ICAO SAFETY

NO COUNTRY LEFT BEHIND

ICAO Big Data Project

ADS-B Data as a source for analytical solutions of traffic behaviour in airspace

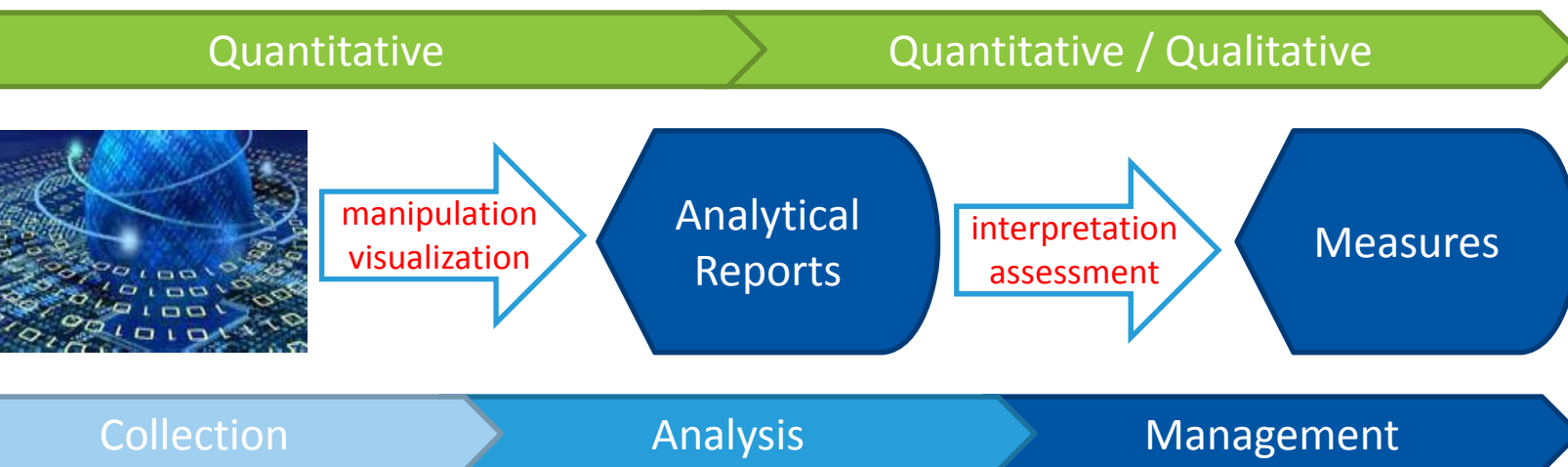## Andreas Meyer

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Integrated Aviation Analysis Section / ANB

Bogota, 6 September 2016

Big Data process

Quantitative	Quantitative / Qualitative

manipulation visualization → Analytical Reports

interpretation assessment → Measures

Collection	Analysis	Management

Code of Conduct (A-Res 37-1)

GASP - Appendix 3: Code of Conduct on the Sharing and Use of Safety Information

- 5.1. b) ensure that shared safety information is used in an appropriate, fair and consistent manner, solely to improve aviation safety and not for inappropriate purposes, including for the purpose of gaining economic advantage;

ADS-B Data Summary

The availability of automatic dependent surveillance broadcast (ADS-B) data presents a useful source for analytical efforts on effective and efficient airspace and navigation procedure usage. The sufficient availability of such data depends in-part, on a network of ground based receivers. Presently most States in the SAM do not have adequate coverage of these receivers for meaningful analysis. This presentation provides an overview on technical requirements for this type of analysis and illustrates possible solutions for States, once appropriate coverage is established.

ADS-B Data

ADS-B is a system intended to broadcast the precise location of the aircraft via a digital link to other aircraft and air traffic control without the need for secondary radar. The system involves a GPS equipped aircraft whose position can be determined through cross-validation of multiple on-board sources, and is capable of transmitting that position through a suitable ADS-B transmitter to a ground station (in the future, satellite-based receivers are perceived).

