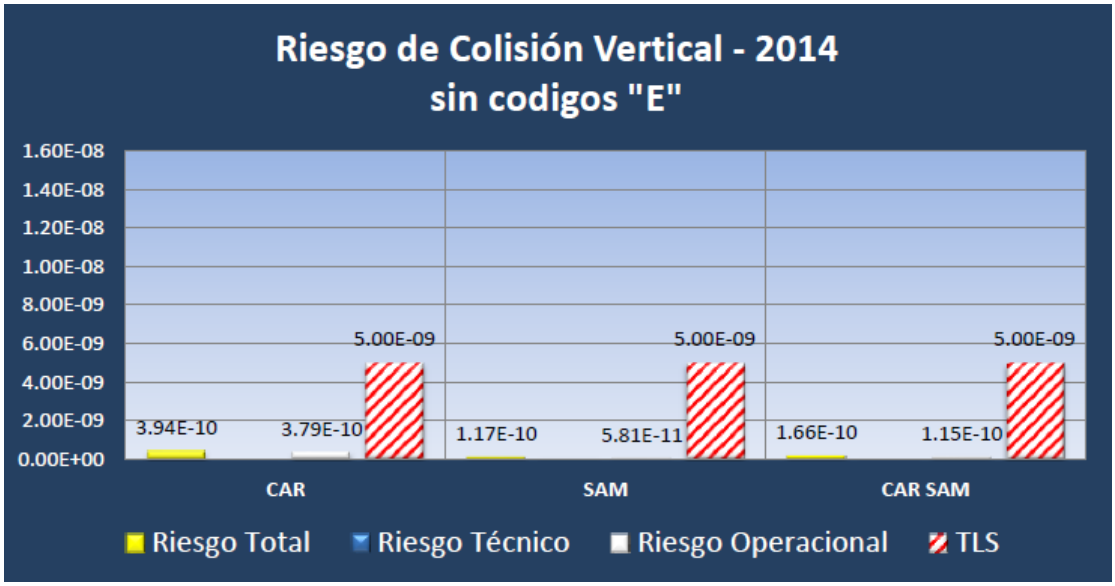


Table 11 and Graph 3 - Annual risk estimates for RVSM airspace in CAR/SAM FIRs

1.31. Analysis of vertical collision risk scenarios - From the scenarios analysed, the Meeting noted the reduction in the vertical colllision risk estimates and in the annual volume of LHDs shown in scenario 1. Scenario 2 shows how would be the situation excluding “E” codes, as shown in Tables 12a and 12b.

Month	#LHD	DURATION (min)
JAN	136	502
FEB	107	465
MAR	126	423
APR	136	393
MAY	102	315
JUN	95	125
JUL	103	215
AUG	109	313
SEP	134	272
OCT	144	164
NOV	124	192
DEC	135	108
TOTAL	1.451	3.487
Total Risk: 1,85 x 10-9		

Table 12a - LHD comparative table (scenario 1)

MONTH	#LHD	DURATION (min)
JAN	4	2,67
FEB	8	36,08
MAR	3	2,40
APR	2	2,00
MAY	1	7,00
JUN	4	6,50
JUL	4	93,17
AUG	5	126,50
SEP	8	5,67
OCT	6	6,50
NOV	6	4,75
DEC	7	6,00
TOTAL	58	299,23
Risk excluding "E" codes: 0,166 x 10-9		

Table 12b - LHD comparative table (scenario 2)

1.31.1 The estimated vertical collision risk scenarios show where efforts should be focused to improve coordination during the transfer of traffic to adjacent sectors, and thus reduce the CAR/SAM collision risk estimate to an insignificant level (scenario 2).

Proposal of modification of the reference guide of the Scrutiny Working Group (GTE)

1.32. Peru presented a proposal on the reduction of the ***"buffer time"*** or ***"buffer zone"*** from 5 minutes to 3 minutes, recalling that this time refers strictly to the time that the controller needs for taking action regarding unknown traffic or an unforeseen situation, such as lack of transfer or revision of the flight level, respectively.

1.33. Following a fruitful discussion, the Meeting considered that the buffer time of 5 minutes should be maintained and the proposal revisited after completing the operational implementation of AIDC.

Issues addressed by the RMACG/10 meeting

1.34. Under this agenda item, the Meeting took note of the CARSAMMA report on the 10th Meeting of Monitoring Agencies (RMACG/10), held in 2015 in Bangkok. The agenda included the following items:

a) Improved coordination of data exchange between Regional Monitoring Agencies;

b) Harmonisation of processes applied by RMAs;

c) Review of the global RVSM certification database;

d) Global investigation in December 2014 of non-RVSM aircraft flying in this portion of airspace;

e) Safety assessment issues.

1.35. In this regard, the Secretariat noted that this information was presented in Information Paper GTE/15-IP/03 of this Meeting, in Spanish, and suggested that CARSAMMA post the report of the Meeting on its website, in English, for English-speaking States.

1.36. Finally, upon reviewing the different aspects of this part of the report, the Meeting considered that, in addition to the significant quantitative improvement observed in 2014, there was also a significant improvement in the reporting culture, although the severity of the events was lower than in 2013.

Agenda Item 2: Large Height Deviation (LHD) analysis

a) Application of approved methodology by GREPECAS for qualitative safety assessment to reported LHD events

b) Identifying trends

c) GTE recommendations

d) Qualitative LHD safety assessment methodology (SGSO/SMS)

2.1 Under this agenda item, the Meeting reviewed the following papers:

a) WP/04 - *Safety assessment in the RVSM airspace of the CAR/SAM FIRs* (presented by CARSAMMA);
b) WP/05 - *Trend indentification* (presented by CARSAMMA);
c) WP/06 - *Recurrent identification in the Havana FIR of LHDs caused by turbulence, impact on safety, and recommendations for CAR/SAM ANSPs to mitigate their occurrence* (presented by Cuba); and
d) IP/12 - *LHD events Risk Value trend in the CAR/SAM Regions* (presented by Dominican Republic) (Spanish only)

2.2 The Meeting recalled that the CAR/SAM Regional Planning and Implementation Group (GREPECAS) entrusted the Caribbean and South American Monitoring Agency (CARSAMMA) with the implementation of the SGSO/SMS methodology for LHD analysis.

2.3 The Meeting recognised that an extremely important improvement in the use of SGSO for LHD analysis was the risk assessment and quick trend identification system, as well as the critical points where they occurred, thus reducing system safety calculation time.

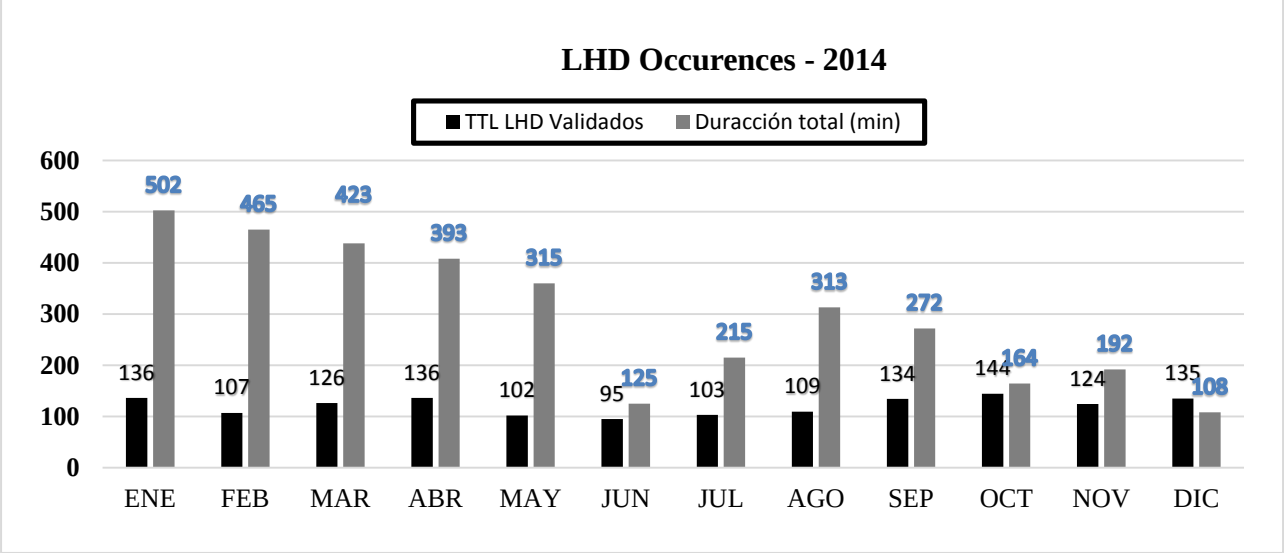
2.4 In this sense, CARSAMMA presented a series of LHD reports accumulated over a period of 12 months between January and December 2014 was used for this safety assessment.

2.5 **Table 1** and **Graph 1** summarise the validated LHD occurrences and their duration (in minutes), per month.

MONTH	Number of LHDs	Total DURATION (min.)	Average DURATION	Average RISK	Highest RISK
JANUARY	136	502	3,69	26,3	51
FEBRUARY	107	465	4,35	26,7	58
MARCH	126	423	3,36	26,1	51
APRIL	136	393	2,89	24,9	51
MAY	102	315	3,09	25,5	51
JUNE	95	125	1,32	23,1	39
JULY	103	215	2,09	22,9	45
AUGUST	109	313	2,87	23,9	51

SEPTEMBER	134	272	2,02	23,6	46
OCTOBER	144	164	1,14	23,9	45
NOVEMBER	124	192	1,55	23,3	50
DECEMBER	135	108	0,80	23,6	51
TOTAL	**1.451**	**3.487**	**2,43**	**24,5**	

***Table 1**. LHD occurrences, with the duration, average duration, average risk and highest risk, per month*



***Graph 1** - LHD occurrences/duration, per month*

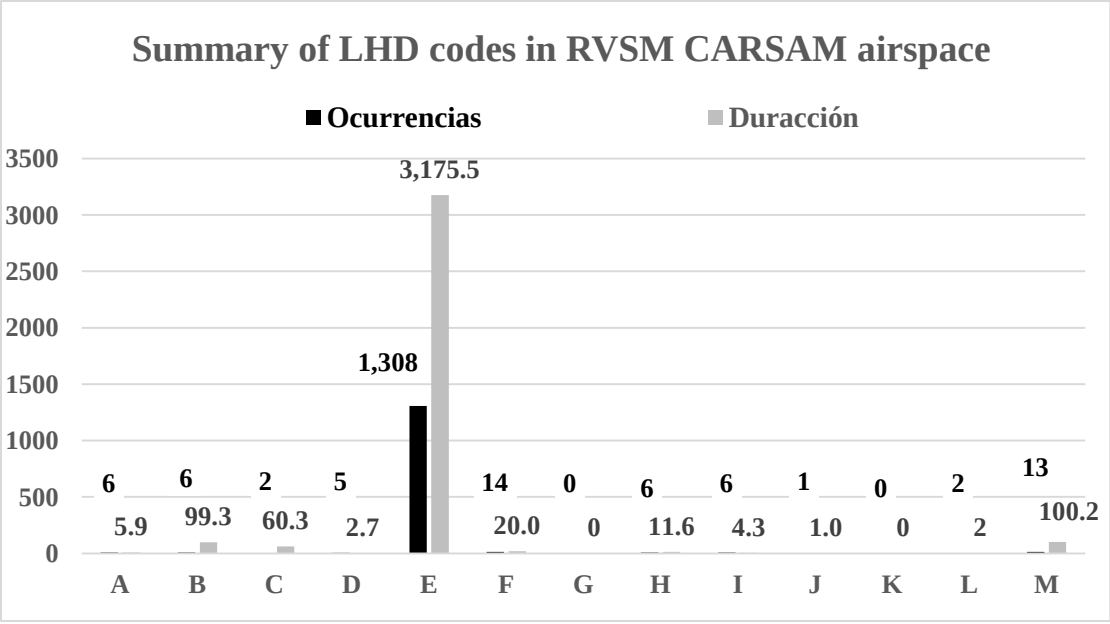
2.6 The Meeting was informed that in September, there was a case in which a single LHD (report # 1126) lasted 105 minutes in the Central America FIR. The highest risk value (58 - report # 192) was observed in February, also in the Central America FIR. From January until May, there were several long-duration LHDs at the Montevideo FIR, due to lack of information by EGYP in the Falkland Islands.

2.7 **Table 2** and **Graph 2** summarise the number of LHDs, the duration (in minutes) associated to the LHD, and the number of flight levels crossed without clearance, by LHD code, from 1 January to 31 December inclusive.

LHD CODE	Description of the LHD code	Number of LHDs	Duration of the LHD (min)	Levels crossed without clearance
A	Fail to climb/descend the aircraft as cleared.	6	5.9	10
B	Climb/descent without clearance.	6	99.3	5
C	Incorrect operation or interpretation of airborne equipment (*e.g.,* incorrect operation of fully functional FMS, incorrect transcription of ATC clearance or re-clearance, flight plan followed rather than ATC clearance, original clearance followed instead of re-clearance, etc.)	2	6.3	3
D	ATC system loop error (*e.g.,* ATC issues incorrect clearance or flight crew misunderstands clearance message)	5	2.7	2

LHD CODE	Description of the LHD code	Number of LHDs	Duration of the LHD (min)	Levels crossed without clearance
E	Coordination errors between ATC units concerning transfer or control responsibility due to human factors (*e.g.,* late or inexistent coordination; incorrect estimated/actual time; flight level, ATS route, etc., in conflict with the agreed parameters)	1,308	3,175.5	1,327
F	Coordination errors in the ATC to ATC transfer or control responsibility as a result of equipment outage or technical issues.	14	20.0	7
G	Deviation due to aircraft contingency event leading to sudden inability to maintain assigned flight level (*e.g.,* pressurisation failure, engine failure)	0	0.0	0
H	Deviation due to airborne equipment failure leading to unintentional or undetected change of flight level	6	11.6	2
I	Deviation due to turbulence or other weather-related cause.	6	4.3	4
J	Deviation due to TCAS resolution advisory; flight crew correctly following the resolution advisory.	1	1.0	0
K	Deviation due to TCAS resolution advisory; flight crew incorrectly following the resolution advisory.	0	0.0	0
L	An aircraft being provided with RVSM separation is not RVSM approved (*e.g.,* flight plan indicating RVSM approval but aircraft not approved; ATC misinterpretation of flight plan)	2	2.0	0
M	Other - this includes situations of flights operating (including climbing/descending) in airspace where flight crews are unable to establish normal air-ground communications with the responsible ATS unit.	13	100.2	0
Total	(Jan 14 – Dec 14)	1,369	3,482.8	1,360

***Table 2** - Summary of LHD occurrences and duration, by LHD code*

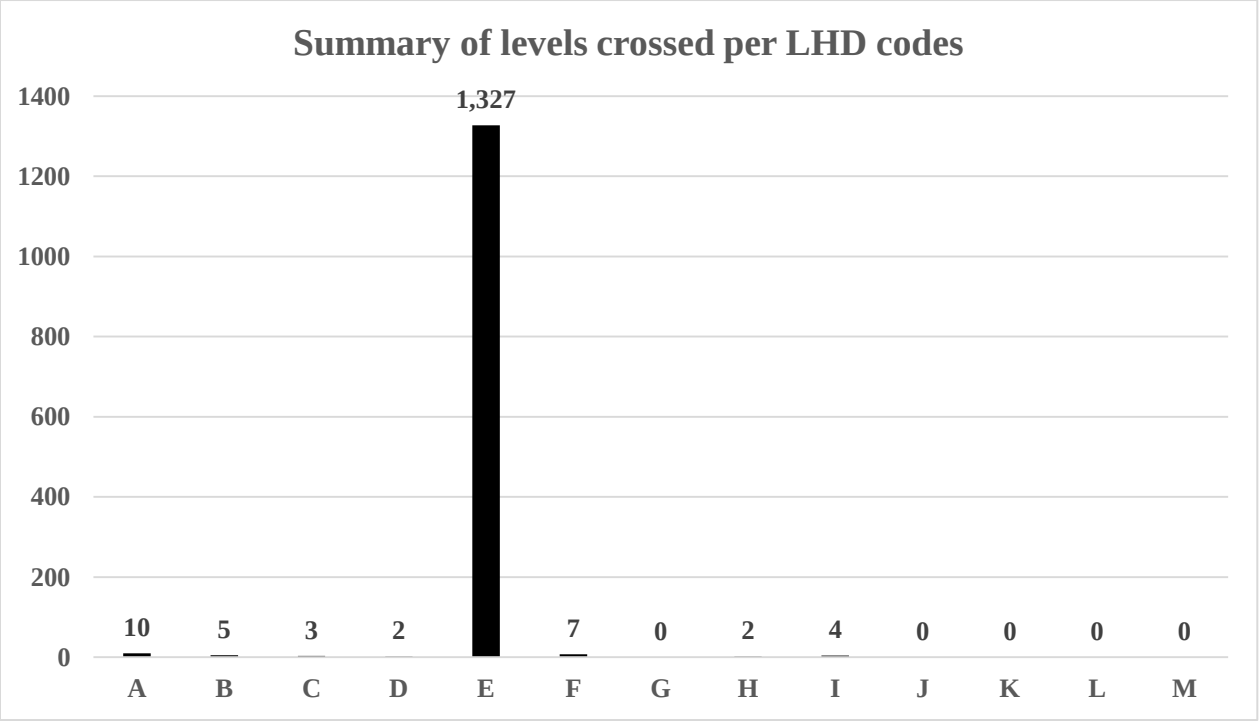


***Graph 2**. Summary of LHD occurrences, by code*

2.8 E-coded LHDs (*coordination error between ATCs*) were the most frequent in 2014, with 1,308 events, followed by codes F (14), M (13), A, B, H and I (6). The high number of this type of LHDs (E-coded) shows the need for better coordination with the adjacent ATC units, which could be achieved through sensitisation and training of controllers in coordination issues.

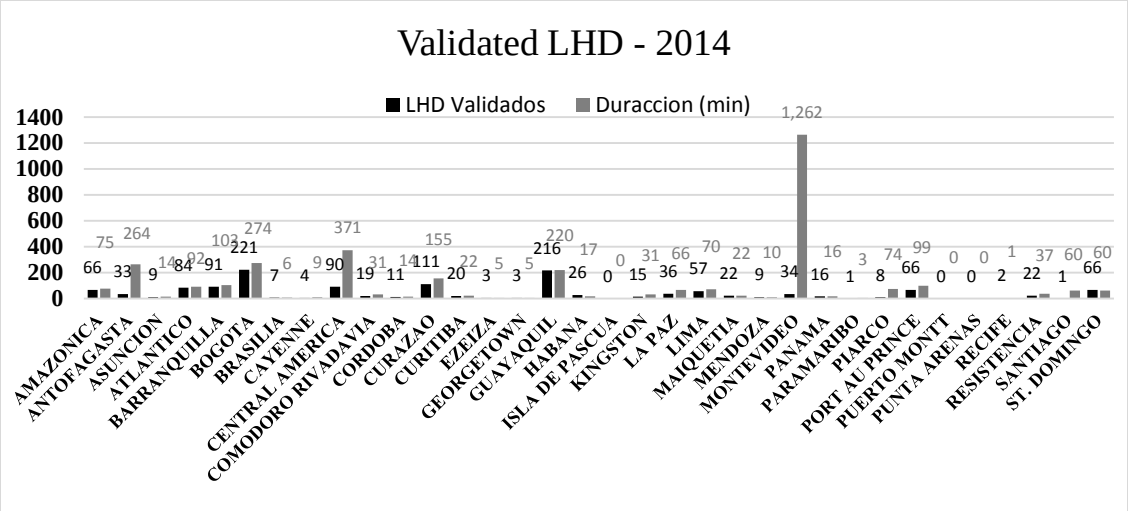
2.9 Likewise, Graph 2 shows that, in terms of duration, E-coded LHDs stood out in this analysis, with a total duration of 3,175.5 minutes. This is one of the worse air traffic incidents, since the aircraft involved are not expected in that position or at that level.

2.10 **Graph 3** shows LHDs involving crossing of levels without air traffic control clearance. In this case, E-coded LHDs prevailed, with 1,327 level crossings.



Graph 3 *- Summary of LHD occurrences, by levels crossed*

2.11 **Graph 4** shows all validated LHDs, by FIR. It should be noted that the Montevideo FIR has the highest absolute duration in minutes, thereby increasing the operational risk.



***Graph 4**. Summary of LHD occurrences, by FIR*

Risk value (VR) assessment

2.12 The Meeting analysed the results of the safety assessment of RVSM airspace in the CAR/SAM FIRs and noted that the risk value assessment methodology (SGSO/SMS) was applied to the internationally accepted safety assessment of this airspace.

2.13 As to VR parameter estimates, the Meeting took note of the internationally accepted values taken into account for estimating the values of each parameter of the risk value, and which are used for the safety assessment of RVSM airspace, as summarised in the following formula and as described in **Table 3**.

VR = (PxDxS)+R+W+T, where:

Parameter	Description	Value
VR	Risk value	**To be calculated**
P	Probability of the position	**Varies from 1 to 5**
D	Duration of the event	**Varies from 1 to 3**
S	Severity of the event	**Varies from 1 to 5**
R	With or without RADAR/ADS	**With=5 or without=10**
W	Weather conditions	**VMC=0 or IMC=5**
T	Other traffic (if any)	**The range varies from 5 (with radar) to 10 (without radar)**
	TOTAL	**Maximum: 100**

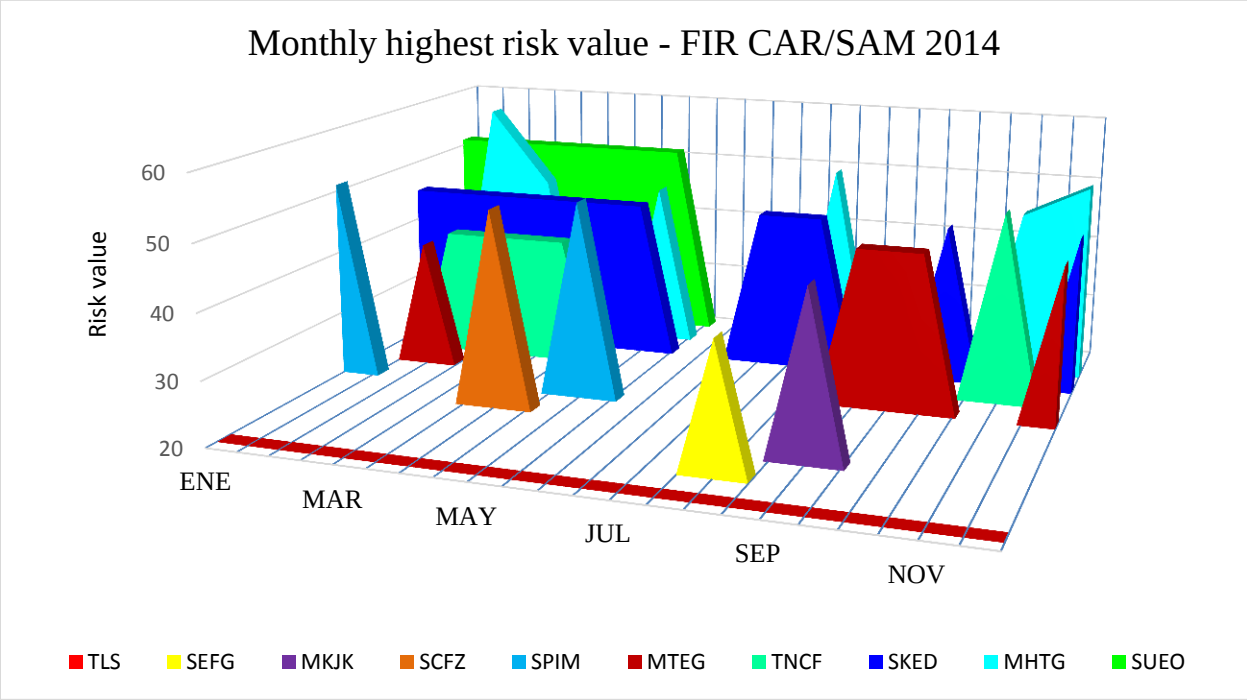
***Table 3** - Calculation of risk value parameters*

2.14 Regarding the safety assessment, the Meeting took note of the results of the safety assessment of CAR/SAM FIRs that were exposed to the risk, as detailed in **Table 4** and **Graph 5** (FIRs with LHDs with a VR greater than 20).

	LHD LS (LS=Level of Safety)	SEFG	MKJK	SCFZ	SPIM	MTEG	TNCF	SKED	MHTG	SUEO
JAN	20				51			45		51
FEB	20					40	40	45	58	51
MAR	20						40	45	46	51
APR	20			51			40	45		51
MAY	20				51			45	46	51
JUN	20									
JUL	20							45		
AUG	20	40						45	51	
SEP	20		46			45				
OCT	20					45		45		
NOV	20						50		46	
DEC	20					45		45	51	

***Table 4** - Estimating the highest risk value for the LHD*

2.15 Graph 5 shows the estimation of the risk value of the main LHDs that occurred during all the months, based on LHD reports from 1 January and 31 December 2014.



***Graph 5** - Highest risk value for CAR/SAM RVSM FIRs. The red line is the VR of the TLS (20).*

2.16 The Central America FIR (MHTG) had the highest VR in 2014, with 58 points. In 2014, mainly during the first five months, the Montevideo FIR (SUEO) had an operational risk value above the LHD level of safety (LHD LS - red line in Graph 5), *i.e.*, more than 20 points. It should be noted that, in some months, the Bogota, Port-au-Prince and Curaçao FIRs had a VR that exceeded 20 points. This 20-point limit of the risk value was agreed at the Eleventh Meeting of the Scrutiny Working Group (GTE/11-ICAO), held in 2011, in Lima, Peru.

