



Agenda Item 5: Priorities for the implementation of safety and air navigation 2017-2019

**Optimization and harmonization of the Longitudinal Separation Minima
in the SAM FIR's boundaries**

(Presented by IATA)

SUMMARY	
This working paper presents a proposal for changing the goals for optimization and harmonization of the Longitudinal Separation Minima in the SAM FIR's boundaries, using the current ATC systems and infrastructure, proposed in the AN & FS/2-WP 12	
References:	
- SAM/IG/15 Meeting	
ICAO strategic objectives:	<i>A - Safety</i> <i>B - Air navigation capacity and efficiency</i> <i>E - Environmental protection</i>

1. **Background**

1.1 After a thorough analysis, the SAM/IG/15 meeting considered that the implementation of an optimization of longitudinal separation could be gradual and that it was advisable that this optimization be applied regionally to increase airspace efficiency and capacity.

1.2 The SAM/IG/15 meeting also considered that since the longitudinal optimization procedures were established in the PANS ATM DOC 4444, they could be implemented as the Letters of Operational Agreement between different adjacent FIRs were reviewed.

1.3 The SAM/IG/15 meeting was of the opinion that this implementation be part of ATFM Implementation Plan and in that sense understood appropriate to include this activity in the GREPECAS ATFM Project and the corresponding ATFM Action Plan.

1.4 Based on the above, the SAM/IG/15 meeting formulated the following Conclusion:

Conclusion SAM/IG/15-4: Reduction of the longitudinal separation between aircraft in the SAM airspace

That, taking into account the operational benefits to be gained from reducing the longitudinal separation of aircraft in the SAM airspace, States:

- a) investigate the possibility of reducing the longitudinal separation of aircraft at 40 NM between adjacent FIRs using the Mach number technique;

- b) their application be included in the Letters of Operational Agreement; and
- c) the Secretariat include this implementation in the GREPECAS ATFM Project and its Action Plan.

2. Discussion

2.1 In the first phase, it would be possible the application of 20 NM longitudinal separation with the use of GNSS (item 5.4.2.3.3.1 of the Doc. 4444), which would represent a gain of 60 NM in longitudinal separation, allowing the application of the optimum flight levels available.

2.2 In a second phase, it is recommended the application of radar separation, whose requirements are described below.

2.3 Application of radar separation within the limits of FIRs depends on four main aspects:

- a) Radar Coverage.
- b) Radar coverage Overlap.
- c) Ability to transfer and maintain radar identification of the aircraft.
- d) Direct VHF Communication.

2.4 Regarding the radar coverage and the corresponding overlap, it is observed that there is a sufficient surveillance infrastructure in significant portions of the South American airspace. The Surveillance Infrastructure can be observed in the **Appendix A** to this working paper.

2.5 The transfer and maintenance of aircraft identification must be made in accordance with paragraph 8.6.3 of Doc. 4444. While one of the mechanisms of transfer is the application of automated systems, there are 7 other applicable methods, and some of them can be used immediately, without need for new equipment or systems. These methods of immediate application would be:

- a) Notification of the aircraft's discrete SSR code or aircraft address;
- b) Designation of the position indication by reference to, or in terms of bearing and distance from, a geographical position or navigational facility accurately indicated on both situation displays, together with the track of the observed position indication if the route of the aircraft is not known to both controllers;
- c) Where applicable, issuance of an instruction to the aircraft by the transferring controller to change SSR code and the observation of the change by the accepting controller;
- d) Issuance of an instruction to the aircraft by the transferring controller to squawk/transmit IDENT and observation of this response by the accepting controller.

2.6 In summary, the optimization of longitudinal separation, either in a conventional or radar operational environment, is expected to increase efficiency of operations in the SAM Region. The final goal, for radar environments, based on the coverage and corresponding overlap, is the application of radar separation in the FIR's boundaries. The application of some methods of transfer and maintenance of radar identification available in Doc. 4444 would allow the optimization of the longitudinal separation minimum in some FIR's boundaries.

2.7 Taking into consideration that the optimization of longitudinal separation from 10 minutes or 80 NM directly to a separation of 20 NM in a conventional environment could represent a significant impact on the operational procedures currently applied, the SAM/IG/15 has established a

strategy to applying a gradual optimization, through an action plan developed by the SAM/IG and the States involved, using initially 40 NM longitudinal separation, that is double the separation minimum required under Doc 4444.

2.8 The longitudinal separation minima has normally a domino effect on the flight operations, due to the need of coordination between ACCs responsible by ATS in neighboring FIRs. Taking that into consideration, it is important to establish a close coordination with CAR Region, with the objective of avoiding the mentioned domino effect. In this sense, the following conclusions and goals achieved by the Second NAM/CAR Air Navigation Implementation Working Group Meeting (ANI/WG/2) should be considered, in order to achieve a coordination between CAR and SAM Regions:

4.1.2.17 The Meeting agreed that this matter deserves high priority and that under ICAO Document 4444, paragraph 5.4.2.3.3.1, longitudinal separation of 20 NM may be applicable under the specified condition. The meeting recommended that the issue can be dealt through bilateral discussions under the guidance of the ATM Regional Officer of the ICAO NACC Office.

4.1.2.18 it was informed that, during the SAM/CAR ATFM workshop held in Panama City, Panama, 25-29 May 2015, the participants proposed to reduce the ATC separation 40 NM by December 2016, 20 NM by December 2017 and 10 NM by December 2018.

