

# FEDERATIVE REPUBLIC OF BRAZIL

## BRAZILIAN AIR FORCE

### DEPARTMENT OF AIR SPACE CONTROL



Departamento de Controle  
do Espaço Aéreo

DEPARTMENT OF AIR SPACE CONTROL - DECEA

[www.decea.gov.br](http://www.decea.gov.br)

# ORGANIZATIONS MAIN CHART



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[www.decea.gov.br](http://www.decea.gov.br)

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# DECEA Organization Chart



# BRAZILIAN AIR SPACE CONTROL SYSTEM - SISCEAB



**COVERAGE  
FL 250**

© 2011 Europa Technologies  
US Dept. of State Geographer  
© 2011 MapLink/Tele Atlas  
© 2011 Google

14°26'11.94"S 52°14'29.82"O

©2009 Google™

Altitude do ponto de visão 5834.38 km

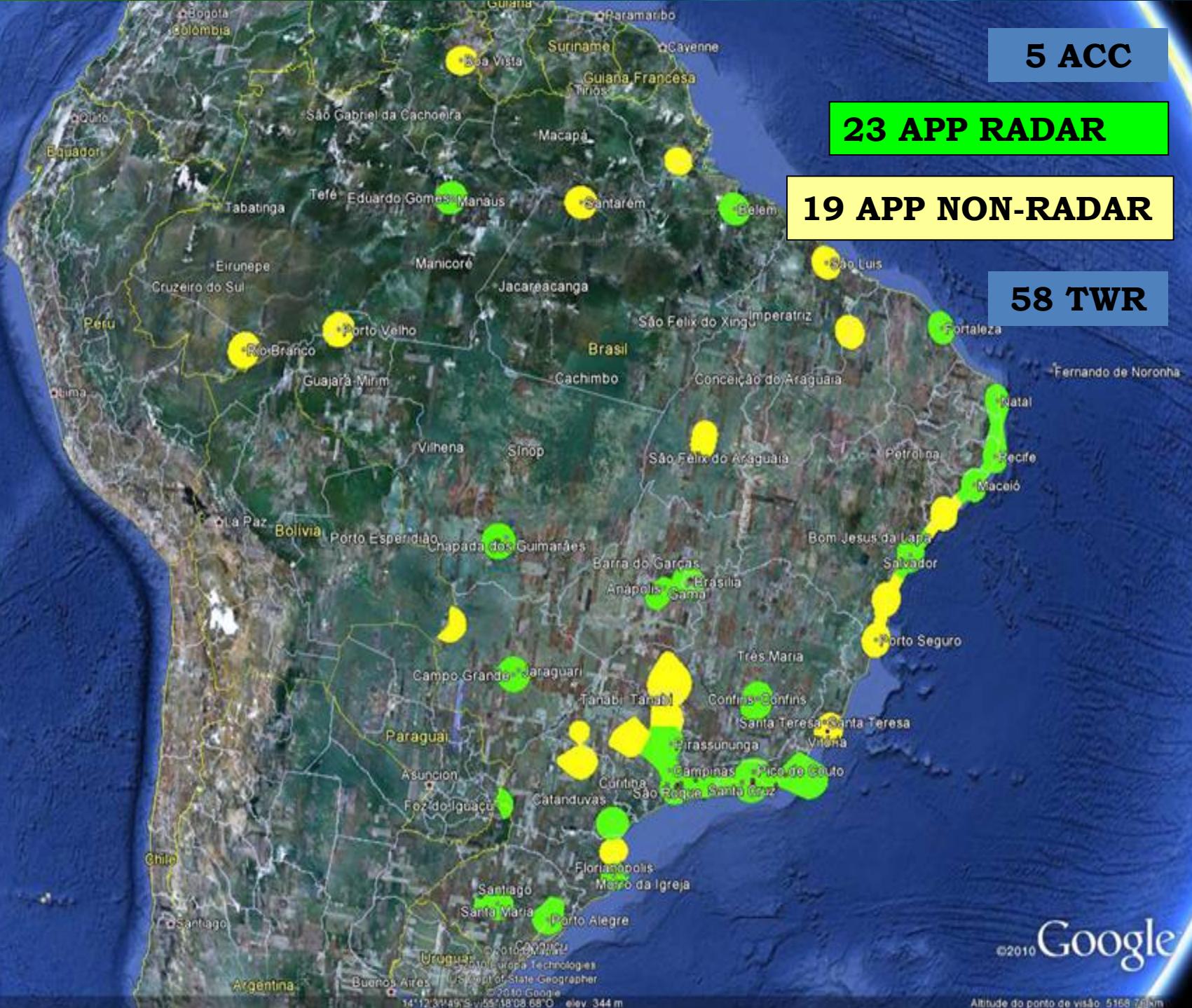


5 ACC

23 APP RADAR

19 APP NON-RADAR

58 TWR