Safety analysis (SGSO) of LHDs

2.17 **Appendix A** describes in detail the LHDs or operational errors assessed by the GTE, as well as those with the highest risk value (> 20) for 2014. **Table 5** shows the FIRs that were exposed and that generated risks in 2014.

2.18 LHD report #192 that was presented in February 2014 accounted for 2.108% of the risk assessed for that month, with a VR = 58, the highest in the sample.

2.19 The BOGOTA FIR appeared 221 times and the GUAYAQUIL FIR appeared 216 times in LHD reports submitted by adjacent FIRs, since they contributed to the generation of risk in their RVSM airspace.

2.20 Likewise, the BOGOTA FIR appeared 209 times in terms of risk generation, while the GUAYAQUIL FIR only generated risk 108 times.

2.21 The PANAMA FIR, although it only submitted 19 LHD reports of risk caused by adjacent FIRs, generated 134 risk occasions in adjacent FIRs, mainly in the BOGOTA FIR, with 84 errors/failures.

FIR	Exposed to risk	Generated risk
AMAZONICA	66	57
ANTOFAGASTA	33	7
ASUNCION	9	8
ATLANTICO	84	1
BARRANQUILLA	91	49
BOGOTA	221	209
BRASILIA	7	14
CAYENNE	4	5
CENTRAL AMERICA	90	59
COMODORO RIVADAVIA	19	3
CORDOBA	11	23
CURAÇAO	111	37
CURITIBA	20	10
EZEIZA	3	50
GEORGETOWN	3	2
GUAYAQUIL	216	108
HAVANA	26	12
EASTER ISLAND	0	0
KINGSTON	15	27
LA PAZ	36	36
LIMA	57	84
MAIQUETIA	22	51
MENDOZA	9	2
MONTEVIDEO	34	52
PANAMA	16	134
PARAMARIBO	1	11
PIARCO	8	2

FIR	Exposed to risk	Generated risk
PORT-AU-PRINCE	66	36
PUERTO MONTT	0	0
PUNTA ARENAS	0	0
RECIFE	2	2
RESISTENCIA	22	3
SANTIAGO	1	4
ST. DOMINGO	66	115

Table - *FIRs that were exposed to, and that generated, risk (LHDs) in 2014*

2.22 Part of the analysis process includes a detailed review of certain operational errors/failures to identify the contributing factors and ensuring that the safety authorities of CAR/SAM FIRs carry out procedures and processes to reduce the probability of recurrence.

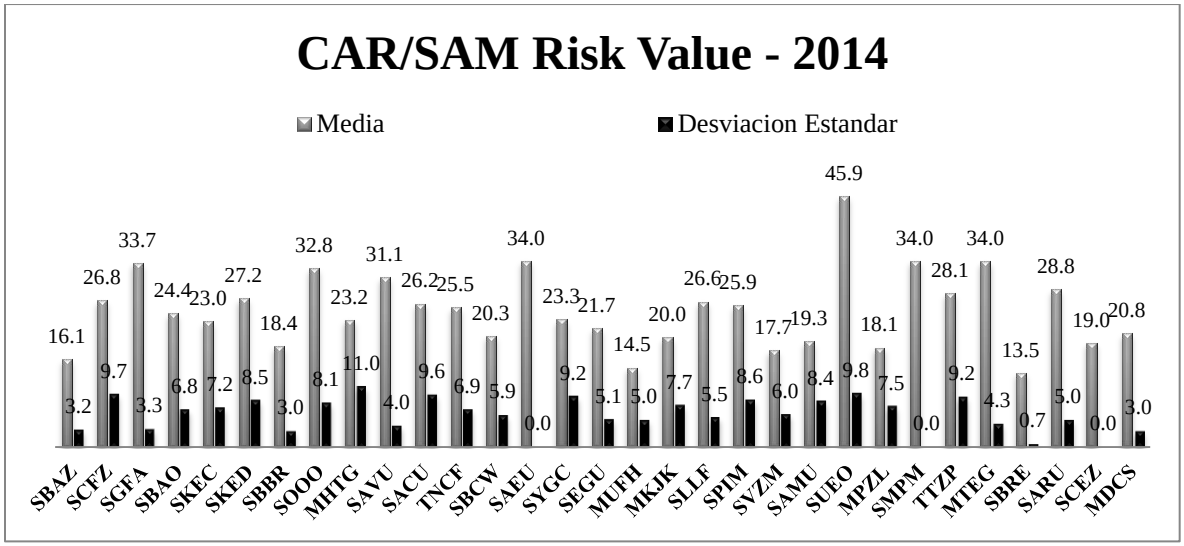
2.23 In the case of RVSM airspace, CARSAMMA assessed the individual operational errors identified in the LHD reports submitted by the 34 FIRs in its geographical coverage area, grouping them by FIR and then by State, using the following statistical tools:

Risk value **average** ⟹ $M = \sum VR / n \quad ;$

Standard deviations ⟹ $\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x - \bar{x})^2}$; and

Confidence interval for the analysis of 95% (= 1.96)

2.24 **Graph 6** shows averages and standard deviations resulting from this analysis, with risk value contributions assigned to operational errors of large height deviations by the FIRs involved in the 2014 LHD data analysis.



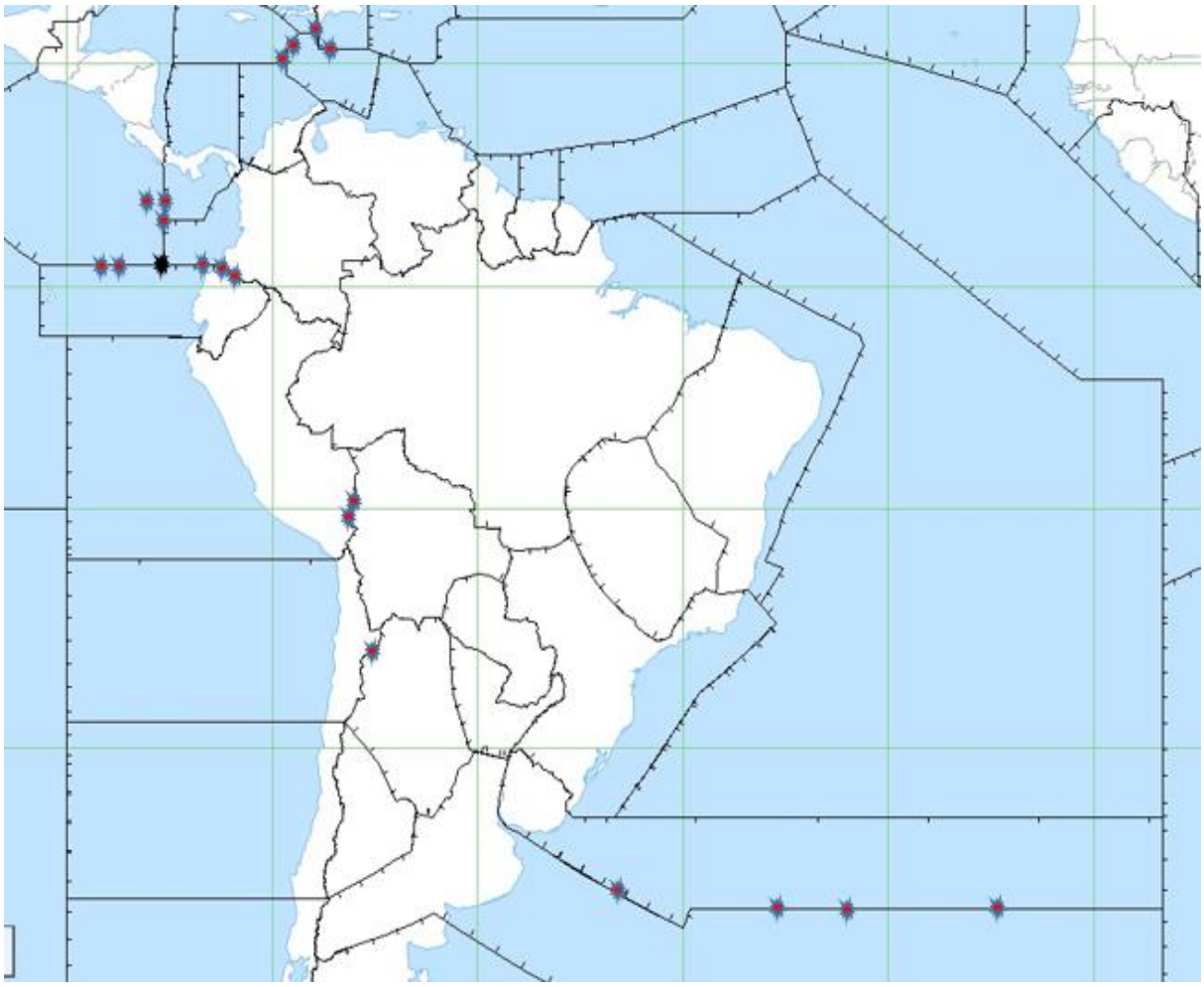
Graph 6 *- Contribution to averages and standard deviations by FIRs involved in the risk*

2.25 **Graph 7** below shows the geographical location of risk points (hotspots, VR ≥ 40) of LHD reports, with 20 points and 62 reports in the data set corresponding to 12 consecutive months in 2014, issued by CAR/SAM FIRs. The image provides a means to identify specific risk points related to RVSM operations.

2.26 The black dot to the left is the LHD with the highest VR = 58 (generated by Guayaquil) in the Central American Region. The boundaries of the Guayaquil / Bogota and Guayaquil / Central America FIRs continue to show a high number of LHDs, most of which are E-coded errors (*coordination errors*). There are several LHDs identified in the current data set, especially in the vicinity of the Montevideo / Ezeiza FIRs.

2.27 It should also be noted that in 2014, there were some reports with high values between Port-au-Prince / Santo Domingo, Curaçao / Santo Domingo, Curaçao / Kingston, and an increasing number of reports involving other FIRs that did not appear before, such as Panama, Kingston, Lima, La Paz, Cordoba, and Antofagasta, which generated values of more than 40.

2.28 **Table 6** shows these points and the number of reports and the respective VRs and FIRs involved.



***Graph 7** - CAR/SAM FIRs - RVSM large height deviation (LHD) risk points*
January - December 2014

POINTS	NUMBER OF REPORTS	RISK VALUE (MAX)	FIRs INVOLVED
AMBIN	1 / 4	46	Curaçao / Kingston
ARTOM	1 / 4	51	Central America / Guayaquil
BOKAN	1 / 49	45	Bogota / Guayaquil
BOLDO	1 / 12	51	Bogota / Central America
DIBOK	1 / 4	46	Curaçao / Kingston
DOBNI	1 / 6	51	La Paz / Lima
ENSOL	10 / 42	45	Bogota / Guayaquil
KONRI	1 / 6	51	Antofagasta / Córdoba
LESIR	1 / 3	46	Central America / Panama
LIXAS	1 / 28	58	Central America / Guayaquil
PIGBI	5 / 35	40 and 45	Port Au Prince / Santo Domingo
RADIM	1 / 1	46	Central America / (Guayaquil)
RAXUN	1 / 4	51	La Paz / Lima
SUEOSAEU3	1 / 1	51	Ezeiza / Montevideo
SUEOSAEU5	4 / 4	51	Ezeiza / Montevideo
SUEOSAEU6	19 / 23	51	Ezeiza / Montevideo
SUEOSAEU8	1 / 2	51	Ezeiza / Montevideo
UGADI	1 / 8	46	Central America / Guayaquil
UGUPI	6 / 68	40 and 45	Bogota / Guayaquil
VESKA	4 / 31	40 and 50	Curaçao / Santo Domingo

***Table 6** - CAR/SAM FIRs - RVSM large height deviation (LHD) risk points*
January - December 2014

Risk value of LHDs (SGSO/SMS) in the CAR/SAM Regions

2.29 The Meeting took note that in 2011, CARSAMMA and the GTE had validated 690 LHD reports, 95.07% of which only required to be documented, and the remaining 4.93% required mitigation actions. Accordingly, the methodology was modified. In 2012, CARSAMMA and the GTE had validated 1,065 LHD reports, 49% of which obtained a risk value of more than 20 according to the SMS methodology, thus requiring mitigation actions, and 51% obtained a risk value below that established, thus only requiring documentation.

2.30 The number of LHDs that obtained a risk value above that established increased substantially in 2013. Out of a total of 1,306 validated LHDs, 71.82% required mitigation actions, while 28.18% only required to be documented.

2.31 During 2014, 1,451 LHD reports were validated, of which 60.61% obtained a risk value above to the established, and the remaining 39.39% obtained a risk value below to the established.

2.32 Following a thorough analysis, the Meeting acknowledged and congratulated CARSAMMA for the work done and recommended that States use this data to identify points that required specific mitigation action and procedures that needed to be implemented in order to improve the risk value in each FIR.

Trend identification

2.33 Under this agenda item, the Meeting took note with great interest of the identification of trends during 2015 resulting from the work done by CARSAMMA based on the preliminary data obtained, which allowed for more proactive action on similar failures that could occur in the future.

2.34 The Meeting noted that some LHD reports of 2014 (first and second semester) and of the first half of 2015 (*in bold*) showed as coordination error in the last parameter a level other than that coordinated, that is, traffic was still climbing or descending.

2.35 **Table 1** shows all LHD reports that fall into this category: traffic is coordinated at one level and calls while climbing or descending.

Report	Reporting FIR	FIR that failed	Position
42	Resistencia	Asuncion	REPAM
88	Guayaquil	Bogota	ENSOL
264	Lima	Guayaquil	VAKUD
367	Bogota	Panama	DAKMO
401	Bogota	Panama	DAKMO
408	Bogota	Guayaquil	MOXAS
461	Bogota	Guayaquil	BOKAN
473	Bogota	Guayaquil	MOXAS
511	Merida	Central America	ERBOR
513	Bogota	Guayaquil	BOKAN
661	Merida	Central America	TAP
748	Bogota	Guayaquil	BOKAN
991	Bogota	Panama	BUSMO
1002	Havana	Central America	SELEK
1109	Bogota	Panama	BUSMO
1155	Central America	Merida	TAKUX
1440	Guayaquil	Bogota	PULTU
22	**Resistencia**	**Asuncion**	**REPAM**
61	**Guayaquil**	**Bogota**	**UGUPI**
71	**Bogota**	**Guayaquil**	**BOKAN**
89	**Bogota**	**Panama**	**BUSMO**
206	**Guayaquil**	**Central America**	**LIXAS**
335	**Georgetown**	**Piarco**	**MINDA**
343	**Curaçao**	**Santo Domingo**	**PALAS**
367	**Port-Au-Prince**	**Santo Domingo**	**RETAK**
448	**Maiquetia**	**Barranquilla**	**ORTIZ**
529	**Lima**	**La Paz**	**ELAKO**
654	**Merida**	**Central America**	**PENSO**

***Table 1** - LHD reports in which transfer is made at one level and call made while climbing or descending*

2.36 As shown in Table 1, the FIR that reports more cases is Bogota (11 times). The most reported FIR is Guayaquil (7 times) and the most reported points are BOKAN, DAKMO, MOXAS and BUSMO in 2014. So far in 2015, no point is worth mentioning; only BOKAN and BUSMO appear again as points already reported in 2014.

2.37 Likewise, some LHD reports corresponding to 2014 (first and second semester) and to the first half of 2015 (*in bold*) showed as coordination error in the last parameter a level other than that coordinated, that is, the aircraft is flying on an airway and changes airway without any coordination.

2.38 **Table 2** shows all LHD reports that fall into this category: traffic is coordinated at one point and calls from another.

Report	Reporting FIR	FIR that fails	Coordinated position	Position from which the aircraft calls
119	Bogota	Guayaquil	ENSOL	UGUPI
144	Bogota	Guayaquil	VAMOS	MOXAS
148	Amazonica	Bogota	BRACO	MTU
215	Panama	Bogota	TOKUT	BUXOS
254	Bogota	Guayaquil	ANGEL	UGUPI
260	Bogota	Guayaquil	MOXAS	VAMOS
267	Panama	Bogota	BUXOS	TOKUT
299	Bogota	Guayaquil	MOXAS	VAMOS
312	Bogota	Guayaquil	MOXAS	VAMOS
364	Bogota	Guayaquil	PULTU	BOKAN
374	Bogota	Guayaquil	MOXAS	VAMOS
416	Bogota	Guayaquil	MOXAS	VAMOS
419	Bogota	Guayaquil	ITATA	UGUPI
426	Central America	Mérida	PENSO	ANIKO
541	Guayaquil	Bogota	UGUPI	ENSOL
547	Bogota	Guayaquil	ENSOL	UGUPI
558	Merida	Central America	CTM	SATOS
591	Guayaquil	Bogota	UGUPI	ENSOL
756	Guayaquil	Bogota	UGUPI	ANRAX
922	Bogota	Panama	BUXOS	TOKUT
924	Bogota	Panama	BUXOS	TOKUT
930	Amazonica	Maiquetia	VUMPI	PAKON
1004	Guayaquil	Bogota	ANGEL	BOKAN
1053	Guayaquil	Lima	ARNEL	VAKUD
1061	Mérida	Central America	AVRIS	NALDA
1077	Guayaquil	Bogota	ITATA	UGUPI
1089	Bogota	Panama	BUXOS	PUDAK
1124	Santo Domingo	Port-au-Prince	ETBOD	PIGBI
1180	Guayaquil	Bogota	PULTU	BOKAN

Report	Reporting FIR	FIR that fails	Coordinated position	Position from which the aircraft calls
1198	Guayaquil	Bogota	BOKAN	ENSOL
1211	Bogota	Amazonica	ABIDE	BRACO
1232	La Paz	Asuncion	OROMU	MARIA
1238	Bogota	Guayaquil	VAMOS	MOXAS
1311	Guayaquil	Bogota	ANGEL	ENSOL
1334	Port-Au-Prince	Santo Domingo	DCR	ETBOD
1337	La Paz	Lima	DOBNI	ELAKO
1374	Barranquilla	Kingston	OTAMO	KILER
1377	Merida	Central America	TAP	ALSAL
1426	Guayaquil	Central America	UGADI	OSELO
1431	Guayaquil	Lima	EVLIM	LOBOT
1451	La Paz	Lima	RAXUN	OBLIR
1491	Central America	Panama	FALLA	ANSON
1506	Port-au-Prince	Santo Domingo	ONPAD	OSIDU
1515	La Paz	Amazonica	MIBOL	UDIDI
1552	Guayaquil	Central America	UGADI	OSELO
30	**Montevideo**	**Curitiba**	**UGELO**	**BGE**
100	**Curitiba**	**La Paz**	**SIDAK (UL216)**	**SIDAK (UM402)**
143	**Kingston**	**Panama**	**ARNAL**	**DUXUN**
192	**Curaçao**	**Santo Domingo**		
260	**Port-au-Prince**	**Miami**	**BODLO**	**JOSES**
348	**Curaçao**	**Santo Domingo**		
405	**Merida**	**Central America**	**GABEN**	**TAP**
439	**Guayaquil**	**Bogota**	**UGUPI**	**ITATA**
440	**Guayaquil**	**Bogota**	**ANGEL**	**ENSOL**
454	**La Paz**	**Lima**	**RAXUN**	**OBLIR**
486	**Guayaquil**	**Bogota**	**ENSOL**	**ANGEL**
601	**Lima**	**La Paz**	**ELAKO**	**ORALO**
606	**Merida**	**Central America**	**NOTOS**	**ANREX**

Table 2 *- LHD reports of transfer at one level and call from another*

2.39 As shown in Table 2, the FIRs that submitted more reports in 2014 were: Bogota (16 times), followed by Guayaquil (12 times). The most reported FIRs were: Guayaquil (12 times), followed by Bogota (11 times), and the most reported points were MOXAS, exchanged for VAMOS and *vice versa*, as well as BUXOS, exchanged for TOKUT and *vice versa*. So far in 2015, the FIR that reported the largest number of these cases was Guayaquil (3 times) with errors made by Bogota (3 times), noting exchanges from IRGUT to VESKA and *vice versa*, and from ENSOL to ANGEL and *vice versa*.

2.40 The Meeting was also informed that some LHD reports corresponding to 2014 (first and second semester) and to the first half of 2015 (*in bold*) showed as coordination error the misunderstanding of level or time, that is, coordination is made, but collation is done improperly.

2.41 **Table 3** shows all LHD reports that fall into this category: traffic is coordinated at one level or time but since it was annotated erroneously, it gave rise to an LHD report.

Report	Reporting FIR	FIR that fails	Coordinated time or level	Annotated time or level
852	Central America	Havana	20:25	22:55
1026	Central America	Merida	370	350
1036	Havana	Central America	360	380
1045	Antofagasta	Cordoba	09:13	09:33
1051	Guayaquil	Lima	400	340
1224	Central America	Merida	370	330
156	**Kingston**	**Panama**	**340**	**300**
219	**Merida**	**Central America**	**340**	**300**
423	**Antofagasta**	**Lima**	**20:45**	**21:45**
582	**Merida**	**Central America**	**350**	**360**

***Table 3** - LHD reports where transfer was made but it was wrongly understood*

2.42 As shown in Table 3, the FIR that reported more cases in 2014 was Central America (3 times). The most reported FIR was Merida (2 times). So far in 2015, the FIR that reported more cases was Merida (2 times) with errors made by Central America (2 times).

2.43 The Meeting considered that this information was very positive and that trends, if available, could be reported every 6 months at LHD teleconferences so as not to wait one year for their analysis.

2.44 In this regard, the Secretariat highlighted the importance of participating in LHD teleconferences, and of focal points sending monthly LHD data before the 15th of each month, since the absence of data delayed the analysis of trends. The Meeting agreed. Distribution of E-codes during year 2014 is shown in **Appendix B** to this part of the report.

Recurrent identification in the Havana FIR of LHDs caused by turbulence, impact on safety and recommendations for CAR/SAM ANSPs to mitigate their occurrence

2.45 In this regard, Cuba noted that information was available on the number of LHD events caused by weather conditions (type "I" events) and especially, those in which the vertical deviation of the aircraft was caused by turbulence.

2.46 The Meeting took note of the following LHDs caused by turbulence, as reported by CAR/SAM FIRs in 2014/2015:

DATE	REPOR FIR	ACFT	BRIEF DESCRIPTION	OTHER ACFT	VR
09/06/2014	CURITIBA	A321	CLIMBED 500 FT	NO	18
28/08/2014	CENAMER	BE40	DESCENDED 1100 FT	NO	14
10/09/2014	CURITIBA	LJ60	DESCENDED 700 FT	NO	14
24/10/2014	HAVANA	B738	DESCENDED 500 FT	NO	14
05/12/2014	CURITIBA	A320	CLIMBED 1000 FT	NO	14
20/01/2015	CURITIBA	E190	CLIMBED 600 FT	NO	14
25/01/2015	CURITIBA	E135	CLIMBED AND DESCENDED 500 FT	NO	14
03/02/2015	CURITIBA	A320	DESCENDED 900 FT	NO	14
09/03/2015	CURITIBA	C680	CLIMBED 500 FT	NO	14
14/03/2015	BRASILIA	A319	DESCENDED 400 FT	YES (TA)	19
07/04/2015	RECIFE	A320	DESCENDED 500 FT	NO	9
11/05/2015	HAVANA	A319	CLIMBED 400 AND DESCENDED 500 FT	NO (PAN)	18
16/05/2015	CURITIBA	BE40	DESCENDED 4000 FT	NO	14
04/06/2015	HAVANA	B738	DESCENDED 800 FT	NO	14

2.47 The analysis made by Cuba of the statistical information showed the following important elements:

a) Out of the 34 FIRs that made up the CAR/SAM Regions, only 5 had reported LHDs due to turbulence in 2014 and 2015, for 11.7% of all the FIRs in the Region.

b) Occurrences in 2015 almost doubled those of the previous year, even though the end of the year was still 5 months away.

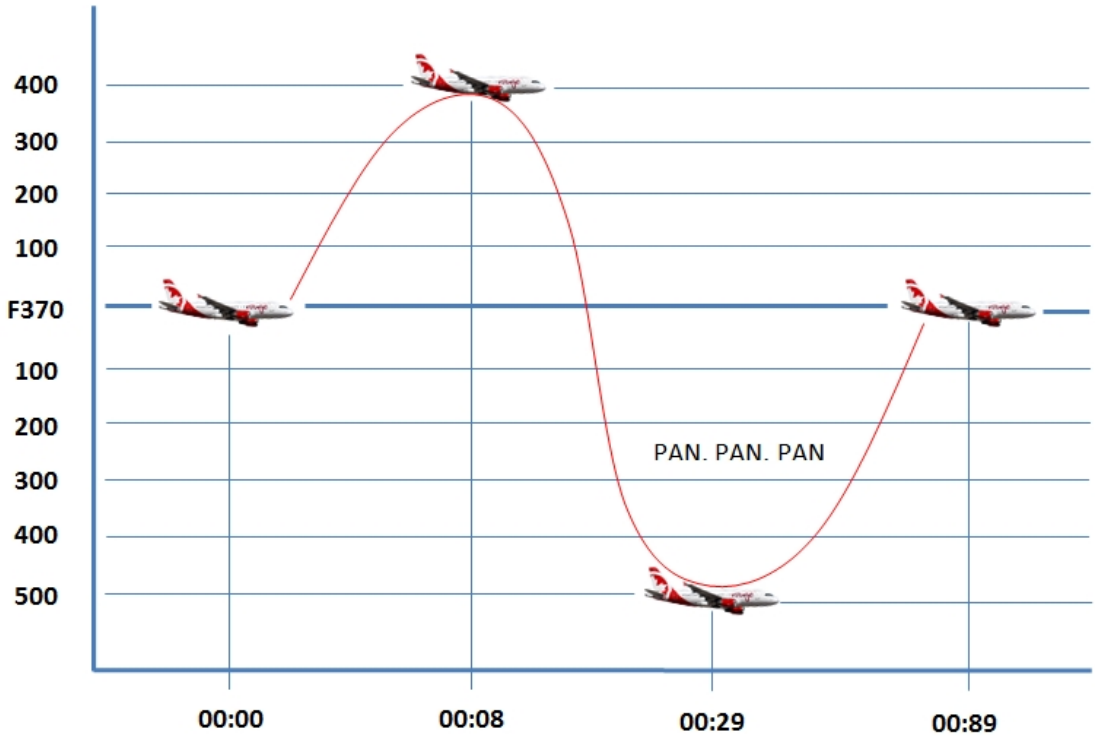
c) The average VR for these events, considering both 2014 and 2015, was 14.57.