2.9 In the AN & FS/2-WP 12, Secretariat does not propose goals for radar separation minima and proposes that the separation of 40NM and 20NM, are implemented as follows:

B0 – APTA: Approach with Vertical Guidance Optimization 2017-2019				
ELEMENTS	Scope	Indicators/metrics	GOALS: %/ Date	Status
6 - Reduction of the Conventional Separation Minima from 80 to 40 NM	All States	Indicator: % of States that applies 40 NM Longitudinal Separation Minima in the FIR Boundaries Support Metrics: Number of Sates that applies 40 NM Longitudinal Separation Minima in the FIR Boundaries	50% in 2017 100% in 2018	XX%
7 - Reduction of the Conventional Separation Minima from 40 to 20 NM	All States	Indicator: % of States that applies 20 NM Longitudinal Separation Minima in the FIR Boundaries Support Metrics: Number of Sates that applies 20 NM Longitudinal Separation Minima in the FIR Boundaries	50% in 2019	XX %

2.10 It is important to observe that the implementation of separation of 40 NM is quite simple, considering that:

- a) 20 NM conventional separation minima based on the application of GNSS is already established in Doc. 4444 and its safety has already been proved by the Panel on Separation and Airspace Safety (SASP).
- b) The proposed separation of 40 NM is twice the minimum required under Doc. 4444.
- c) The implementation of this proposal would need to provide the following information (briefing) to the ATCOs:
 - the new separation minima;
 - the corresponding phraseology; and
 - the application of the new letters of agreement.
- d) The effectiveness of the new separation would be done by small changes in the current Operational Agreement Letters, replacing the current 80 NM longitudinal separation by 40 NM.

2.11 The 20 NM longitudinal separation minima would be the next phase of implementation, taking into account that the 40 NM separation would be applied "only" for the ATCOs adaptation, in order to allow application of 20 NM separation minima in the near future, as contained in Doc. 4444. Thus, the transition from separation 40 NM to 20 NM separation could be made within a period of 1 year and may be already established in the same Letter of Agreement signed for a change from 80 NM separation minima to 40 NM. Although it is not a specific requirement of Doc. 4444, taking into consideration that 20 NM is a conventional separation, it is important to observe that a significant portion of the separation of 20 NM will be held in airspace with radar coverage.

2.12 Taking into consideration the existing radar coverage in the SAM Region and the projects on expansion of this coverage, the evolution for the separation of 10 NM is natural, with a view of a better use of existing CNS infrastructure.

2.13 The present impact of the 80 NM separation minima currently applied in the SAM FIR boundaries is equivalent to the absence of radar coverage to the international flights.

2.14 It is essential that SAM States establish a comprehensive Action Plan, beginning with the optimization to 40 NM, but also includes the separation of 20 NM and 10 NM. Thus, it is expected that the percentage of states with corresponding optimizations separation evolve over a period of approximately one year between implementations.

2.15 Based on the above, the following change to the separation optimizations targets within the limits of the SAM FIR is proposed:

<i>B0 – APTA: Approach with Vertical Guidance Optimization 2017-2019</i>				
ELEMENTS	Scope	Indicators/metrics	GOALS: %/ Date	Status
6 - Optimization of the Conventional Separation Minima from 80 to 40 NM	All States	Indicator: % of States that applies 40 NM Longitudinal Separation Minima in the FIR Boundaries Support Metrics: Number of Sates that applies 40 NM Longitudinal	50% in 2016 100% in 2017	XX

<i>B0 – APTA: Approach with Vertical Guidance Optimization 2017-2019</i>				
ELEMENTS	Scope	Indicators/metrics	GOALS: %/ Date	Status
		Separation Minima in the FIR Boundaries and Number of SAM States		
7 - Optimization of the Conventional Separation Minima from 40 to 20 NM	All States	Indicator: % of States that applies 20 NM Longitudinal Separation Minima in the FIR Boundaries Support Metrics: Number of Sates that applies 20 NM Longitudinal Separation Minima in the FIR Boundaries	50% para 2017 100% para 2018	XX %
8 - Optimization of the Longitudinal Separation Minima from 20 to 10 NM, with application of ATS Surveillance Systems	All States	Indicator: % of States that applies 10 NM Longitudinal Separation Minima in the FIR Boundaries Support Metrics: Number of Sates that applies 10 NM Longitudinal Separation Minima in the FIR Boundaries	50% in 2018 100% in 2019	XX %

