AIR TRAFFIC MANAGMENT

A growing partnership

Air Ground Communication

ICAO Seminar/workshop on the Implementation of
Ground-ground and Air- ground data links in the
SAM Region - **Lima , Peru**
12/Sep/2012

By: Adriana Mattos

SITA
Create success. Together

SITA VHF AIRCOM

VHF & VDL AIRCOM

- Provides data communications to aircraft equipped with ACARS avionics using SITA's VHF / VDL ground station network

SITA has over 1000+ VHF radios operating in 160+ countries

- 6,500+ aircraft are equipped ACARS and use a VHF datalink services

- 200+ aircraft are equipped to use VDL mode 2 services

- VHF Ground Stations are connected via SITA Network Services to SITA's VHF *AIRCOM* Datalink Traffic processor

- SITA Network Services uses the OBS network which extends to 225 countries

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SITA AIRCOM ATM portfolio

Data link Air Traffic Services

- PreFANS services : D-ATIS, D-VOLMET, DCL and OCL
- FANS service : ADS and CPDLC
- ATN VDL2 service : Full Operational service, ATN backbone, Test / Trial ATN service
- Hosted ATS services (CFRS / CADS)
- Regional ADS-B service trial

Data link Air Traffic Systems

- Airport Tower Systems : D-ATIS (EVATIS) , D-VOLMET (EVAMET), DCL (CLEVER) and Centralized ATS server
- En Route Systems : ADS/CPDLC Gateway, ADS/CPDLC Workstation, Data-Link Front End Processor.

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Air/Ground Data Link Services

- SITA has almost 30 years experience in the delivery of air/ground data link services
  - To support AOC since 1980
  - To support ATS since 1990
    - Digital-ATIS
    - Departure Clearance
    - FANS 1/A (CPDLC, ADS-C)
  - Services delivered through
    - VHF data link
    - Satellite data link
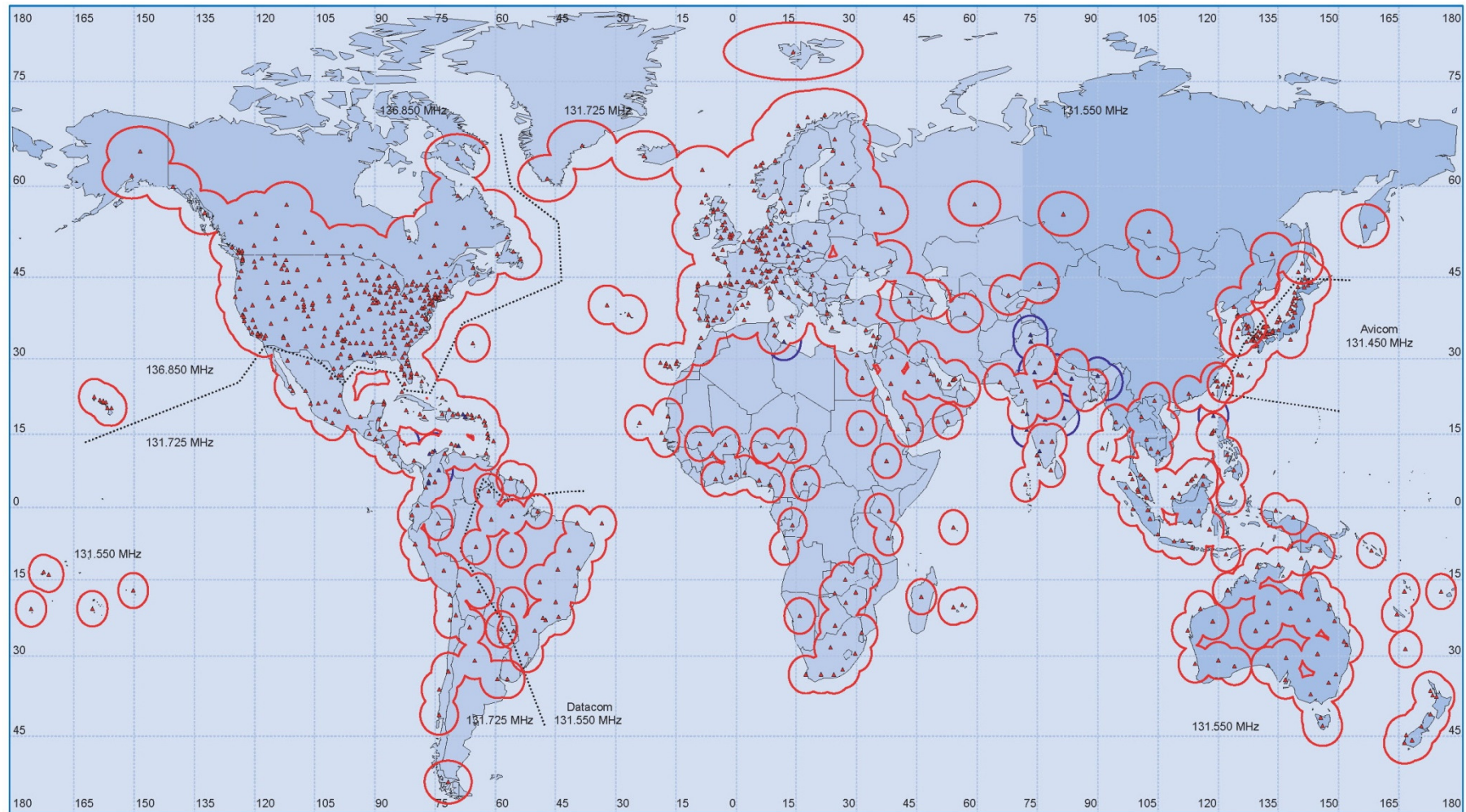 - Based on the ACARS protocols

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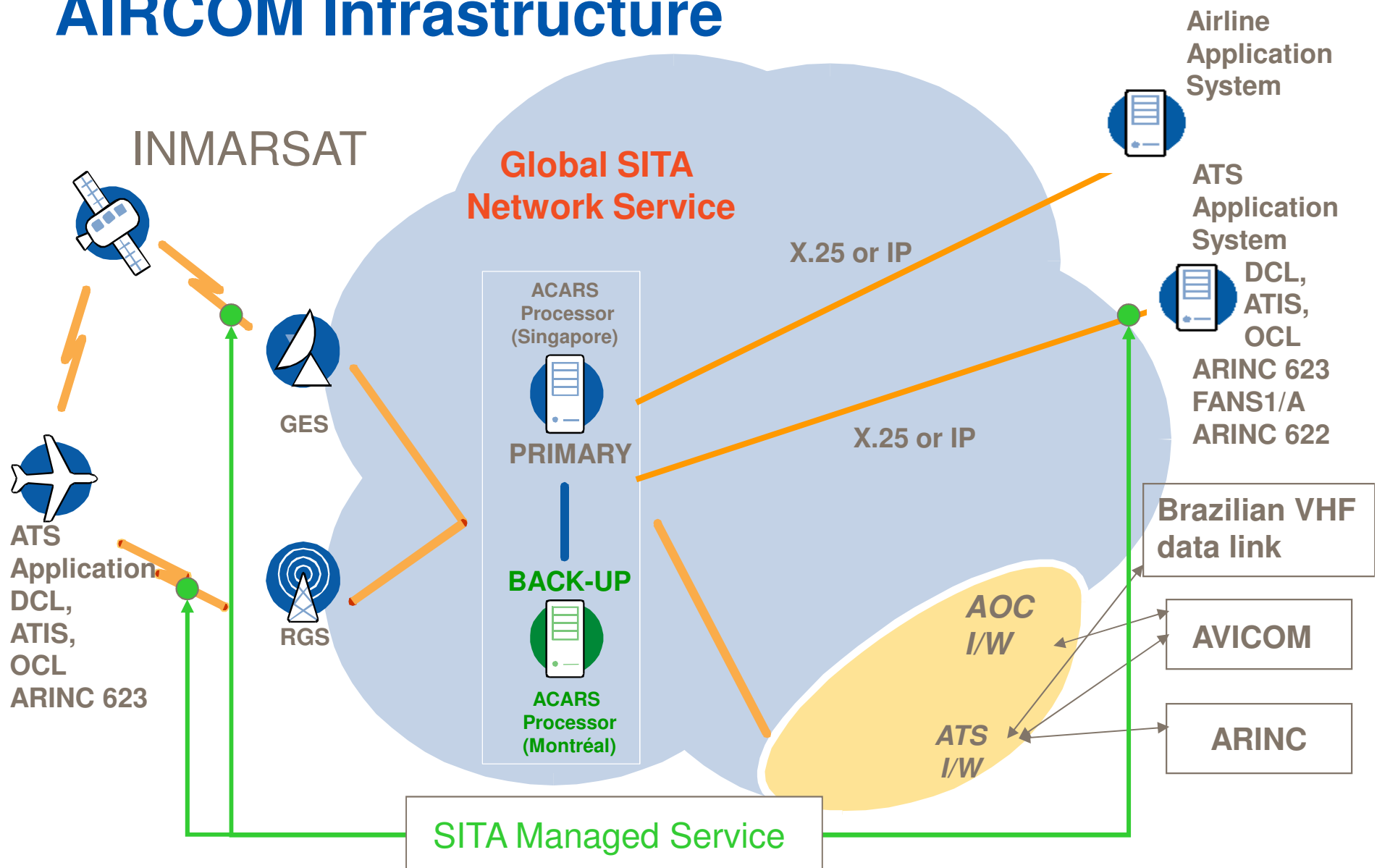
Data Link Applications

	Taxi	Take-Off	Departure	En Route	Approach	Land	Taxi
From A/C	OUT	OFF	Engine Data	Position Reports	Provisioning	ON	IN
	Link Test			Weather Reports	Gate Requests		Fuel Information
	Clock Update			Delay Info/ETA	ETA		Crew Information
	Delay Reports			Voice Request	Special Requests		Fault Data from CMC
				Engine Information	Engine Information		
				Maintenance Reports	Maintenance Reports		
To A/C	PDC, and ATIS		Flight Plan Update	ATC Oceanic Clearance	Gate Assignment		
	Load Sheet		Weather Reports	Weather Reports	Connecting Gates		
	Weight and Balance			Reclearance	Passengers and Crew		
	Airport Analysis			Ground Voice Request	ATIS		
	V-Speeds						
	Flight-Plan, Loaf FMC						

VHF AIRCOM Coverage - worldwide

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AIRCOM Infrastructure

INMARSAT

Global SITA
Network Service

Airline
Application
System

ATS
Application
System
DCL,
ATIS,
OCL
ARINC 623
FANS1/A
ARINC 622

X.25 or IP

X.25 or IP

GES

RGS

ACARS
Processor
(Singapore)