2.48 In none of the reported events did the crew promptly report the vertical deviation to the air traffic control service (SCTA); the latter became aware and advised the crew of the deviation based on the surveillance systems used for the provision of air traffic control services.

2.49 Likewise, in none of the reported events did the VR exceed a value of 20, even in those cases in which another aircraft was involved and in conflict with the deviating aircraft, causing the collision avoidance system (ACARS) to issue a traffic advisory (TA). Likewise, the events in which the aircraft executed very steep vertical deviations (more than 1000 and up to 4000 ft) did not exceed the risk value of 14. According to the current procedure, none of these events required the implementation of measures, reason why they were only documented.

2.50 The analysis of the reported events showed that both general aviation and the large airlines of the Region were affected by these occurrences, and that there were several types of aircraft involved, showing that this type of LHD event threatened all aircraft and operators in RVSM airspace of the Region.

2.51 The increasing occurrence of extreme meteorological phenomena caused by climate change in our planet posed a serious risk for the safety of air operations and, in these specific cases, the result was the vertical deviation of aircraft operating in RVSM airspace. As an example, mention was made of the event occurred in the Havana FIR on 11 May 2015, where an A319 aircraft, with registration CGKOB, operated by Air Canada Rouge as flight ROU1804, underwent the following vertical deviation:



2.52 It may be seen how the manoeuvre led the aircraft to first climb and then to descend 300 ft from its cleared flight level (F370), creating a possible conflict with aircraft both above and below, doubling the risk of occurrence of a collision. The fact that the crew reported an "urgent" condition confirms that, if there had been conflicting traffic, this situation would have seriously hindered the execution of an evasive manoeuvre. (For this event, a VR of 18 was calculated).

2.53 The Meeting took note that the ANSP of Cuba had decided to adopt a series of measures as shown below:

- Sharing of LHD experiences among supervisory personnel and controllers of the Havana ACC.
- Publication of safety bulletins with information on LHD events and other safety-related events, where weather was a serious contributing factor.
- Improve coordination procedures between the Havana ACC and the MET services of the Cuban ANSP.
- Training of supervisory personnel and controllers of the Havana ACC on the issuance and decoding of PIREP and SIGMET messages.
- Improve forecasting and surveillance processes of MET services of the Cuban ANSP.
- Establish the exchange of safety information with aircraft operators involved in I-coded LHDs through the State representative and IATA.
- Pre-planning and adoption of ATFM management measures to guide the flow of aircraft, avoiding areas of bad weather.
- Plan the acquisition of a meteorological radar for the Cuban ANSP and increase the number of sources in order to obtain updated meteorological information in graphical format.

2.54 Cuba informed the Meeting that the implementation of the aforementioned measures had resulted in:

- Significant increase in the number of I-coded LHDs reported in 2015, providing important information for the analysis of this risk.
- Improved quality and frequency of SIGMETs and PIREPs issued by the Cuban ANSP on weather impacts on the Havana FIR, offering crews the possibility of protecting their aircraft from the hazards of severe meteorological phenomena.

2.55 The Meeting noted that in the CAR/SAM Regions, where air operations have grown in a sustained manner in the last 5 years, and despite the increasing number of increasingly severe meteorological phenomena, I-coded LHD reports, especially those related to deviations due to turbulence, were very few and only issued by a few FIRs of the Region.

2.56 The Meeting felt that it was important to conduct training and motivational activities for SCTA personnel and LHD PoCs of CAR/SAM ANSPs, in order to increase the number of I-coded LHD reports.

2.57 On the other hand, the Meeting noted that it was important to remember that the probability value in the risk value formula was associated to the number of reports, and since this number was low, the resulting probability value was also low, thus giving a low safety index.

2.58 Likewise, the Meeting suggested that CAR/SAM ANSPs analyse their weather forecasting and updating systems in order to enhance their precision and expedite the issuance of information, and do the same with operational coordination procedures between MET and ATS services in order to optimise the exchange of meteorological information.

2.59 Finally, the Meeting underlined the importance that automated data processing and display systems be equipped with visual and sound alarm systems to alert air traffic controllers when an aircraft deviates from the cleared altitude or flight level without permission.

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1	LIMA	LA PAZ	01/01/14	E2	51
1B	LIMA	PILOTO	01/01/14	B	27
2	AMAZONICA	CURITIBA	01/01/14	E2	17
3	RESISTENCIA	CORDOBA	02/01/14	E2	34
4	RESISTENCIA	CORDOBA	02/01/14	E2	34
5	MONTEVIDEO	EZEIZA	02/01/14	E2	51
6	ATLANTICO	MONTEVIDEO	02/01/14	E2	39
8	CURAÇAO	ST. DOMINGO	03/01/14	E1	26
9	BOGOTA	GUAYAQUIL	03/01/14	E1	35
10	BOGOTA	PANAMA	03/01/14	E2	22
11	BOGOTA	PANAMA	03/01/14	E2	22
12	BOGOTA	PANAMA	03/01/14	E2	22
13	AMAZONICA	LA PAZ	03/01/14	E2	17
14	BOGOTA	PANAMA	03/01/14	E2	22
15	LIMA	GUAYAQUIL	04/01/14	E1	18
16	CAYENNE	AMAZONICA	04/01/14	E2	22
17	CURAÇAO	MAIQUETIA	04/01/14	E2	17
18	BOGOTA	PANAMA	04/01/14	E2	22
19	BOGOTA	PANAMA	04/01/14	E2	22
20	COMODORO RIVADAVIA	MOUNT PLEASANT	04/01/14	E1	26
21	AMAZONICA	BRASILIA	05/01/14	E2	17
22	AMAZONICA	BRASILIA	05/01/14	E1	13
23	MONTEVIDEO	EZEIZA	05/01/14	E2	51
24	ATLANTICO	MONTEVIDEO	05/01/14	E2	22
25	ST. DOMINGO	SAN JUAN	05/01/14	E1	18
26	PORT AU PRINCE	ST. DOMINGO	05/01/14	E1	31
28	BOGOTA	GUAYAQUIL	06/01/14	E2	45
29	ST. DOMINGO	PORT-AU-PRINCE	06/01/14	E1	18
30	CURITIBA	MONTEVIDEO	06/01/14	E2	39
31	BOGOTA	PANAMA	06/01/14	E2	22
32	PANAMA	BOGOTA	06/01/14	F	13
33	AMAZONICA	CAYENNE	07/01/14	E2	17
34	MONTEVIDEO	EZEIZA	07/01/14	E2	51
35	ATLANTICO	MONTEVIDEO	07/01/14	E2	22
36	PORT AU PRINCE	MIAMI	08/01/14	E1	31
37	COMODORO RIVADAVIA	EZEIZA	08/01/14	E1	26
39	ATLANTICO	LUANDA	08/01/14	E2	22
40	BOGOTA	PANAMA	08/01/14	E2	39

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
41	BOGOTA	GUAYAQUIL	08/01/14	E2	45
42	RESISTENCIA	ASUNCION	09/01/14	E1	36
43	AMAZONICA	BRASILIA	09/01/14	E1	13
44	ST. DOMINGO	SAN JUAN	09/01/14	E1	18
45	AMAZONICA	PILOTO	09/01/14	E1	17
46	LIMA	LA PAZ	10/01/14	E1	23
47	COMODORO RIVADAVIA	MOUNT PLEASANT	10/01/14	E1	26
48	BOGOTA	AMAZONICA	10/01/14	E1	18
49	MAIQUETIA	BARRANQUILLA	10/01/14	E2	17
50	BOGOTA	PANAMA	10/01/14	E1	31
51	BOGOTA	PANAMA	10/01/14	E1	31
52	MAIQUETIA	BOGOTA	10/01/14	E1	13
54	CENTRAL AMERICA	HABANA	11/01/14	E1	13
55	DAKAR - (PIARCO)	PIARCO	11/01/14	E1	31
56	MAIQUETIA	BOGOTA	11/01/14	E2	17
57	ST. DOMINGO	CURAÇAO	11/01/14	E1	20
58	MAIQUETIA	BARRANQUILLA	11/01/14	E2	17
59	GUAYAQUIL	BOGOTA	11/01/14	E2	30
61	ST. DOMINGO	PORT-AU-PRINCE	12/01/14	E2	25
62	RESISTENCIA	CORDOBA	12/01/14	E1	26
63	ST. DOMINGO	CURAÇAO	12/01/14	E1	18
64	CURAÇAO	ST. DOMINGO	12/01/14	E1	30
65	ST. DOMINGO	PORT-AU-PRINCE	12/01/14	E2	25
66	ST. DOMINGO	PORT-AU-PRINCE	12/01/14	E2	25
67	ST. DOMINGO	PORT-AU-PRINCE	12/01/14	E2	25
69	ST. DOMINGO	PORT-AU-PRINCE	13/01/14	E1	20
70	BRASILIA	BRASILIA	13/01/14	D	19
71	ST. DOMINGO	PORT-AU-PRINCE	13/01/14	E1	20
72	CURAÇAO	BARRANQUILLA	13/01/14	E1	26
73	BOGOTA	MAIQUETIA	14/01/14	E1	18
76	PORT-AU-PRINCE	ST. DOMINGO	14/01/14	E2	39
78	AMAZONICA	PARAMARIBO	15/01/14	E2	17
81	ST. DOMINGO	CURAÇAO	15/01/14	E2	25
82	COMODORO RIVADAVIA	EZEIZA	16/01/14	E1	26
83	RESISTENCIA	EZEIZA	16/01/14	E1	26
84	PORT AU PRINCE	CURAÇAO	16/01/14	E1	31
85	AMAZONICA	MAIQUETIA	16/01/14	E1	13
87	GUAYAQUIL	BOGOTA	16/01/14	E2	30

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
88	GUAYAQUIL	BOGOTA	17/01/14	E1	25
89	BOGOTA	PANAMA	17/01/14	E1	18
90	MONTEVIDEO	EZEIZA	17/01/14	E2	51
91	ATLANTICO	MONTEVIDEO	17/01/14	E2	22
94	HABANA	CENTRAL AMERICA	17/01/14	E1	18
95	CURITIBA	AMAZONICA	17/01/14	E2	22
96	GUAYAQUIL	CENTRAL AMERICA	17/01/14	E1	23
97	AMAZONICA	BRASILIA	17/01/14	E2	17
98	AMAZONICA	BRASILIA	17/01/14	E2	17
100	CENTRAL AMERICA	BOGOTA	18/01/14	E2	34
102	GUAYAQUIL	BOGOTA	19/01/14	E1	25
103	CURAÇAO	BARRANQUILLA	19/01/14	E1	26
104	AMAZONICA	BOGOTA	19/01/14	E1	13
105	CURAÇAO	ST. DOMINGO	19/01/14	E1	26
106	PORT AU PRINCE	ST. DOMINGO	20/01/14	E1	31
107	ATLANTICO	ABIDJAN	20/01/14	E2	39
109	PORT-AU-PRINCE	ST. DOMINGO	20/01/14	E1	35
114	LIMA	LA PAZ	21/01/14	E2	39
116	BOGOTA	AMAZONICA	22/01/14	E1	18
117	AMAZONICA	BRASILIA	23/01/14	E2	17
118	LIMA	LA PAZ	23/01/14	E1	31
119	BOGOTA	GUAYAQUIL	23/01/14	E1	35
120	BOGOTA	LIMA	23/01/14	E2	22
123	AMAZONICA	MAIQUETIA	24/01/14	E2	17
124	MONTEVIDEO	EZEIZA	24/01/14	E2	51
125	ATLANTICO	MONTEVIDEO	24/01/14	E2	39
126	GUAYAQUIL	BOGOTA	24/01/14	E2	30
127	BOGOTA	MAIQUETIA	25/01/14	E2	22
128	GUAYAQUIL	BOGOTA	25/01/14	E2	30
129	GUAYAQUIL	BOGOTA	25/01/14	E1	20
130	PIARCO	PARAMARIBO	25/01/14	E1	31
132	MEXICO - (CENTRAL AMERICA)	CENTRAL AMERICA	25/01/14	E1	13
133	AMAZONICA	BOGOTA	26/01/14	E2	17
135	ST. DOMINGO	CURAZAO	26/01/14	E1	20
137	ASUNCION	LA PAZ	26/01/14	E2	34
139	HABANA	CENTRAL AMERICA	26/01/14	E1	18
141	SAN JUAN - (CURAÇAO)	CURAÇAO	26/01/14	E2	34
142	BOGOTA	PANAMA	27/01/14	E2	39

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
143	SAN JUAN - (ST. DOMINGO)	ST. DOMINGO	27/01/14	E2	22
144	BOGOTA	GUAYAQUIL	27/01/14	E1	31
145	AMAZONICA	CAYENNE	27/01/14	E2	17
146	COMODORO RIVADAVIA	EZEIZA	27/01/14	E1	26
147	GUAYAQUIL	BOGOTA	28/01/14	E1	20
148	AMAZONICA	BOGOTA	28/01/14	E1	13
149	MONTEVIDEO	EZEIZA	28/01/14	E2	51
150	ATLANTICO	MONTEVIDEO	28/01/14	E2	39
151	MONTEVIDEO	EZEIZA	28/01/14	E2	51
152	ATLANTICO	MONTEVIDEO	28/01/14	E2	39
153	BOGOTA	AMAZONICA	28/01/14	E1	18
154	LIMA	AMAZONICA	28/01/14	E2	27
155	CENTRAL AMERICA	PANAMA	28/01/14	E2	17
156	PANAMA	BOGOTA	28/01/14	E2	22
157	BOGOTA	GUAYAQUIL	29/01/14	E1	35
158	CENTRAL AMERICA	BOGOTA	29/01/14	E2	34
159	ASUNCION	LA PAZ	30/01/14	E2	34
160	CENTRAL AMERICA	PANAMA	30/01/14	E1	26
161	HABANA	HABANA	30/01/14	D	19
162	ST. DOMINGO	CURAÇAO	31/01/14	E2	25
163	ST. DOMINGO	PORT-AU-PRINCE	31/01/14	E2	22
164	MAIQUETIA	GEORGETOWN	31/01/14	E1	13
165	MAIQUETIA	BARRANQUILLA	01/02/14	E2	17
166	GUAYAQUIL	BOGOTA	01/02/14	E1	20
167	GUAYAQUIL	BOGOTA	02/02/14	E2	27
168	GUAYAQUIL	BOGOTA	02/02/14	E2	27
169	RESISTENCIA	CORDOBA	02/02/14	E1	26
170	ST. DOMINGO	CURAÇAO	02/02/14	E1	18
171	RESISTENCIA	CORDOBA	03/02/14	E1	26
172	BOGOTA	PANAMA	03/02/14	E1	31
173	CURAÇAO	ST. DOMINGO	03/02/14	E1	30
174	ST. DOMINGO	PORT-AU-PRINCE	03/02/14	E1	18
175	CURAÇAO	BARRANQUILLA	03/02/14	E1	26
176	BOGOTA	GUAYAQUIL	03/02/14	E1	35
177	CENTRAL AMERICA	BOGOTA	04/02/14	E1	36
178	MONTEVIDEO	EZEIZA	04/02/14	E2	51
179	ATLANTICO	MONTEVIDEO	04/02/14	E2	22
180	CURAÇAO	ST. DOMINGO	04/02/14	E2	40
181	CURAÇAO	KINGSTON	05/02/14	E1	36

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
182	CENTRAL AMERICA	PILOTO	05/02/14	B	9
184	BOGOTA	GUAYAQUIL	07/02/14	E2	45
185	ATLANTICO	LUANDA	07/02/14	E2	22
186	MONTEVIDEO	EZEIZA	07/02/14	E2	51
187	ATLANTICO	MONTEVIDEO	07/02/14	E2	22
188	CURAZAO	ST. DOMINGO	07/02/14	E1	26
189	BOGOTA	GUAYAQUIL	08/02/14	E1	35
190	PORT-AU-PRINCE	ST. DOMINGO	08/02/14	E1	31
192	CENTRAL AMERICA	GUAYAQUIL	09/02/14	B	58
193	MEXICO	CENTRAL AMERICA	09/02/14	E2	22
194	RESISTENCIA	EZEIZA	09/02/14	E1	26
195	MIAMI - (ST. DOMINGO)	ST. DOMINGO	09/02/14	E2	17
196	BOGOTA	GUAYAQUIL	09/02/14	E1	18
197	BOGOTA	GUAYAQUIL	09/02/14	E2	45
198	CENTRAL AMERICA	BOGOTA	10/02/14	E2	34
200	PORT-AU-PRINCE	ST. DOMINGO	10/02/14	E1	31
204	GUAYAQUIL	BOGOTA	11/02/14	E1	20
205	BOGOTA	PANAMA	11/02/14	E1	18
206	BOGOTA	PANAMA	11/02/14	E1	18
207	BOGOTA	GUAYAQUIL	11/02/14	E1	35
208	MONTEVIDEO	EZEIZA	11/02/14	E2	51
209	ATLANTICO	MONTEVIDEO	11/02/14	E2	22
210	PORT-AU-PRINCE - (ST. DOMINGO)	ST. DOMINGO	11/02/14	E2	40
211	MAIQUETIA	SAN JUAN	11/02/14	E2	34
212	PORT-AU-PRINCE	KINGSTON	12/02/14	E2	39
213	MEXICO - (CENTRAL AMERICA)	CENTRAL AMERICA	12/02/14	E1	13
214	BOGOTA	GUAYAQUIL	12/02/14	E2	45
215	PANAMA	BOGOTA	12/02/14	E1	13
216	CURAÇAO	BARRANQUILLA	12/02/14	E1	26
219	MONTEVIDEO	EZEIZA	13/02/14	E2	51
220	ATLANTICO	MONTEVIDEO	13/02/14	E2	39
221	BOGOTA	GUAYAQUIL	13/02/14	E1	31
222	MEXICO	CENTRAL AMERICA	13/02/14	E1	18
223	MEXICO	CENTRAL AMERICA	13/02/14	E1	18
226	GUAYAQUIL	BOGOTA	13/02/14	E2	27
227	HABANA	CENTRAL AMERICA	13/02/14	E1	13
230	ATLANTICO	MONTEVIDEO	13/02/14	M	14
231	CURAÇAO	PORT-AU-PRINCE	13/02/14	E1	26

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
232	BOGOTA	GUAYAQUIL	14/02/14	E2	39
233	MONTEVIDEO	EZEIZA	14/02/14	E2	51
234	ATLANTICO	MONTEVIDEO	14/02/14	E2	22
235	ANTOFAGASTA	LIMA	15/02/14	E1	34
238	BOGOTA	PANAMA	15/02/14	E1	31
240	GUAYAQUIL	BOGOTA	16/02/14	E1	20
243	GUAYAQUIL	LIMA	16/02/14	E1	23
244	PORT-AU-PRINCE - (ST. DOMINGO)	ST. DOMINGO	16/02/14	E1	26
245	PIARCO	SAL	16/02/14	E2	39
246	MIAMI - (ST. DOMINGO)	ST. DOMINGO	16/02/14	E2	22
247	LIMA	BOGOTA	16/02/14	E1	31
248	CENTRAL AMERICA	MEXICO	16/02/14	E1	13
252	LIMA	LA PAZ	17/02/14	E1	31
253	CURAÇAO	ST. DOMINGO	18/02/14	E1	26
254	BOGOTA	GUAYAQUIL	18/02/14	E1	35
257	ATLANTICO	MONTEVIDEO	18/02/14	M	14
258	RECIFE	AERONAVE	19/02/14	H	14
259	GUAYAQUIL	BOGOTA	19/02/14	E1	20
260	BOGOTA	GUAYAQUIL	19/02/14	E1	31
261	CENTRAL AMERICA	MEXICO	19/02/14	E1	13
262	PANAMA	BOGOTA	20/02/14	E1	18
264	LIMA	GUAYAQUIL	20/02/14	E1	20
266	ST. DOMINGO	SAN JUAN	20/02/14	E2	22
267	PANAMA	BOGOTA	20/02/14	E1	13
269	MAIQUETIA	BOGOTA	21/02/14	E1	13
270	ANTOFAGASTA - (LIMA)	LIMA	22/02/14	E1	31
272	ATLANTICO	MONTEVIDEO	22/02/14	M	14
273	PANAMA	BOGOTA	22/02/14	E1	13
274	ATLANTICO	LUANDA	22/02/14	E2	22
275	GUAYAQUIL	BOGOTA	23/02/14	E1	20
277	HABANA - (CENTRAL AMERICA)	CENTRAL AMERICA	23/02/14	E1	13
278	CURAZAO	MAIQUETIA	23/02/14	E1	13
279	CAYENNE	AMAZONICA	23/02/14	E2	39
280	CURAZAO	ST. DOMINGO	23/02/14	E1	26
281	CENTRAL AMERICA	MEXICO	24/02/14	E1	26
282	CURAÇAO - (ST. DOMINGO)	ST. DOMINGO	24/02/14	E2	39
285	GUAYAQUIL	LIMA	24/02/14	E1	18
286	GUAYAQUIL	BOGOTA	24/02/14	E1	25
288	LIMA	GUAYAQUIL	25/02/14	E1	31

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
289	MONTEVIDEO	EZEIZA	25/02/14	E2	51
290	ATLANTICO	MONTEVIDEO	25/02/14	M	14
294	BRASILIA	AERONAVE	26/02/14	L	13
295	ANTOFAGASTA - (LIMA)	LIMA	26/02/14	E1	31
296	CURAZAO	BARRANQUILLA	27/02/14	E1	26
297	CURAZAO	BARRANQUILLA	27/02/14	E1	26
298	ATLANTICO	LUANDA	27/02/14	E2	22
299	BOGOTA - (GUAYAQUIL)	GUAYAQUIL	27/02/14	E1	18
300	GEORGETOWN - (PIARCO)	PIARCO	28/02/14	E1	18
301	ATLANTICO	LUANDA	28/02/14	E2	22
302	PORT-AU-PRINCE	ST. DOMINGO	28/02/14	E2	39
303	GUAYAQUIL	BOGOTA	28/02/14	E1	23
304	CURITIBA	BRASILIA	28/02/14	E1	18
306	CENTRAL AMERICA	GUAYAQUIL	01/03/14	E2	46
308	CURAÇAO	ST. DOMINGO	01/03/14	E1	26
309	KINGSTON	BARRANQUILLA	01/03/14	E2	22
310	CURAÇAO	ST. DOMINGO	01/03/14	E2	34
311	BOGOTA	GUAYAQUIL	02/03/14	E1	35
312	BOGOTA	GUAYAQUIL	02/03/14	E1	31
313	KINGSTON	BARRANQUILLA	02/03/14	E1	18
314	CURAÇAO - (ST. DOMINGO)	ST. DOMINGO	02/03/14	E2	22
315	BOGOTA	PANAMA	02/03/14	E1	31
316	CURAÇAO	ST. DOMINGO	02/03/14	E1	26
317	PORT-AU-PRINCE - (MIAMI)	MIAMI	03/03/14	E1	26
322	GUAYAQUIL	CENTRAL AMERICA	03/03/14	E1	23
323	CURITIBA	PILOTO	03/03/14	A	13
324	MONTEVIDEO	EZEIZA	04/03/14	E2	51
325	ATLANTICO	MONTEVIDEO	04/03/14	E2	22
326	LIMA	AMAZONICA	04/03/14	E2	39
327	PANAMA	KINGSTON	04/03/14	E1	13
328	MONTEVIDEO	EZEIZA	04/03/14	E2	51
329	ATLANTICO	MONTEVIDEO	04/03/14	E2	39
331	LIMA	AMAZONICA	04/03/14	E2	39
332	ST. DOMINGO	CURAÇAO	04/03/14	E1	20
334	CURAZAO	ST. DOMINGO	05/03/14	E1	30
335	RESISTENCIA	CORDOBA	06/03/14	E1	26
338	PORT-AU-PRINCE	ST. DOMINGO	06/03/14	E2	39
339	ANTOFAGASTA	LIMA	07/03/14	E1	18