3. **Suggested actions:**

3.1 The Meeting is invited to:

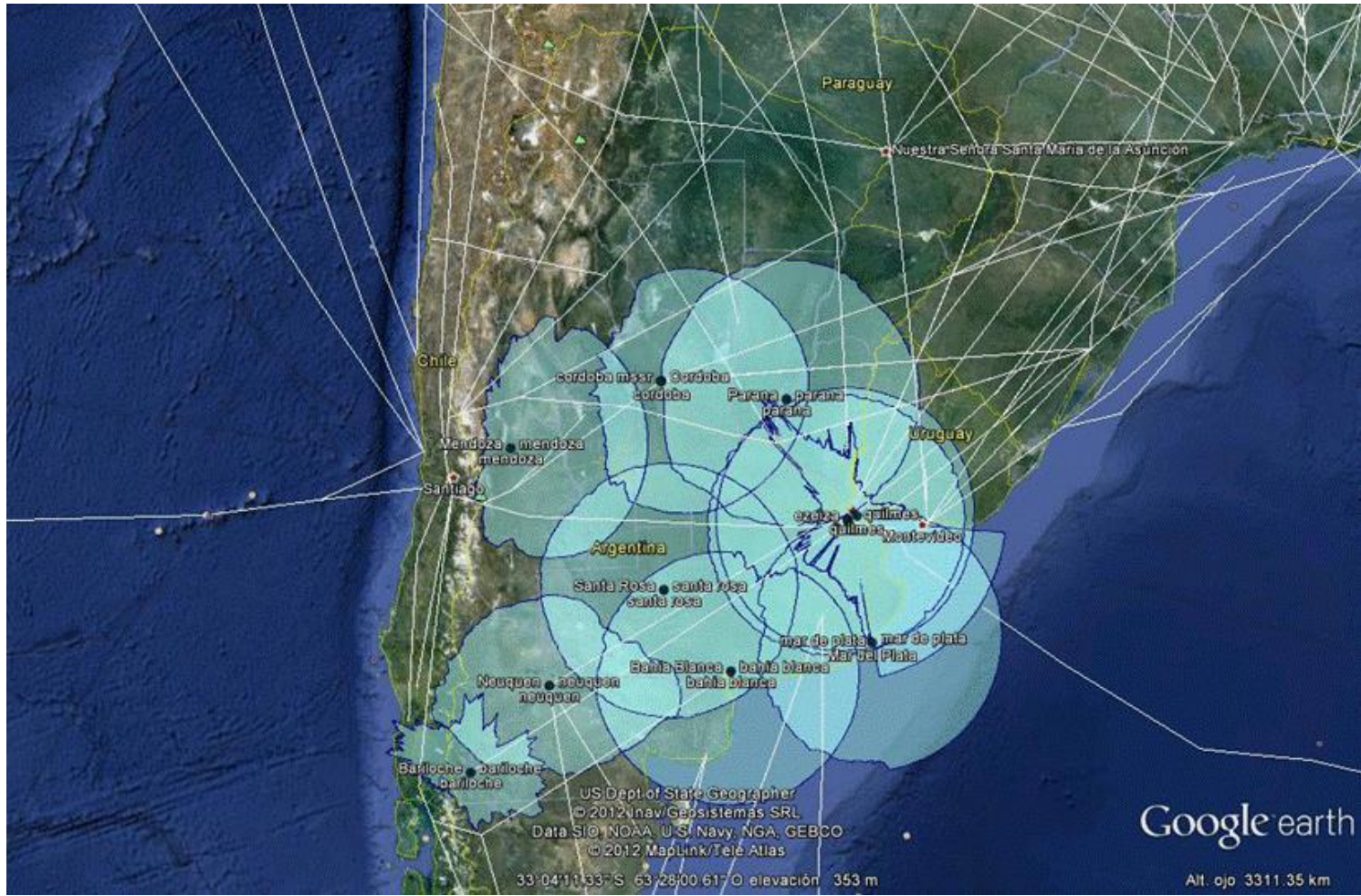
- a) take note of the information provided in this working paper;
- b) replace the goals established on AN & FS/2-WP 12 by the goals proposed in the paragraph 2.15.