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**ACC AMAZON**

**ACC RECIFE**

**ACC BRASILIA**

**ACC CURITIBA**

**ACC ATLANTIC**

**22.000.000km<sup>2</sup>**

Oceano Atlântico Sul

# Reach and Mobility



# ENERGY

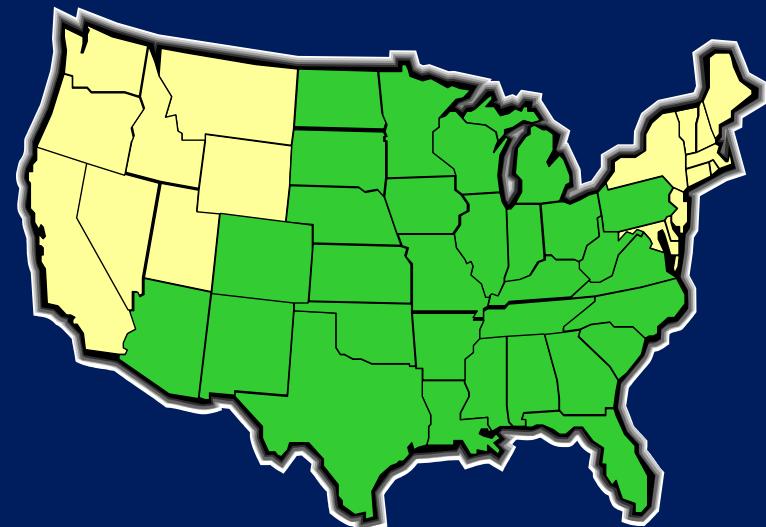


MOBILE ENERGY

CLEAN SOLUTION



# Comparisons Areas



32 european  
countries





# SIRIUS PRINCIPALS

## CONOPS GUIDING PRINCIPLES

- Safety;
- Humans;
- Technology;
- Information;
- Collaboration; and
- Continuity.



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# SIRIUS PRINCIPALS

**Flexibility to cope with the global evolution towards harmonization.**

**Flexibility to accommodate any evolution with potential operational benefits.**

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Instituto de Controle do  
Espaço Aéreo  
Aerospace Control Institute - ICEA