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
341	CURAÇAO	MAIQUETIA	07/03/14	E1	13
342	PORT-AU-PRINCE	ST. DOMINGO	07/03/14	E1	31
343	BOGOTA	MAIQUETIA	07/03/14	E2	22
344	BOGOTA	AMAZONICA	07/03/14	E1	18
345	GUAYAQUIL - (LIMA)	LIMA	07/03/14	E1	35
346	ATLANTICO	LUANDA	07/03/14	E2	22
347	MONTEVIDEO	EZEIZA	07/03/14	E2	51
348	ATLANTICO	MONTEVIDEO	07/03/14	E2	22
351	MONTEVIDEO	EZEIZA	07/03/14	E2	51
352	ATLANTICO	MONTEVIDEO	07/03/14	E2	39
353	CURAÇAO	ST. DOMINGO	07/03/14	E1	30
354	LIMA	LA PAZ	07/03/14	E1	18
354B	LIMA	PILOTO	07/03/14	I	19
355	CURAÇAO	BARRANQUILLA	08/03/14	E1	26
356	GUAYAQUIL	BOGOTA	08/03/14	E1	25
357	LIMA	LA PAZ	08/03/14	E1	31
359	ANTOFAGASTA	LIMA	08/03/14	E1	18
360	MEXICO	CENTRAL AMERICA	08/03/14	E1	18
361	PORT-AU-PRINCE	ST. DOMINGO	08/03/14	E1	35
362	CENTRAL AMERICA - (MEXICO)	MEXICO	08/03/14	E2	22
363	LIMA	GUAYAQUIL	08/03/14	E1	20
364	BOGOTA	GUAYAQUIL	09/03/14	E1	18
365	BOGOTA	PANAMA	09/03/14	E2	22
366	GUAYAQUIL	LIMA	09/03/14	E1	25
367	BOGOTA	PANAMA	09/03/14	E1	18
368	GUAYAQUIL - (LIMA)	LIMA	09/03/14	E2	39
369	BOGOTA	CENTRAL AMERICA	09/03/14	E1	31
370	ST. DOMINGO	PORT-AU-PRINCE	10/03/14	E1	20
371	ST. DOMINGO	PORT-AU-PRINCE	11/03/14	E2	22
373	GUAYAQUIL	CENTRAL AMERICA	12/03/14	E2	27
374	BOGOTA	GUAYAQUIL	12/03/14	E1	31
375	MEXICO	CENTRAL AMERICA	12/03/14	E1	18
376	PORT-AU-PRINCE	ST. DOMINGO	12/03/14	E1	31
377	MAIQUETIA	BOGOTA	12/03/14	E2	17
378	MAIQUETIA	AMAZONICA	13/03/14	E2	17
379	GUAYAQUIL	BOGOTA	13/03/14	E2	30
380	MEXICO	CENTRAL AMERICA	13/03/14	E1	18
381	HABANA	CENTRAL AMERICA	13/03/14	E1	13
383	ANTOFAGASTA	LIMA	14/03/14	E1	34

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
384	ATLANTICO	LUANDA	14/03/14	E2	22
386	BOGOTA	GUAYAQUIL	14/03/14	E2	45
387	NEW YORK - (PIARCO)	PIARCO	14/03/14	E2	39
389	BOGOTA	AMAZONICA	15/03/14	E1	18
390	MONTEVIDEO	EZEIZA	15/03/14	E2	51
391	ATLANTICO	MONTEVIDEO	15/03/14	E2	39
392	CURITIBA	PILOTO	15/03/14	A	16
393	CURAZAO	ST. DOMINGO	15/03/14	E2	40
394	BOGOTA	AMAZONICA	15/03/14	E1	18
395	BOGOTA	AMAZONICA	15/03/14	E1	18
396	PORT-AU-PRINCE	ST. DOMINGO	16/03/14	E1	31
398	CURAÇAO	ST. DOMINGO	16/03/14	E1	26
399	PORT AU PRINCE	ST. DOMINGO	16/03/14	E1	35
400	CURAÇAO	MAIQUETIA	17/03/14	E2	17
401	BOGOTA	PANAMA	17/03/14	E1	18
403	GUAYAQUIL	BOGOTA	18/03/14	E1	25
404	GUAYAQUIL	BOGOTA	18/03/14	E2	25
405	ATLANTICO	LUANDA	19/03/14	E2	22
407	GUAYAQUIL	BOGOTA	19/03/14	E1	25
408	BOGOTA	GUAYAQUIL	20/03/14	E1	31
409	RESISTENCIA	EZEIZA	20/03/14	E1	26
410	GUAYAQUIL	BOGOTA	20/03/14	E1	23
411	ATLANTICO	JOHANNESBURG	20/03/14	E2	22
414	GUAYAQUIL	LIMA	21/03/14	E1	23
415	ST. DOMINGO	PORT-AU-PRINCE	21/03/14	E1	20
416	BOGOTA	GUAYAQUIL	21/03/14	E1	31
417	PORT-AU-PRINCE	ST. DOMINGO	21/03/14	E1	31
418	PORT-AU-PRINCE	MIAMI	21/03/14	E1	31
419	BOGOTA	GUAYAQUIL	21/03/14	E1	31
420	GUAYAQUIL	BOGOTA	22/03/14	E1	25
421	BOGOTA	AMAZONICA	22/03/14	E1	18
422	GUAYAQUIL	LIMA	22/03/14	E1	23
423	PORT-AU-PRINCE	MIAMI	22/03/14	E2	39
424	ANTOFAGASTA	LIMA	22/03/14	E1	18
426	CENTRAL AMERICA - (MEXICO)	MEXICO	22/03/14	E1	18
427	CURAÇAO	BARRANQUILLA	23/03/14	E2	34
428	MEXICO	CENTRAL AMERICA	23/03/14	E1	18
430	MIAMI - (ST. DOMINGO)	ST. DOMINGO	23/03/14	E2	22

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
431	ST. DOMINGO	SAN JUAN	23/03/14	E1	18
432	CURAÇAO	ST. DOMINGO	23/03/14	E1	30
433	CURAÇAO	BARRANQUILLA	24/03/14	E1	26
434	BOGOTA	AMAZONICA	24/03/14	E2	22
435	RESISTENCIA	EZEIZA	24/03/14	E1	26
436	PORT-AU-PRINCE	ST. DOMINGO	24/03/14	E1	31
437	GUAYAQUIL	BOGOTA	25/03/14	E1	25
438	ST. DOMINGO	CURAÇAO	25/03/14	E1	18
439	MEXICO	CENTRAL AMERICA	25/03/14	E2	22
440	GUAYAQUIL	BOGOTA	26/03/14	E1	23
441	GUAYAQUIL	BOGOTA	26/03/14	E1	23
442	GUAYAQUIL	BOGOTA	26/03/14	E1	25
443	ANTOFAGASTA	CORDOBA	26/03/14	E1	13
444	ST. DOMINGO	PORT-AU-PRINCE	27/03/14	E1	20
445	BOGOTA	PANAMA	28/03/14	E2	22
446	ST. DOMINGO	PORT-AU-PRINCE	28/03/14	E2	22
447	LIMA	BOGOTA	29/03/14	E1	18
448	ANTOFAGASTA	CORDOBA	29/03/14	E1	29
449	MONTEVIDEO	EZEIZA	29/03/14	E2	51
450	DAKAR - (CAYENNE)	CAYENNE	30/03/14	E1	31
451	AMAZONICA	BOGOTA	30/03/14	E1	13
453	MIAMI - (ST. DOMINGO)	ST. DOMINGO	31/03/14	E2	22
454	ST. DOMINGO	MIAMI	31/03/14	E2	22
455	ANTOFAGASTA	LIMA	31/03/14	E1	18
457	ST. DOMINGO	SAN JUAN	01/04/14	E1	18
458	GUAYAQUIL	BOGOTA	01/04/14	E2	30
459	MONTEVIDEO	EZEIZA	01/04/14	E2	39
460	ATLANTICO	MONTEVIDEO	01/04/14	E2	22
461	BOGOTA	GUAYAQUIL	02/04/14	E1	20
462	ATLANTICO	LUANDA	02/04/14	E2	22
463	AMAZONICA	PARAMARIBO	02/04/14	E1	13
464	CURAÇAO	BARRANQUILLA	02/04/14	E1	26
465	CURAÇAO	KINGSTON	02/04/14	E1	26
466	CURAÇAO	ST. DOMINGO	03/04/14	E1	30
467	AMAZONICA	MAIQUETIA	03/04/14	E1	13
468	ATLANTICO	ABIDJAN	03/04/14	E2	22
469	MONTEVIDEO	EZEIZA	03/04/14	E2	39
470	ATLANTICO	MONTEVIDEO	03/04/14	E2	22
471B	LA PAZ	LIMA	03/04/14	E2	27

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
471	CORDOBA	LA PAZ	03/04/14	E1	13
472	GUAYAQUIL	CENTRAL AMERICA	04/04/14	E1	23
473	BOGOTA	GUAYAQUIL	04/04/14	E1	31
475	GUAYAQUIL	LIMA	04/04/14	E1	20
480	MEXICO	CENTRAL AMERICA	05/04/14	E1	18
481	ST. DOMINGO	PORT-AU-PRINCE	06/04/14	E1	20
482	MEXICO	CENTRAL AMERICA	07/04/14	E1	18
484	PORT-AU-PRINCE	MIAMI	07/04/14	E1	31
485	CENTRAL AMERICA	BOGOTA	07/04/14	E2	34
486	BOGOTA	PANAMA	07/04/14	E1	18
487	CENTRAL AMERICA - (MEXICO)	MEXICO	08/04/14	E1	18
488	MONTEVIDEO	EZEIZA	08/04/14	E2	39
489	ATLANTICO	MONTEVIDEO	08/04/14	E2	22
490	KINGSTON	BARRANQUILLA	08/04/14	E1	18
491	CURAÇAO	ST. DOMINGO	08/04/14	E1	26
493	PORT AU PRINCE	ST. DOMINGO	09/04/14	E1	35
494	AMAZONICA	LA PAZ	09/04/14	E2	17
495	CURAÇAO	ST. DOMINGO	09/04/14	E1	30
496	CURAZAO - (ST. DOMINGO)	ST. DOMINGO	10/04/14	E1	18
497	AMAZONICA	AERONAVE	10/04/14	L	8
498	CURAÇAO	ST. DOMINGO	10/04/14	E1	26
499	CENTRAL AMERICA - (MEXICO)	MEXICO	10/04/14	E2	22
500	MEXICO	CENTRAL AMERICA	10/04/14	E1	23
501	CURAÇAO	ST. DOMINGO	10/04/14	E1	30
503	PORT-AU-PRINCE	ST. DOMINGO	10/04/14	E1	35
505	CURAÇAO	ST. DOMINGO	10/04/14	E2	40
506	CURAÇAO	ST. DOMINGO	11/04/14	E1	26
507	AMAZONICA	LA PAZ	11/04/14	E1	13
508	KINGSTON - (HABANA)	HABANA	11/04/14	E1	13
509	MEXICO	CENTRAL AMERICA	11/04/14	E2	22
510	MEXICO	CENTRAL AMERICA	11/04/14	E2	22
511	MEXICO	CENTRAL AMERICA	12/04/14	E1	18
513	BOGOTA	GUAYAQUIL	12/04/14	E1	20
514	ATLANTICO	LUANDA	12/04/14	E2	22
516	LIMA	GUAYAQUIL	12/04/14	E2	22
517	BOGOTA	GUAYAQUIL	12/04/14	E1	35
519	ST. DOMINGO	SAN JUAN	12/04/14	E2	22
520	LIMA	AMAZONICA	12/04/14	E2	22

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
521	GUAYAQUIL - (LIMA)	LIMA	13/04/14	E2	39
522	AMAZONICA	LA PAZ	13/04/14	E2	17
523	BOGOTA	GUAYAQUIL	13/04/14	E1	35
524	LIMA	AMAZONICA	13/04/14	E2	22
525	CORDOBA	LA PAZ	13/04/14	E2	34
526	BOGOTA - (GUAYAQUIL)	GUAYAQUIL	14/04/14	F	18
527	BOGOTA	PANAMA	14/04/14	E1	31
529	LIMA	GUAYAQUIL	14/04/14	E1	20
530	GUAYAQUIL	CENTRAL AMERICA	14/04/14	E2	27
531	BOGOTA	GUAYAQUIL	14/04/14	E2	45
532	AMAZONICA	MAIQUETIA	14/04/14	E2	17
533	GUAYAQUIL	CENTRAL AMERICA	14/04/14	E1	23
536	AMAZONICA	MAIQUETIA	14/04/14	E2	17
537	MEXICO	CENTRAL AMERICA	14/04/14	E2	27
539	MEXICO	CENTRAL AMERICA	14/04/14	E2	22
540	MIAMI	PORT AU PRINCE	14/04/14	E1	13
541	GUAYAQUIL	BOGOTA	15/04/14	E1	25
542	GUAYAQUIL	BOGOTA	15/04/14	E2	30
543	MONTEVIDEO	EZEIZA	15/04/14	E2	51
544	ATLANTICO	MONTEVIDEO	15/04/14	E2	22
545	ATLANTICO	LUANDA	15/04/14	E2	22
546	BARRANQUILLA - (CURAZAO)	CURAZAO	15/04/14	E2	34
547	BOGOTA	GUAYAQUIL	15/04/14	E1	35
548	ATLANTICO	LUANDA	16/04/14	E2	39
549	BOGOTA	GUAYAQUIL	17/04/14	E1	18
550	GUAYAQUIL	BOGOTA	17/04/14	E1	23
551	MONTEVIDEO	EZEIZA	18/04/14	E2	51
552	ATLANTICO	MONTEVIDEO	18/04/14	E2	22
553	GUAYAQUIL	LIMA	19/04/14	E1	23
554	PIARCO - (MAIQUETIA)	MAIQUETIA	19/04/14	E1	13
555	ATLANTICO	LUANDA	19/04/14	E2	22
556	MAIQUETIA	AMAZONICA	19/04/14	E1	13
557	LIMA	AMAZONICA	19/04/14	E2	22
558	MEXICO	CENTRAL AMERICA	19/04/14	E1	18
560	CURAÇAO	ST. DOMINGO	20/04/14	E1	30
561	ST. DOMINGO	PORT-AU-PRINCE	20/04/14	E2	22
562	ST. DOMINGO	PORT-AU-PRINCE	20/04/14	E2	22
563	GEORGETOWN	PARAMARIBO	21/04/14	E1	34
564	GEORGETOWN	PARAMARIBO	21/04/14	E1	18

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
565	MEXICO	CENTRAL AMERICA	21/04/14	E1	18
566	MEXICO	CENTRAL AMERICA	21/04/14	E1	18
567	GUAYAQUIL	LIMA	21/04/14	E2	27
568	GUAYAQUIL	BOGOTA	21/04/14	E2	30
569	GUAYAQUIL	BOGOTA	21/04/14	E2	30
570	MEXICO	CENTRAL AMERICA	22/04/14	E1	23
571	AMAZONICA	MAIQUETIA	22/04/14	E1	13
572	GUAYAQUIL	CENTRAL AMERICA	22/04/14	E1	23
574	MONTEVIDEO	EZEIZA	22/04/14	E2	51
575	ATLANTICO	MONTEVIDEO	22/04/14	E2	22
576	MONTEVIDEO	EZEIZA	22/04/14	E2	51
577	ATLANTICO	MONTEVIDEO	22/04/14	E2	22
578	MONTEVIDEO	EZEIZA	22/04/14	E2	51
579	ATLANTICO	MONTEVIDEO	22/04/14	E2	22
580	ST. DOMINGO	CURAÇAO	23/04/14	E1	18
581	CENTRAL AMERICA	PANAMA	23/04/14	E1	13
582	GUAYAQUIL	LIMA	23/04/14	E2	22
583	BOGOTA	AMAZONICA	23/04/14	E1	18
584	GUAYAQUIL	BOGOTA	23/04/14	E2	25
585	LIMA - (GUAYAQUIL)	GUAYAQUIL	23/04/14	E2	25
586	GUAYAQUIL	CENTRAL AMERICA	24/04/14	E1	23
587	ST. DOMINGO	CURAZAO	25/04/14	E2	22
588	ANTOFAGASTA	CORDOBA	25/04/14	E2	51
589	CURAÇAO	ST. DOMINGO	25/04/14	E1	26
591	GUAYAQUIL	BOGOTA	26/04/14	E1	20
592	BOGOTA	PANAMA	26/04/14	E2	22
593	HABANA	CENTRAL AMERICA	26/04/14	E1	13
594	MIAMI - (ST. DOMINGO)	ST. DOMINGO	26/04/14	E2	22
595	HABANA	CENTRAL AMERICA	27/04/14	E1	13
596	ANTOFAGASTA	LIMA	27/04/14	E1	39
599	ANTOFAGASTA	LIMA	27/04/14	E2	27
600	ST. DOMINGO	PORT-AU-PRINCE	28/04/14	E2	22
601	ST. DOMINGO	PORT-AU-PRINCE	28/04/14	E2	22
602	ST. DOMINGO	PORT-AU-PRINCE	28/04/14	E2	22
603	ASUNCION	LA PAZ	28/04/14	E2	34
605	GUAYAQUIL	LIMA	28/04/14	E2	27
606	LIMA	BOGOTA	28/04/14	E2	22
607	GUAYAQUIL	LIMA	28/04/14	E1	25

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
608	ATLANTICO	LUANDA	29/04/14	E2	22
609	ATLANTICO	LUANDA	29/04/14	E2	22
610	ST. DOMINGO	PORT AU PRINCE	30/04/14	E2	22
611	GUAYAQUIL - (LIMA)	LIMA	30/04/14	E1	31
612	MAIQUETIA	BARRANQUILLA	30/04/14	E2	17
613	LIMA	BOGOTA	30/04/14	E2	22
614	PANAMA - (KINGSTON)	KINGSTON	01/05/14	E1	18
615	CURAÇAO	KINGSTON	01/05/14	E1	26
616	ST. DOMINGO	PORT-AU-PRINCE	01/05/14	E1	18
617	MEXICO	CENTRAL AMERICA	01/05/14	E1	18
619	CENTRAL AMERICA	HABANA	01/05/14	E1	13
624	BOGOTA	MAIQUETIA	03/05/14	E1	18
625	ATLANTICO	ABIDJAN	03/05/14	E2	22
626	PANAMA	CENTRAL AMERICA	03/05/14	E1	13
627	ST. DOMINGO - (CURAÇAO)	CURAÇAO	03/05/14	E2	34
628	LIMA	LA PAZ	04/05/14	E2	51
629	CENTRAL AMERICA	GUAYAQUIL	04/05/14	E1	26
630	CENTRAL AMERICA	MEXICO	04/05/14	E1	13
632	COMODORO RIVADAVIA	MOUNT PLEASANT	04/05/14	E2	34
633	BOGOTA	PANAMA	05/05/14	E1	18
634	CENTRAL AMERICA	MEXICO	05/05/14	E1	13
635	MAIQUETIA	BARRANQUILLA	05/05/14	E2	17
636	KINGSTON	PANAMA	05/05/14	E1	18
637	BOGOTA	GUAYAQUIL	06/05/14	E1	35
638	CENTRAL AMERICA	GUAYAQUIL	06/05/14	F	34
639	LIMA	GUAYAQUIL	06/05/14	E2	25
640	CENTRAL AMERICA	GUAYAQUIL	06/05/14	E2	46
641	BOGOTA	GUAYAQUIL	06/05/14	E2	45
642	LIMA	GUAYAQUIL	06/05/14	E1	20
644	ANTOFAGASTA	LIMA	07/05/14	E1	34
645	ST. DOMINGO	MIAMI	07/05/14	E2	22
646	LA PAZ - (LIMA)	LIMA	07/05/14	E1	31
647	CENTRAL AMERICA - (MEXICO)	MEXICO	07/05/14	E1	18
648	GUAYAQUIL	BOGOTA	08/05/14	E1	23
649	GUAYAQUIL	BOGOTA	08/05/14	E1	23
650	GUAYAQUIL	LIMA	08/05/14	E1	23
651	ATLANTICO	ABIDJAN	08/05/14	E2	22
652	ST. DOMINGO	PORT AU PRINCE	09/05/14	E2	22
653	CURAÇAO	ST. DOMINGO	09/05/14	E1	26

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
655	CURAÇAO	ST. DOMINGO	09/05/14	E2	34
656	ATLANTICO	LUANDA	10/05/14	E2	22
657	PORT AU PRINCE	ST. DOMINGO	10/05/14	E1	31
659	AMAZONICA	MAIQUETIA	11/05/14	E2	17
662	MEXICO	CENTRAL AMERICA	12/05/14	E1	18
663	LIMA	LA PAZ	12/05/14	E2	39
665	MONTEVIDEO	EZEIZA	13/05/14	E2	51
666	ATLANTICO	MONTEVIDEO	13/05/14	E2	22
667	MIAMI	HABANA	13/05/14	E1	13
668	BOGOTA	PANAMA	14/05/14	E1	18
669	BOGOTA	PANAMA	14/05/14	E2	39
670	CENTRAL AMERICA	PILOTO	14/05/14	M	6
671	GUAYAQUIL	BOGOTA	14/05/14	E2	30
672	GUAYAQUIL	BOGOTA	14/05/14	E1	23
673	PORT AU PRINCE - (ST. DOMINGO)	ST. DOMINGO	15/05/14	E1	31
674	ST. DOMINGO	PORT-AU-PRINCE	15/05/14	E2	22
675	CENTRAL AMERICA	PANAMA	15/05/14	E1	13
676	BOGOTA	PANAMA	16/05/14	E1	31
677	BOGOTA	PANAMA	16/05/14	E1	31
678	MAIQUETIA	BARRANQUILLA	16/05/14	E2	17
680	CENTRAL AMERICA	MEXICO	16/05/14	E2	17
681	CENTRAL AMERICA	PANAMA	16/05/14	E2	17
682	MONTEVIDEO	EZEIZA	16/05/14	E2	39
683	ATLANTICO	MONTEVIDEO	16/05/14	E2	22
684	BOGOTA	PANAMA	16/05/14	E1	18
685	BOGOTA	GUAYAQUIL	17/05/14	E2	45
686	BOGOTA	CENTRAL AMERICA	17/05/14	E1	31
687	BOGOTA	GUAYAQUIL	17/05/14	E1	31
688	CURAZAO	ST. DOMINGO	17/05/14	E1	26
690	LIMA - (ANTOFAGASTA)	ANTOFAGASTA	18/05/14	E1	13
691	BOGOTA	PANAMA	18/05/14	E2	39
692	CURAÇAO	ST. DOMINGO	18/05/14	E1	26
693	ASUNCION	LA PAZ	18/05/14	E2	34
694	ASUNCION	LA PAZ	18/05/14	E2	34
695	LIMA	LA PAZ	19/05/14	E1	39
696	MIAMI	ST. DOMINGO	19/05/14	E1	13
697	BOGOTA	PANAMA	20/05/14	E1	31
698	BOGOTA	AMAZONICA	20/05/14	E1	18

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
699	PIARCO	PARAMARIBO	20/05/14	E1	31
700	PANAMA	BOGOTA	20/05/14	E1	31
701	CENTRAL AMERICA	PANAMA	20/05/14	E1	13
702	MONTEVIDEO	EZEIZA	20/05/14	E2	39
703	ATLANTICO	MONTEVIDEO	20/05/14	E2	22
704	GUAYAQUIL	BOGOTA	21/05/14	E1	25
705	CURAÇAO	ST. DOMINGO	21/05/14	E1	26
707	CURAÇAO	ST. DOMINGO	21/05/14	E1	26
708	BOGOTA	GUAYAQUIL	22/05/14	E1	35
709	LIMA	AMAZONICA	22/05/14	E2	22
711	CENTRAL AMERICA	BOGOTA	23/05/14	E2	34
712	MONTEVIDEO	EZEIZA	23/05/14	E2	51
713	ATLANTICO	MONTEVIDEO	23/05/14	E2	22
714	MEXICO	CENTRAL AMERICA	23/05/14	E2	27
717	MEXICO	HABANA	24/05/14	E2	27
718	ANTOFAGASTA - (LIMA)	LIMA	24/05/14	E2	22
719	SAN JUAN - (ST. DOMINGO)	ST. DOMINGO	24/05/14	E1	18
720	SAN JUAN - (ST. DOMINGO)	ST. DOMINGO	24/05/14	E1	18
721	GUAYAQUIL	BOGOTA	25/05/14	E1	23
722	LIMA	ANTOFAGASTA	25/05/14	E1	18
723	RESISTENCIA	EZEIZA	25/05/14	E1	31
724	CENTRAL AMERICA	HABANA	26/05/14	E1	13
726	CAYENNE	ATLANTICO	28/05/14	E1	39
728	CURAZAO	ST. DOMINGO	29/05/14	E1	30
729	NEW YORK - (PIARCO)	PIARCO	29/05/14	E1	18
730	CENTRAL AMERICA	CENTRAL AMERICA	29/05/14	D	9
731	CENTRAL AMERICA - (HABANA)	HABANA	29/05/14	E1	18
732	BOGOTA	AMAZONICA	31/05/14	E1	18
733	ST. DOMINGO	CURAZAO	31/05/14	E1	18
734	CURITIBA	APP SP	31/05/14	E1	26
736	CURITIBA	APP SP	31/05/14	E1	26
737	MONTEVIDEO - (RESISTENCIA)	RESISTENCIA	01/06/14	E2	34
738	BOGOTA	GUAYAQUIL	01/06/14	E2	39
739	MEXICO	CENTRAL AMERICA	01/06/14	E1	18
740	GUAYAQUIL	BOGOTA	01/06/14	E1	20
742	BOGOTA	PANAMA	01/06/14	E2	22
745	CURAÇAO	ST. DOMINGO	01/06/14	E1	26
746	BOGOTA	GUAYAQUIL	02/06/14	E1	35
747	BOGOTA	MAIQUETIA	03/06/14	E1	18