APPENDIX A / APÉNDICE A

SAM RADAR COVERAGE DIAGRAMS /

DIAGRAMAS DE COBERTURA RADAR SAM

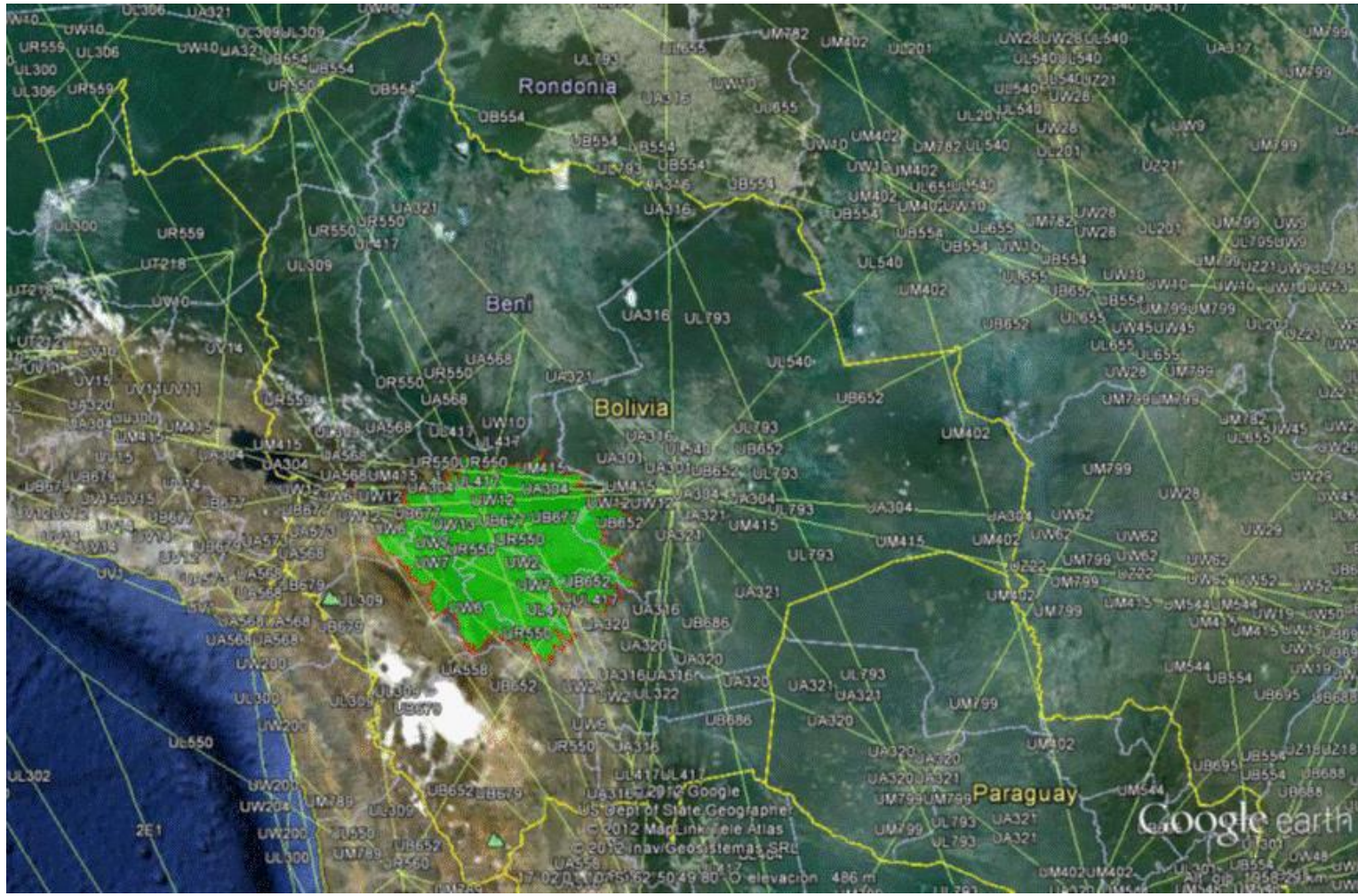
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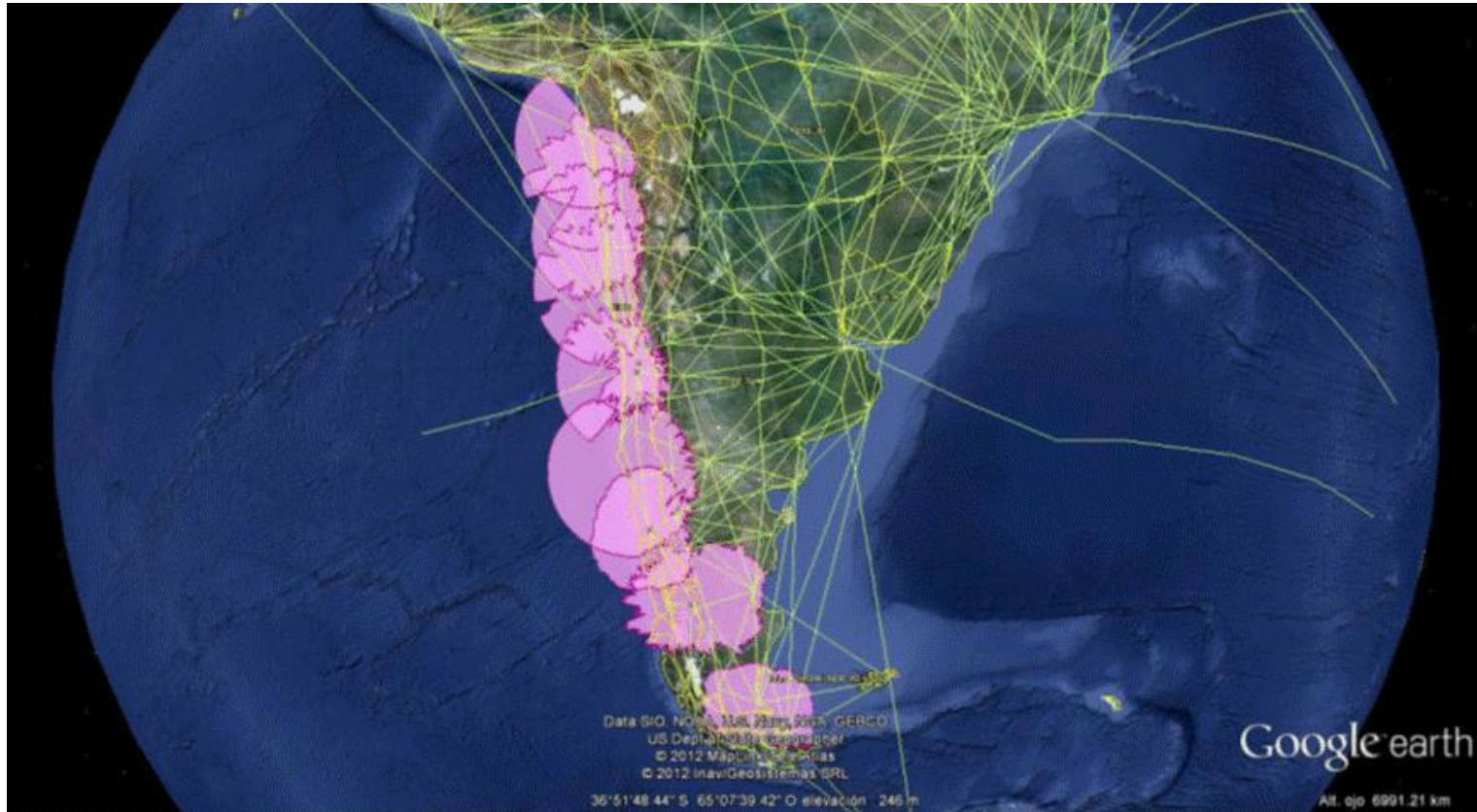
BRAZIL (FL200)