PRIMARY

BACK-UP

ACARS
Processor
(Montréal)

ATS
Application
DCL,
ATIS,
OCL
ARINC 623

*AOC
I/W*

*ATS
I/W*

**Brazilian VHF
data link**

AVICOM

ARINC

SITA Managed Service

High Level Functional Architecture

ANSPs hosts

GES

SITA Network Services

RGS/VGS

ACARS

PROCESSORS

24/7 Helpdesk

Airlines Hosts
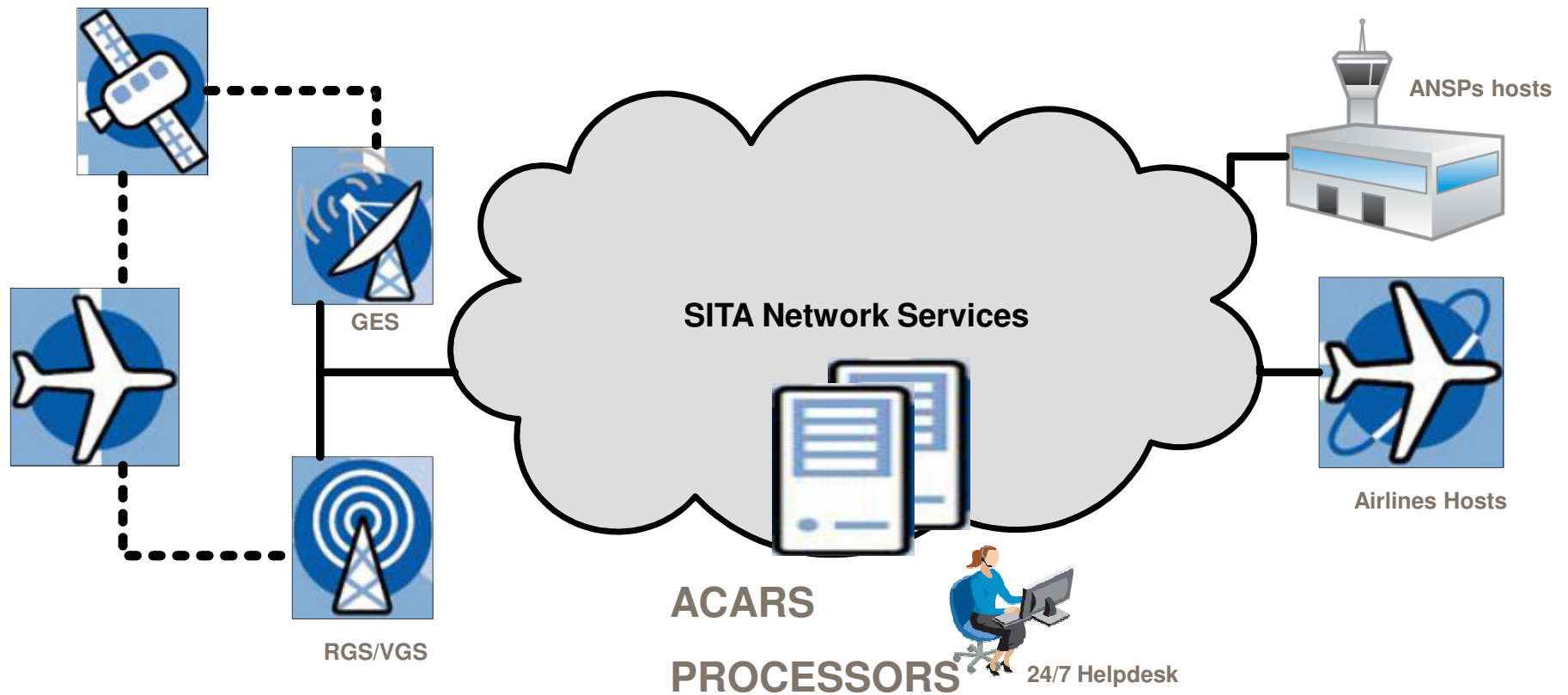
Why Continental CPDLC using ATN/VDL2 ?

**END TO END DELAY
< 3.5 SECONDS**

CPDLC - MESSAGE   01/01
09:45 – EDYY   5   OPEN
CLIMB TO FL390

------------ RESPONSE -----------
-
*WILCO   UNABLE>

PRINT   –   STANDBY

<RETURN 09:46   ATC MSG*

DATALINK

AEA1312   H / S / V / TOD   R

AEA1312
L CLMB 390/   **ATC MSG**
R WCO/DEG L 015/
V
I

LVL   ROUTE   CONT   SSR   ROT/STANDBY   MIKE
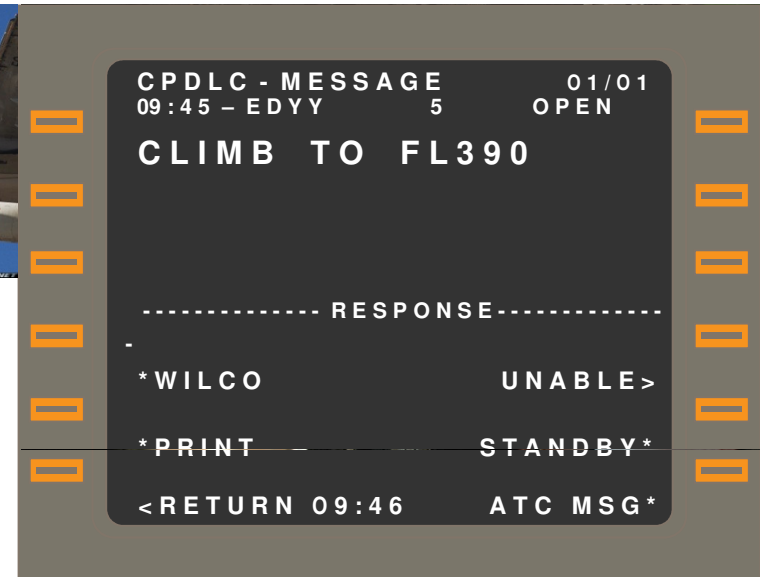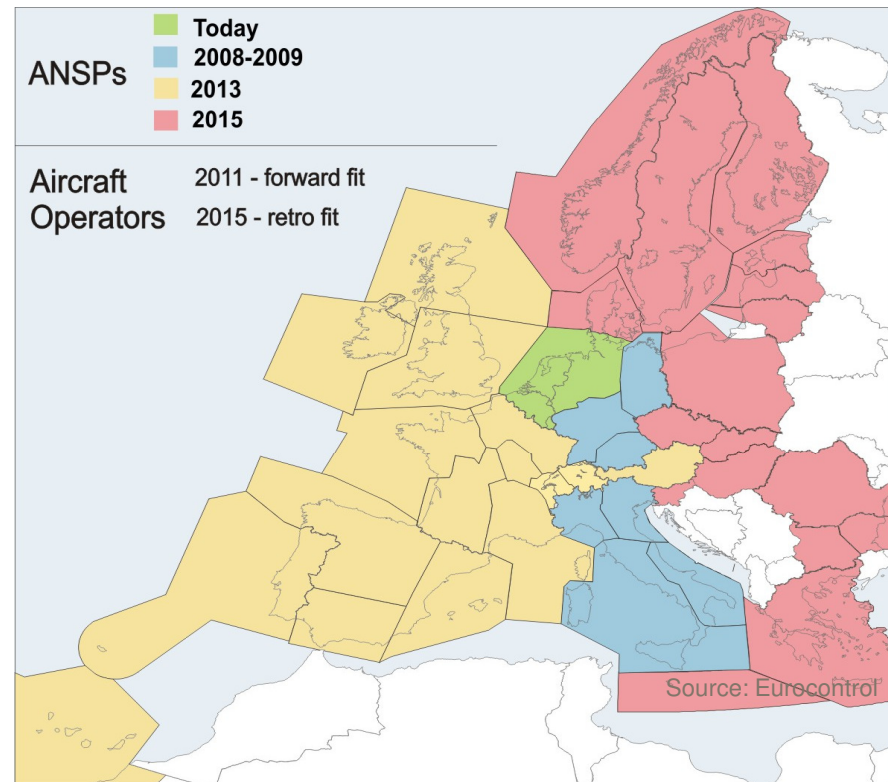
The EUROCONTROL Link 2000+ programme

- Implementing En-route CPDLC over ATN/VDL2
  - Superior performance compared to FANS 1/A
  - FANS 1/A and ATN will need to co-exist in transition period
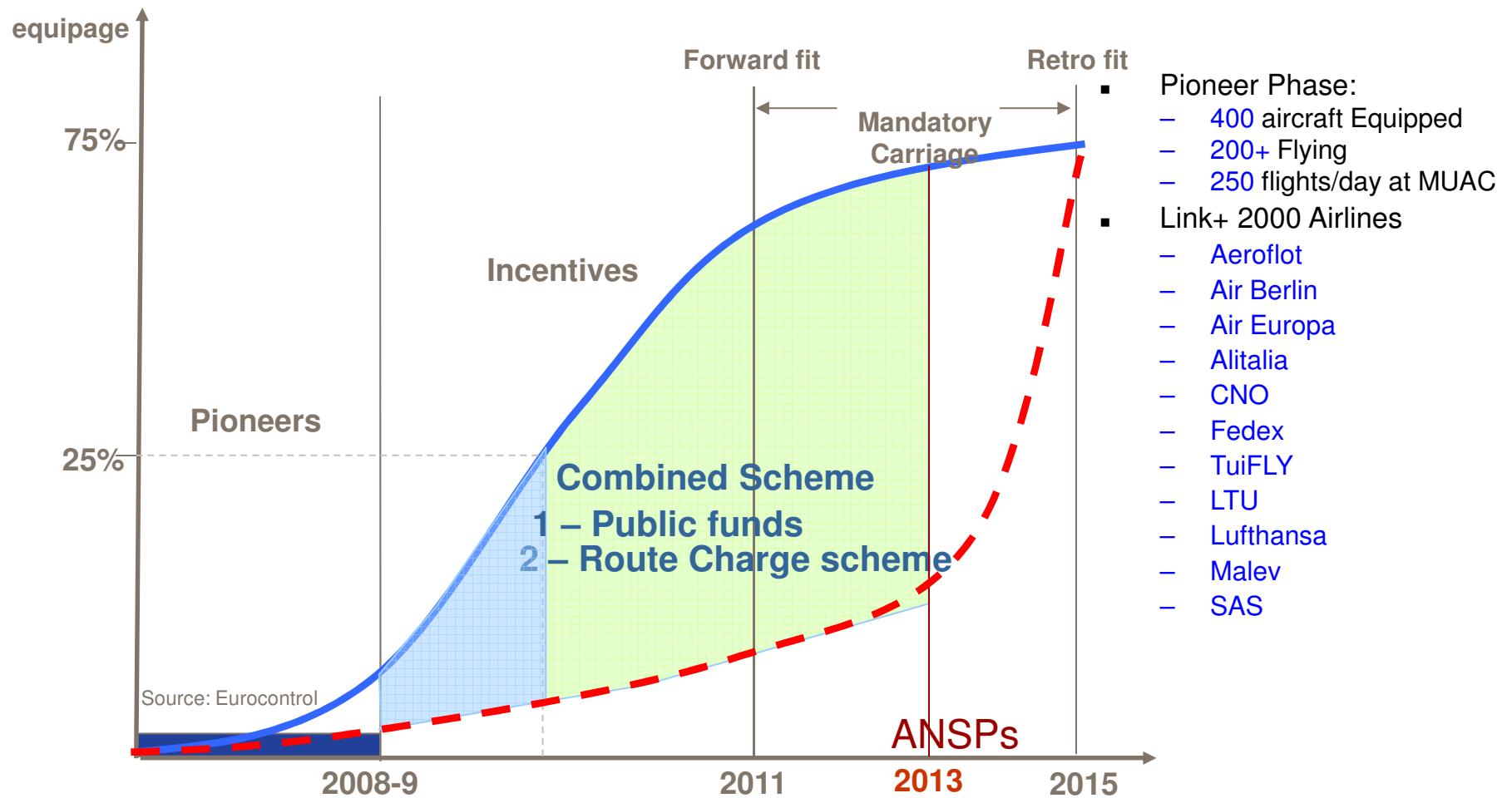- Baseline ICAO standards

