SITAONAIR

Air Ground data link communications in South America region

Agenda

1. Introduction to SITAONAIR
2. Global SITAONAIR Data link infrastructure
3. Data link context for ATC
4. Deployment of VHF infrastructure in Brazil
5. SITAONAIR major activities in SAM region
6. Conclusion

SITAONAIR a new organisation to serve the connected aircraft market

SITA

Airport, passenger and government solutions	Aircraft communications	onair Inflight connectivity solutions
Passenger processing and management Reservation, e-commerce Baggage management Operations management Border management Biometrics	• Aircraft operational applications • Aircraft operation communications • Cockpit solutions • Cabin crew solutions • Air traffic management	• Inflight Connectivity solutions for passenger Wi-Fi Internet Mobile roaming Wireless entertainment

SITAONAIR

Pioneering e-Aircraft™ solutions


Passenger


Cabin Crew


Cockpit Crew


Aircraft


Flight Operations


Air Traffic Control

SITAONAIR Applications products

Internet ONAIR
Inflight Wi-Fi

ONAIR Play
On-demand Entertainment

Mobile ONAIR
Mobile data, SMS and voice

CrewTab
Digital crew operations

CrewRetail
Live onboard sales

CrewServices
Concierge

EFB
Digital flight operation

EFB Weather Services
Weather situational awareness

Device Management
Mobility

Aircraft Health Management
Air framer data

Aircraft Data Management
OEM driven operations
IT & connectivity

VGAR*
QAR management

Aircraft Maintenance
Digital Aircraft operations

AIRCOM FlightMessenger
AIRCOM Server

AIRCOM FlightTracker
Real-time flight tracking

AIRCOM Info Services
Surface weather, d-ATIS gateway, Wind up link

AIRCOM FlightPlanner
Flight navigation & briefing

ATS AIRCOM Solutions
Airport Tower Systems, En route Systems

ATS AIRCOM Services
Pre-FANS, FANS, ATN

SITAONAIR Enabling products

Link ONAIR
IP Satellite / inflight connectivity

Gate Connect
Gate Link Wi-Fi / 3/4G at the gate

AIRCOM Network Services (ACARS)
VHF, VDL2, Satellite aero

ATS AIRCOM
Network Systems

ONAIR Plug
Wireless network to connect airlines' devices

AIRCOM
Connect

Combined operating system

Installation Services and Equipment Resell
Design to installation

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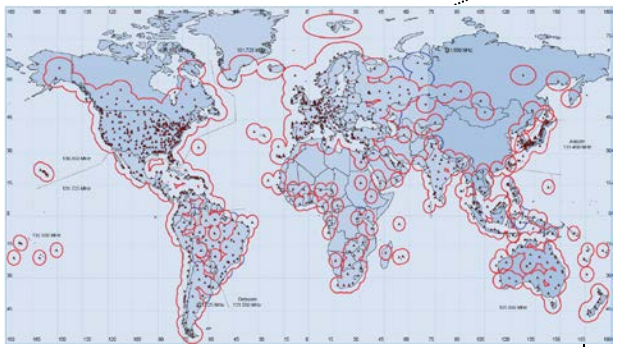
Datalink Service Provider (DSP)

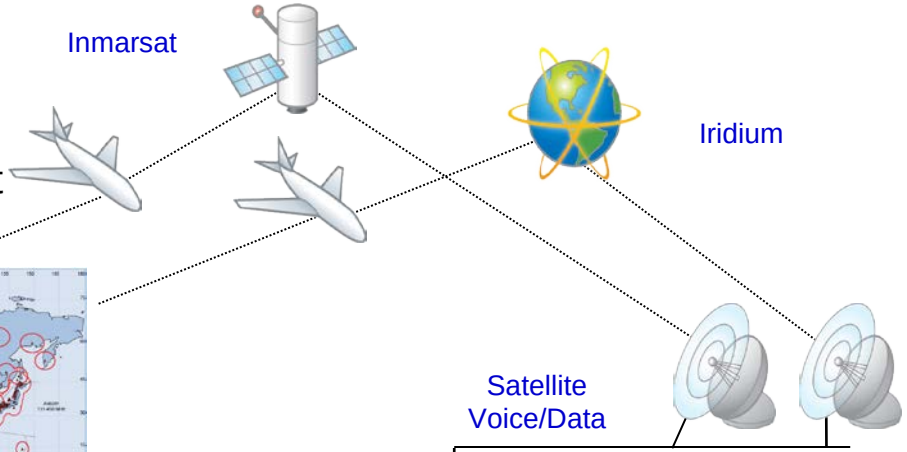
- Extensive VHF and Satellite Network worldwide
- Internetworking (I/W)
- Air-Ground Communications and Ground-to-Ground Services for airlines users and air navigation service providers implementing ATS services using data link technology
- Traffic Monitoring/ Statistics
- Customer Support Service: Helpdesk 24H, dedicated staff, technical support and performance reports

SITA Aircraft Cockpit Data Link Service

AIRCOM user aircraft
- 10,000+ air transport aircraft
- 4,000+ business/government