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
748	CENTRAL AMERICA	PANAMA	03/06/14	E1	13
749	CURAÇAO	BARRANQUILLA	03/06/14	E2	34
750	BOGOTA	GUAYAQUIL	04/06/14	E1	20
752	GUAYAQUIL - (LIMA)	LIMA	05/06/14	E2	22
753	GUAYAQUIL	CENTRAL AMERICA	05/06/14	E1	18
754	HABANA	PILOTO	06/06/14	H	19
755	HABANA	HABANA	06/06/14	D	14
756	CURAÇAO	ST. DOMINGO	06/06/14	E1	26
757	RESISTENCIA	CORDOBA	06/06/14	E2	22
758	GUAYAQUIL	BOGOTA	06/06/14	E1	18
759	GUAYAQUIL	LIMA	07/06/14	E1	20
760	GUAYAQUIL	BOGOTA	07/06/14	E1	20
761	GUAYAQUIL	BOGOTA	07/06/14	E1	23
762	GUAYAQUIL	BOGOTA	07/06/14	E1	20
763	CURAÇAO	MAIQUETIA	07/06/14	E1	13
764	CENTRAL AMERICA	MEXICO	08/06/14	E1	26
765	MEXICO	CENTRAL AMERICA	08/06/14	E1	18
766	ST. DOMINGO	PORT-AU-PRINCE	08/06/14	E1	20
768	CURITIBA	AERONAVE	09/06/14	I	18
770	ANTOFAGASTA	LIMA	09/06/14	E1	18
771	LIMA	LA PAZ	09/06/14	E1	31
772	CURAÇAO	ST. DOMINGO	09/06/14	E1	26
773	BOGOTA	GUAYAQUIL	09/06/14	E1	31
774	GUAYAQUIL	LIMA	10/06/14	E1	23
775	GUAYAQUIL	LIMA	10/06/14	E2	25
776	GUAYAQUIL	BOGOTA	10/06/14	E2	25
777	CENTRAL AMERICA	GUAYAQUIL	10/06/14	E1	34
778	CURAÇAO	BARRANQUILLA	10/06/14	E1	26
779	CURAÇAO	BARRANQUILLA	10/06/14	E2	34
781	AMAZONICA	CAYENNE	11/06/14	E2	17
782	AMAZONICA	MAIQUETIA	11/06/14	E1	13
783	PORT-AU-PRINCE	ST. DOMINGO	12/06/14	E2	39
785	CENTRAL AMERICA	BOGOTA	12/06/14	F	34
786	CURITIBA	ASUNCION	13/06/14	E1	18
787	ASUNCION	LA PAZ	13/06/14	E2	39
788	ST. DOMINGO	PORT-AU-PRINCE	13/06/14	E2	22
789	GUAYAQUIL	BOGOTA	14/06/14	E1	20
790	BOGOTA	PANAMA	14/06/14	E1	31

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
791	GUAYAQUIL	CENTRAL AMERICA	14/06/14	E1	23
792	BOGOTA	GUAYAQUIL	14/06/14	E1	35
793	GUAYAQUIL	BOGOTA	14/06/14	E1	20
794	BOGOTA	GUAYAQUIL	14/06/14	E1	20
795	GUAYAQUIL	CENTRAL AMERICA	14/06/14	E1	18
796	BOGOTA	GUAYAQUIL	14/06/14	E1	31
797	CURAZAO	BARRANQUILLA	14/06/14	E2	34
799	MEXICO	CENTRAL AMERICA	14/06/14	E2	22
800	MEXICO	CENTRAL AMERICA	14/06/14	E1	18
801	GUAYAQUIL - (LIMA)	LIMA	15/06/14	E1	31
802	BOGOTA	PANAMA	15/06/14	E1	18
803	LA PAZ - (LIMA)	LIMA	15/06/14	E1	31
804	LA PAZ - (LIMA)	LIMA	15/06/14	E1	31
805	CENTRAL AMERICA	PANAMA	16/06/14	E2	17
806	CENTRAL AMERICA - (MEXICO)	MEXICO	16/06/14	E2	22
807	LA PAZ	CORDOBA	17/06/14	E1	23
808	BRASILIA	AERONAVE	18/06/14	H	23
809	CENTRAL AMERICA	MEXICO	18/06/14	E2	17
810	CENTRAL AMERICA	PANAMA	18/06/14	E2	17
811	CURAÇAO	ST. DOMINGO	18/06/14	E1	30
812	CENTRAL AMERICA	PANAMA	19/06/14	E2	17
813	GUAYAQUIL	BOGOTA	19/06/14	E1	20
814	PANAMA - (CENTRAL AMERICA)	CENTRAL AMERICA	19/06/14	E1	13
815	AMAZONICA	MAIQUETIA	20/06/14	E2	17
816	GUAYAQUIL	BOGOTA	22/06/14	E2	25
817	BOGOTA	BARRANQUILLA	22/06/14	E1	18
819	ANTOFAGASTA	LIMA	22/06/14	E1	34
820	BOGOTA	GUAYAQUIL	22/06/14	E1	35
821	GUAYAQUIL	BOGOTA	23/06/14	E1	23
822	AMAZONICA	PARAMARIBO	23/06/14	E1	13
823	AMAZONICA	PARAMARIBO	23/06/14	E1	13
824	GUAYAQUIL	BOGOTA	23/06/14	E1	20
825	KINGSTON - (CENTRAL AMERICA)	CENTRAL AMERICA	23/06/14	E1	13
826	HABANA	CENTRAL AMERICA	24/06/14	E1	18
827	RESISTENCIA	CORDOBA	24/06/14	E1	26
828	MIAMI	HABANA	24/06/14	E1	13
829	LIMA	AMAZONICA	24/06/14	E2	22
830	LIMA	GUAYAQUIL	25/06/14	E1	18
831	ST. DOMINGO	SAN JUAN	25/06/14	E2	22

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
832	ATLANTICO	DAKAR	26/06/14	E2	22
834	CENTRAL AMERICA	MEXICO	27/06/14	E2	17
835	GUAYAQUIL	BOGOTA	27/06/14	E1	23
836	PORT AU PRINCE	ST. DOMINGO	28/06/14	E1	31
838	BOGOTA	GUAYAQUIL	29/06/14	E1	35
839	GUAYAQUIL	CENTRAL AMERICA	30/06/14	E1	23
840	GUAYAQUIL	CENTRAL AMERICA	30/06/14	E2	27
841	MEXICO - (CENTRAL AMERICA)	CENTRAL AMERICA	30/06/14	E1	26
843	CURAÇAO	ST. DOMINGO	30/06/14	E1	26
844	MEXICO	CENTRAL AMERICA	30/06/14	E2	22
845	ASUNCION	CURITIBA	01/07/14	E1	26
846	CURAÇAO	ST. DOMINGO	01/07/14	E1	26
847	LIMA	BOGOTA	01/07/14	E2	22
849	AMAZONICA	CAYENNE	02/07/14	E2	17
850	PORT-AU-PRINCE	ST. DOMINGO	02/07/14	E2	39
851	HABANA	CENTRAL AMERICA	02/07/14	E1	18
852	CENTRAL AMERICA - (HABANA)	HABANA	02/07/14	E1	18
853	BOGOTA	BARRANQUILLA	02/07/14	E2	22
855	AMAZONICA	BOGOTA	03/07/14	E1	18
856	CURAZAO	BARRANQUILLA	03/07/14	E1	26
857	MEXICO	CENTRAL AMERICA	03/07/14	E2	22
859	HABANA	PILOTO	04/07/14	M	11
861	GUAYAQUIL - (CENTRAL AMERICA)	CENTRAL AMERICA	05/07/14	E2	22
862	ATLANTICO	MONTEVIDEO	05/07/14	E2	22
863	CENTRAL AMERICA	BOGOTA	06/07/14	E2	34
864	BARRANQUILLA - (CURAZAO)	CURAZAO	06/07/14	E1	13
865	GUAYAQUIL	CENTRAL AMERICA	07/07/14	E2	22
866	AMAZONICA	BRASILIA	07/07/14	E2	17
867	AMAZONICA	RECIFE	08/07/14	E2	17
868	CENTRAL AMERICA - (MEXICO)	MEXICO	09/07/14	E1	18
869	BOGOTA	PANAMA	10/07/14	E2	22
870	CENTRAL AMERICA	PANAMA	12/07/14	E2	17
871	LIMA	LA PAZ	12/07/14	E2	39
872	COMODORO RIVADAVIA	MOUNT PLEASANT	12/07/14	E2	34
873	GUAYAQUIL	BOGOTA	12/07/14	E1	18
874	GUAYAQUIL	BOGOTA	13/07/14	E2	25
875	PORT-AU-PRINCE	ST. DOMINGO	13/07/14	E1	35
876	RESISTENCIA	CORDOBA	13/07/14	E2	34

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
877	AMAZONICA	BOGOTA	14/07/14	E1	13
878	AMAZONICA	BOGOTA	14/07/14	E1	13
879	LA PAZ	CORDOBA	15/07/14	E1	23
880	PORT-AU-PRINCE	MIAMI	15/07/14	E1	31
882	CURAÇAO	ST. DOMINGO	15/07/14	E2	34
883	LIMA	GUAYAQUIL	15/07/14	E2	22
884	AMAZONICA	BOGOTA	16/07/14	E2	22
885	AMAZONICA	BOGOTA	16/07/14	E2	22
887	BOGOTA	GUAYAQUIL	16/07/14	E2	45
888	ST. DOMINGO	PORT-AU-PRINCE	17/07/14	E2	22
889	CURAZAO	ST. DOMINGO	17/07/14	E1	26
890	MAIQUETIA	BARRANQUILLA	17/07/14	E1	13
891	MAIQUETIA	BARRANQUILLA	17/07/14	E2	17
892	ANTOFAGASTA	LIMA	18/07/14	E2	34
894	GUAYAQUIL	BOGOTA	18/07/14	E2	25
895	ATLANTICO	ABIDJAN	18/07/14	E1	18
896	CENTRAL AMERICA	MEXICO	18/07/14	E1	13
898	RECIFE	PILOTO	18/07/14	A	13
900	GUAYAQUIL	CENTRAL AMERICA	18/07/14	E1	18
901	CENTRAL AMERICA	HABANA	19/07/14	E1	13
902	ATLANTICO	LUANDA	19/07/14	E2	22
903	BOGOTA	GUAYAQUIL	19/07/14	E2	45
904	ATLANTICO	MONTEVIDEO	19/07/14	E2	22
905	COMODORO RIVADAVIA	MOUNT PLEASANT	19/07/14	E2	34
906	GUAYAQUIL	BOGOTA	19/07/14	E1	20
907	CENTRAL AMERICA - (HABANA)	HABANA	20/07/14	E1	18
908	HABANA	CENTRAL AMERICA	20/07/14	E2	22
909	BOGOTA	PANAMA	21/07/14	E1	31
910	BOGOTA	PANAMA	21/07/14	E1	31
911	GUAYAQUIL	CENTRAL AMERICA	21/07/14	E1	18
913	CURAÇAO	MAIQUETIA	21/07/14	E1	13
914	PORT AU PRINCE - (ST. DOMINGO)	ST. DOMINGO	21/07/14	E1	35
915	AMAZONICA	BRASILIA	22/07/14	E2	22
917	BOGOTA	LIMA	22/07/14	E2	22
918	LIMA	GUAYAQUIL	23/07/14	E1	18
919	PORT-AU-PRINCE	ST. DOMINGO	23/07/14	E1	35
920	CURAÇAO	BARRANQUILLA	23/07/14	E1	26
921	GUAYAQUIL	BOGOTA	23/07/14	E1	20
922	BOGOTA	PANAMA	23/07/14	E1	31

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
923	CENTRAL AMERICA - (MEXICO)	MEXICO	23/07/14	E1	26
924	BOGOTA	PANAMA	23/07/14	E1	31
925	MEXICO	CENTRAL AMERICA	24/07/14	E1	26
926	AMAZONICA	LA PAZ	24/07/14	E1	13
927	CENTRAL AMERICA	MEXICO	24/07/14	E1	13
928	PIARCO	MAIQUETIA	24/07/14	E2	27
929	BOGOTA	BARRANQUILLA	25/07/14	E2	22
930	AMAZONICA	MAIQUETIA	25/07/14	E1	13
931	BOGOTA	MAIQUETIA	25/07/14	E1	18
932	LIMA - (ANTOFAGASTA)	ANTOFAGASTA	26/07/14	E1	13
933	MENDOZA - (SANTIAGO)	SANTIAGO	26/07/14	E1	13
934	ST. DOMINGO	CURAÇAO	26/07/14	E1	18
935	CURAZAO	BARRANQUILLA	26/07/14	E1	26
936	COMODORO RIVADAVIA	MOUNT PLEASANT	26/07/14	E2	34
937	GUAYAQUIL	BOGOTA	27/07/14	E1	18
938	GUAYAQUIL	BOGOTA	27/07/14	E1	20
939	ANTOFAGASTA	LIMA	27/07/14	E1	34
940	BOGOTA	AMAZONICA	27/07/14	E1	18
941	CENTRAL AMERICA	PILOTO	27/07/14	M	13
942	SAN JUAN - (PIARCO)	PIARCO	27/07/14	E1	18
943	ST. DOMINGO	PORT AU PRINCE	28/07/14	E1	20
944	BOGOTA	GUAYAQUIL	28/07/14	E1	20
946	CURAÇAO	ST. DOMINGO	28/07/14	E1	30
947	GUAYAQUIL	BOGOTA	29/07/14	E1	20
948	ANTOFAGASTA	PILOTO	29/07/14	M	13
949	CENTRAL AMERICA - (MEXICO)	MEXICO	29/07/14	E1	26
951	CENTRAL AMERICA	MEXICO	29/07/14	E1	13
953	MEXICO	CENTRAL AMERICA	29/07/14	E1	26
954	GUAYAQUIL	LIMA	29/07/14	E1	18
955	CENTRAL AMERICA	KINGSTON	29/07/14	E2	17
956	BOGOTA	AMAZONICA	30/07/14	E1	18
957	BOGOTA	MAIQUETIA	30/07/14	E1	18
958	CENTRAL AMERICA - (MEXICO)	MEXICO	30/07/14	E1	26
960	ANTOFAGASTA	LIMA	31/07/14	E2	34
961	CENTRAL AMERICA - (MEXICO)	MEXICO	31/07/14	E2	34
963	CURAÇAO	KINGSTON	31/07/14	E2	34
965	BOGOTA	GUAYAQUIL	01/08/14	E2	45
966	PORT-AU-PRINCE	ST. DOMINGO	01/08/14	E1	31

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
967	BOGOTA - (LIMA)	LIMA	01/08/14	E2	34
968	CURAZAO	ST. DOMINGO	02/08/14	E2	22
969	BOGOTA	PANAMA	02/08/14	E2	22
970	GUAYAQUIL	BOGOTA	02/08/14	E1	20
971	MAIQUETIA	SAN JUAN	02/08/14	E1	26
972	GUAYAQUIL	BOGOTA	02/08/14	E1	20
973	CURAÇAO	BARRANQUILLA	03/08/14	E1	18
974	PANAMA - (KINGSTON)	KINGSTON	03/08/14	E1	18
975	GUAYAQUIL	CENTRAL AMERICA	03/08/14	E1	31
977	GUAYAQUIL	BOGOTA	03/08/14	E1	20
978	MEXICO	CENTRAL AMERICA	04/08/14	E1	18
979	GUAYAQUIL	BOGOTA	04/08/14	E1	20
980	LIMA	LA PAZ	04/08/14	E2	39
981	CURAÇAO - (PORT-AU-PRINCE)	PORT-AU-PRINCE	04/08/14	E2	39
982	ST. DOMINGO	MIAMI	04/08/14	E1	18
983	RESISTENCIA	EZEIZA	04/08/14	E1	18
984	ST. DOMINGO - (CURAÇAO)	CURAÇAO	04/08/14	E2	17
985	BOGOTA	PANAMA	05/08/14	E1	23
986	CURAÇAO	BARRANQUILLA	05/08/14	E2	22
987	RESISTENCIA	ASUNCION	05/08/14	B	34
988	PORT AU PRINCE - (ST. DOMINGO)	ST. DOMINGO	06/08/14	E1	31
989	CURAZAO	MAIQUETIA	06/08/14	E1	13
990	BOGOTA	MAIQUETIA	06/08/14	E1	18
991	BOGOTA	PANAMA	06/08/14	E1	18
992	BOGOTA	PANAMA	06/08/14	E2	22
994	ANTOFAGASTA	LIMA	07/08/14	E1	31
995	ANTOFAGASTA	LIMA	07/08/14	E1	39
996	PORT-AU-PRINCE	ST. DOMINGO	07/08/14	E1	31
997	CENTRAL AMERICA	GUAYAQUIL	07/08/14	E2	51
998	ST. DOMINGO	PORT-AU-PRINCE	07/08/14	E2	22
999	BOGOTA	PANAMA	08/08/14	E1	18
1000	BOGOTA	AMAZONICA	08/08/14	E1	18
1001	ATLANTICO	MONTEVIDEO	08/08/14	E2	22
1002	HABANA - (CENTRAL AMERICA)	CENTRAL AMERICA	08/08/14	E1	23
1003	CAYENNE	AMAZONICA	09/08/14	E1	31
1004	GUAYAQUIL	BOGOTA	09/08/14	E1	20
1005	CURAÇAO	ST. DOMINGO	09/08/14	E1	20
1006	GUAYAQUIL	BOGOTA	09/08/14	E2	25
1007	ATLANTICO	MONTEVIDEO	10/08/14	E2	22

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1008	LIMA	ANTOFAGASTA	10/08/14	E2	22
1009	BOGOTA	BARRANQUILLA	11/08/14	E1	18
1010	BOGOTA	PANAMA	11/08/14	E1	31
1011	GUAYAQUIL	BOGOTA	11/08/14	E1	20
1012	LIMA	GUAYAQUIL	12/08/14	E1	25
1013	ATLANTICO	MONTEVIDEO	12/08/14	E2	22
1014	SANTIAGO	PILOTO	13/08/14	C	19
1015	PIARCO	PILOTO	13/08/14	B	27
1016	CENTRAL AMERICA	KINGSTON	13/08/14	E2	22
1017	BOGOTA	GUAYAQUIL	15/08/14	E1	35
1019	HABANA	MIAMI	15/08/14	D	14
1020	ASUNCION	LA PAZ	16/08/14	E2	34
1022	BOGOTA	CENTRAL AMERICA	16/08/14	E1	31
1023	BOGOTA	GUAYAQUIL	16/08/14	E1	35
1024	RESISTENCIA	CURITIBA	16/08/14	E1	34
1025	CURAZAO	ST. DOMINGO	16/08/14	E1	18
1026	CENTRAL AMERICA - (MEXICO)	MEXICO	16/08/14	E1	18
1027	GUAYAQUIL	CENTRAL AMERICA	16/08/14	E1	18
1028	KINGSTON - (CENTRAL AMERICA)	CENTRAL AMERICA	17/08/14	E1	18
1029	GUAYAQUIL	BOGOTA	17/08/14	E1	31
1030	MEXICO	CENTRAL AMERICA	19/08/14	E2	34
1031	GUAYAQUIL	BOGOTA	19/08/14	E2	25
1032	GUAYAQUIL	BOGOTA	19/08/14	E1	20
1033	GUAYAQUIL	BOGOTA	19/08/14	E1	18
1034	GUAYAQUIL	BOGOTA	19/08/14	E1	18
1035	BOGOTA	MAIQUETIA	19/08/14	E2	22
1036	HABANA	CENTRAL AMERICA	19/08/14	E1	13
1038	MEXICO - (CENTRAL AMERICA)	CENTRAL AMERICA	20/08/14	E2	22
1039	PORT-AU-PRINCE	ST. DOMINGO	20/08/14	E1	35
1040	CURAÇAO	BARRANQUILLA	20/08/14	E2	22
1041	GUAYAQUIL	CENTRAL AMERICA	20/08/14	E1	18
1042	CURAÇAO	BARRANQUILLA	21/08/14	E1	18
1043	CURAÇAO	ST. DOMINGO	21/08/14	E1	18
1044	GUAYAQUIL	BOGOTA	21/08/14	E2	25
1045	ANTOFAGASTA	CORDOBA	22/08/14	E1	26
1046	BOGOTA	GUAYAQUIL	22/08/14	E1	35
1047	BOGOTA	GUAYAQUIL	22/08/14	E1	35
1048	BOGOTA - (GUAYAQUIL)	GUAYAQUIL	22/08/14	E2	22

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1049	CURAÇAO	KINGSTON	23/08/14	E1	18
1050	CURITIBA	APP SP	23/08/14	E2	22
1051	GUAYAQUIL - (LIMA)	LIMA	23/08/14	E1	20
1052	ST. DOMINGO	MIAMI	24/08/14	E1	18
1053	GUAYAQUIL	LIMA	24/08/14	E1	15
1054	PORT-AU-PRINCE	ST. DOMINGO	24/08/14	E1	35
1055	PORT-AU-PRINCE	ST. DOMINGO	24/08/14	E1	31
1056	GUAYAQUIL	BOGOTA	24/08/14	E2	40
1058	GUAYAQUIL	LIMA	24/08/14	E1	13
1059	ST. DOMINGO	CURAÇAO	25/08/14	E2	22
1060	MENDOZA - (SANTIAGO)	SANTIAGO	25/08/14	E2	17
1061	MEXICO	CENTRAL AMERICA	25/08/14	E1	26
1062	LIMA	BOGOTA	26/08/14	E1	18
1063	MEXICO	CENTRAL AMERICA	26/08/14	E1	18
1064	CENTRAL AMERICA - (GUAYAQUIL)	GUAYAQUIL	26/08/14	E1	13
1066	GUAYAQUIL	BOGOTA	27/08/14	E1	20
1067	GUAYAQUIL	BOGOTA	27/08/14	E1	20
1068	MEXICO	CENTRAL AMERICA	27/08/14	E2	34
1069	GUAYAQUIL	CENTRAL AMERICA	28/08/14	E1	18
1070	CENTRAL AMERICA	PILOTO	28/08/14	I	14
1072	GUAYAQUIL	BOGOTA	28/08/14	E1	20
1074	BOGOTA	PANAMA	28/08/14	E1	18
1075	GUAYAQUIL	BOGOTA	29/08/14	E1	18
1076	ATLANTICO	MONTEVIDEO	29/08/14	E2	22
1077	GUAYAQUIL	BOGOTA	29/08/14	E1	15
1079	ANTOFAGASTA	LIMA	29/08/14	E1	18
1080	CURAÇAO	ST. DOMINGO	30/08/14	E2	25
1081	BOGOTA	GUAYAQUIL	31/08/14	E1	31
1082	BOGOTA	GUAYAQUIL	31/08/14	E1	35
1084	CENTRAL AMERICA	MEXICO	31/08/14	E2	22
1085	ST. DOMINGO	PORT-AU-PRINCE	01/09/14	E1	20
1087	GUAYAQUIL	LIMA	01/09/14	E1	20
1089	BOGOTA	PANAMA	01/09/14	E1	31
1090	BOGOTA	GUAYAQUIL	01/09/14	E2	25
1091	GUAYAQUIL	BOGOTA	02/09/14	E1	15
1092	BOGOTA	GUAYAQUIL	03/09/14	E1	31
1094	BOGOTA	MAIQUETIA	03/09/14	E1	18
1095	PORT-AU-PRINCE	CURAÇAO	04/09/14	E1	31
1096	BOGOTA	PANAMA	04/09/14	E1	18

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1097	BOGOTA	GUAYAQUIL	04/09/14	E1	31
1098	HABANA	PILOTO	04/09/14	M	6
1099	GUAYAQUIL	BOGOTA	04/09/14	E1	15
1100	CURAÇAO	BARRANQUILLA	04/09/14	E1	26
1101	MEXICO	CENTRAL AMERICA	04/09/14	E2	22
1102	KINGSTON	BARRANQUILLA	04/09/14	E1	18
1103	ST. DOMINGO	SAN JUAN	04/09/14	E1	18
1104	GUAYAQUIL	BOGOTA	05/09/14	E1	13
1105	GUAYAQUIL	BOGOTA	05/09/14	E1	15
1106	CURITIBA	MONTEVIDEO	05/09/14	E1	18
1108	BOGOTA	PANAMA	05/09/14	E1	31
1109	BOGOTA	PANAMA	05/09/14	E1	18
1110	BOGOTA	PILOTO	05/09/14	A	21
1111	ANTOFAGASTA - (LIMA)	LIMA	06/09/14	E1	26
1112	BOGOTA	PANAMA	06/09/14	E1	31
1113	CURAÇAO	ST. DOMINGO	06/09/14	E1	30
1114	ST. DOMINGO	CURAÇAO	06/09/14	E2	25
1115	COMODORO RIVADAVIA	MOUNT PLEASANT	06/09/14	E2	34
1116	PORT-AU-PRINCE - (ST. DOMINGO)	ST. DOMINGO	07/09/14	E2	45
1117	BOGOTA	PANAMA	07/09/14	F	18
1118	HABANA	PILOTO	07/09/14	M	6
1119	GUAYAQUIL	BOGOTA	09/09/14	E2	25
1120	CURITIBA	BRASILIA	09/09/14	E2	22
1121	MEXICO	CENTRAL AMERICA	09/09/14	E1	26
1122	LIMA	ANTOFAGASTA	10/09/14	E1	18
1123	CURITIBA	AERONAVE	10/09/14	I	14
1124	ST. DOMINGO	PORT AU PRINCE	10/09/14	E1	20
1125	ST. DOMINGO	CURAÇAO	10/09/14	E1	20
1126	CENTRAL AMERICA	GUAYAQUIL	11/09/14	E1	39
1127	MEXICO	CENTRAL AMERICA	11/09/14	E1	31
1128	BOGOTA	PANAMA	11/09/14	E2	39
1129	BOGOTA	GUAYAQUIL	11/09/14	E2	25
1130	BOGOTA	MAIQUETIA	12/09/14	E2	22
1131	COMODORO RIVADAVIA	MOUNT PLEASANT	12/09/14	E2	34
1132	CENTRAL AMERICA - (MEXICO)	MEXICO	12/09/14	E1	26
1133	PANAMA	BOGOTA	12/09/14	E1	13
1135	CURITIBA	PILOTO	12/09/14	H	14
1136	PORT-AU-PRINCE	ST. DOMINGO	12/09/14	E1	35