Key Objective:
11% Capacity Gain in the so called Link Airspace

Key Figures:
29% controller workload decrease
37 ACCs in the SES airspace
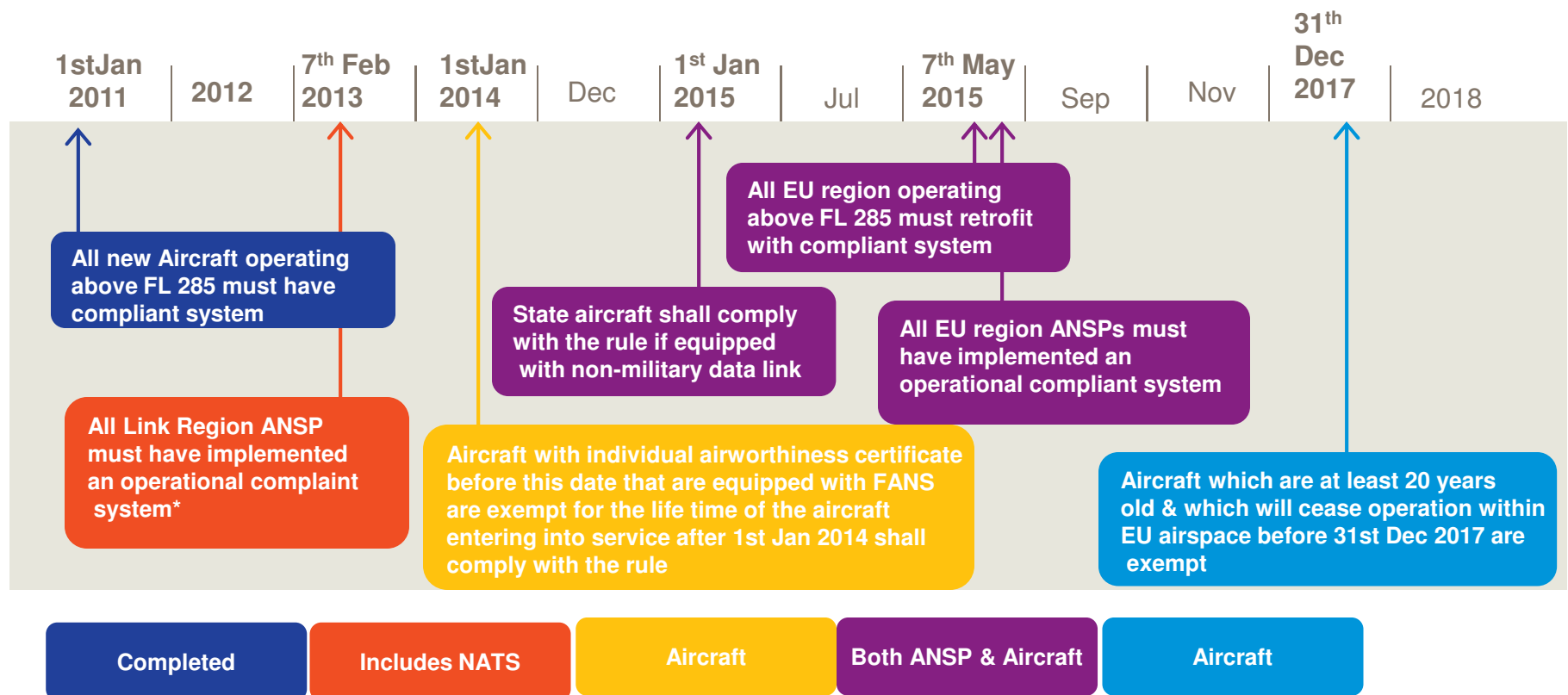About 10000 aircraft will be using the airspace under consideration

ANSPs
- Today
- 2008-2009
- 2013
- 2015

Aircraft Operators
2011 - forward fit
2015 - retro fit

Source: Eurocontrol

The Link2000+ Programme Plan

equipage

Forward fit

Retro fit

Mandatory Carriage

75%

Incentives

Pioneers

25%

Combined Scheme
1 – Public funds
2 – Route Charge scheme

Source: Eurocontrol

ANSPs

2008-9   2011   2013   2015

- Pioneer Phase:
  - 400 aircraft Equipped
  - 200+ Flying
  - 250 flights/day at MUAC
- Link+ 2000 Airlines
  - Aeroflot
  - Air Berlin
  - Air Europa
  - Alitalia
  - CNO
  - Fedex
  - TuiFLY
  - LTU
  - Lufthansa
  - Malev
  - SAS

Key dates in Europe

European Union SES legislation will require **ANSPs** and **airspace users** to comply

1stJan 2011	2012	7th Feb 2013	1stJan 2014	Dec	1st Jan 2015	Jul	7th May 2015	Sep	Nov	31th Dec 2017	2018

All new Aircraft operating above FL 285 must have compliant system

All Link Region ANSP must have implemented an operational complaint system*

State aircraft shall comply with the rule if equipped with non-military data link

Aircraft with individual airworthiness certificate before this date that are equipped with FANS are exempt for the life time of the aircraft entering into service after 1st Jan 2014 shall comply with the rule

All EU region operating above FL 285 must retrofit with compliant system

All EU region ANSPs must have implemented an operational compliant system

Aircraft which are at least 20 years old & which will cease operation within EU airspace before 31st Dec 2017 are exempt

Completed	Includes NATS	Aircraft	Both ANSP & Aircraft	Aircraft

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SITA support to the ATN/VDLm2 European Mandate

NATS/IAA FAB:
ATN/VDLm2 Service

Maastricht UAC:
ATN/VDLm2 Service

FABEC (France,
Benelux, Switzerland):
Selected SITA

DFS (Germany):
VGS Partnership

NAV Portugal:
VGS Partnership

AENA (Spain):
VGS Partnership

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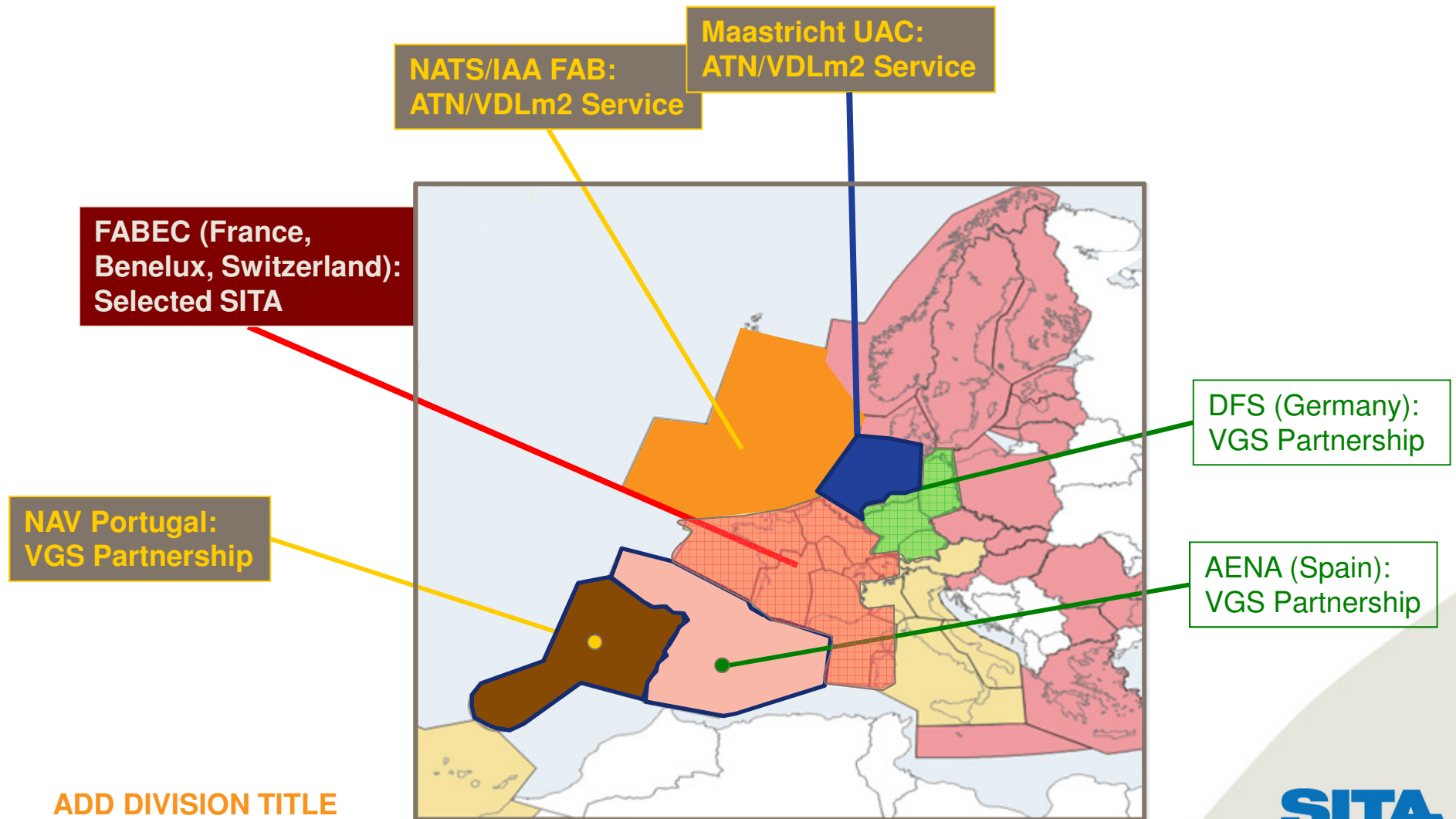
CPDLC Message Set defined for Link 2000+