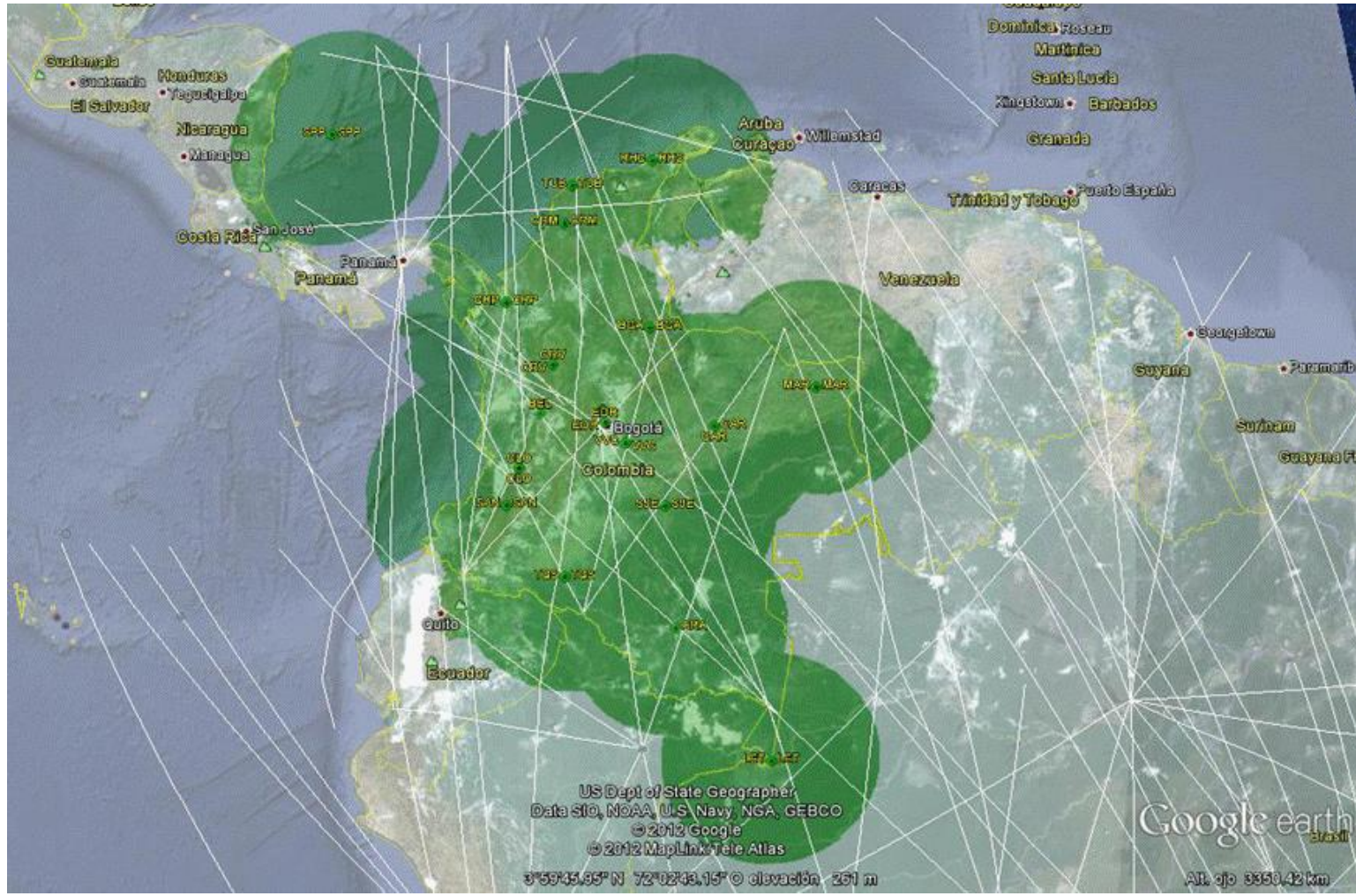
BOLIVIA (FL250)



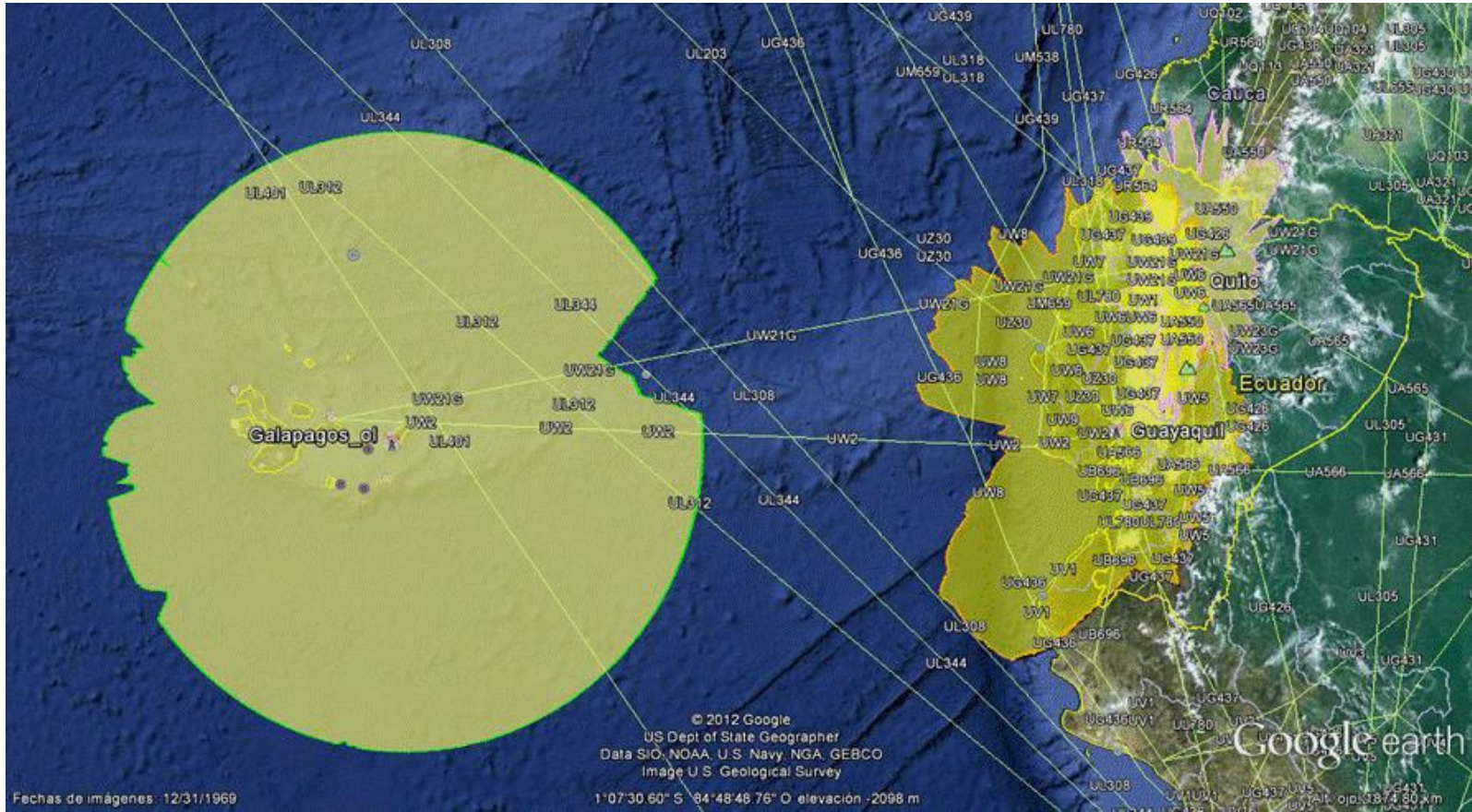
CHILE (FL250)