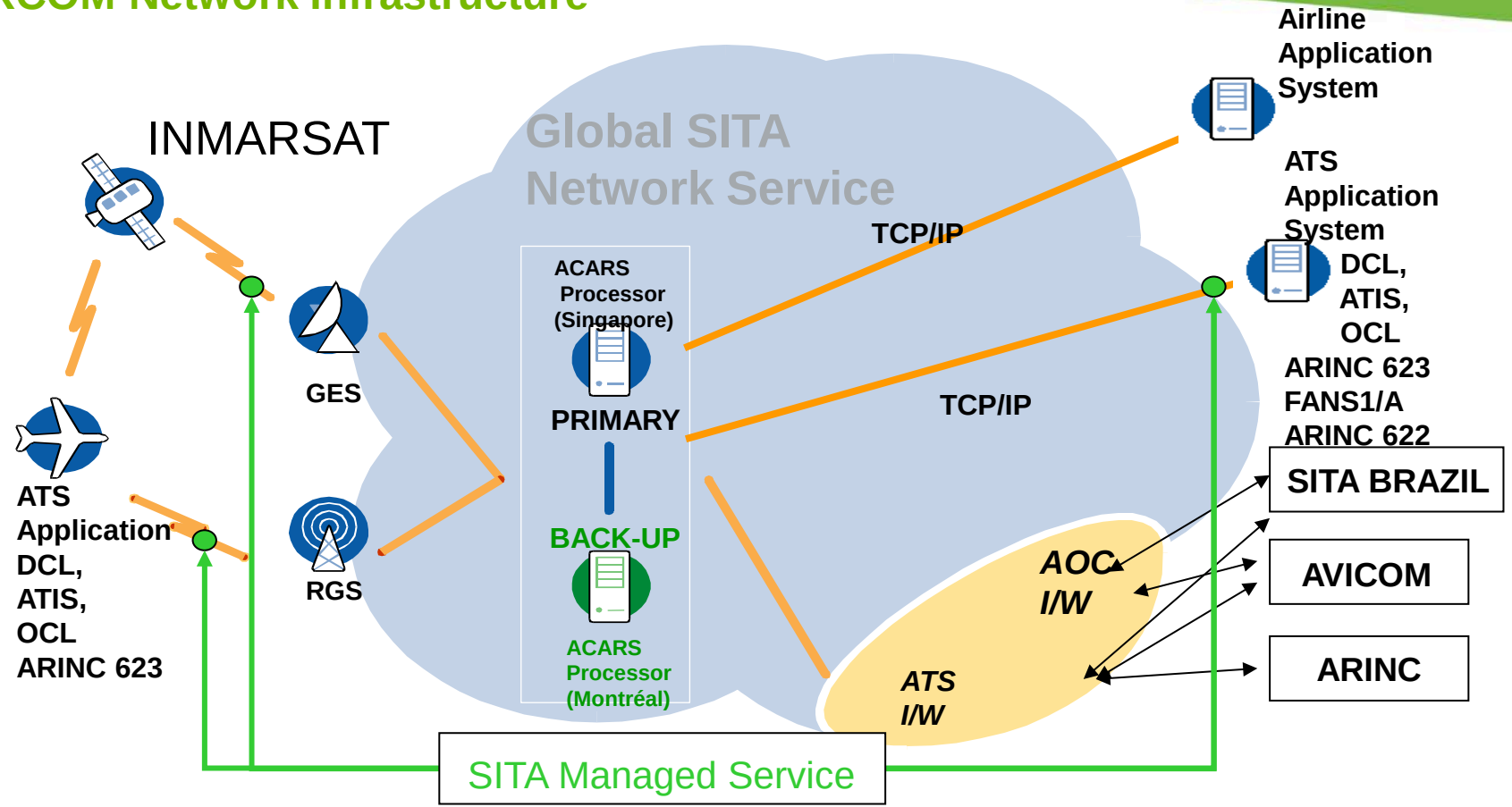
1600 VHF Data Link Radios



AIRCOM user traffic/month
- VHF link: 60m kilobits
- Satellite: 20m kilobits
- ACARS message av. length ~ 1 kilobit

150 airlines – passenger & cargo
10 government aircraft operators
5 business jet service providers

AIRCOM Network Infrastructure



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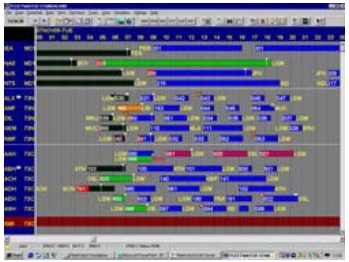
Data link in AOC

- Datalink has been initially developed for AOC (Airline Operational Communication) and now Airline Operations depend on datalink

Aircraft Maintenance
Engine reports via ACARS enable preventive maintenance avoiding costly in-flight breakdowns

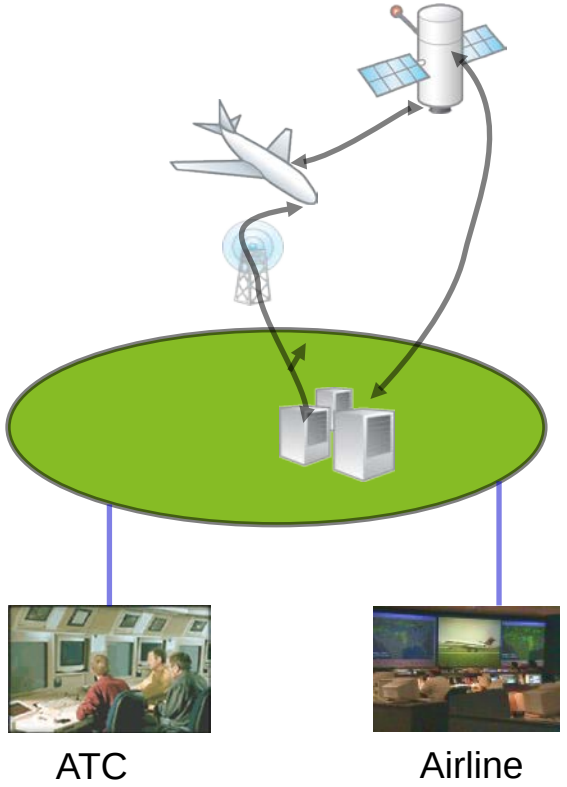


Operations Control
Aircraft movement reports
via ACARS key to synchronize operations through airports