- Implementation of subset of CPDLC messages
  - DLIC: Data Link Initiation Capability
    - Makes data link communications possible between an ATSU and aircraft
  - ACM: ATC Communications Management
    - Provides automated assistance for the transfer of communications (voice and CPDLC)
  - ACL: ATC Clearances
    - Allows flight crew and controllers to conducts operational exchanges
  - AMC: ATC Microphone Check
    - Allows controllers to send an instruction to all CPDLC equipped aircraft to verify that their voice communication equipment is not blocking a given voice channel

ATN/CPDLC - Feedback from MAAS UAC Controllers

- Use is Voluntary but Controllers use it – even in busy sectors
- LINK is a useful package to start Datalink with (Controllers drive the use of CPDLC)
- Use is Increasing
  - No. of messages sent by controllers
  - No. of messages per flight
  - No. of aircraft that Logon and have CPDLC dialogue
- "Less Misunderstandings .. It's saving us a lot of time" – Nick Miller
- Push for more automation/functionality (SSR code)
  - and next auto-ACM, Monitor, Top of Descent etc.

ATN/CPDLC - Feedback from MAAS UAC Controllers

- Increased Safety:
  - CPDLC is offering an independent second unambiguous communication channel,
    - e.g. in case of blocked or deteriorated VHF frequency!
- Reduced VHF frequency load.
  - More that 50% of the messages used are "contact" messages which do not require a read back. CPDLC aircraft are providing a relieve on Com's in busy ATC sectors.

Which are the options for an ANSP?

BUY

- ANSPs could buy the service from existing vendors e.g. SITA

- Standard Tender Doc template issued by EUROCONTROL could be used

Make

- VHF Partnership with SITA

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Managed ATN Service

- Comprises operation of VDLM2 stations providing required coverage compliant with Link2000+ ACSP generic req'ts
- Comprises ATN routing:
  - Aircraft not in ANSP airspace
  - Interworking with 3rd party ATN infrastructure (EEC, Airbus...)
  - Access to SITA's ATN and VDLm2 test facilities

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Current SITA/ANSP VHF Data link Partnerships

Fundamental partnership principles

- ANSP takes over complete ownership and control of end to end chain for message delivery through its National ATN/VDL Network

- SITA has exclusive use of network for delivery of AOC

- SITA pays ANSP share of airline AOC revenues

As a result of the EU Legislation Partnerships were established with the following:

- AENA, Spain (2003)
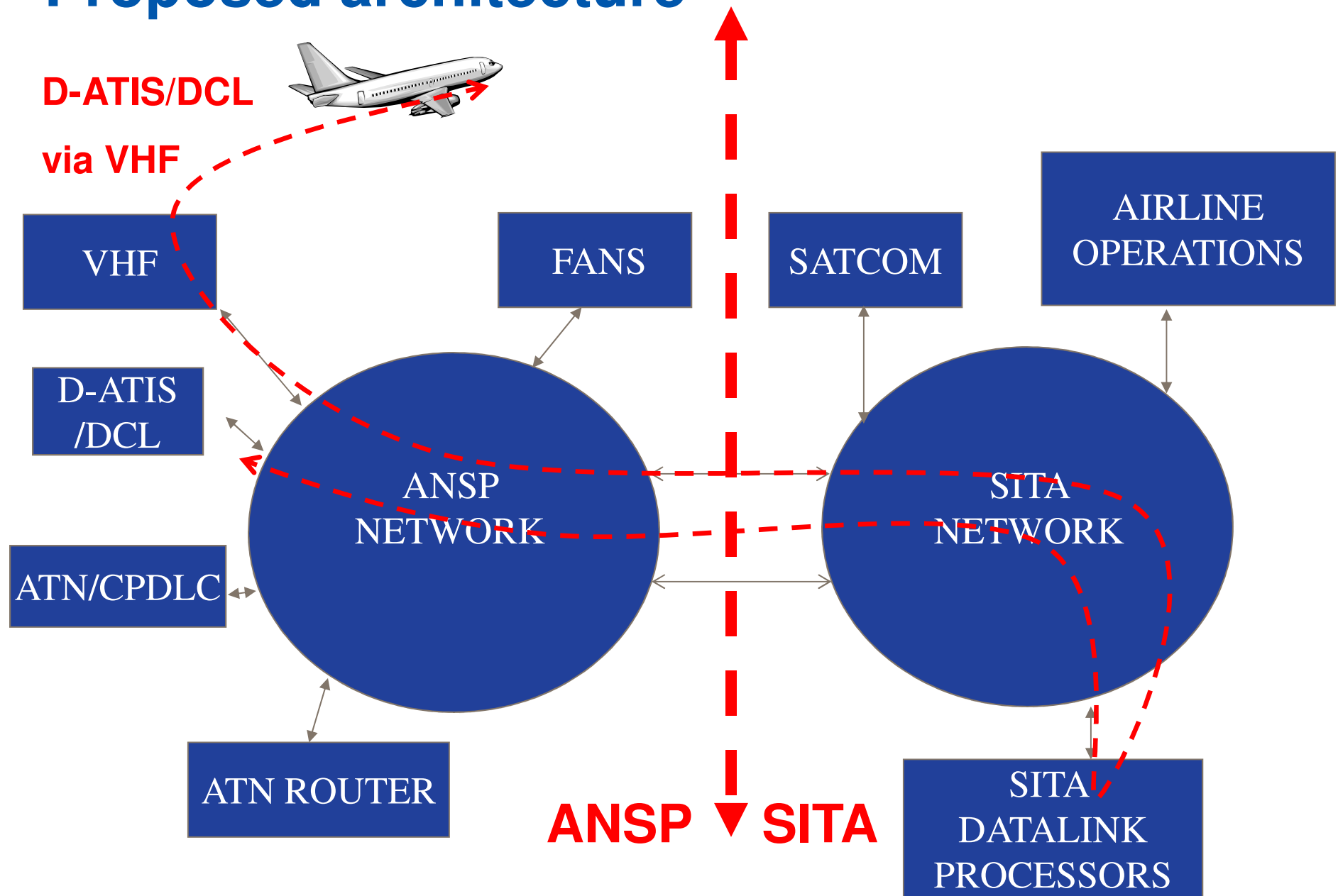
- DFS, Germany (2005)
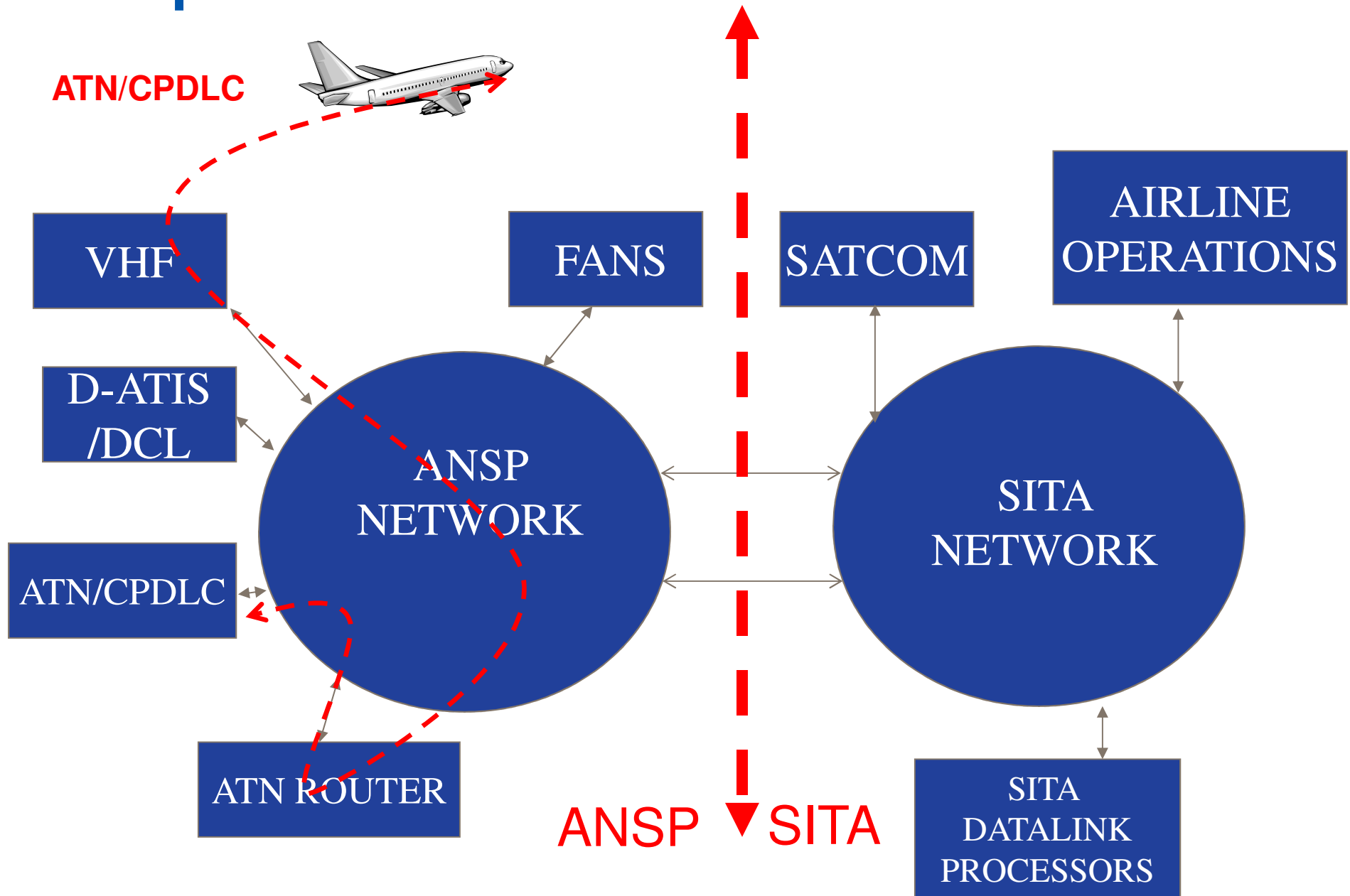
- GACA, Saudi Arabia (2007)