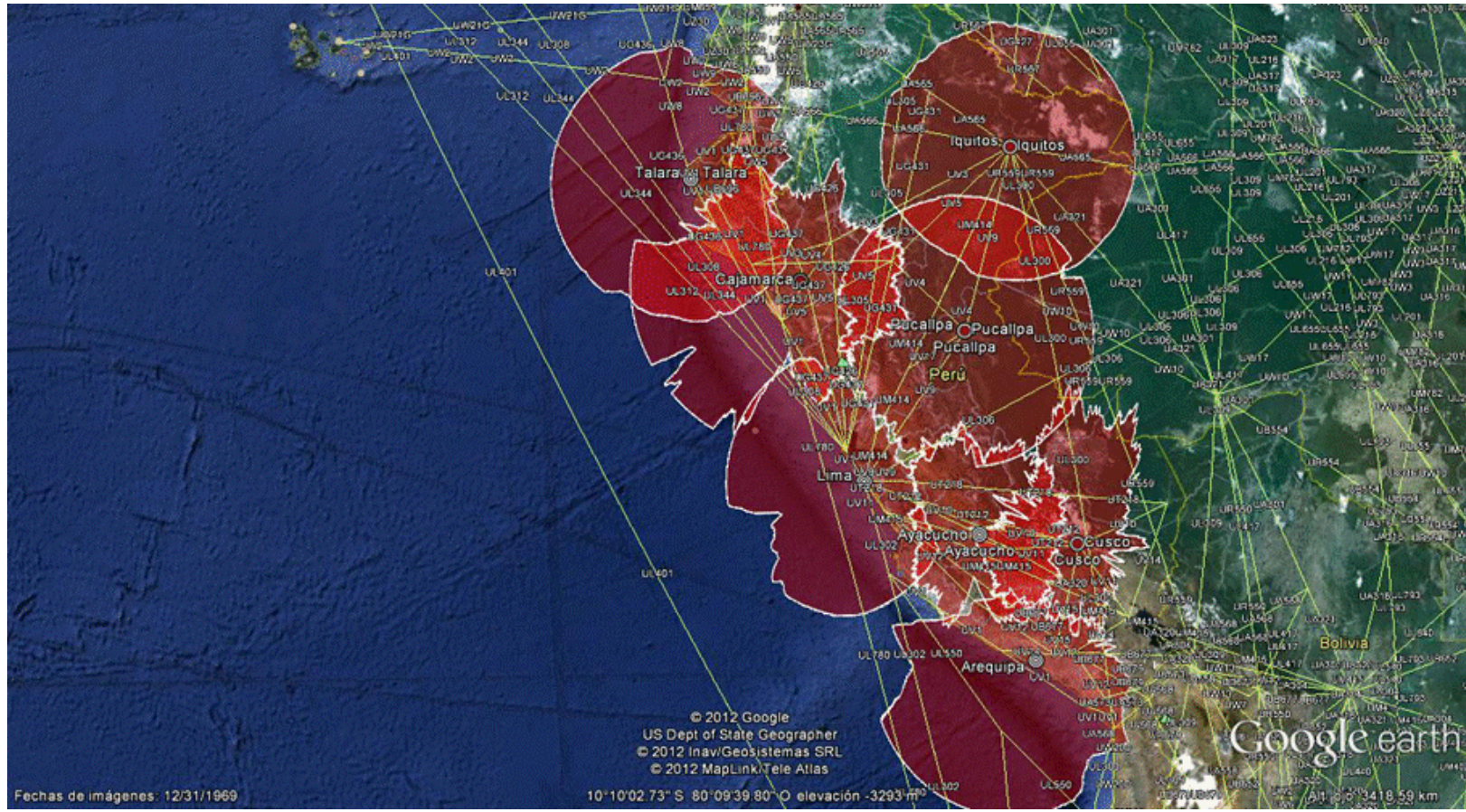
COLOMBIA (FL250)