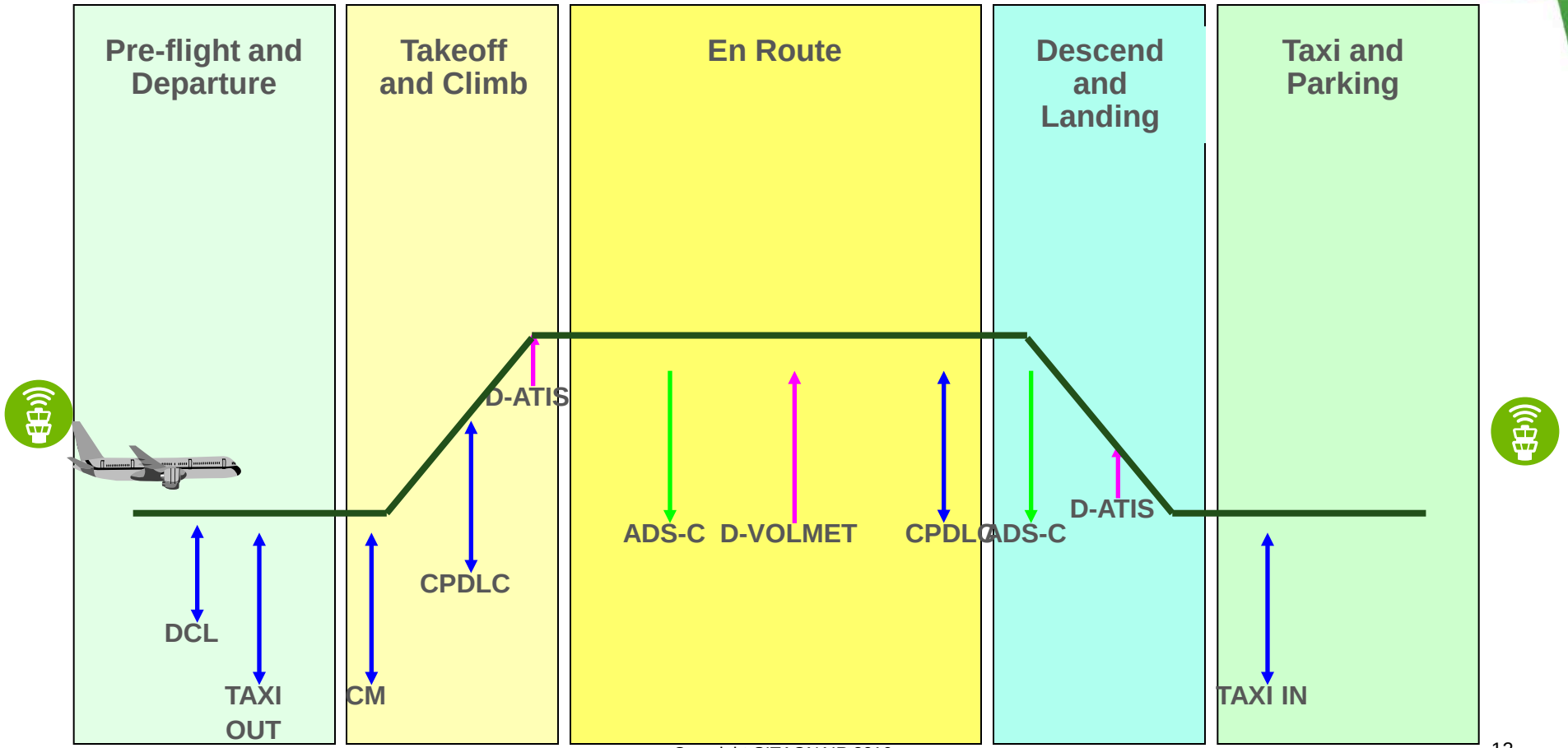
Flight Planning
Flight plans & weather transmission to cockpit enable efficient operation
of modern aircraft

ATC Sharing of airline data link networks

- ICAO on adopting the FANS concept in 1988 agreed to ATC/airline sharing of data link avionics & networks.
- SITA adapted airline VHF & satellite data link to meet emerging ATC needs.
- SITA has partnered with ANSPs worldwide to share data link technology.