- FABEC

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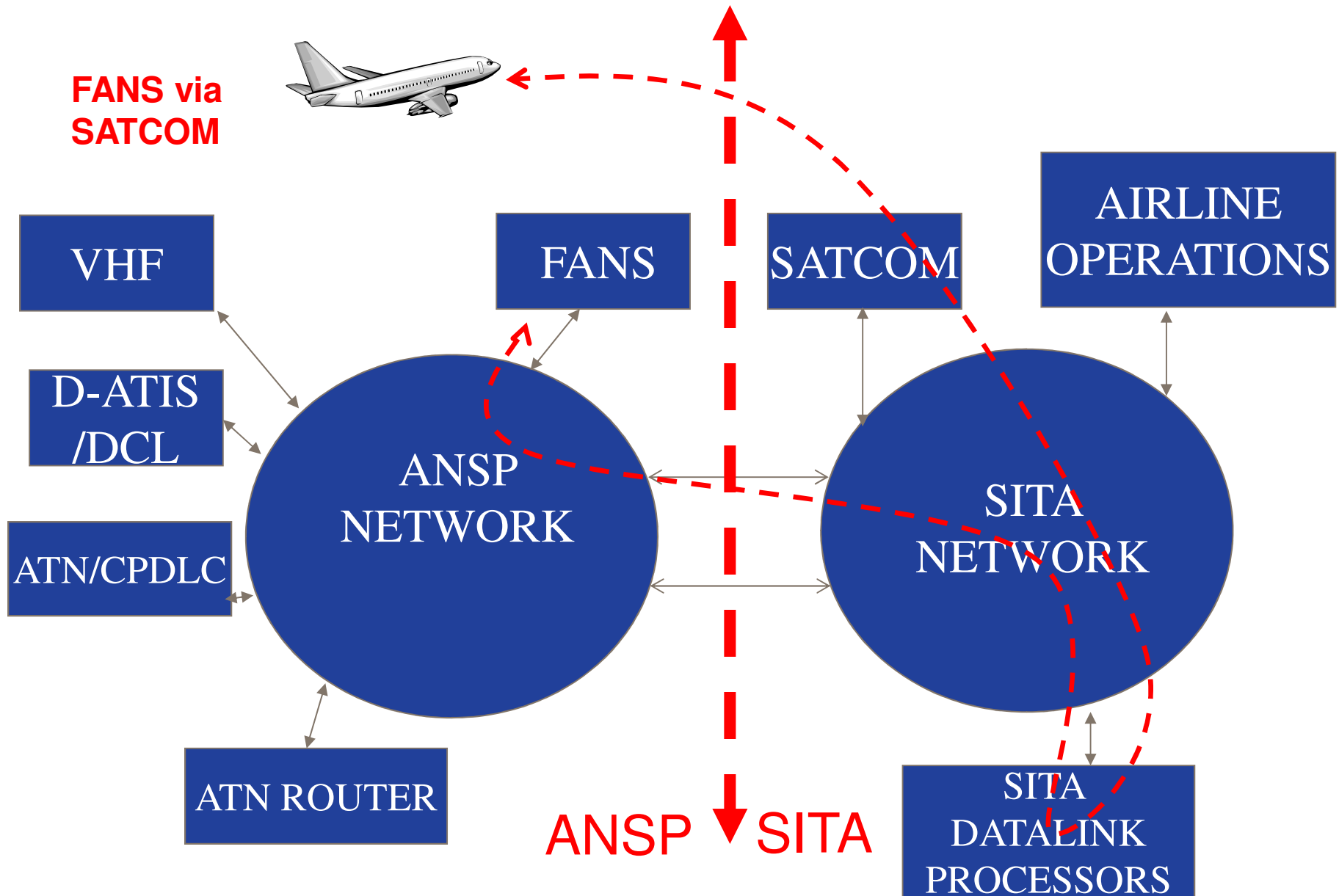
Proposed architecture

Proposed architecture

FANS via VHF

VHF	**FANS**	**SATCOM**	**AIRLINE OPERATIONS**

D-ATIS /DCL

ATN/CPDLC

ANSP NETWORK

SITA NETWORK

ATN ROUTER

ANSP ⬇ **SITA**

SITA DATALINK PROCESSORS

Proposed architecture

D-ATIS/DCL

via VHF

VHF

D-ATIS /DCL

ATN/CPDLC

ATN ROUTER

FANS

SATCOM

AIRLINE OPERATIONS

ANSP NETWORK

SITA NETWORK

SITA DATALINK PROCESSORS

ANSP ▼ SITA

Proposed architecture

ATN/CPDLC

VHF

D-ATIS /DCL

ATN/CPDLC

ATN ROUTER

FANS

SATCOM

AIRLINE OPERATIONS

ANSP NETWORK

SITA NETWORK

SITA DATALINK PROCESSORS

ANSP ▼ SITA

What is included in the partnership 1

Sharing of Revenue

Software monitoring tool

- Remote VGS, ATN control and monitoring tool
- Runs on a standalone workstation
- Or to be located at ANSP's central operations centre

ATN Platform - Optional

- Hardware platform
- ProATN G/G – A/G router
- ATN RRI Ground End System
- ATN RRI Air End System
- ADS-CPDLC Gateway system
- COCPIT software (CPDLC HMI)
- AFAME : ATN Air Test Tool and Gateway to ATN Air ES.

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What is included in the partnership 2

Services

- SW installation, configuration (assume hardware installation ensured by NATS)
- Training
- Remote testing support
- Test scenario definition support
- Test coordination with airline

AFAME – ATN Test Tool

- Test Configuration against..
- YUL bench, EEC, ATN Aircraft, AFAME + AES, Local Avionic bench and Lab Aircraft.

A solid partnership in Europe

Supporting the implementation of Controller Pilot Data Link Communications (CPDLC)

- SITA has been the **ATN/VDL mode-2** service provider to EUROCONTROL **since 2008**

- SITA operates with ANSPs more than **50 VDL mode-2 stations** in Europe

- **85%** of the **airlines** that exchange CPDLC messages with EUROCONTROL Maastricht do so through **SITA**

CPDLC will improve safety and increase overall capacity by 11%

SITA & ANSP: A growing partnership in the CAR/SAM region

- ADS CPDLC developments
- VHF data link partnership in Brazil
- Pre FANS program in Brazil
  - D-ATIS/DCL/D-VOLMET

DGCA Chile

DGAC CHILE -   OCEANIC SECTOR/ SOUTH PACIFIC

DGCA Chile wished to acquire some initial experience with FANS 1/A for their South Pacific airspace, besides provide better safety monitoring in the Pacific FIR under their responsibility

Selected SITA to provide FANS trials in the Oceanic airspace in 2006.

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DECEA Brasil

Trials started in 2003 with own ADS CPDLC prototype system but it was taking too long to become an operational service

A SITA FANS workstation was commissioned at Atlantico Area Control Center (ACC AO) by Ago2008:

Proven software / robust platform and dual architecture

A new integrated ATM system supplied by Atech was commissioned by Oct09, in replacement to SITA ACW

SOUTH ATLANTICO

CINDACTA III

ACC Atlantico

Statistics for ADS-C/CPDLC in ACC AO

- Traffic msgs:
  - JAN2007: 226
  - MAY2009: 30.716
  - JUN 1st: Air France
  - JUL 2009: 73.172
  - JUL2012: 118.428

Service Availability	# of outages	Shortest Duration	Average Duration	Longest Duration	Total Duration	Availability	3-month average	12-month average
VHF FANS AIRCOM Processor Availability	0	0	0	0	0	100,00%	100,00%	99,99%
Satellite FANS AIRCOM Processor Availability	0	0	0	0	0	100,00%	100,00%	99,99%
VHF Access Network Availability								
Satellite Access Network Availability						99,99%	100,00%	100,00%
VHF FANS Service Availability								
Satellite FANS Service Availability						99,99%	100,00%	99,98%

DGTA Argentina

A new integrated ATM system supplied by INDRA was commissioned in both Area Control Centers of Ezeiza and Comodoro Rivadavia

ACC Ezeiza was connected to SITA AIRCOM network since May 2010
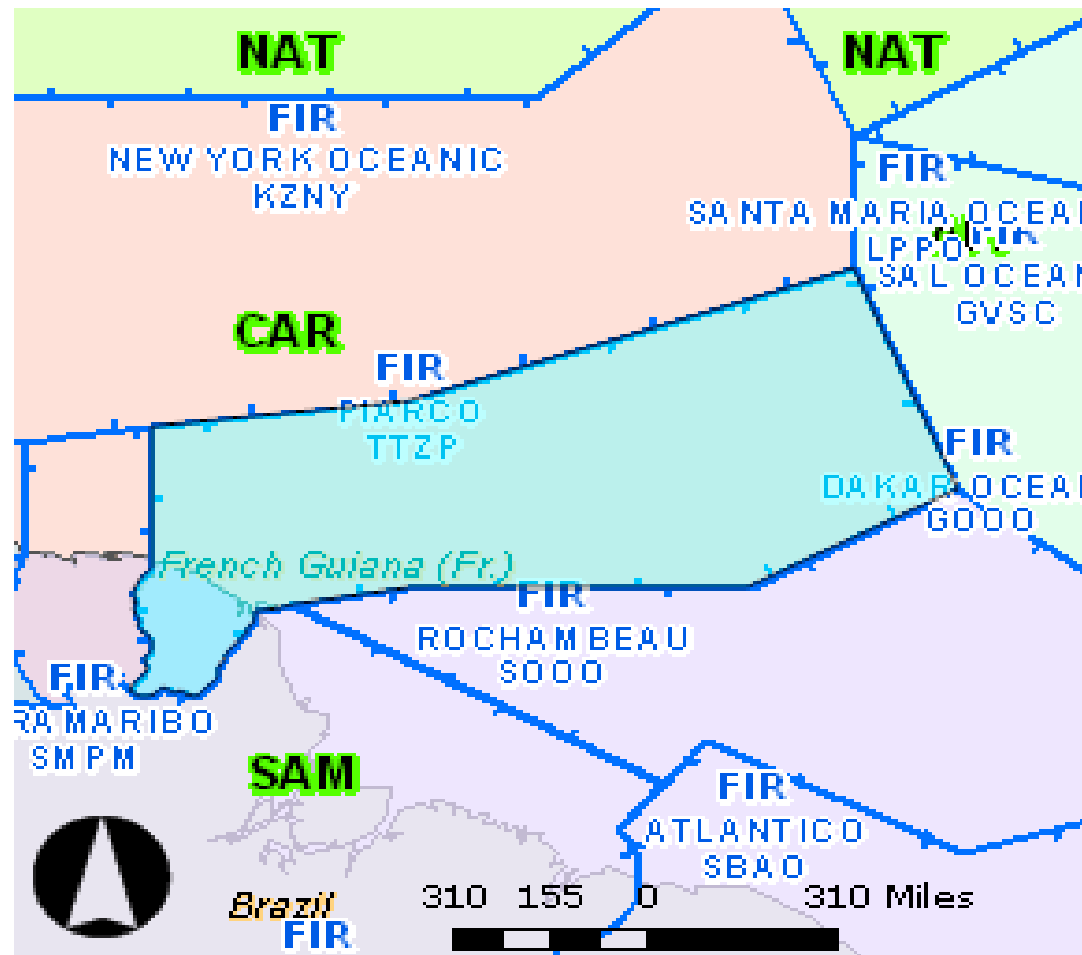
DGTA to advise trial and operational phases planning.