ADS-B Data

e broadcast consists of information
tinually transmitted for monitoring
appropriately equipped aircraft or
und stations and is: automatic
quires no pilot inputs or external
rrogation); dependent (influenced
he accurate position and velocity
a from the aircraft's navigation
tem – e.g. GPS); and offers
veillance capability. ADS-B data is
adcasted every half-second on a
0 MHz datalink and may include:

- flight identification (flight number call sign or call sign);
- ICAO 24-bit aircraft address (globally unique airframe code);
- position (latitude/longitude);
- position integrity/accuracy (GPS horizontal protection limit);
- barometric and geometric altitudes;
- vertical rate (rate of climb/descent);
- track angle and ground speed (velocity);
- emergency indication (when emergency code selected); and
- special position identification (when IDENT selected).

Feeder Coverage

Altitude: **0ft - 60,000ft and above**

last updated 2 days ago

☑ ADS-B ☑ MLAT ☑ Radar ☑ Oceanic ☐ Projected
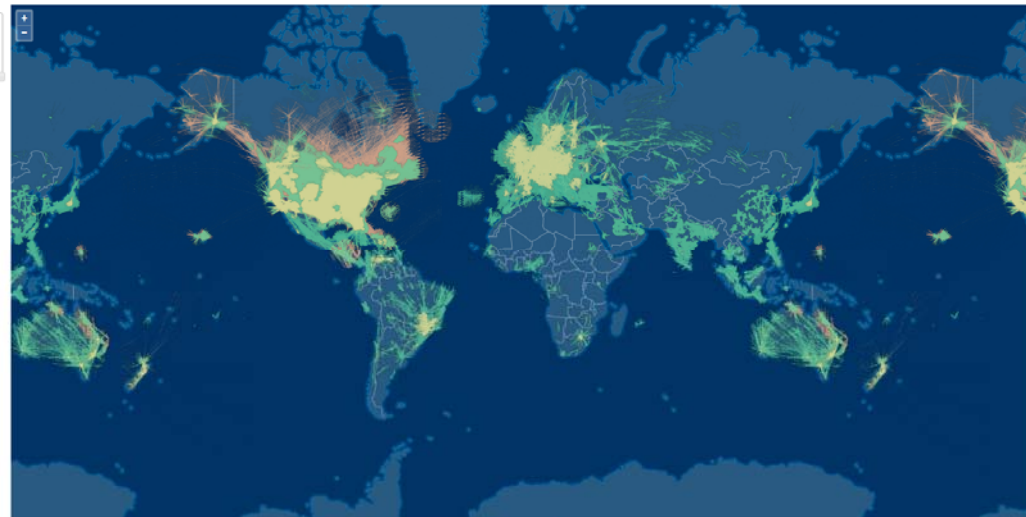
Feeder location characteristics

Average site covers approx.
- 50nm up to 5,000ft AGL
- 100nm above 10,000ft AGL
- 300nm for 20,000 to 40,000ft AGL