ATC datalink functions



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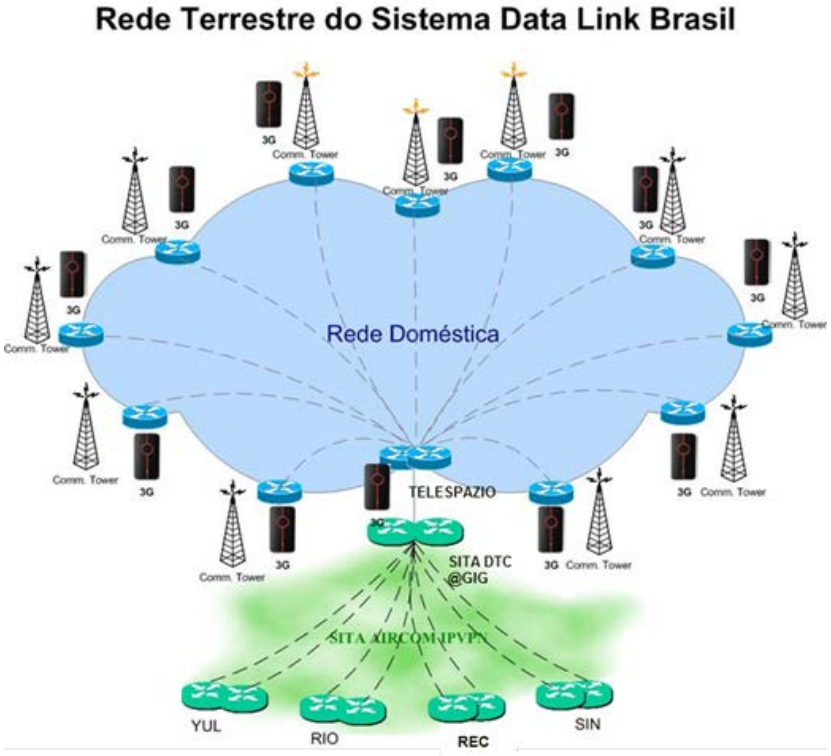
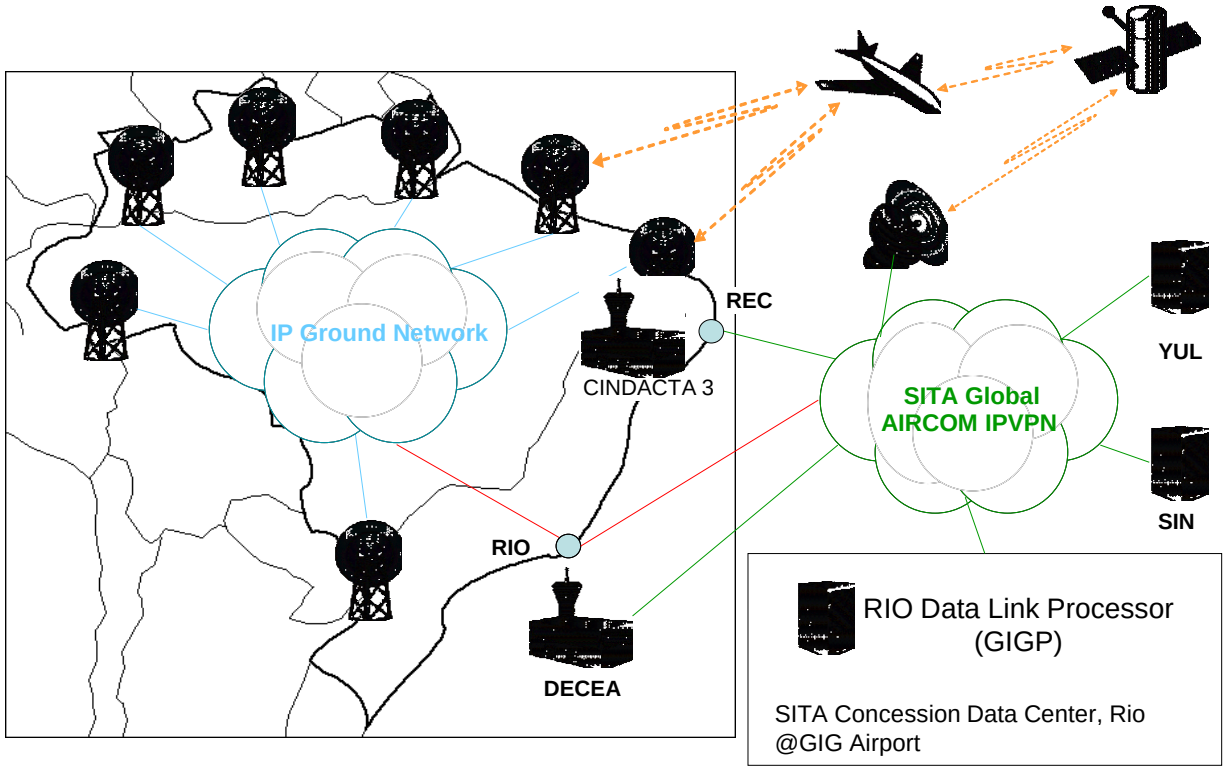
VHF CONCESSION OVERVIEW

- In 2010, after a public RFP process, SITA has been selected by DECEA to deploy a new VHF data link network in Brazil;
- The agreement model is a 20 years public concession where SITA operates and maintain the VHF network on behalf of DECEA;
- SITAONAIR became exclusive service provider in Brazil for AOC and keeps Internetworking with other DSP for ATS purpose;
- SITAONAIR replaced obsolete DECEA's data link network and Processor.



VHF CONCESSION SERVICE OVERVIEW



Operational requirement: to provide ACARS and VDL M2 full coverage on Brazilian airspace above FL245 and selected Terminal Areas (TMAs).

Contract signature

PHASE 1

PHASE 2

Concession operation initiated

PHASE 3

Lot 01

The existing infrastructure is replaced (ACARS processor, VHF stations (24) and Network) + 5 key sites are duplicated (GRU,CGH, GIG, RIO and BSB) = 29 Stations by end of 2012

Lot 02

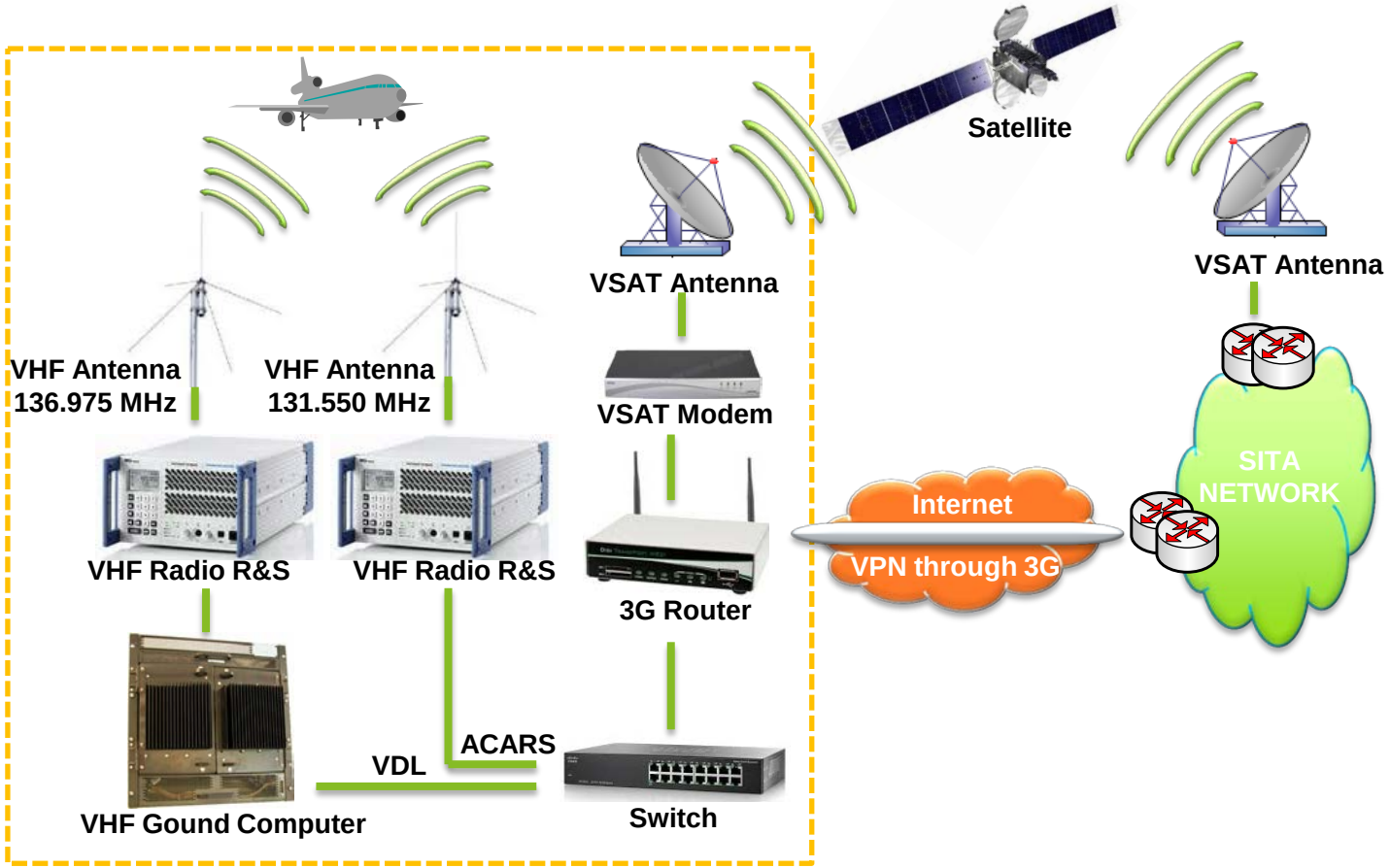
- complete POA (ACARS) Data Link coverage over Brazil;
- 22 additional SITA stations.