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1137	KINGSTON	CURAÇAO	12/09/14	E2	46
1138	BOGOTA	PANAMA	12/09/14	E1	31
1139	MEXICO - (CENTRAL AMERICA)	CENTRAL AMERICA	13/09/14	E1	18
1140	BOGOTA	PANAMA	13/09/14	E2	39
1141	RESISTENCIA	ASUNCION	13/09/14	E1	26
1142	MEXICO	CENTRAL AMERICA	13/09/14	E1	18
1143	GUAYAQUIL	BOGOTA	13/09/14	E1	15
1144	PORT-AU-PRINCE	MIAMI	14/09/14	E1	31
1146	ST. DOMINGO	CURAÇAO	14/09/14	E1	20
1147	LA PAZ	ASUNCION	15/09/14	E1	23
1148	PORT-AU-PRINCE	ST. DOMINGO	15/09/14	E1	31
1149	MEXICO	CENTRAL AMERICA	15/09/14	E1	26
1150	LA PAZ	AMAZONICA	15/09/14	E1	23
1151	AMAZONICA	BRASILIA	16/09/14	E1	13
1152	BOGOTA	MAIQUETIA	16/09/14	E1	18
1153	LA PAZ	LIMA	16/09/14	E1	33
1154	BRASILIA	PILOTO	16/09/14	A	18
1155	CENTRAL AMERICA - (MEXICO)	MEXICO	16/09/14	E1	18
1156	CURITIBA	MONTEVIDEO	17/09/14	E2	22
1158	AMAZONICA	LIMA	17/09/14	E2	17
1159	CURAÇAO	ST. DOMINGO	17/09/14	E1	26
1160	AMAZONICA	BOGOTA	17/09/14	E2	17
1161	CURAÇAO	MAIQUETIA	17/09/14	E1	13
1163	LIMA	BOGOTA	17/09/14	E2	39
1164	GUAYAQUIL	BOGOTA	18/09/14	E1	18
1165	LA PAZ	CORDOBA	18/09/14	E1	39
1166	MIAMI	HABANA	18/09/14	E1	13
1168	ST. DOMINGO	SAN JUAN	18/09/14	E1	18
1169	BOGOTA	PANAMA	18/09/14	E1	18
1170	PORT-AU-PRINCE	ST. DOMINGO	18/09/14	E1	35
1171	LA PAZ	AMAZONICA	19/09/14	E1	23
1172	ATLANTICO	LUANDA	19/09/14	E1	18
1173	KINGSTON	PANAMA	19/09/14	E2	22
1174	ATLANTICO	MONTEVIDEO	19/09/14	E2	22
1175	PORT-AU-PRINCE	MIAMI	19/09/14	E1	31
1176	LIMA	GUAYAQUIL	20/09/14	E2	27
1177	BOGOTA	MAIQUETIA	21/09/14	E2	22
1178	BOGOTA	MAIQUETIA	21/09/14	F	22
1179	LA PAZ	AMAZONICA	21/09/14	E1	23

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1180	GUAYAQUIL	BOGOTA	21/09/14	E1	20
1181	BOGOTA	LIMA	21/09/14	E1	18
1182	LA PAZ	CURITIBA	22/09/14	E1	39
1183	ST. DOMINGO	CURAÇAO	22/09/14	E1	18
1184	GUAYAQUIL	BOGOTA	22/09/14	E2	20
1185	BOGOTA	PANAMA	22/09/14	E2	22
1186	GUAYAQUIL	CENTRAL AMERICA	22/09/14	E1	13
1187	AMAZONICA	RECIFE	22/09/14	E2	17
1188	LA PAZ	AMAZONICA	22/09/14	E1	23
1191	LA PAZ	CORDOBA	23/09/14	E1	23
1192	CORDOBA	LA PAZ	23/09/14	E2	29
1193	BOGOTA	GUAYAQUIL	23/09/14	E1	20
1194	PORT-AU-PRINCE	ST. DOMINGO	23/09/14	E1	31
1195	CURITIBA	APP RJ	23/09/14	E1	18
1196	COMODORO RIVADAVIA	MOUNT PLEASANT	24/09/14	E2	34
1197	EZEIZA	COMODORO RIVADAVIA	24/09/14	E2	34
1198	GUAYAQUIL	BOGOTA	24/09/14	E1	15
1199	MONTEVIDEO	EZEIZA	24/09/14	E2	22
1200	ATLANTICO	MONTEVIDEO	24/09/14	E2	39
1201	GUAYAQUIL	BOGOTA	25/09/14	E2	25
1202	PORT-AU-PRINCE - (ST. DOMINGO)	ST. DOMINGO	25/09/14	E2	39
1203	CURAÇAO	KINGSTON	25/09/14	E1	26
1205	GUAYAQUIL	BOGOTA	26/09/14	E2	20
1206	GUAYAQUIL	BOGOTA	26/09/14	E1	15
1207	BOGOTA	AMAZONICA	26/09/14	E1	18
1208	BOGOTA	PANAMA	27/09/14	E2	22
1209	BOGOTA	BARRANQUILLA	27/09/14	E2	22
1210	BOGOTA	BARRANQUILLA	27/09/14	E2	22
1211	BOGOTA	AMAZONICA	27/09/14	E1	18
1212	LA PAZ	CURITIBA	27/09/14	E2	27
1213	LA PAZ	CURITIBA	27/09/14	E2	27
1214	BOGOTA	PANAMA	27/09/14	E1	18
1215	COMODORO RIVADAVIA	MOUNT PLEASANT	27/09/14	E2	34
1216	EZEIZA	COMODORO RIVADAVIA	27/09/14	E2	34
1217	LA PAZ	CORDOBA	27/09/14	E1	23
1218	BOGOTA	PANAMA	28/09/14	E1	18
1219	PIARCO	PARAMARIBO	28/09/14	E2	39

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1221	ANTOFAGASTA - (LIMA)	LIMA	28/09/14	E1	18
1222	GUAYAQUIL	LIMA	28/09/14	E1	18
1223	ATLANTICO	ABIDJAN	28/09/14	E2	22
1224	CENTRAL AMERICA - (MEXICO)	MEXICO	28/09/14	E1	18
1225	BOGOTA	GUAYAQUIL	29/09/14	E1	35
1226	ST. DOMINGO	PORT-AU-PRINCE	29/09/14	E2	25
1227	ST. DOMINGO	PORT-AU-PRINCE	29/09/14	E2	22
1228	ATLANTICO	MONTEVIDEO	30/09/14	E2	22
1229	GUAYAQUIL	BOGOTA	30/09/14	E1	15
1230	BOGOTA	PANAMA	30/09/14	E1	18
1231	KINGSTON	HABANA	30/09/14	E1	18
1232	LA PAZ	ASUNCION	01/10/14	E1	23
1233	GUAYAQUIL	BOGOTA	01/10/14	E1	15
1234	BOGOTA	GUAYAQUIL	01/10/14	E1	35
1235	BOGOTA	GUAYAQUIL	01/10/14	E2	45
1237	CURAÇAO	KINGSTON	01/10/14	E1	18
1238	BOGOTA	GUAYAQUIL	02/10/14	E1	31
1239	AMAZONICA	MAIQUETIA	02/10/14	E2	17
1240	BOGOTA	PANAMA	03/10/14	E1	31
1241	COMODORO RIVADAVIA	MOUNT PLEASANT	03/10/14	E2	34
1242	BOGOTA	AMAZONICA	03/10/14	E2	22
1243	BOGOTA	GUAYAQUIL	03/10/14	E2	45
1244	AMAZONICA - (LIMA)	LIMA	04/10/14	E2	22
1245	CENTRAL AMERICA	PANAMA	04/10/14	E1	18
1246	BOGOTA	AMAZONICA	04/10/14	E2	22
1247	BOGOTA	AMAZONICA	04/10/14	E2	22
1248	AMAZONICA	MAIQUETIA	05/10/14	E2	22
1249	GUAYAQUIL - (LIMA)	LIMA	05/10/14	E1	20
1250	BOGOTA	PANAMA	05/10/14	E1	18
1251	BOGOTA	PANAMA	05/10/14	E1	18
1252	BOGOTA	PANAMA	05/10/14	E2	22
1253	RESISTENCIA	ASUNCION	05/10/14	E1	26
1254	NEW YORK - (PIARCO)	PIARCO	06/10/14	E2	22
1255	BOGOTA	AMAZONICA	06/10/14	E2	22
1256	BOGOTA	AMAZONICA	06/10/14	E2	22
1257	BOGOTA	AMAZONICA	06/10/14	E2	22
1258	BOGOTA	AMAZONICA	06/10/14	E2	22
1259	ANTOFAGASTA	CORDOBA	06/10/14	E1	34
1260	PORT-AU-PRINCE	ST. DOMINGO	06/10/14	E1	35

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1261	CENTRAL AMERICA	PANAMA	06/10/14	E2	22
1262	CURAÇAO	ST. DOMINGO	06/10/14	E1	18
1263	CURAÇAO	ST. DOMINGO	06/10/14	E2	22
1264	GUAYAQUIL	BOGOTA	07/10/14	E1	20
1268	LA PAZ	RESISTENCIA	07/10/14	E1	23
1269	BOGOTA	GUAYAQUIL	07/10/14	E2	39
1270	LIMA	AMAZONICA	08/10/14	E1	18
1271	BOGOTA	GUAYAQUIL	08/10/14	E1	20
1272	CENTRAL AMERICA - (MEXICO)	MEXICO	08/10/14	E2	22
1273	LA PAZ	CURITIBA	09/10/14	E1	33
1274	BOGOTA	PANAMA	09/10/14	E1	31
1275	BOGOTA	PANAMA	09/10/14	E2	22
1276	AMAZONICA	AERONAVE	09/10/14	H	17
1277	BOGOTA	PANAMA	09/10/14	E2	39
1278	CURAÇAO	BARRANQUILLA	09/10/14	E1	18
1279	LA PAZ	AMAZONICA	09/10/14	E1	23
1280	HABANA	PILOTO	09/10/14	M	6
1281	GUAYAQUIL	LIMA	10/10/14	E1	18
1283	BOGOTA	MAIQUETIA	10/10/14	E1	18
1284	PORT AU PRINCE	ST. DOMINGO	10/10/14	E1	35
1285	BRASILIA	PILOTO	10/10/14	C	18
1287	CENTRAL AMERICA	MEXICO	11/10/14	E1	31
1288	GUAYAQUIL	BOGOTA	11/10/14	E1	15
1290	CURAÇAO	ST. DOMINGO	11/10/14	E1	20
1291	BOGOTA	PANAMA	12/10/14	E1	31
1292	BARRANQUILLA	CURAÇAO	12/10/14	E2	22
1293	BARRANQUILLA	KINGSTON	12/10/14	E1	18
1294	GUAYAQUIL	BOGOTA	12/10/14	E2	25
1295	GUAYAQUIL	BOGOTA	13/10/14	E1	20
1296	BOGOTA	GUAYAQUIL	13/10/14	E1	35
1297	BARRANQUILLA	PANAMA	13/10/14	E2	27
1298	GUAYAQUIL	LIMA	13/10/14	E1	15
1300	BARRANQUILLA	KINGSTON	14/10/14	E2	22
1301	BOGOTA	PANAMA	14/10/14	E1	31
1302	LA PAZ	CURITIBA	14/10/14	E1	23
1303	BARRANQUILLA	PANAMA	14/10/14	E1	18
1305	LIMA	GUAYAQUIL	16/10/14	E1	31
1306	BARRANQUILLA	PANAMA	16/10/14	E1	18

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1307	BARRANQUILLA	KINGSTON	16/10/14	E1	18
1308	BARRANQUILLA	KINGSTON	16/10/14	E2	22
1309	BARRANQUILLA	KINGSTON	16/10/14	E2	22
1311	GUAYAQUIL	BOGOTA	17/10/14	E1	20
1312	BARRANQUILLA	BOGOTA	17/10/14	E1	18
1313	BARRANQUILLA	BOGOTA	17/10/14	E1	18
1314	BARRANQUILLA	BOGOTA	17/10/14	E1	18
1315	GUAYAQUIL	BOGOTA	17/10/14	E1	20
1316	MEXICO	CENTRAL AMERICA	17/10/14	E1	18
1317	BARRANQUILLA	KINGSTON	17/10/14	E1	18
1318	GUAYAQUIL - (CENTRAL AMERICA)	CENTRAL AMERICA	17/10/14	E2	39
1319	BARRANQUILLA	PANAMA	18/10/14	F	14
1320	COMODORO RIVADAVIA	MOUNT PLEASANT	18/10/14	E2	34
1321	BOGOTA	GUAYAQUIL	18/10/14	E2	45
1322	BARRANQUILLA	BOGOTA	18/10/14	E2	22
1323	GUAYAQUIL	BOGOTA	19/10/14	E1	23
1324	GUAYAQUIL	CENTRAL AMERICA	19/10/14	E1	18
1325	CENTRAL AMERICA	MEXICO	19/10/14	E1	31
1326	BOGOTA	PANAMA	19/10/14	E1	18
1327	BOGOTA	GUAYAQUIL	19/10/14	E1	35
1328	CURITIBA	MONTEVIDEO	19/10/14	E2	22
1329	BOGOTA - (GUAYAQUIL)	GUAYAQUIL	19/10/14	F	25
1331	BARRANQUILLA	BOGOTA	19/10/14	E1	26
1332	BARRANQUILLA	BOGOTA	19/10/14	E1	18
1333	GUAYAQUIL	LIMA	20/10/14	E1	20
1334	PORT-AU-PRINCE	ST. DOMINGO	20/10/14	E1	31
1335	BARRANQUILLA	CURAÇAO	20/10/14	E1	18
1336	BARRANQUILLA	BOGOTA	20/10/14	E1	18
1337	LA PAZ	LIMA	20/10/14	E1	23
1339	CURITIBA	RESISTENCIA	21/10/14	E2	22
1340	BARRANQUILLA	MAIQUETIA	21/10/14	E1	18
1343	PORT-AU-PRINCE	MIAMI	22/10/14	E1	31
1344	GUAYAQUIL	LIMA	22/10/14	E1	15
1345	BARRANQUILLA	PANAMA	23/10/14	E2	34
1346	GUAYAQUIL	LIMA	23/10/14	E2	20
1347	KINGSTON	BARRANQUILLA	23/10/14	E1	18
1348	GUAYAQUIL - (LIMA)	LIMA	23/10/14	E2	22
1350	MEXICO	CENTRAL AMERICA	23/10/14	E2	39
1351	BARRANQUILLA	BOGOTA	24/10/14	E2	34

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1352	BARRANQUILLA	BOGOTA	24/10/14	E2	34
1353	BARRANQUILLA	BOGOTA	24/10/14	E1	23
1355	HABANA	PILOTO	24/10/14	I	14
1356	GUAYAQUIL	BOGOTA	24/10/14	E1	15
1357	BARRANQUILLA	CURAÇAO	24/10/14	E2	22
1358	KINGSTON	PANAMA	25/10/14	E2	22
1359	GUAYAQUIL	LIMA	25/10/14	E2	22
1360	BARRANQUILLA	PANAMA	26/10/14	E1	18
1361	PORT-AU-PRINCE	ST. DOMINGO	26/10/14	E1	31
1363	ANTOFAGASTA - (LIMA)	LIMA	26/10/14	E1	18
1365	AMAZONICA	PARAMARIBO	26/10/14	E2	17
1366	BARRANQUILLA	CURAZAO	26/10/14	E2	39
1368	BARRANQUILLA	BOGOTA	26/10/14	E1	18
1371	CENTRAL AMERICA	MEXICO	27/10/14	E2	22
1374	BARRANQUILLA	KINGSTON	27/10/14	E1	18
1375	MEXICO	CENTRAL AMERICA	27/10/14	E1	18
1377	MEXICO	CENTRAL AMERICA	27/10/14	E1	18
1378	AMAZONICA	BOGOTA	27/10/14	E1	13
1379	CENTRAL AMERICA	GUAYAQUIL	27/10/14	E2	39
1380	MEXICO	CENTRAL AMERICA	28/10/14	E1	18
1381	MEXICO	CENTRAL AMERICA	28/10/14	E1	18
1382	AMAZONICA	BOGOTA	28/10/14	E2	17
1383	BOGOTA	MAIQUETIA	28/10/14	E1	18
1384	COMODORO RIVADAVIA	MOUNT PLEASANT	29/10/14	E2	34
1385	EZEIZA	COMODORO RIVADAVIA	29/10/14	E2	34
1386	MONTEVIDEO	EZEIZA	29/10/14	E2	22
1387	BARRANQUILLA	KINGSTON	30/10/14	E2	34
1388	GUAYAQUIL	BOGOTA	30/10/14	E1	18
1389	GUAYAQUIL	BOGOTA	30/10/14	E1	15
1390	MEXICO	CENTRAL AMERICA	30/10/14	E1	18
1391	PORT-AU-PRINCE	ST. DOMINGO	30/10/14	E2	45
1392	PORT-AU-PRINCE	MIAMI	31/10/14	E1	31
1394	ATLANTICO	MONTEVIDEO	31/10/14	E2	22
1395	BOGOTA	AMAZONICA	31/10/14	E2	22
1396	CENTRAL AMERICA	PANAMA	31/10/14	E2	39
1397	CENTRAL AMERICA	PANAMA	31/10/14	E2	39
1398	CENTRAL AMERICA	PANAMA	31/10/14	E2	22
1399	BARRANQUILLA	PANAMA	31/10/14	E1	18

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1400	GUAYAQUIL	BOGOTA	31/10/14	E2	25
1402	BOGOTA	PANAMA	01/11/14	E1	31
1403	BARRANQUILLA	BOGOTA	01/11/14	E1	18
1404	LIMA	LA PAZ	01/11/14	F	23
1405	BARRANQUILLA	BOGOTA	01/11/14	E2	34
1406	MIAMI - (ST. DOMINGO)	ST. DOMINGO	01/11/14	E1	18
1407	GUAYAQUIL	CENTRAL AMERICA	02/11/14	F	26
1408	GUAYAQUIL	CENTRAL AMERICA	02/11/14	F	14
1410	GUAYAQUIL	BOGOTA	02/11/14	E2	20
1411	COMODORO RIVADAVIA	EZEIZA	02/11/14	E1	26
1412	BARRANQUILLA	PANAMA	02/11/14	E1	18
1413	LA PAZ	AMAZONICA	02/11/14	E1	23
1414	BARRANQUILLA	CURAÇAO	03/11/14	E1	18
1415	CURAÇAO	ST. DOMINGO	03/11/14	E1	20
1416	CURAÇAO	MAIQUETIA	03/11/14	E2	29
1419	BOGOTA	GUAYAQUIL	04/11/14	E2	25
1420	BARRANQUILLA	PANAMA	04/11/14	E1	18
1422	GUAYAQUIL	CENTRAL AMERICA	05/11/14	E2	22
1423	GUAYAQUIL	LIMA	05/11/14	E1	18
1425	BOGOTA	PANAMA	05/11/14	E2	22
1426	GUAYAQUIL	CENTRAL AMERICA	05/11/14	E1	18
1427	AMAZONICA	LA PAZ	05/11/14	E2	17
1428	BARRANQUILLA	BOGOTA	05/11/14	E2	34
1429	BARRANQUILLA	PANAMA	05/11/14	E2	34
1430	BARRANQUILLA	BOGOTA	06/11/14	E1	18
1431	GUAYAQUIL	LIMA	06/11/14	E1	13
1432	COMODORO RIVADAVIA	EZEIZA	06/11/14	E1	26
1433	GUAYAQUIL	BOGOTA	06/11/14	E1	25
1434	BOGOTA	GUAYAQUIL	06/11/14	E1	35
1435	CURAÇAO	ST. DOMINGO	07/11/14	E2	50
1436	BARRANQUILLA	BOGOTA	07/11/14	E1	18
1437	BARRANQUILLA	BOGOTA	07/11/14	E1	18
1438	BARRANQUILLA	KINGSTON	07/11/14	E2	39
1439	GUAYAQUIL	BOGOTA	08/11/14	E1	20
1440	GUAYAQUIL	BOGOTA	08/11/14	E1	13
1441	GUAYAQUIL	LIMA	08/11/14	E2	17
1442	BARRANQUILLA	BOGOTA	08/11/14	E1	18
1443	BARRANQUILLA	CURAÇAO	08/11/14	E1	18
1444	GUAYAQUIL	LIMA	09/11/14	E1	20

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1445	PANAMA	BOGOTA	09/11/14	E2	39
1447	CENTRAL AMERICA	PANAMA	09/11/14	E2	46
1449	ANTOFAGASTA	LIMA	09/11/14	E1	34
1450	HABANA	KINGSTON	09/11/14	E2	17
1451	LA PAZ	LIMA	10/11/14	E1	23
1452	MEXICO	CENTRAL AMERICA	10/11/14	E2	22
1453	MEXICO	CENTRAL AMERICA	10/11/14	E2	22
1454	GUAYAQUIL	LIMA	11/11/14	E2	25
1456	CENTRAL AMERICA - (GUAYAQUIL)	GUAYAQUIL	11/11/14	E2	22
1457	BARRANQUILLA	CURAÇAO	11/11/14	E1	26
1458	BARRANQUILLA	PANAMA	11/11/14	E1	18
1459	ATLANTICO	MONTEVIDEO	11/11/14	E2	22
1460	GUAYAQUIL	BOGOTA	11/11/14	E2	20
1463	BOGOTA	PANAMA	12/11/14	E1	18
1464	BOGOTA	PANAMA	12/11/14	E1	18
1467	MEXICO	CENTRAL AMERICA	12/11/14	E1	18
1468	GUAYAQUIL	BOGOTA	12/11/14	E1	15
1472	BARRANQUILLA	MAIQUETIA	13/11/14	E1	18
1473	BARRANQUILLA	BOGOTA	13/11/14	E2	34
1474	MEXICO	CENTRAL AMERICA	13/11/14	E1	18
1475	BARRANQUILLA	CURAÇAO	13/11/14	E2	34
1476	CURAÇAO	ST. DOMINGO	13/11/14	E2	22
1478	BARRANQUILLA	MAIQUETIA	14/11/14	E1	18
1479	BARRANQUILLA	BOGOTA	14/11/14	E1	18
1480	GUAYAQUIL	LIMA	14/11/14	E1	13
1483	BARRANQUILLA	BOGOTA	15/11/14	E2	34
1484	CENTRAL AMERICA	MEXICO	15/11/14	E2	17
1485	CENTRAL AMERICA	MEXICO	15/11/14	E2	17
1486	CENTRAL AMERICA - (HABANA)	HABANA	15/11/14	E1	13
1487	COMODORO RIVADAVIA	MOUNT PLEASANT	15/11/14	E2	34
1488	BARRANQUILLA	BOGOTA	16/11/14	E2	34
1489	BOGOTA	PANAMA	16/11/14	E2	39
1490	AMAZONICA	MAIQUETIA	17/11/14	E1	18
1491	CENTRAL AMERICA	PANAMA	17/11/14	E1	13
1492	LA PAZ	AMAZONICA	17/11/14	E1	23
1493	MAIQUETIA	BARRANQUILLA	17/11/14	E2	17
1494	HABANA	PILOTO	17/11/14	M	11
1495	AMAZONICA	BOGOTA	18/11/14	E1	13

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1496	AMAZONICA	PARAMARIBO	18/11/14	E2	17
1497	MAIQUETIA	BARRANQUILLA	18/11/14	E1	13
1498	BARRANQUILLA	MAIQUETIA	18/11/14	E1	18
1499	LIMA	AMAZONICA	18/11/14	E2	22
1500	MAIQUETIA	BARRANQUILLA	18/11/14	E1	13
1501	ATLANTICO	MONTEVIDEO	18/11/14	E2	22
1502	MAIQUETIA	BARRANQUILLA	18/11/14	E2	17
1505	CURAZAO	ST. DOMINGO	19/11/14	E2	22
1506	PORT-AU-PRINCE	ST. DOMINGO	19/11/14	E1	31
1507	LA PAZ	CORDOBA	20/11/14	E1	23
1508	ATLANTICO	ABIDJAN	20/11/14	E2	24
1509	ATLANTICO	MONTEVIDEO	20/11/14	E2	22
1510	BARRANQUILLA	BOGOTA	20/11/14	E1	18
1511	BARRANQUILLA	BOGOTA	20/11/14	E1	18
1512	LIMA	ANTOFAGASTA	21/11/14	E1	26
1514	BARRANQUILLA	PANAMA	21/11/14	E1	18
1515	LA PAZ	AMAZONICA	21/11/14	E1	39
1516	CORDOBA	LA PAZ	22/11/14	E2	39
1517	BARRANQUILLA	PANAMA	22/11/14	E1	18
1518	LIMA	AMAZONICA	22/11/14	E1	18
1519	CURAÇAO	ST. DOMINGO	22/11/14	E1	20
1520	BARRANQUILLA	BOGOTA	23/11/14	E1	18
1522	BOGOTA	PANAMA	24/11/14	E1	31
1523	BOGOTA	PANAMA	24/11/14	E2	39
1524	BARRANQUILLA	PANAMA	24/11/14	E1	18
1525	BARRANQUILLA	BOGOTA	25/11/14	E2	34
1526	GUAYAQUIL	CENTRAL AMERICA	25/11/14	E2	22
1527	GUAYAQUIL	CENTRAL AMERICA	25/11/14	E2	22
1529	BOGOTA	GUAYAQUIL	25/11/14	E1	31
1530	LIMA - (GUAYAQUIL)	GUAYAQUIL	25/11/14	E2	25
1532	BOGOTA	PANAMA	26/11/14	E1	31
1534	CORDOBA	MENDOZA	26/11/14	E2	22
1535	BARRANQUILLA	MAIQUETIA	26/11/14	E1	18
1536	BARRANQUILLA	CURAÇAO	26/11/14	E1	18
1537	GUAYAQUIL - (LIMA)	LIMA	27/11/14	E1	18
1538	ANTOFAGASTA	PILOTO	27/11/14	B	9
1540	BARRANQUILLA	PANAMA	28/11/14	E1	18
1541	RESISTENCIA	CURITIBA	28/11/14	E2	34
1544	PORT AU PRINCE	ST. DOMINGO	28/11/14	E1	31