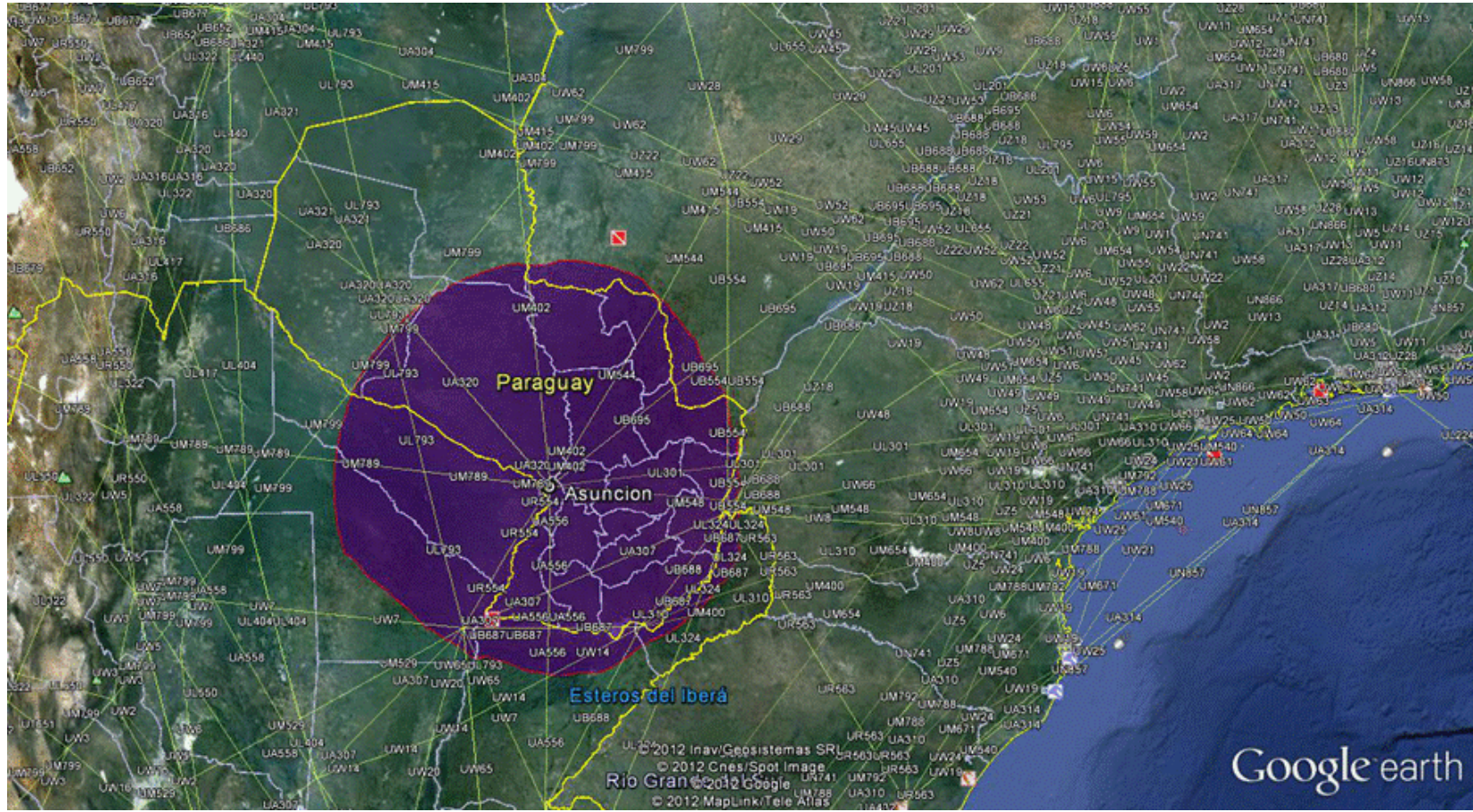
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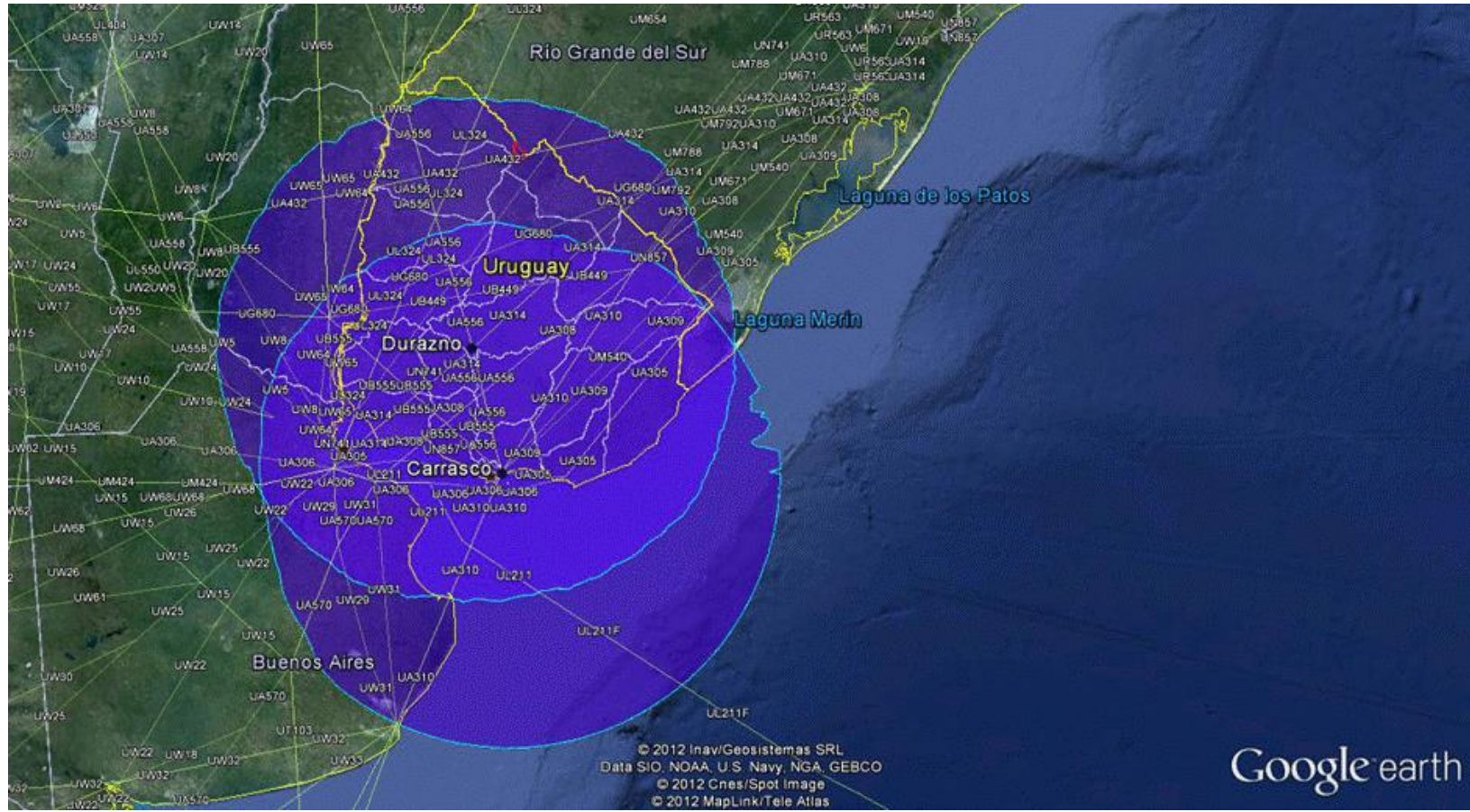
PERU (FL250)