Lot 03

- complete VDL coverage over Brazil (total 51 POA + VDL stations operational)
- ATN router SAT completed on Dec2015

16

VHF STATION TOPOLOGY



PROJECT COMPLEXITY

During the project, it was required to handle great complexity of factors to deliver the project on time

VHF sites	Most located on INFRAERO airports – Public Calls, location of the antennas and cabinet, technical projects, installation authorization. Private airports and small cities airports – Commercial agreements and technical project evaluation
Radio licenses	• Application submission to the Brazilian Telecom agency (ANATEL) that has issued and granted the use of VHF frequencies by SITAONAIR on behalf of DECEA
Logistis	• Transport, storage and installation of equipment • Compliance with Brazilian Law and tax regulation

Example of Installations

- SDU site 1

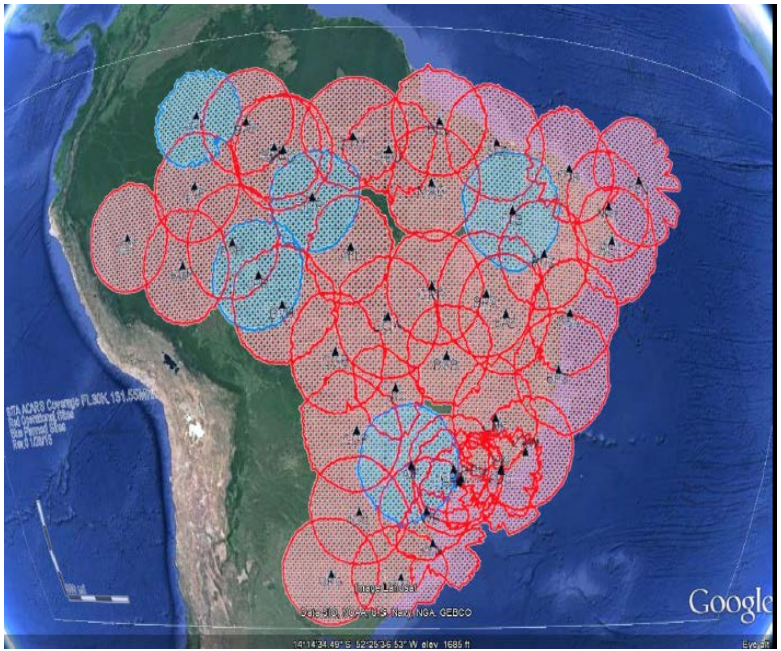
- GIG site 1

Example of Installations

- GIG site 1

- CGR site 1

VHF INFRASTRUCTURE SUMMARY



VHF data link Concession

- Total of implemented sites: **51**
- Total of active ground stations: **102**
- VDL stations delivered: **51**
- ACARS stations delivered: **51**
- ATN router: HW platform installed in SITA premises. SAT performed with THALES on last DEC/2015
- Two new sites required by DECEA under implementation: JCR and SJL