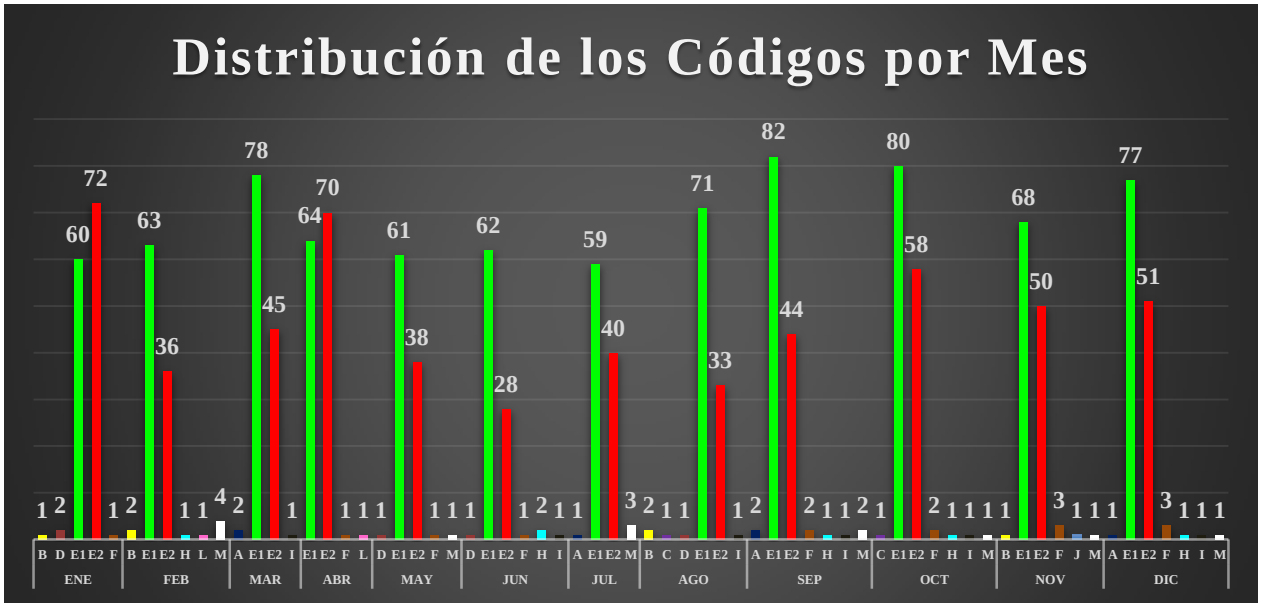
LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1545	BARRANQUILLA	PANAMA	28/11/14	E2	34
1547	BARRANQUILLA	PANAMA	28/11/14	E2	34
1548	BARRANQUILLA	KINGSTON	28/11/14	E1	23
1549	CURAÇAO	KINGSTON	28/11/14	E2	46
1550	PARAMARIBO - (GEORGETOWN)	GEORGETOWN	29/11/14	E1	34
1551	GUAYAQUIL	CENTRAL AMERICA	30/11/14	E1	18
1552	GUAYAQUIL	CENTRAL AMERICA	30/11/14	E1	23
1553	ATLANTICO	LUANDA	30/11/14	E2	22
1554	BRASILIA	PILOTO	30/11/14	J	20
1555	BARRANQUILLA	PANAMA	01/12/14	E2	34
1556	BARRANQUILLA	MAIQUETIA	01/12/14	E1	18
1557	BARRANQUILLA	PANAMA	01/12/14	E1	26
1558	BARRANQUILLA	MAIQUETIA	01/12/14	E1	18
1559	BARRANQUILLA	CURAZAO	01/12/14	E1	18
1560	BARRANQUILLA	MAIQUETIA	02/12/14	E1	18
1561	GUAYAQUIL	BOGOTA	02/12/14	E1	18
1562	GUAYAQUIL	BOGOTA	02/12/14	E2	25
1563	AMAZONICA	CAYENNE	02/12/14	E1	13
1566	BARRANQUILLA	PANAMA	03/12/14	E1	18
1567	CENTRAL AMERICA	MEXICO	04/12/14	E2	22
1568	BRASILIA	PILOTO	04/12/14	A	18
1569	LA PAZ	AMAZONICA	05/12/14	E1	23
1571	CORDOBA	LA PAZ	05/12/14	E1	18
1572	BARRANQUILLA	PANAMA	05/12/14	E1	18
1575	CURITIBA	PILOTO	05/12/14	I	14
1576	PORT-AU-PRINCE	CURAÇAO	06/12/14	E2	39
1577	AMAZONICA	BOGOTA	06/12/14	E2	17
1578	LA PAZ	AMAZONICA	06/12/14	E1	23
1579	BARRANQUILLA	PANAMA	06/12/14	E1	18
1580	CORDOBA	LA PAZ	06/12/14	E2	34
1581	CORDOBA	LA PAZ	06/12/14	E2	34
1582	CORDOBA	MENDOZA	06/12/14	E1	13
1584	GUAYAQUIL	CENTRAL AMERICA	07/12/14	E1	23
1585	GUAYAQUIL	BOGOTA	07/12/14	E1	20
1586	BARRANQUILLA	PANAMA	07/12/14	E1	18
1587	GUAYAQUIL	CENTRAL AMERICA	07/12/14	E1	18
1589	BARRANQUILLA	BOGOTA	08/12/14	E1	18
1590	GUAYAQUIL	LIMA	08/12/14	E1	18

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1591	ANTOFAGASTA	CORDOBA	08/12/14	E1	13
1592	RESISTENCIA	EZEIZA	08/12/14	E1	36
1593	MENDOZA	EZEIZA	08/12/14	E1	13
1594	MENDOZA	EZEIZA	08/12/14	E1	13
1595	BOGOTA	GUAYAQUIL	09/12/14	E1	35
1596	ATLANTICO	ABIDJAN	09/12/14	E2	22
1597	ATLANTICO	LUANDA	09/12/14	E2	22
1598	ATLANTICO	MONTEVIDEO	09/12/14	E2	39
1599	HABANA	CENTRAL AMERICA	09/12/14	E2	17
1601	GUAYAQUIL	LIMA	09/12/14	E2	17
1602	GUAYAQUIL	CENTRAL AMERICA	10/12/14	E1	18
1603	BARRANQUILLA	BOGOTA	10/12/14	E2	34
1604	ANTOFAGASTA	LIMA	10/12/14	E1	34
1606	AMAZONICA	MAIQUETIA	10/12/14	E1	13
1607	CORDOBA	LA PAZ	11/12/14	E1	18
1608	AMAZONICA	BRASILIA	11/12/14	E2	17
1609	AMAZONICA	BRASILIA	11/12/14	E2	17
1610	KINGSTON	PANAMA	11/12/14	E1	18
1611	CORDOBA	LA PAZ	11/12/14	E2	34
1612	ATLANTICO	LUANDA	11/12/14	E2	22
1613	CURAÇAO	ST. DOMINGO	12/12/14	E1	18
1614	PORT-AU-PRINCE	KINGSTON	12/12/14	E2	39
1615	GUAYAQUIL	BOGOTA	12/12/14	E1	18
1616	MENDOZA	CORDOBA	12/12/14	E2	17
1618	ATLANTICO	AMAZONICA	13/12/14	E2	39
1620	MONTEVIDEO	CURITIBA	13/12/14	F	14
1621	CURAÇAO	ST. DOMINGO	13/12/14	E1	18
1622	CURAÇAO	BARRANQUILLA	13/12/14	E1	18
1624	BOGOTA	GUAYAQUIL	14/12/14	E2	45
1625	ATLANTICO	LUANDA	14/12/14	E2	27
1626	CENTRAL AMERICA	BOGOTA	14/12/14	E2	51
1627	BARRANQUILLA	PANAMA	14/12/14	E2	34
1628	BARRANQUILLA	PANAMA	14/12/14	E2	34
1630	HABANA	PILOTO	14/12/14	M	6
1631	BARRANQUILLA	BOGOTA	14/12/14	E1	18
1632	CURAÇAO	ST. DOMINGO	15/12/14	E1	18
1633	CURAÇAO	ST. DOMINGO	15/12/14	E1	18
1634	BARRANQUILLA	MAIQUETIA	15/12/14	E2	34
1635	LA PAZ	ASUNCION	15/12/14	E1	23

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1636	BARRANQUILLA	BOGOTA	15/12/14	E1	18
1637	BARRANQUILLA	BOGOTA	16/12/14	E2	34
1638	ATLANTICO	LUANDA	16/12/14	E2	22
1639	LIMA	ANTOFAGASTA	16/12/14	E2	22
1641	BARRANQUILLA	BOGOTA	16/12/14	E1	18
1643	STA. MARIA - (PIARCO)	PIARCO	16/12/14	E1	31
1644	GUAYAQUIL	BOGOTA	16/12/14	E2	25
1645	LA PAZ	AMAZONICA	17/12/14	E2	27
1646	CENTRAL AMERICA	MEXICO	17/12/14	E2	39
1647	BOGOTA	PANAMA	17/12/14	E1	31
1648	GUAYAQUIL	BOGOTA	17/12/14	E1	20
1649	PIARCO	SAN JUAN	17/12/14	E1	18
1650	KINGSTON	PANAMA	17/12/14	E1	18
1651	CURAÇAO	PORT-AU-PRINCE	17/12/14	E1	18
1652	BARRANQUILLA	CURAÇAO	17/12/14	E2	34
1653	CENTRAL AMERICA - (MEXICO)	MEXICO	18/12/14	E2	39
1654	LA PAZ	CORDOBA	18/12/14	E2	27
1655	BOGOTA	PANAMA	18/12/14	E1	18
1657	GUAYAQUIL	BOGOTA	18/12/14	E1	20
1658	GUAYAQUIL	CENTRAL AMERICA	19/12/14	E1	18
1659	SAN JUAN - (PIARCO)	PIARCO	19/12/14	E1	18
1661	HABANA - (CENTRAL AMERICA)	CENTRAL AMERICA	19/12/14	E2	22
1662	PORT-AU-PRINCE	ST. DOMINGO	20/12/14	E2	45
1663	GUAYAQUIL	BOGOTA	20/12/14	E2	22
1664	MAIQUETIA	PIARCO	20/12/14	E2	34
1665	LA PAZ	AMAZONICA	20/12/14	E1	39
1666	MENDOZA	EZEIZA	21/12/14	E1	18
1667	LA PAZ	AMAZONICA	21/12/14	E1	31
1668	AMAZONICA	AERONAVE	21/12/14	H	17
1670	MENDOZA	SANTIAGO	21/12/14	E2	39
1671	MENDOZA	EZEIZA	21/12/14	E1	18
1673	BOGOTA	PANAMA	22/12/14	E2	39
1674	ASUNCION	LA PAZ	22/12/14	E2	34
1675	GUAYAQUIL	BOGOTA	22/12/14	E1	18
1676	PORT-AU-PRINCE	CURAÇAO	22/12/14	E1	31
1677	ST. DOMINGO - (CURAÇAO)	CURAÇAO	22/12/14	E1	13
1678	BARRANQUILLA	PANAMA	22/12/14	E1	18
1679	GUAYAQUIL	BOGOTA	23/12/14	E1	20

LHD Sequence	FIR Suffering Risk	FIR Generating Risk	Date of the event	GTE code	Risk Value
1680	GUAYAQUIL	BOGOTA	23/12/14	F	30
1681	GUAYAQUIL	BOGOTA	23/12/14	F	30
1682	GUAYAQUIL	LIMA	23/12/14	E1	20
1684	MEXICO - (CENTRAL AMERICA)	CENTRAL AMERICA	23/12/14	E2	22
1685	BOGOTA	GUAYAQUIL	23/12/14	E2	22
1686	GUAYAQUIL	BOGOTA	24/12/14	E1	20
1687	CURAÇAO	BARRANQUILLA	24/12/14	E2	22
1688	GUAYAQUIL	LIMA	24/12/14	E1	18
1689	ATLANTICO	ABIDJAN	24/12/14	E2	39
1690	GUAYAQUIL	BOGOTA	24/12/14	E1	15
1691	GUAYAQUIL	BOGOTA	25/12/14	E1	15
1693	PORT-AU-PRINCE	ST. DOMINGO	26/12/14	E1	31
1695	ATLANTICO	ABIDJAN	27/12/14	E2	22
1696	AMAZONICA	MAIQUETIA	27/12/14	E1	13
1697	CURAÇAO	BARRANQUILLA	28/12/14	E1	18
1698	GUAYAQUIL - (CENTRAL AMERICA)	CENTRAL AMERICA	29/12/14	E2	39
1700	MENDOZA	EZEIZA	29/12/14	E1	26
1701	PORT-AU-PRINCE	ST. DOMINGO	29/12/14	E1	35
1702	CURAÇAO	ST. DOMINGO	29/12/14	E1	18
1703	GUAYAQUIL	BOGOTA	29/12/14	E1	18
1704	CURITIBA	MONTEVIDEO	30/12/14	E2	22
1705	PANAMA	BOGOTA	30/12/14	E1	18
1706	BARRANQUILLA	KINGSTON	30/12/14	E1	23
1707	CURAÇAO	ST. DOMINGO	30/12/14	E1	20
1708	PORT AU PRINCE	ST. DOMINGO	30/12/14	E2	45
1709	PANAMA	BOGOTA	31/12/14	E1	18
1710	GUAYAQUIL	BOGOTA	31/12/14	E1	15
1711	GUAYAQUIL	LIMA	31/12/14	E1	13
1712	PANAMA	BOGOTA	31/12/14	E2	22

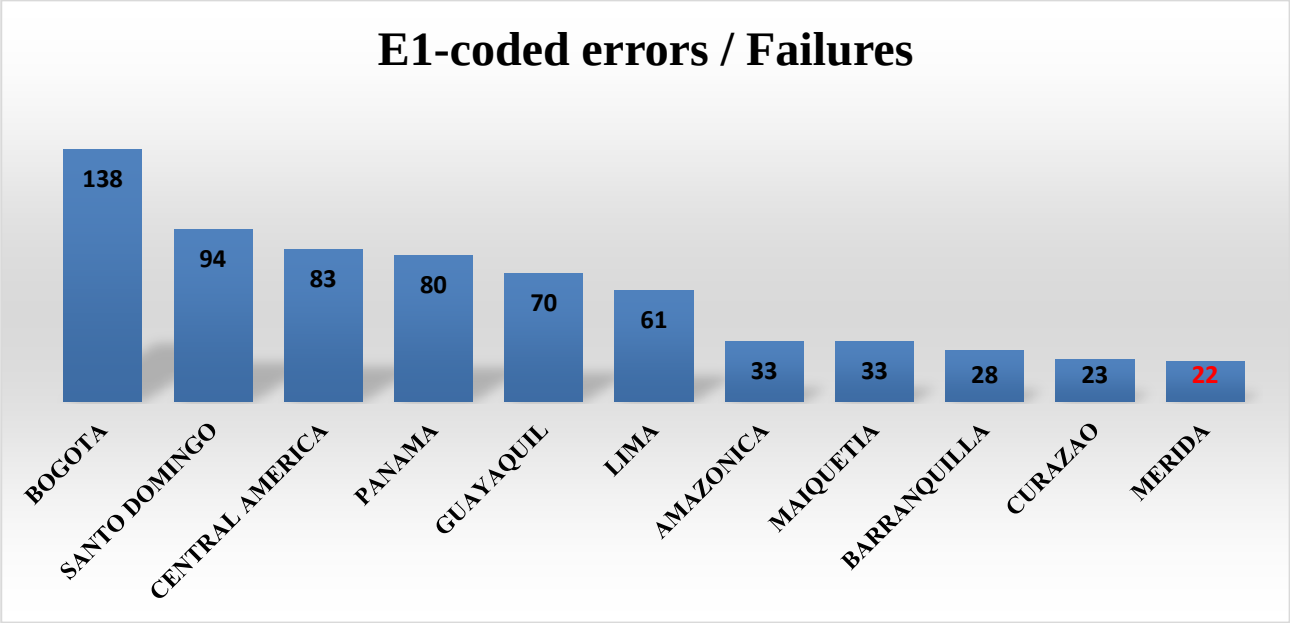
LHD codes distribution (errors / failures) during year 2014



Study on E-coded errors (failures) - Table with FIRs that failed the most

FIR	Number of errors / failures	FIR	Number of errors / failures
BOGOTA	138	SANTO DOMINGO	94
CENTRAL AMERICA	83	PANAMA	80
GUAYAQUIL	70	LIMA	61
AMAZONICA	33	MAIQUETIA	33
BARRANQUILLA	28	CURAÇAO	23
MERIDA	22	EZEIZA	17
CORDOBA	16	PORT-AU-PRINCE	16
KINGSTON	15	HAVANA	13
LA PAZ	12	MIAMI	11
SAN JUAN	8	ASUNCION	7
PARAMARIBO	7	PIARCO	6
ANTOFAGASTA	5	CURITIBA	5
BRASILIA	4	APP SP	2
CAYENNE	2	GEORGETOWN	2
MOUNT PLEASANT	2	SANTIAGO	2
ABIDJAN	1	APP RJ	1
ATLANTICO	1	LUANDA	1
MENDOZA	1	MONTEVIDEO	1
RESISTENCIA	1	COMODORO RIVADAVIA	0
DAKAR	0	JOHANNESBURG	0
RECIFE	0	SAL	0
TOTAL OF E1 ERRORS		**824**	

Graph of FIRs that failed the most



FIR COMMITING ERROR	FIR SUFFERING RISK (AFFECTED)	QUANT. OF ERRORS	POINT(S) / FIX(ES) WHERE ERROR OCCURRED
BOGOTA	GUAYAQUIL	96	ANGEL - ANRAX - BOKAN - ENSOL - ITATA - MOXAS - PULTU - UGUPI
	BARRANQUILLA	21	BUTAL - DAGAN - LOKOV - OPNIR - TESIR
	AMAZONICA	8	ABIDE - ARUXA - ASAPA - LET - MTU
	PANAMA	7	ARORO - BUXOS - TILSO - TOKUT
	LIMA	3	ILMUX - PLG
	MAIQUETIA	2	KIKAS
	CENTRAL AMERICA	1	BOLDO
SANTO DOMINGO	CURAÇAO	51	BEROX - IRGUT - KARUM - PALAS - POKAK - TEKOL - VESKA
	PORT-AU-PRINCE	39	DCR - ETBOD - ONPAD - OSIDU - PIGBI - RETAK
	MIAMI	2	JUELE - SEKAR
	SAN JUAN	2	MELLA
CENTRAL AMERICA	MERIDA	40	ALSAL - AMIDA - ANREX - ASOKU - AVRIS - CTM - GABEN - ICARO - IZT - NALDA - PENSO - SATOS - SIGMA - TAP
	GUAYAQUIL	25	ARTOM - LIXAS - OSELO - UGADI
	HAVANA	11	PABEL - PISIS - SELAK
	BOGOTA	3	BOLDO
	KINGSTON	2	DELVI - PESTO
	PANAMA	2	AMUBI - BUFEO
PANAMA	BOGOTA	53	ARORO - ASEPI - BUSMO - BUXOS - DAKMO - ILTUR - IVROS - KAKOL - PUDAK - TOKUT
	BARRANQUILLA	17	AGUJA - BITIX - BOGAL - ESEDA
	CENTRAL AMERICA	7	ANSON - BUFEO - ISEBA - LESIR - PAPIN
	KINGSTON	3	ARNAL - DAGUD

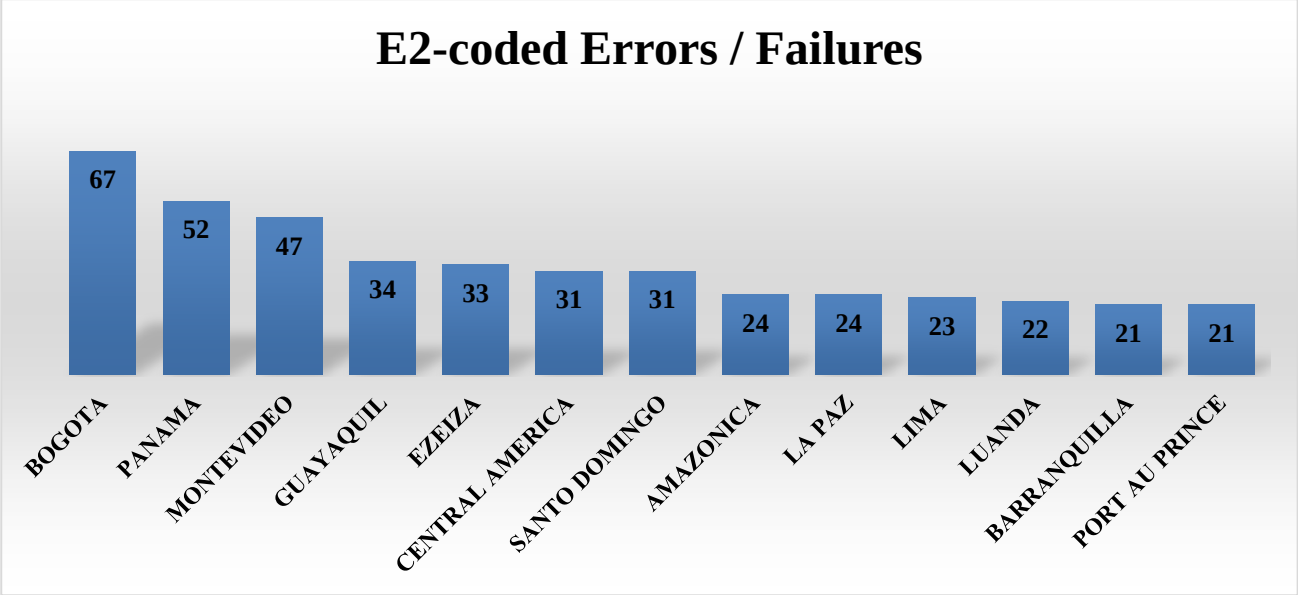
FIR COMMITING ERROR	FIR SUFFERING RISK (AFFECTED)	QUANT. OF ERRORS	POINT(S) / FIX(ES) WHERE ERROR OCCURRED
GUAYAQUIL	BOGOTa	56	ANGEL - ANRAX - BOKAN - ENSOL - ITATA - MOXAS - PULTU - UGUPI - VAMOS
	LIMA	10	EVLIM - KARAZ - LOBOT - TERAS - VAKUD
	CENTRAL AMERICA	4	ANREX - LIXAS
LIMA	GUAYAQUIL	34	AMERO - ANPAL - ARNEL - EVLIM - KARAZ - LOBOT - OSAKI - TERAS - VAKUD
	ANTOFAGASTA	20	ESDIN - IREMI - JURAK - SORTA
	LA PAZ	6	ELAKO - OBLIR - ORALO - RAXUN
	BOGOTA	1	ILMUX
AMAZONICA	BOGOTA	17	ABIDE - ARUXA - ASAPA - BRACO - LET - MTU
	LA PAZ	12	ARMUK - MIBIL - RBC - UDIDI
	LIMA	2	LIMPO - SIGOB
	CAYENNE	1	ARNAM
	MAIQUETIA	1	UDUSA
MAIQUETIA	BOGOTA	10	CUC- ENPUT - KIKAS - OPRUS
	AMAZONICA	8	PAKON - UGAGA - VAGAN - VUMPI - ZORRO
	BARRANQUILLA	8	GILGA - ORTIZ - SIDOS
	CURAÇAO	6	ACORA - ALCOT - KABON - NOREX
	PIARCO	1	DAREX
BARRANQUILLA	CURAÇAO	19	OROSA - SELAN
	KINGSTON	4	KILER - OTAMO
	MAIQUETIA	3	GILGA - ORTIZ - SIDOS
	BOGOTA	2	BUTAL - DAGAN
CURAÇAO	ST. DOMINGO	13	BEROX - KARUM - POKAK - VESKA
	BARRANQUILLA	7	OROSA - SELAN
	PORT-AU-PRINCE	3	LENOM
MERIDA	CENTRAL AMERICA	22	ANIKO - ANREX - ASOKU - GABEN - NALDA - NOTOS - PENSO - SIGMA - TAKUX - TAP

Study on E2-coded errors (failures)
Table of FIR that failed the most

FIR	Number of errors / failures	FIR	Number of errors / failures
BOGOTA	67	PANAMA	52
MONTEVIDEO	47	GUAYAQUIL	34
EZEIZA	33	CENTRAL AMERICA	31
SANTO DOMINGO	31	AMAZONICA	24
LA PAZ	24	LIMA	23
LUANDA	22	BARRANQUILLA	21
PORT-AU-PRINCE	21	MAIQUETIA	17
CURAÇAO	15	MERIDA	15
KINGSTON	12	MOUNT PLEASANT	12
ABIDJAN	9	BRASILIA	9
CORDOBA	7	CAYENNE	4
CURITIBA	4	PARAMARIBO	4
SAN JUAN	4	COMODORO RIVADAVIA	3
MIAMI	3	PIARCO	3
ANTOFAGASTA	2	RECIFE	2
RESISTENCIA	2	SANTIAGO	2