Low altitude full coverage requires a grid of 50nm

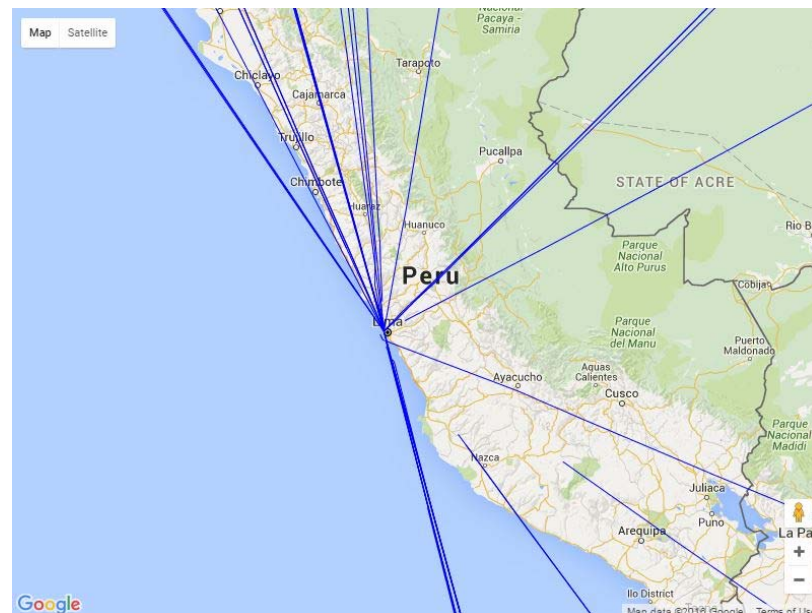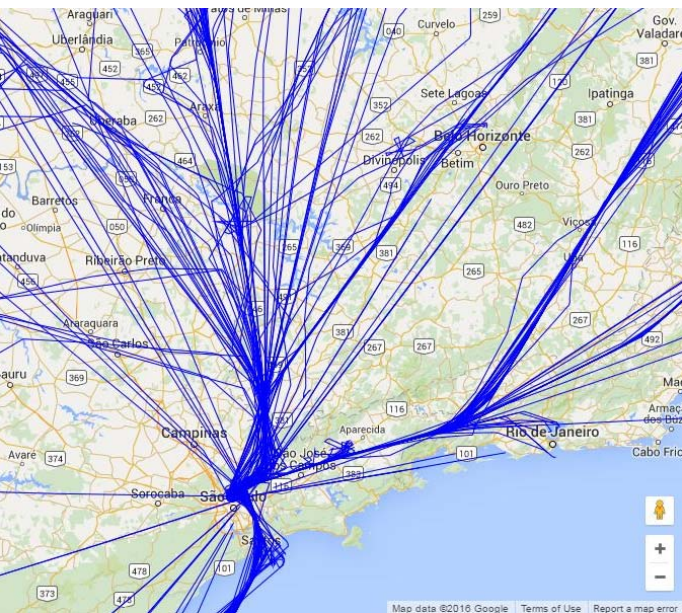High altitude full coverage requires a grid of 150nm
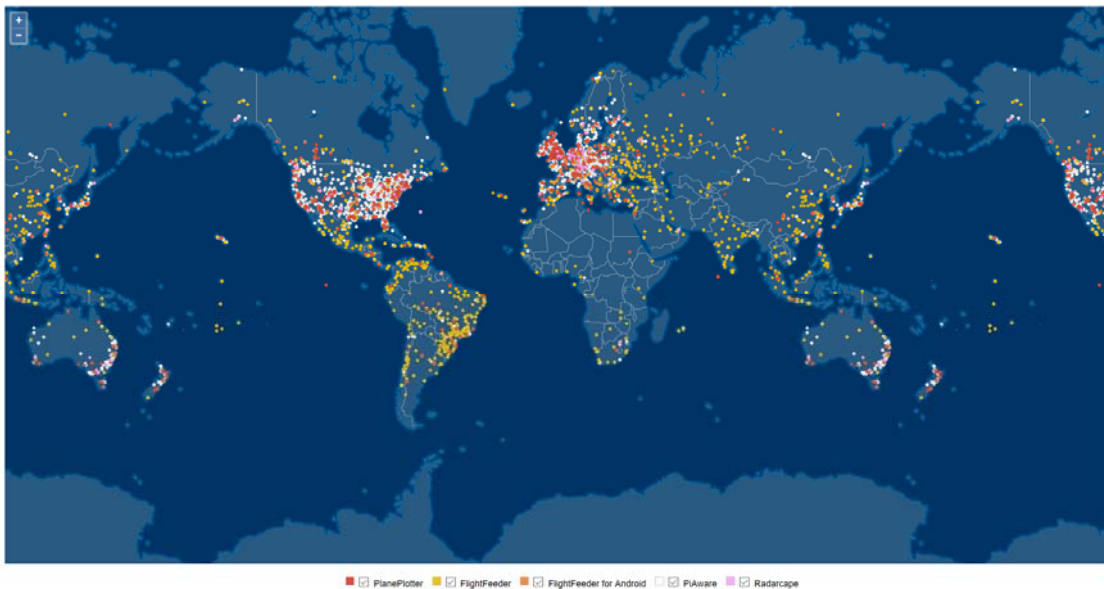
Surface coverage requires on site antenna(s)