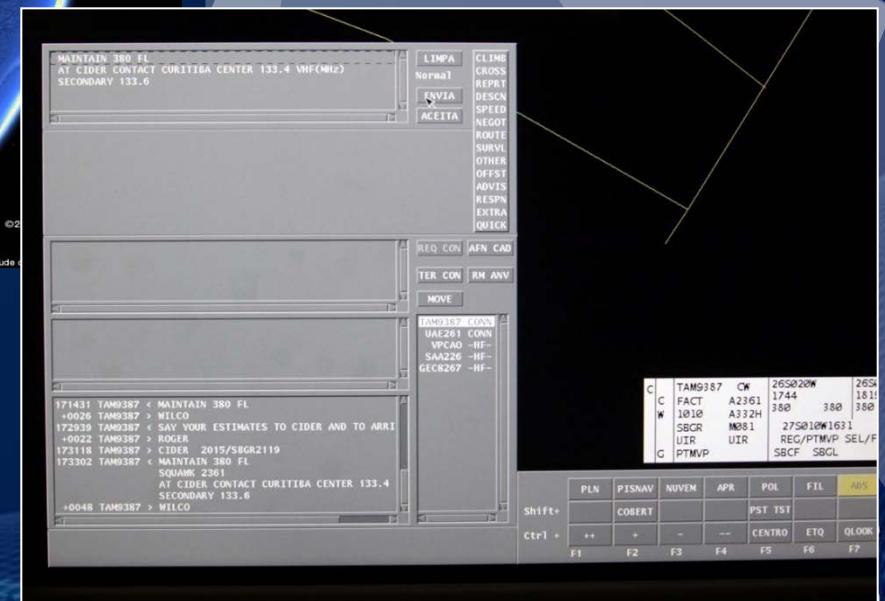
# SIRIUS improvements



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# ADS/C & CPDLC IMPLEMENTATION IN THE ATLANTIC FIR



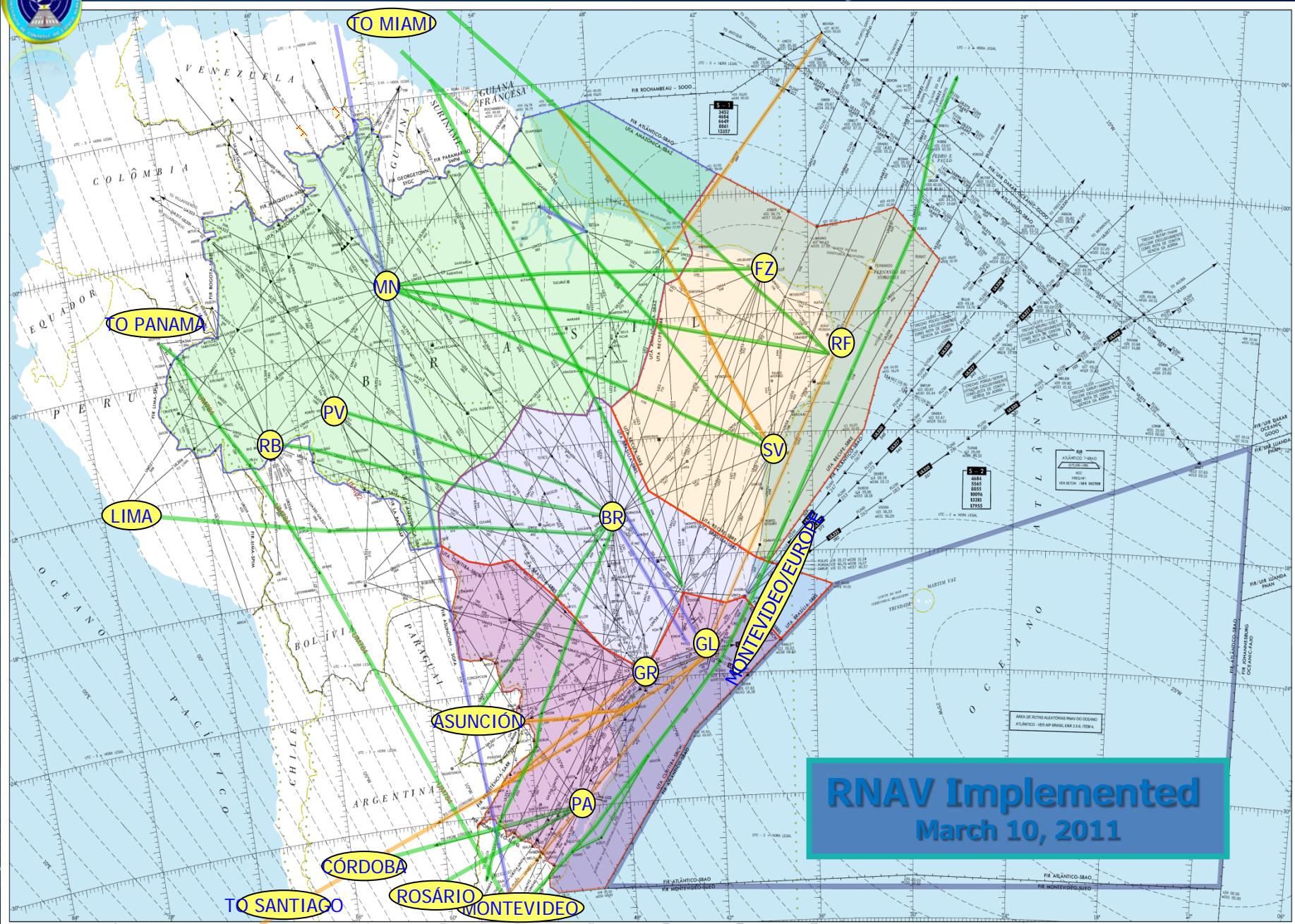
**Operational  
since July 2009**