SOUTH ATLANTICO
ACC Ezeiza (SAEZ)
ACC Comodoro Rivadavia (SAVC)
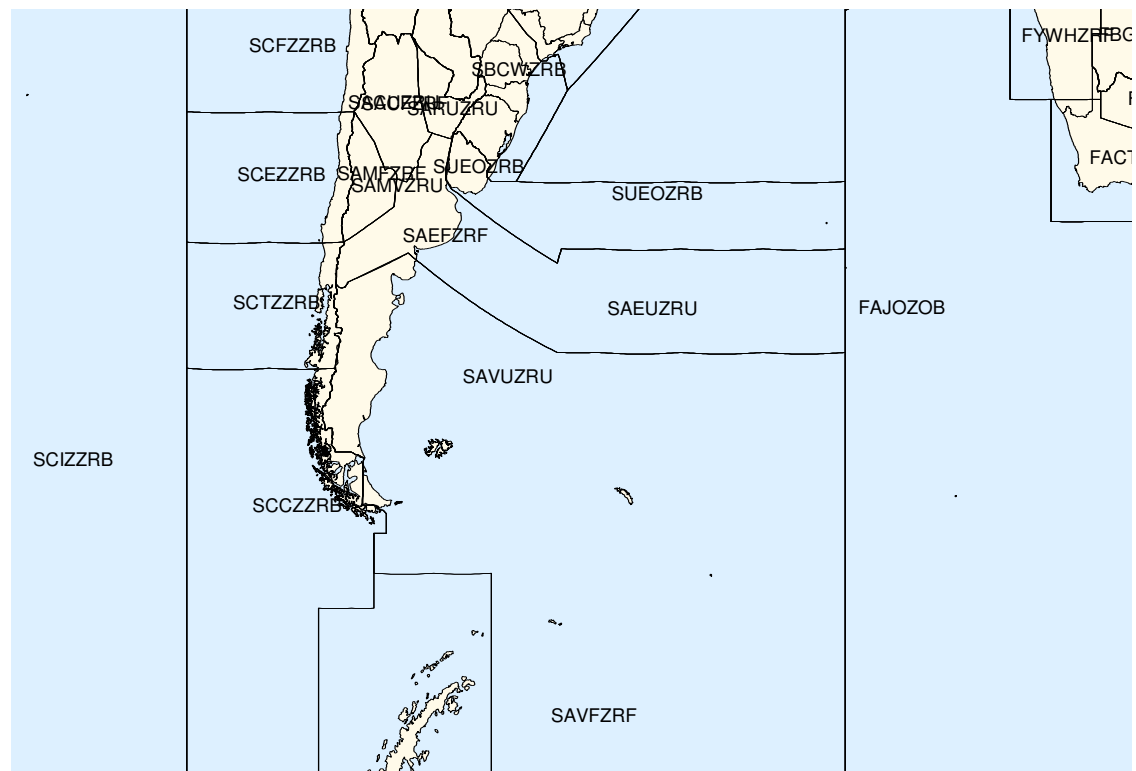
DSNA French Guyanne

FIR Rochambeau

ACC Cayenne

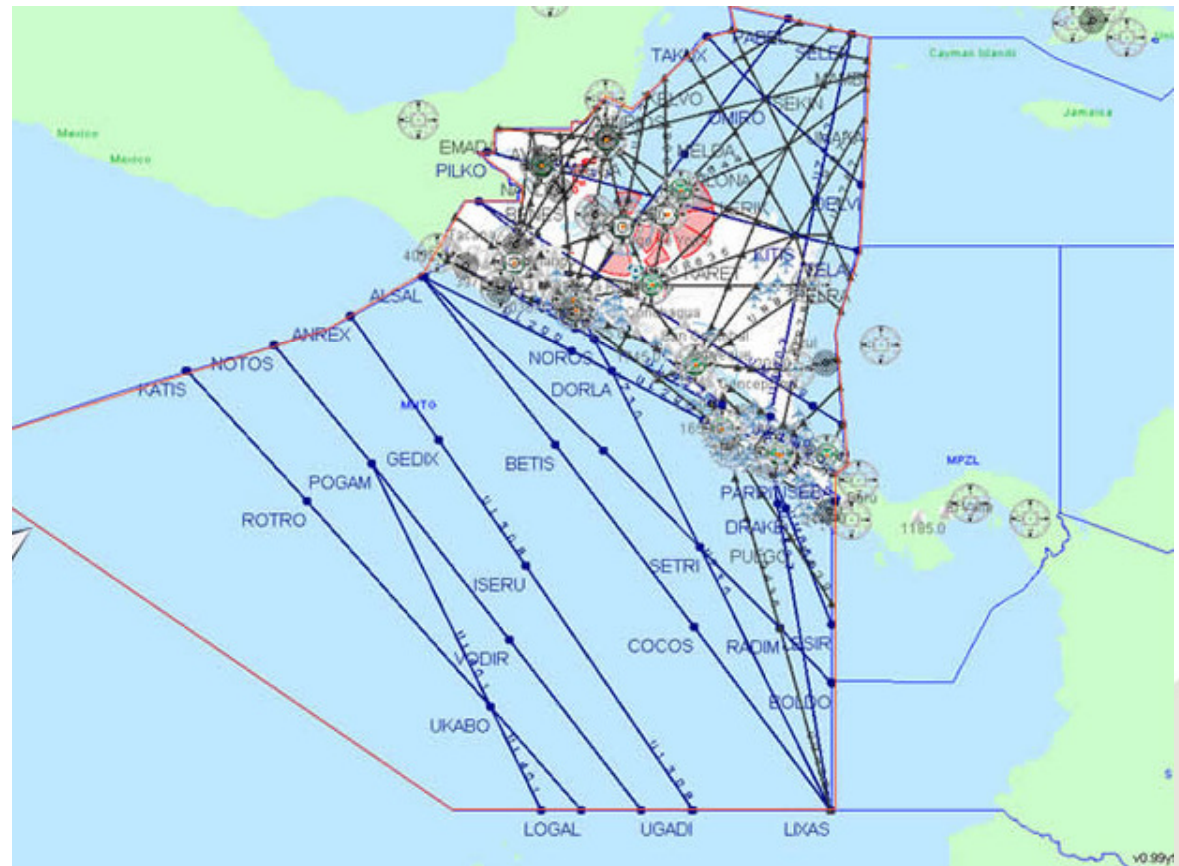- A new integrated ATM system supplied by ADACEL was commissioned in Cayenne ACC in 2010.

COCESNA

ACC CENAMER   FIR CENTROAMERICANA

- COCESNA just refreshed their integrated ATM system supplied by INDRA and plan to start trial phase within 2012 in the ACC CENAMER.
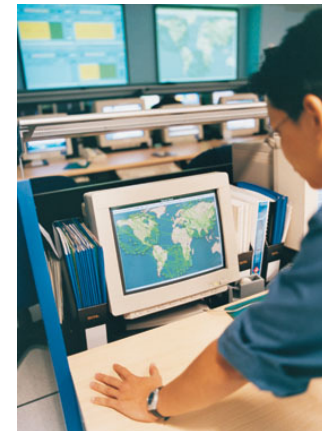
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SITA FANS service performance report

- SITA FANS services perfomance reports are provided to ANSP

- Main sections of the Performance report :

  - Traffic data: number of messages/by airlines

  - Availability of the service (processor, VHF network, Satellite network)

  - Reliability of the service (uplink success rate)

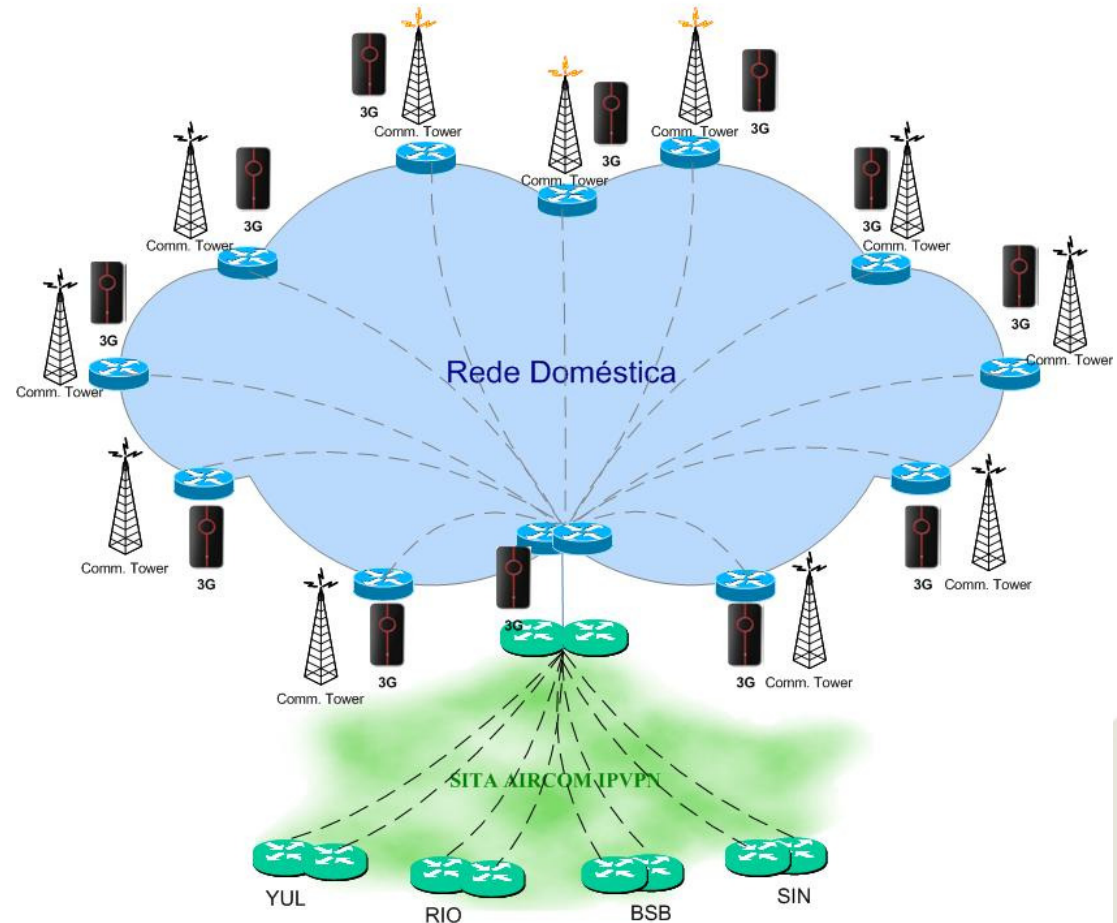 - Performance data (uplink and downlink delivery times)