Coverage vs. Non-Coverage

Feeder Location

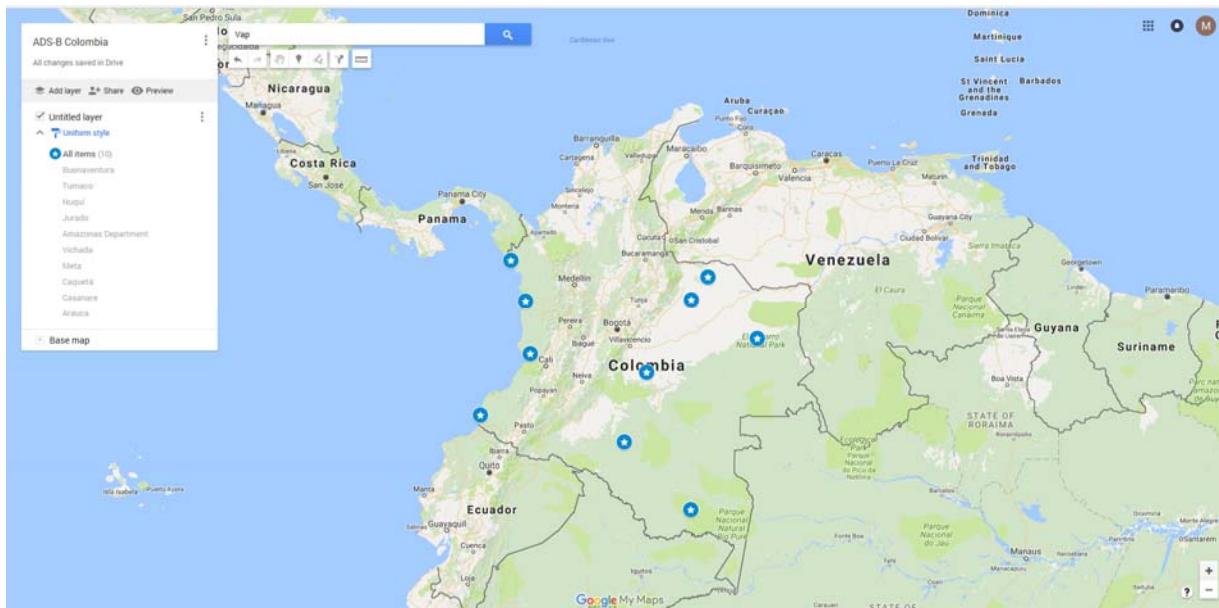PlanePlotter   FlightFeeder   FlightFeeder for Android   PiAware   Radarcape

Proposed Feeder Location

Analytical Solutions

eral Information

- Number of international airports
- Size of Airspace
- Number of annual departures
- Number of national carriers
- Number and details to air traffic connections

pace

- Number of daily overflights
- Number of daily inbound flights
- Number of daily outbound flights
- Number of daily domestic flights
- Average airspace density (below 28,000ft and above 28,000ft)
- Number of daily active NOTAMS
- Daily total of track miles flown within FIR