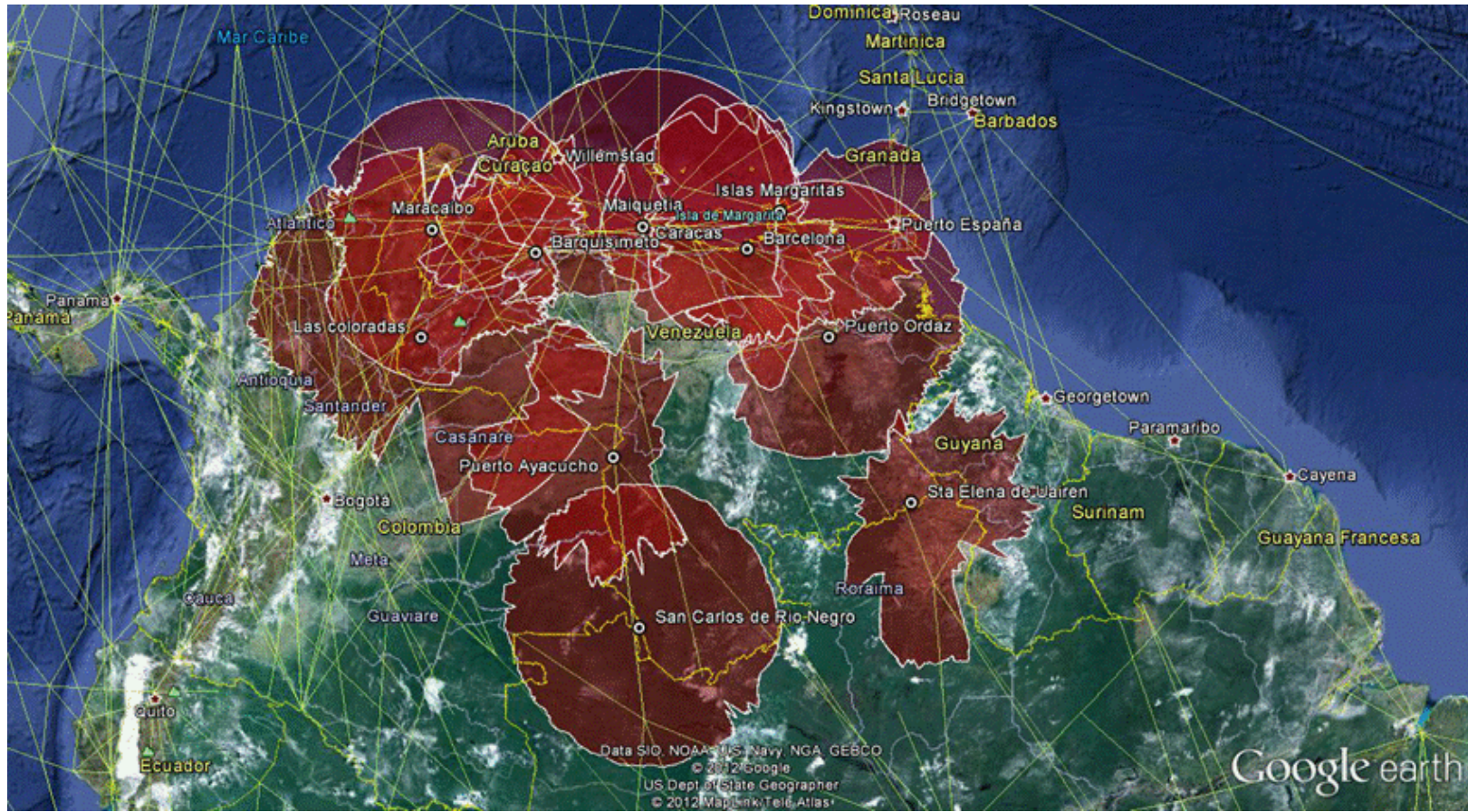
PARAGUAY (FL250)



URUGUAY (FL250)



VENEZUELA (FL250)



TOTAL SAM REGION