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VHF data link partnership in Brazil

- In 2010, after a public RFP process, SITA has been selected by DECEA to deploy a new VHF data link network in Brazil
- The contract model is a public concession where SITA operates and mantain the VHF network on behalf of DECEA
- Exclusive service provider in Brazil for AOC
- ATS Intwk with other DSP

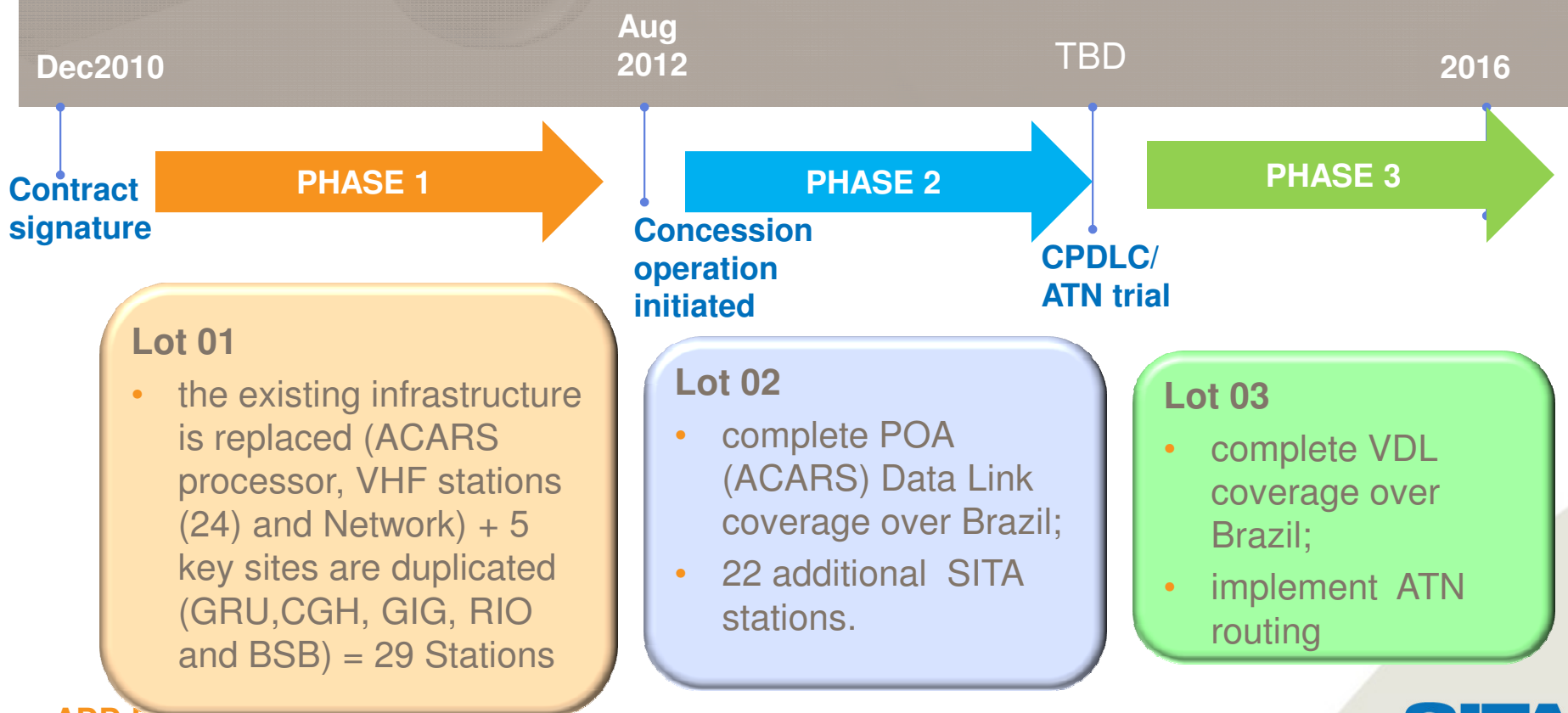Rede Terrestre do Sistema Data Link Brasil

Roadmap for Brazil
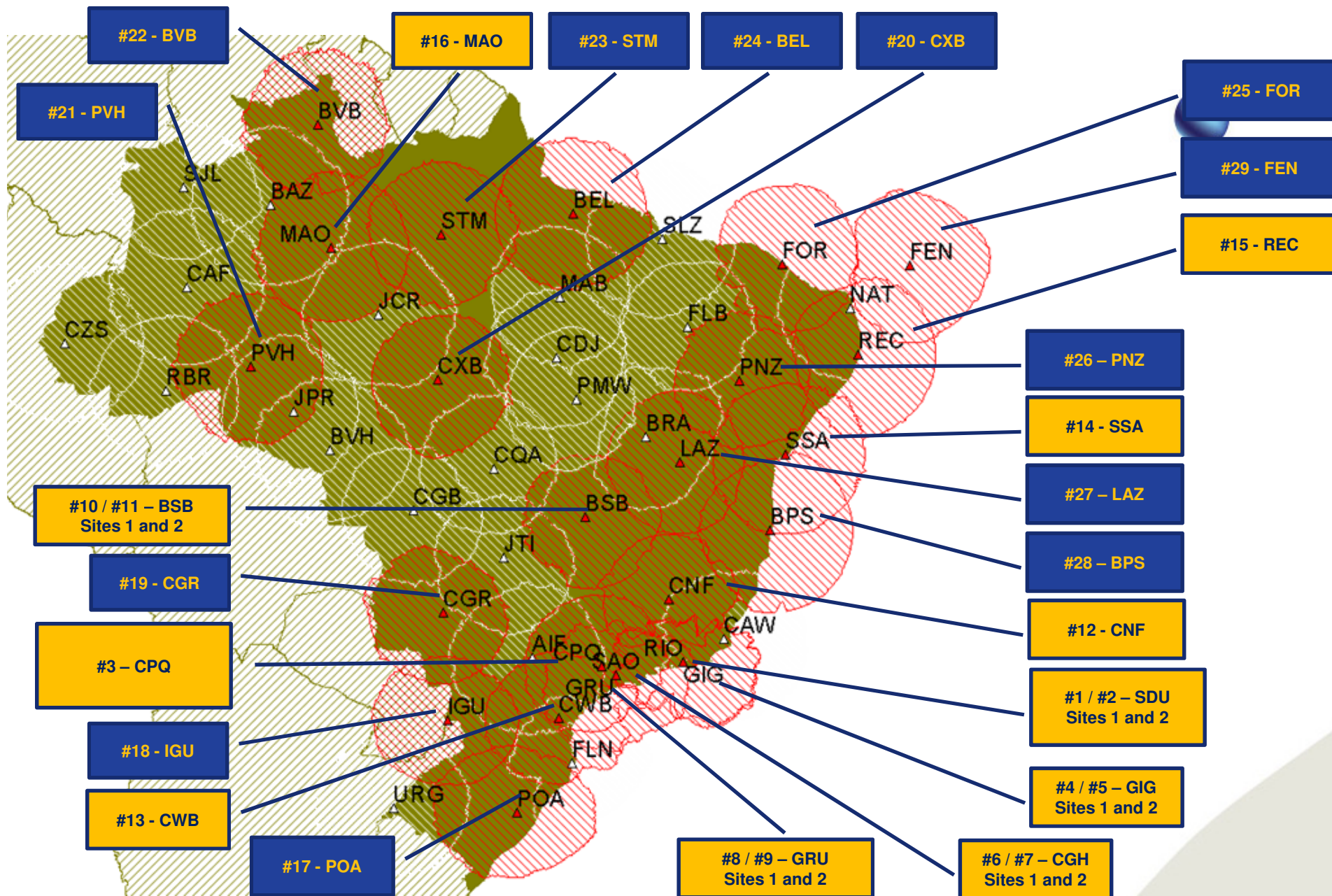
Air ground data link project

Dec 2010	Aug 2012	TBD	2016

Contract signature

PHASE 1

Concession operation initiated

PHASE 2

CPDLC/ATN trial

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

Lot 02
- complete POA (ACARS) Data Link coverage over Brazil;
- 22 additional SITA stations.