Airport

- Number of flights crossing procedural waypoints for each airport
- Percentage of daily tailwind landings
- Percentage of daily bad visibility
- Percentage of daily precipitation
- Percentage of daily wind conditions
- Percentage of daily freezing conditions
- Percentage of daily adverse weather phenomena
- Number of daily departures
- Number of daily active NOTAMs
- Average touch down point of landing traffic for every runway
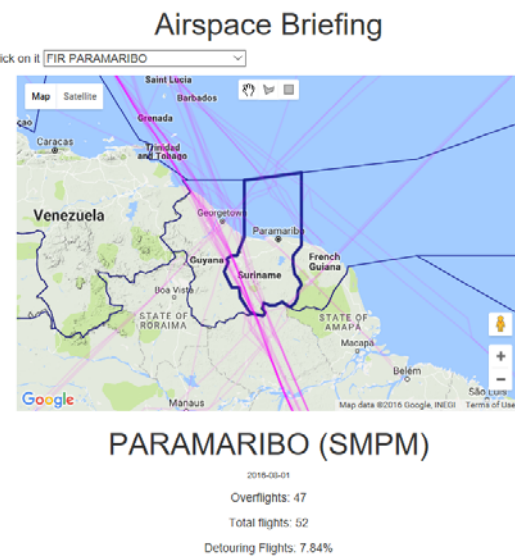- (Ground Surface Movements)

Procedures Overlay Solution
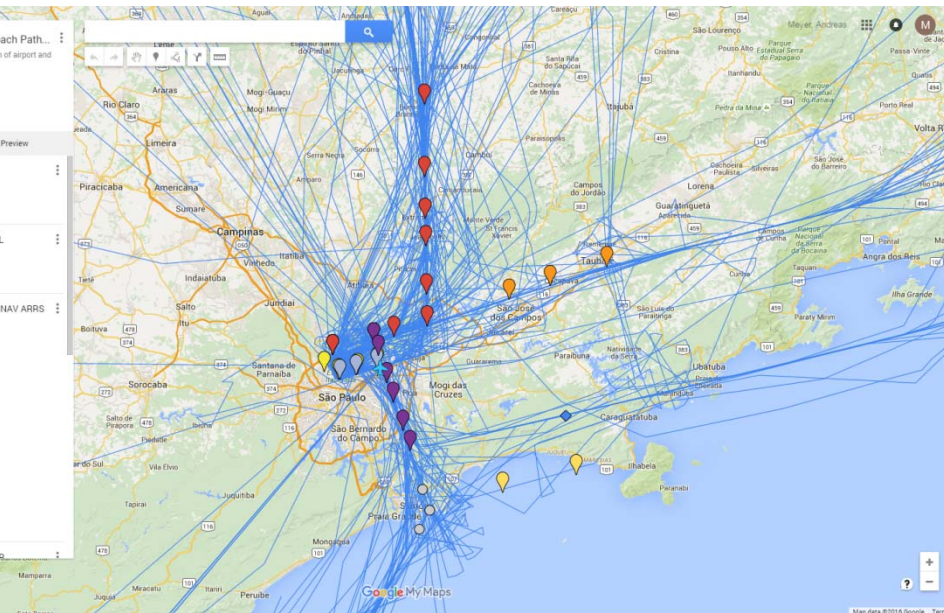
- Qualified visualization
- Exact paths
- Any available procedure
- Terminal and Enroute airspace
- Quantified analysis of rate and numbers for each available procedure

Airspace Briefing

Airspace Briefing

Click on it FIR PARAMARIBO

PARAMARIBO (SMPM)

2016-08-01

Overflights: 47

Total flights: 52

Detouring Flights: 7.84%

- Number of affected flights
- Number of rerouted flights
- Average route length increase
- Additional fuel cost
- Number of affected States of Operators

Requirements

Promote the installation of ADS-B receivers (at no cost)

Promote the cooperation of ANSP to provide radar data in exchange for ADS-B infrastructure

Provide secure locations for the ADS-B receiver installation

Readiness to share collected data

Have a specific goal

ADS-B Project Plan

Expression of interest to the RO

Country coverage analysis and proposed feeder sites

Agreement on scope of project

MoU (Working agreement)

Installation of additional feeder site (at no cost)

Let's GO

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THANK YOU