FIR	Number of errors / failures	FIR	Number of errors / failures
APP SP	1	DAKAR	1
HAVANA	1	JOHANNESBURG	1
MENDOZA	1	SAL	1
APP RJ	0	ASUNCION	0
ATLANTICO	0	GEORGETOWN	0
TOTAL E2-CODED ERRORS		**565**	

Graph of FIRs that failed the most



FIR COMMITING ERROR	FIR SUFFERING RISK (AFFECTED)	QUANT. OF ERRORS	POINT(S) / FIX(ES) WHERE ERROR OCCURRED
BOGOTA	GUAYAQUIL	34	BOKAN - ENSOL - ITATA - PULTU - UGUPI
	BARRANQUILLA	11	BUTAL - DAGAN - LOKOV
	CENTRAL AMERICA	7	BOLDO
	AMAZONICA	6	ARUXA - BRACO - LET - MTU
	LIMA	4	PLG
	PANAMA	3	ANRAX - BUXOS - TOKUT
	MAIQUETIA	2	KIKAS
PANAMA	BOGOTA	30	ARORO - BUSMO - BUXOS - DAKMO - ILTUR - IVROS - KAKOL - TILSO - TOKUT
	CENTRAL AMERICA	11	ANSON - BUFEO - FALLA - ISEBA - LESIR - PAPIN - PELRA
	BARRANQUILLA	9	AGUJA - BITIX - BOGAL - ESEDA - ROPOL
	KINGSTON	2	ARNAL - COLBY
MONTEVIDEO	ATLANTICO	44	SBAOSUEO2 - SBAOSUEO3 - SBAOSUEO3 - SBAOSUEO5 - SBAOSUEO6 - SBAOSUEO8 - SBAOSUEO9
	CURITIBA	4	AKNEN - MLO - UGELO
GUAYAQUIL	BOGOTA	23	ANGEL - BOKAN - ENSOL - ITATA - PULTU - TCO - UGUPI
	LIMA	6	EVLIM - LOBOT - TERAS - VAKUD
	CENTRAL AMERICA	5	ARTOM - LIXAS - RADIM - UGADI

FIR COMMITING ERROR	FIR SUFFERING RISK (AFFECTED)	QUANT. OF ERRORS	POINT(S) / FIX(ES) WHERE ERROR OCCURRED
EZEIZA	MONTEVIDEO	32	SUEOSAEU3 - SUEOSAEU5 - SUEOSAEU6 - SUEOSAEU7 - SUEOSAEU8
CENTRAL AMERICA	MERIDA	18	AMIDA - ANIKO - ANREX - CTM - GABEN - NOTOS - PENSO - SIGMA - TAP
	GUAYAQUIL	10	LIXAS - LOGAL UGADI
	HAVANA	3	PABEL - SELEK
SANTO DOMINGO	CURAÇAO	14	BEROX - IRGUT - PALAS - POKAK - VESKA
	PORT-AU-PRINCE	11	ETBOD - NALGA - OSIDU - PIGBI - RETAK - TUMAR
	MIAMI	5	BESAS - JUELE
	SAN JUAN	1	NEGON
AMAZONICA	BOGOTA	9	ABIDE - ASAPA - MTU
	LIMA	9	LET - LIMPO
	CAYENNE	2	ARNAM - OTONI
	ATLANTICO	1	SBAOSBAZ1
	CURITIBA	1	MUBGI
	LA PAZ	1	RBC
	MAIQUETIA	1	VAGAN
LA PAZ	ASUNCION	8	MOMDI - OROMU - SIDAK
	CORDOBA	6	GAXOK - MARIA - PUBUM
	LIMA	6	DOBNI - ELAKO - RAXUN
	AMAZONICA	4	ARMUK - RBC - UDIDI - VILUX
LUANDA	ATLANTICO	22	ILGER - SBAOFNAN1 - SBAOFNAN2 - VURBI
LIMA	GUAYAQUIL	13	AMERO - ARNAL - EVLIM - TERAS - VAKUD
	ANTOFAGASTA	4	IREMI - SORTA
	BOGOTÁ	3	PLG
	AMAZONICA	2	SELVA
	LA PAZ	1	RAXUN
BARRANQUILLA	MAIQUETIA	9	GILGA - ORTIZ - SIDOS - URIBI
	CURAÇAO	7	OROSA - SELAN
	BOGOTA	4	BUTAL - LOKOV - MUDUM - UGALU
	KINGSTON	1	KILER
PORT-AU-PRINCE	SANTO DOMINGO	20	DCR - ETBOD - ONPAD - OSIDU - PIGBI - RETAK
	CURAÇAO	1	LENOM

Agenda Item 3: Lessons learned by CAR/SAM States to reduce LHDs

3.1 Under this agenda item, the Meeting reviewed the following papers:

a) WP/07 - *Plan of Action of the GTE and the PoC on the follow-up of LHDs caused by pilots* (presented by the Rapporteur);
b) IP/04 - *Activities and tasks to be reported to GREPECAS* (presented by CARSAMMA) (***Spanish only***);
c) IP/05 - *Measures implemented by Lima FIR to reduce number and severity of LHD, as well as results obtained* (presented by Peru) (***Spanish only***);
d) IP/06 - *Measures implemented by Havana FIR to reduce number and severity of LHD. Results obtained during last four years* (presented by Cuba) (***Spanish only***);
e) IP/07 - *Measures adopted by Brazilian FIRs to mitigate LHD concerning 2014* (presented by CARSAMMA) (***Spanish only***);
f) IP/09 - *Process and measures to mitigate LHD* (presented by Chile) (***Spanish only***);
g) IP/10 - Steps and measures adopted by Jamaica to mitigate LHD reports (presented by Jamaica);
h) IP/11 - *Evolution of LHD in Santo Domingo FIR and actions taken* (presented by Dominican Republic) (***Spanish only***); and
i) IP/13 - *Measures of action to mitigate LHD reports in the FIRs of the Republic of Argentina* (presented by Argentina) (***Spanish only***).

LHDs caused by pilots

3.2 The Meeting reviewed the LHDs caused by the pilot or the aircraft, as well as the list of LHDs that had occurred in the CAR/SAM FIRs in 2012, 2013 and 2014, shown in **Appendix A** to this part of the report.

3.3 In this regard, the Meeting considered that it was important for CARSAMMA to send the list of LHDs occurred in the CAR and SAM FIRs to the respective Regional Offices, and ICAO to communicate this information to IATA, IFALPA and the States of each Region, so that they can notify their aircraft operators.

LHD performance indicator

3.4 The Meeting reviewed an application developed by CARSAMMA and Cuba for conducting a monthly SMS/SGSO assessment, to be internally applied by the States that deemed it advisable. In this regard, both CARSAMMA and the Secretariat noted that the response time of civil aviation authorities and air navigation service providers for the implementation of actions to mitigate LHDs was too long.

3.5 Accordingly, after some modifications introduced to the tool, the Meeting approved it for internal use by States that so desired in order to quickly obtain LHD risk values on a monthly basis. This tool was already available on the CARSAMMA website, with a user's guide in Spanish, which would soon be translated into English.

3.6 The Meeting acknowledged Cuba and CARSAMMA and congratulated them for the tool they had developed, which was very useful for the early adoption of actions to mitigate LHDs in the CAR and SAM FIRs.

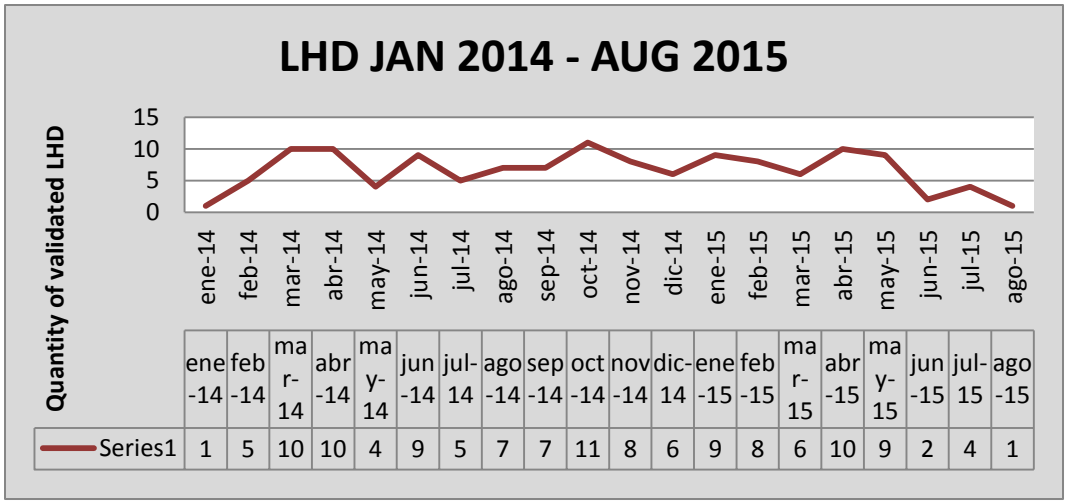
Measures taken in the Lima FIR to reduce the number and severity of LHDs, and results obtained

3.7 The Meeting took note of the measures taken to reduce LHDs in the Lima FIR, especially training plans involving workshops addressed to ATCOs and ACC supervisors, the establishment of a permanent coordination channel with the focal points of the Antofagasta and Guayaquil FIRs and, more recently, during the past month, with the La Paz and Bogota FIRs, allowing for real-time sharing of occurrences with a view to the prompt adoption of mitigating actions. Favourable results were starting to be seen with the first two FIRs.

3.8 In parallel, progress was being made with the AIDC interconnection and tests were being conducted with the adjacent FIRs.

3.9 The Meeting noted that since June 2015, when 58.6% of ATCOs had already been trained, LHDs started to show a decreasing trend, as shown in the following graph.

Graph 1: Evolution of LHDs generated by the Lima FIR
January 2014 - August 2015



3.10 The Meeting recognised that coordination with focal points of adjacent FIRs to address LHDs was a very good practice that resulted in the adoption of prompt mitigating actions, without having to wait for lengthy desktop analyses.

LHD processing and mitigating actions in Chile

3.11 The Meeting took note that Chile had achieved excellent coordination with Argentina, Peru, and Bolivia, whereby LHD reports were compared and collated to filter the information and present the data in accordance with the GTE deviation identification methodology, thus facilitating its analysis.

3.12 Furthermore, Chile reported that it was implementing SMS at national level, where coordination errors between ACCs were of great significance and the subject matter of workshops, training, and bulletins. These errors were the basis for LHDs.

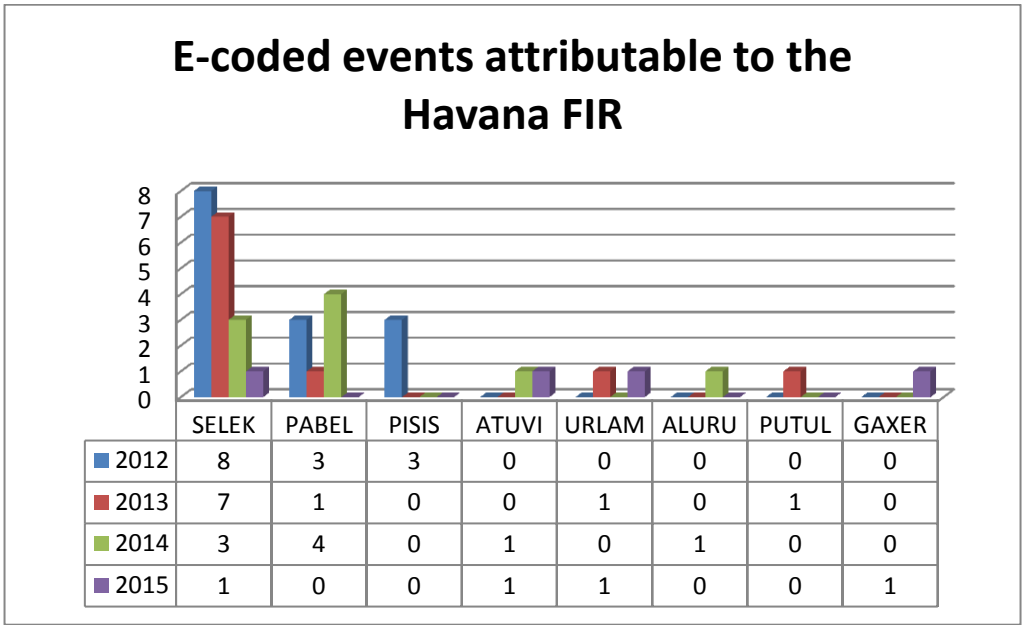
3.13 The following table shows the list of LHDs occurred in 2015, noting a reduction in their numbers after applying these mitigating measures:

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
REPORTED LHDs	0	8	5	3	4	1	3	1	4
LHDs CAUSED BY CHILE	0	3	2	0	1	1	0	1	2

Measures implemented in the Havana FIR to reduce the number and severity of LHDs. Results obtained in the last four years

3.14 The Meeting also took note of the excellent work being done by Cuba in terms of personnel training and investment. It also highlighted the convenience of changing the way of addressing LHDs, moving from the initial concept of **"*finger-pointing the neighbour*"** to the concept of **"*working together with the neighbour*"** to avoid the recurrence of LHDs.

3.15 The Meeting took note of the results of these actions in a comparative study of statistical data showing the following results at transfer of control points:



	SELEK	PABEL	PISIS	ATUVI	URLAM	ALURU	PUTUL	GAXER
2012	8	3	3	0	0	0	0	0
2013	7	1	0	0	1	0	1	0
2014	3	4	0	1	0	1	0	0
2015	1	0	0	1	1	0	0	1

Fig. 1: Occurrence of E-coded events in the Havana FIR, by year and by position (by September 2015)

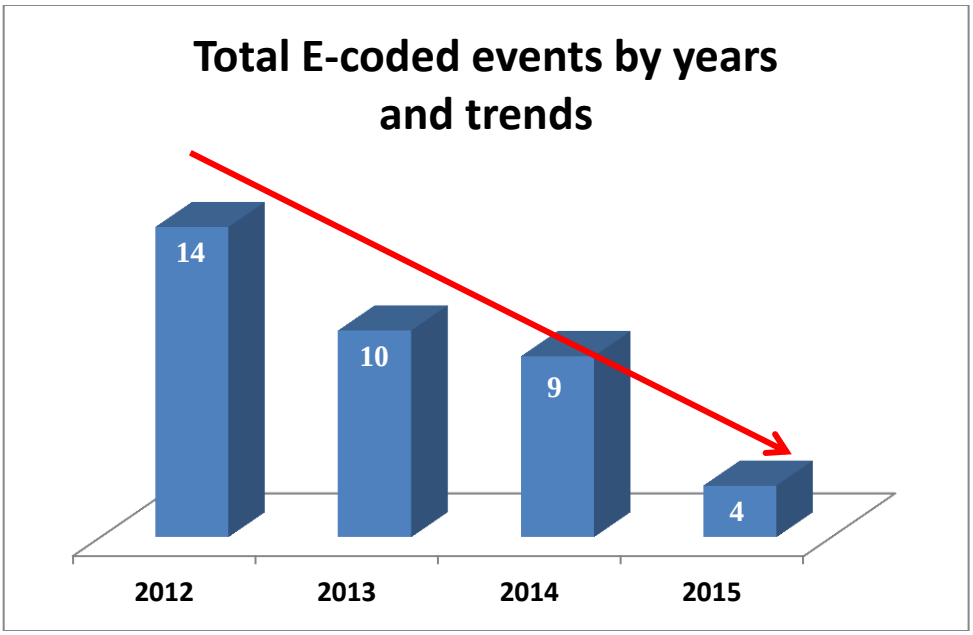


Fig. 2: Downward trend in the occurrence of E-coded LHDs in the Havana FIR

3.16 The Meeting congratulated Cuba for the implementation of measures to reduce the number and severity of LHDs, which had given positive results.

Mitigating action taken by the Brazilian FIRs concerning 2014 LHDs

3.17 The Meeting took note of the action taken by the Brazilian FIRs concerning LHDs generated in 2014, and of the importance of SEGCEA (*Airspace Control Safety Subsystem*), which was responsible for analysing and generating actions to prevent incidents and potential risks.

3.18 Although some air traffic occurrences could be characterised as both LHDs and RICEA (*Airspace Control Investigation Report*), it was noted that sometimes, during initial selection by the ATC supervisor, these events were only processed as RICEA.

3.19 CARSAMMA took the initiative of contacting the responsible authority of ASEGCEA (*Airspace Control Safety Consultancy*) to request ASEGCEA to check the RICEAs processed in 2014 and identify those that could be considered as LHDs.

3.20 The investigation showed that 15 of the RICEAs processed in 2014 could also be characterised as LHDs. Taking into account that there had been 1,451 valid LHDs in 2014, this portion accounted for approximately 1% of the total LHDs validated for the CAR/SAM Regions.

3.21 The Meeting noted that LHD reporting deficiencies and a better control of mitigating actions called for a more targeted training to fully analyse events, including those that could be classified as both RICEA and LHD.

Steps and measures taken by Jamaica to mitigate LHD reports

3.22 Jamaica informed the Meeting that of the six (6) territories surrounding the Kingston FIR, 38% of the validated LHDs occurred with Panama.

- This could be as a result of challenges faced because of lack of radar and poor air/ground radio coverage at the southwestern boundary between the States.

3.23 Additionally, of the 25 LHDs filed between all States and Kingston, 19 had been validated. There was sufficient evidence to confirm the others did not constitute an LHD.

- 66% of invalidated LHDs occurred between Kingston and Curaçao.

  A contributory factor was poor ground/ground communications between both States. Efforts to improve the communication system had been made by the technical engineers of both countries. However, approval from the operational personnel in Curaçao was awaited.

- Many potential LHDs were avoided, radar contact was established with aircraft and coordination effected prior to them reaching the five (5) minutes stipulations adopted at the GTE/14. This was evident especially with Havana and Barranquilla.

- Internal mitigating measures implemented by Kingston included:

  - cross checking of flight progress strips approximately 10 minutes before the aircraft arrived at the transfer control prior;

  - rigidly enforcing the read back/hear back process;

  - emphasising key elements of the transfer (estimate).

3.24 These measures were implemented to ensure that LHDs attributable to Kingston remained within the acceptable level of safety; however the objective was to eliminate them all together.

- Notwithstanding the ‘just culture’ approach adopted by the JCAA, controllers were still attempting to mutually settle coordination loop errors. Also, they failed to report some occurrences.

- States should ensure that this practice is discontinued; it distorts the facts which results in an incorrect interpretation of an accepted level of safety.

3.25 The Meeting took note that the Jamaica ATS Modernisation programme was underway:

- Contract signed.
- Delivery within 21 months.
- Will include Mode S radars.
- AIDC, CPDLC and ADS-B.
- Interoperability.
- Radar sharing capabilities.
- Expanding our MEVAIII capabilities to include shout lines with all adjacent FIRs.
- Expanding our air to ground capabilities with radios in PZA, this is achievable due to collaboration with COCESNA.

3.26 States involved should validate all alleged LHDs before they are submitted to CARSAMMA.

- This would significantly reduce the time spent during teleconference validating these reports.

- Time would be better utilised brainstorming ways to improve how to collaborate, coordinate and communicate information which is vital to a safe, efficient and expeditious flow of air traffic within the Region.

Evolution of LHDs in the Santo Domingo FIR and action taken

3.27 The Meeting was informed by the Dominican Republic of the implementation of the new control centre that became operational in October 2014, and which was equipped for automatic exchange of data between ATC units, thus enabling coordination using AIDC with adjacent control centres.

3.28 The goal of the Dominican Republic was to gradually reduce LHDs to 10% per year, initially based on training and supervision. The result had been a reduction of LHDs in 2014 to 123 validated occurrences, a 14.75% reduction with respect to the previous year, exceeding the set goal.

3.29 Comparing the events validated by July of this year with those of 2014, the 15% downward trend of LHDs was maintained, once again exceeding the set goal.

Measures to mitigate LHDs in the FIRs of Argentina

3.30 The Meeting took note of the measures taken by Argentina to reduce LHD occurrences.

EZEIZA FIR

3.31 Argentina informed that as a result of the adoption of the mitigating measures reported at the GTE/14 meeting, LHDs in the South Atlantic had diminished significantly in the Oceanic sector of the FIR.

3.32 The Meeting took note that there had been 35 reports in the Oceanic sector of Ezeiza in 2013, which dropped to 33 in 2014 and to only 2 reports during the first half of 2015. These figures were consistent with the fact that all mitigating measures had been implemented between September and October 2014.

COMODORO RIVADAVIA FIR

3.33 The Meeting was informed that the greatest risk for this FIR was related to the movement of aircraft coming from the Falkland Islands (Mount Pleasant - EGYP), whose control unit did not report or coordinate traffic clearances with the Comodoro Rivadavia ACC, thus violating the Letter of Operational Agreement between the two controls.

3.34 Thus, in 2014, the Comodoro Rivadavia ACC issued 19 LHD reports to EGYP (14 of which were validated by the GTE), all due to lack of ATC coordination (E2).

3.35 Likewise, by June 2015, 19 E2 reports had been issued (all validated by the GTE), and since July to date, 18 additional reports remained to be validated.

3.36 In these reports, emphasis should be placed on the traffic between the Falkland Islands and the continent (mainly SAWG and SCCI), which used an airway (UW54) that crossed those

established in the Comodoro Rivadavia FIR (UT108 - UT109 and UT662), generating the risk of potential air traffic conflicts.

3.37 In order to mitigate these cases, traffic under the control of Comodoro Rivadavia (outgoing flights to the Falkland Islands) was instructed that, on the way back (before take-off, during taxiing, or as soon as possible), contact should be established with the ACC to obtain the corresponding traffic clearance.

3.38 Likewise, use had been made of the diplomatic channels to have a meeting between the two parties in order to update the existing Letter of Operational Agreement or, failing this, draft a new one.

RESISTENCIA FIR

3.39 In this FIR, training had been provided to the supervisors of the Resistencia ACC, and operational circulars had been issued to formalise the various processes involving LHD report management, from the moment of occurrence of the LHD, through its analysis and investigation, to the mitigation of errors identified in the FIR.

MENDOZA FIR

3.40 A training programme had been implemented to train all ATCOs in the LHD process.

CORDOBA FIR

3.41 Based on the information obtained from the investigation of LHD reports received, training had been provided to ATCOs on compliance with flight management processes in each sector, highlighting the need to update the status when changing position, especially when positions were changed within the same shift.

Comments by the Secretariat

3.42 Regarding all of the above, the Secretariat congratulated all CAR/SAM States that had taken mitigating measures to reduce the occurrence of LHDs. It also noted that LHD quantitative indices had dropped to levels never seen before in the RVSM history in the Region, which meant that States and International Organizations were seriously working on these issues to improve safety in RVSM airspace.

3.43 Furthermore, the Secretariat emphasised the fact that LHD reports had increased, which meant that what had been reduced was the severity of the occurrences. Nevertheless, the Meeting agreed that efforts should also be aimed at reducing the number of events, taking advantage of the existing technology and increasing training.

3.44 Although AIDC did not completely eliminate LHDs, the Secretariat highlighted the fact that if in addition to AIDC, radar signals were to be integrated the number of LHDs would be practically nil. In any case, it was stressed that this success was the result of the work of all focal points that were applying mitigating measures to avoid these events.

LHD EVENTS OCCURRED IN CAR/SAM FIRs

PILOT ERROR 2012

Quantity of Reports	Reporting FIR
1	Amazonia
1	Antofagasta
3	Brasilia
7	Curitiba
1	Maiquetía
1	Mendoza
1	Panama
1	Puerto Montt
12	Recife
1	Rochambeau
3	Santiago
Total Reports: 32	

PILOT ERROR 2013

Quantity of Reports	Reporting FIR
1	Antofagasta
2	Central America
8	Curitiba
1	Kingston
1	Havana
1	Lima
1	Port-Au-Prince
7	Recife
1	Santiago
Total Reports: 23	

PILOT ERRORS 2014

Quantity of Reports	Reporting FIR
4	Amazonica
2	Antofagasta
1	Bogota
6	Brasilia
4	Central America
1	Curaçao
3	Curitiba
8	Havana
3	Lima
1	Piarco
2	Recife
1	Santiago
Total Reports: 36	

Agenda Item 4: Review of the Project on safety assessment of RVSM airspace in the CAR/SAM Regions

4.1 Under this agenda item, the Meeting thoroughly analysed the deliverables presented by the Rapporteur of the Project, introducing several modifications. These modifications will be reflected in the deliverables in Spanish, before proceeding to their translation.

4.2 CARSAMMA graciously offered its website for posting two folders, one in Spanish and the other in English, displaying the approved deliverables.

Agenda Item 5: New Monitoring Agency implementation in the CAR/SAM Regions

5.1 Under this agenda item, the Meeting reviewed the following paper:

a) IP/08 - *Project for the implementation of a new Monitoring Agency in the CAR/SAM Regions* (presented by Dominican Republic) (***Spanish only***)

5.2 The Meeting took note that the Dominican Republic persisted in its intention to sponsor the Monitoring Agency for the CAR Region, which was considered of vital importance. However, reconsidering its priorities, it proposed to leave pending for the fourth quarter of 2016 the possibility of submitting to GREPECAS a plan for the implementation of such RMA for the CAR Region.

Agenda Item 6: Other business

6.1 No other business were presented.