Lot 03
- complete VDL coverage over Brazil;
- implement ATN routing

ADD DIVISION TITLE

SITA
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Brazilian VHF ground stations sites for Phase 1 (until Dec2012)

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PRE FANS program in Brazil
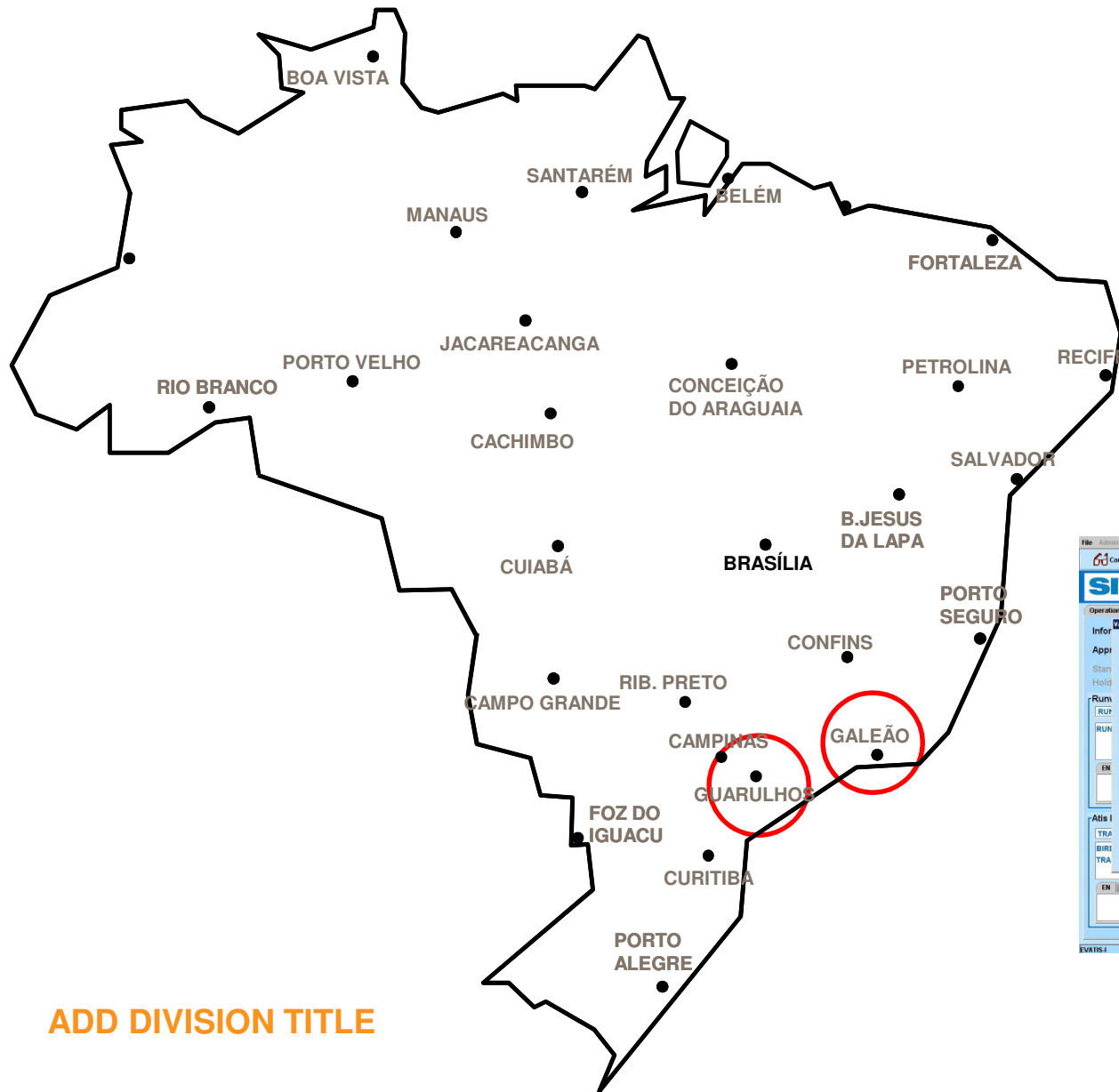
DCL & D-ATIS in Sao Paulo

D-ATIS in Rio

CATS in Rio

D-VOLMET

ADD DIVISION TITLE

Centralized ATS server (CATS)

Rio de Janeiro

D-ATIS source

ACARS aircraft

A34Ɔ-500

RGS

GES

AFTN or TCP/IP Network

ATIS

ATIS + VOLMET

DECEA DTCEATM-RJ

CATS redundant servers
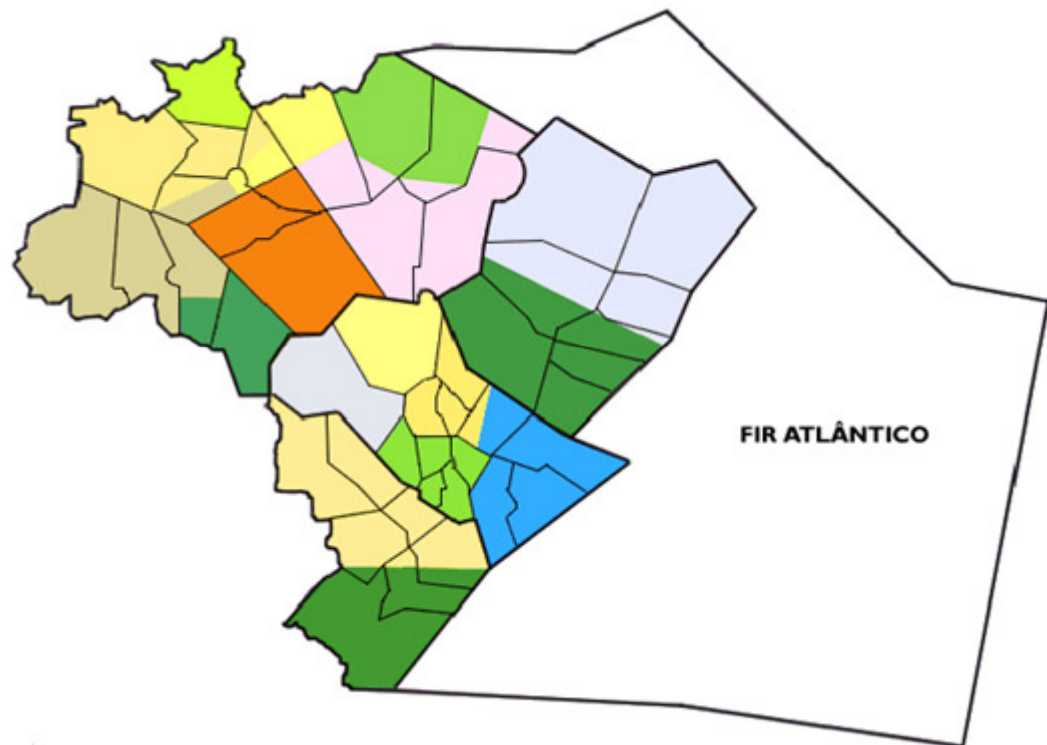
SITA ACARS Network

São Paulo

D-ATIS source

TCP/IP
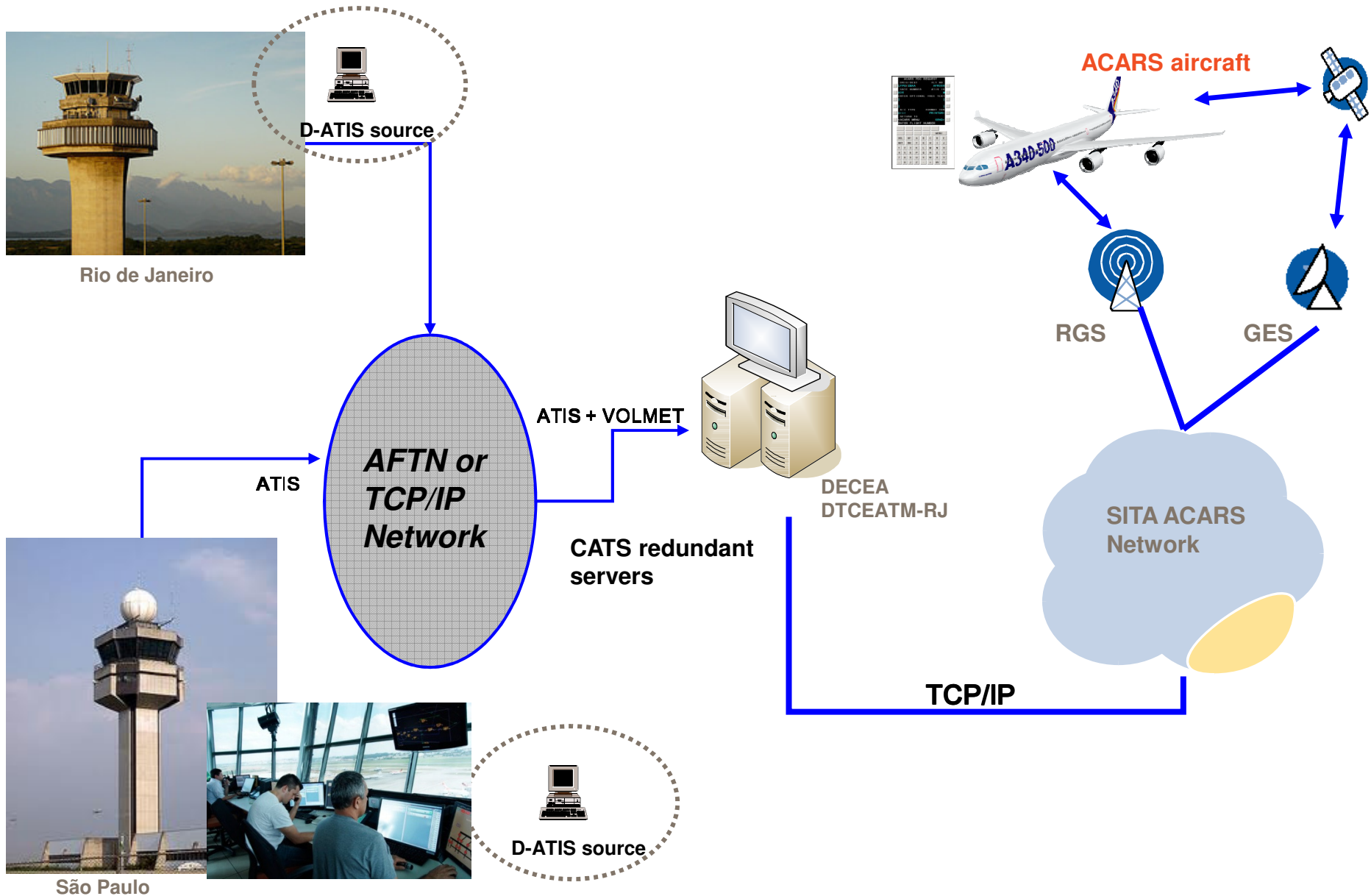
Digital VOLMET

DECEA and SITA
implemented Datalink
broadcast of VOLMET
relevant content for all
Brazilian FIRs:
-FIR Amazonica
-FIR Brasilia
-FIR Recife
-FIR Curitiba

FIR ATLÂNTICO

VOLMET Coverage Map for voice service

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Air ground communication : partnering for safer and more efficient Air Traffic Management

Adriana.mattos@sita.aero

SITA.

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