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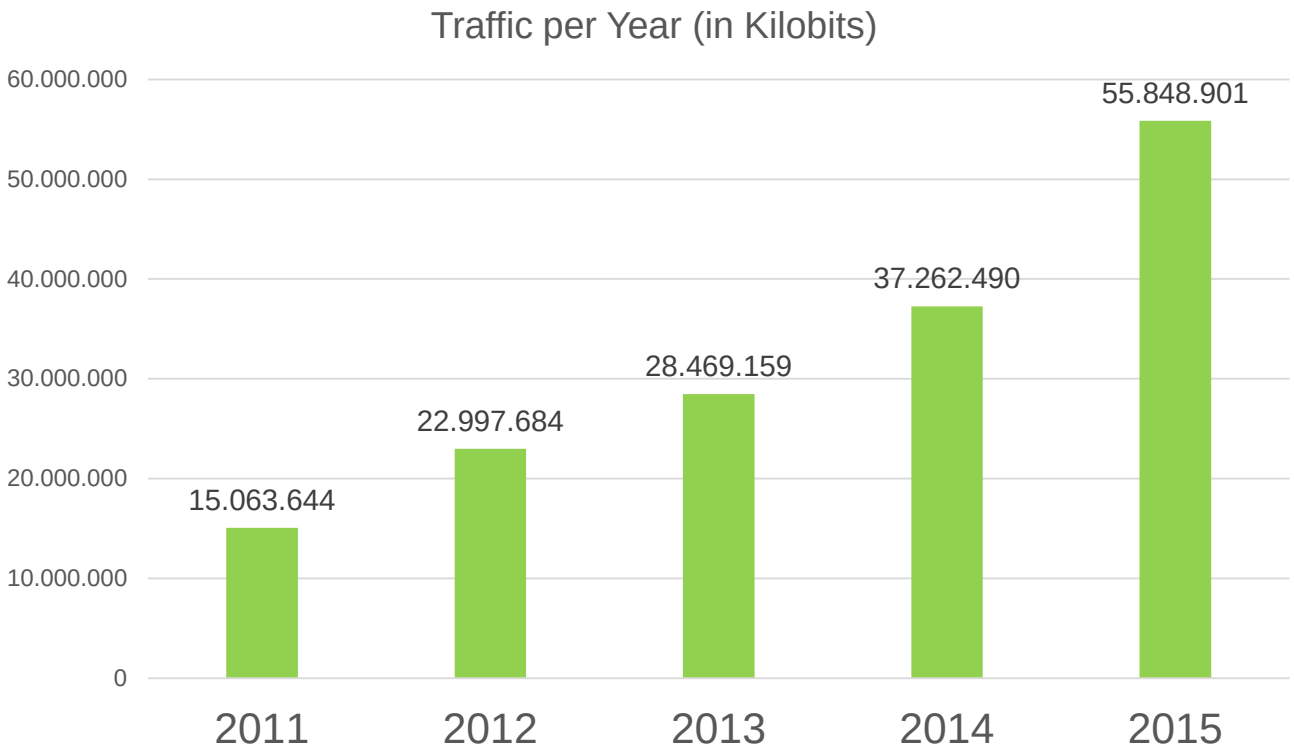
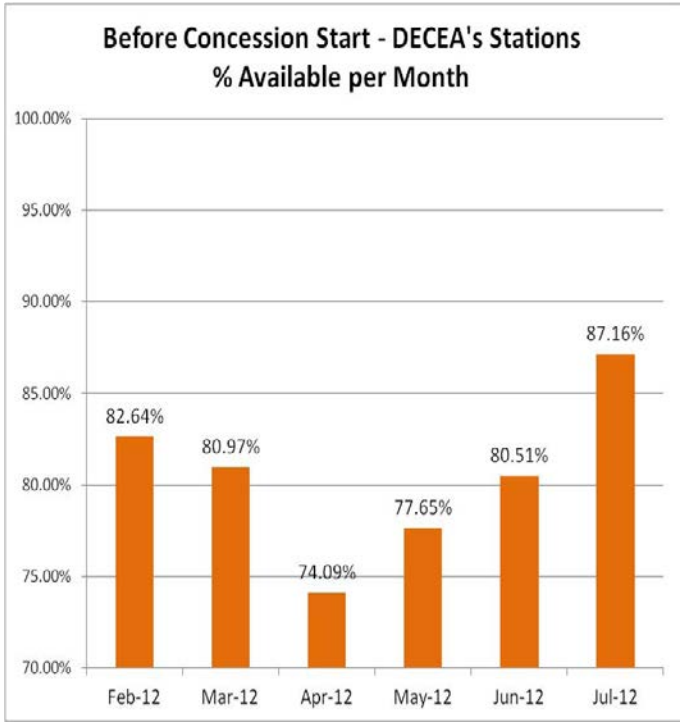
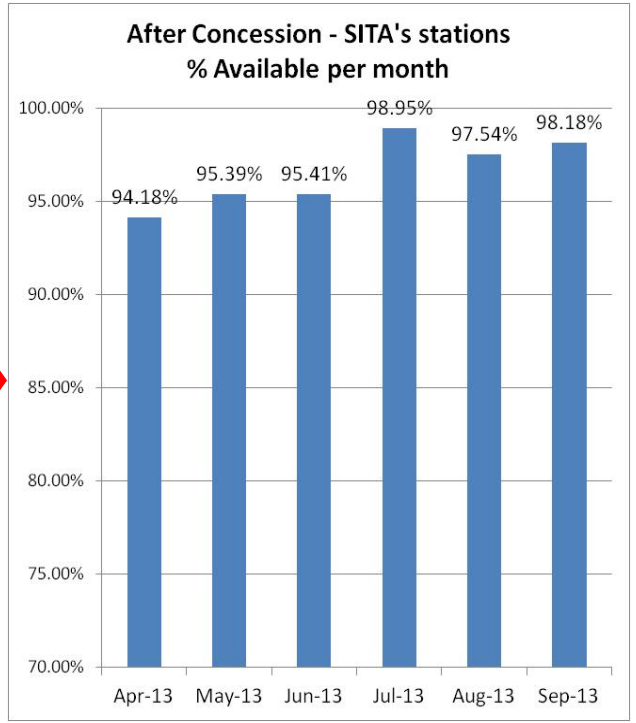
Datalink Traffic in Brazil



SITA's Brazilian Network Availability

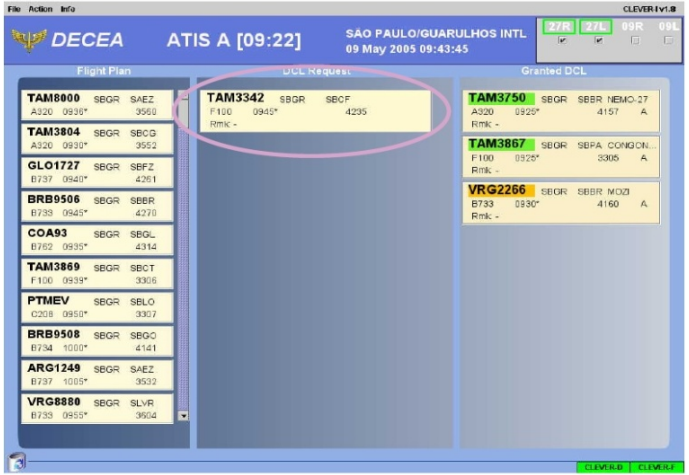
SITA is delivering a much more stable and available network in Brazil, compared to the legacy Network.





Ongoing projects : CISCEA / Brazil / PreFANS

1. Existing Pre FANS services in 2 major airports: Galeao (Rio) and Guarulhos (Sao Paulo).
2. Pre FANS expansion program includes 23 Control Towers equipped with D-ATIS and DCL
   - 19 of 23 sites already certified by DECEA (NOTAMs): SBGL, SBBR, SBRF, SBCY, SBSP, SBCG, SBFL, SBEG, SBBV, SBBE, SBNT, SBCF, SBCT, SBPA, SBFI, SBPS, SBFZ, SBPV and SBMO.
   - Partnership with Saipher (TATIC) and ACAMS/ATCsys (Automated Tower System).
3. D-VOLMET
   - FIRs Brasilia, Recife, Atlantico, Curitiba and Amazonia. Operational since 2012.



CENTRALIZED ATS SERVER (CATS)

Rio de Janeiro

D-ATIS source

1) Centralized management, reduced operating costs
2) Reduced data-link connections requirement
3) Dual redundant architecture provides highly available service

ACARS aircraft

RGS

GES

ATIS

AFTN or TCP/IP Network

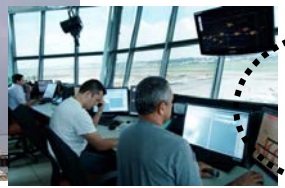
ATIS + VOLMET

CATS redundant servers

DECEA DTCEATM-RJ

SITA ACARS Network

TCP/IP

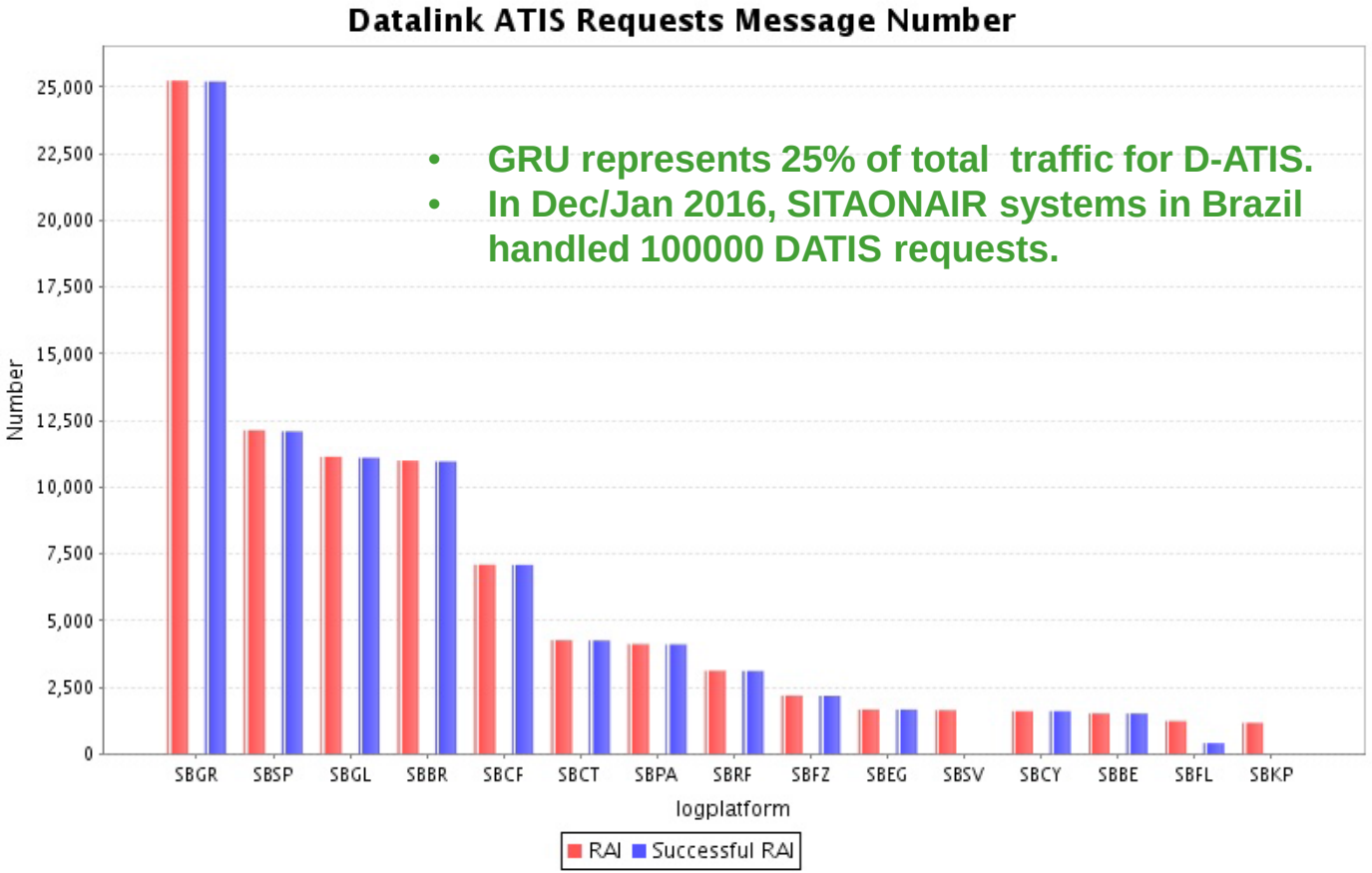


São Paulo

D-ATIS source

CATS in Brazil is enabling DECEA to expand Pre FANS services up to 23 airports.

D-ATIS USE BY AIRPORT – Feb2016



- GRU represents 25% of total traffic for D-ATIS.
- In Dec/Jan 2016, SITAONAIR systems in Brazil handled 100000 DATIS requests.

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FANS regional implementation

- Regionally (Latin America and Caribbean) agreed for remote and oceanic airspaces
- Cost-benefit analysis – ADS-C position report and CPDLC msgs
- ATC systems evolution and functional interconnection
- Adoption of the Global Datalink Operation (GOLD) doc in 2009
- HF communication for back up/alternative mean
- On going deployement on regional Latin America FIRs

SITAONAIR FANS connected LAC ANSP

ANSP Regional network use of SITA Data Link

- Since Oct2015, SITA and DGAC CHILE are performing trials to REDDIG network to access SITA Data Link services.
- REDDIG Coordination Committee and ICAO are following up with both SITA and DGAC for the obtained results and so far, it has been considered that the process for performance of test to access the data link information from ACC oceanic Chile through REDDIG II to Recife REDDIG II node and then through SITA network to the new processing center of Rio in Brazil has been performed succesfully (RCC/19 RLA/03/901 Final report).
- The trials will continue until May/2016 and SITA and DGAC are requested to show final results and to demonstrate the study of cost benefit using REDDIG II to transport data link service.

DGAC CHILE

DGAC CHILE/REDDIG/South America trial

Figure 3 - Ground backbone network (Level 3 MPLS network)

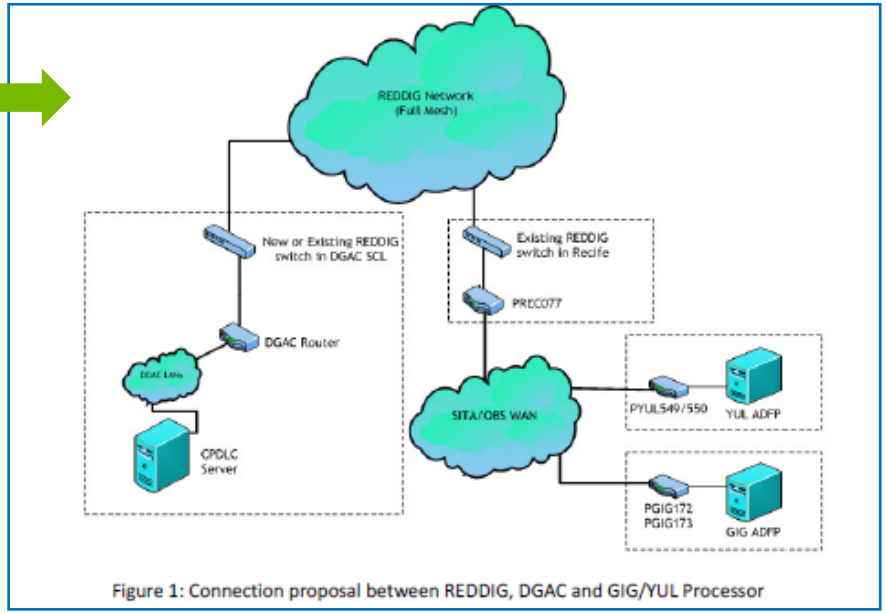
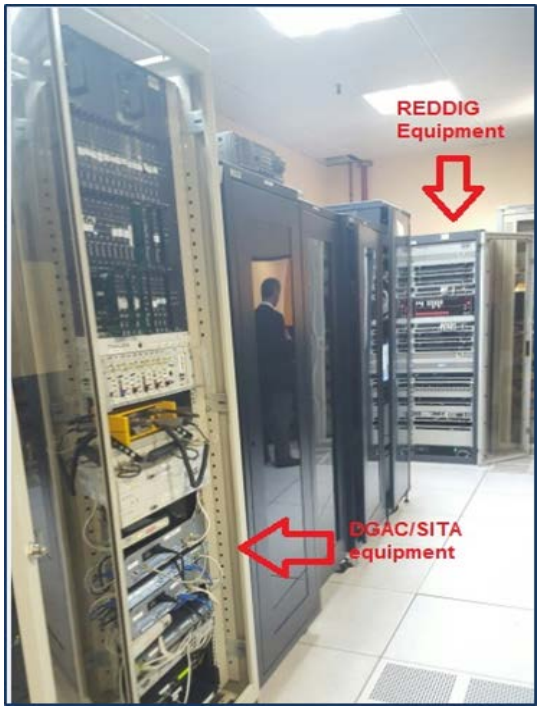


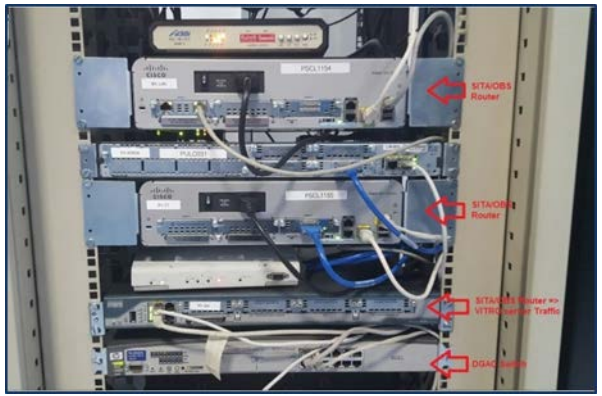
Figure 1: Connection proposal between REDDIG, DGAC and GIG/YUL Processor

Equipment set up in Santiago - DGAC premises



DGAC technical room

DGAC and REDDIG's equipment are in the same Equipment Room (Figures 2, 3 and 4) and only for the trial phase, DGAC is responsible for the physical connection between REDDIG switch and DGAC server.



SITA and DGAC Equipment

Node Santiago REDDIG Equipment.

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- SITAONAIR air ground data link services are enabling Airlines and ANSPs in South America to comply with ICAO recommendations by improving safety and efficiency.
- SAM ANSPs would benefit from using a highly reliable and secure network designed for ATC purposes such as REDDIG to access the data link service which is becoming more critical to ATC.
- In Brazil, the VHF data link infrastructure was designed by SITAONAIR to become the air-ground datalink platform for the DECEA ATM transformation program called SIRIUS.

Thank you

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