# ROUTES OPTIMIZATION

1.100 NM net reduction in 17 City Pairs



# ATFM in Air Navigation Management Center - CGNA SIGMA



de Controle



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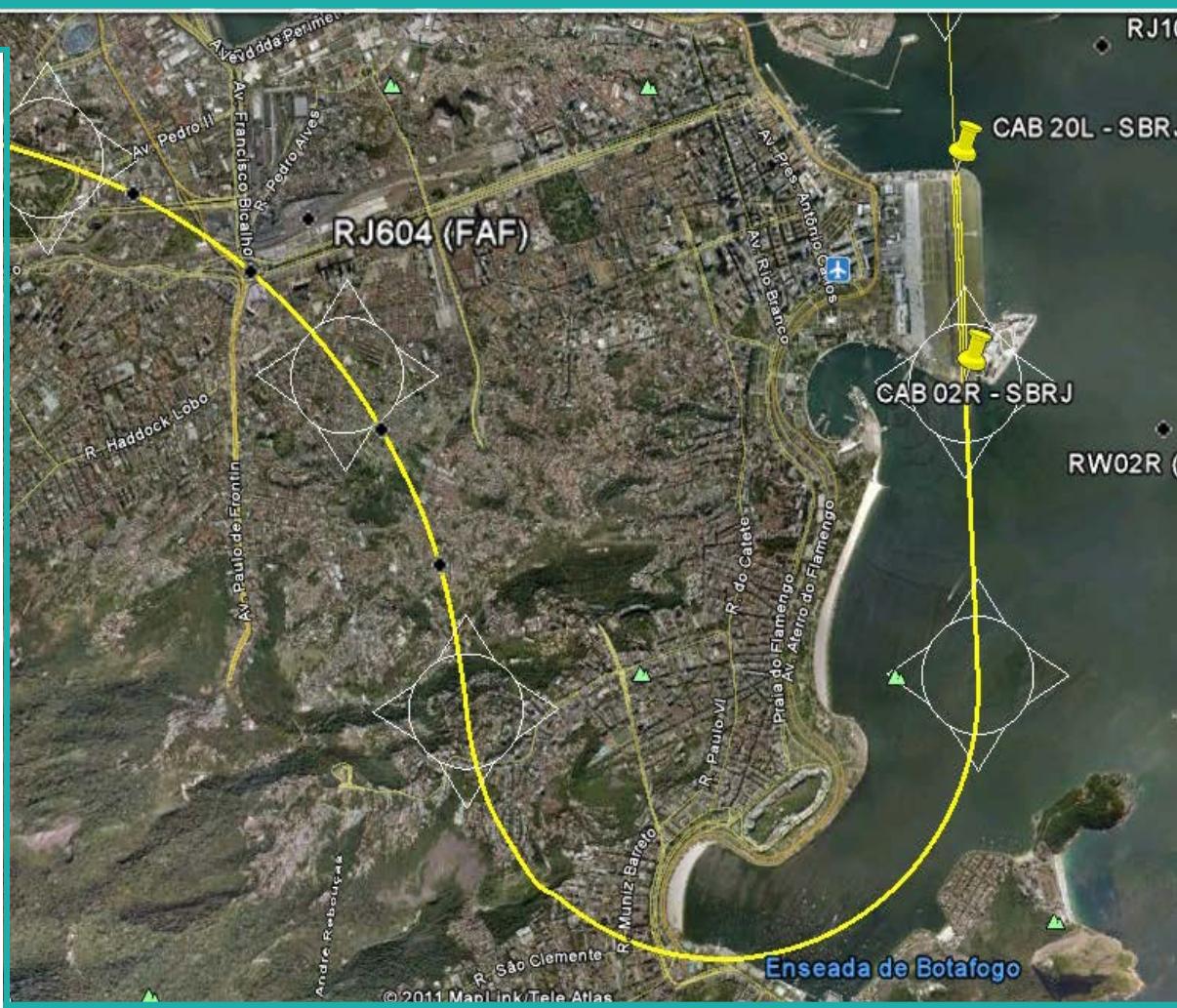
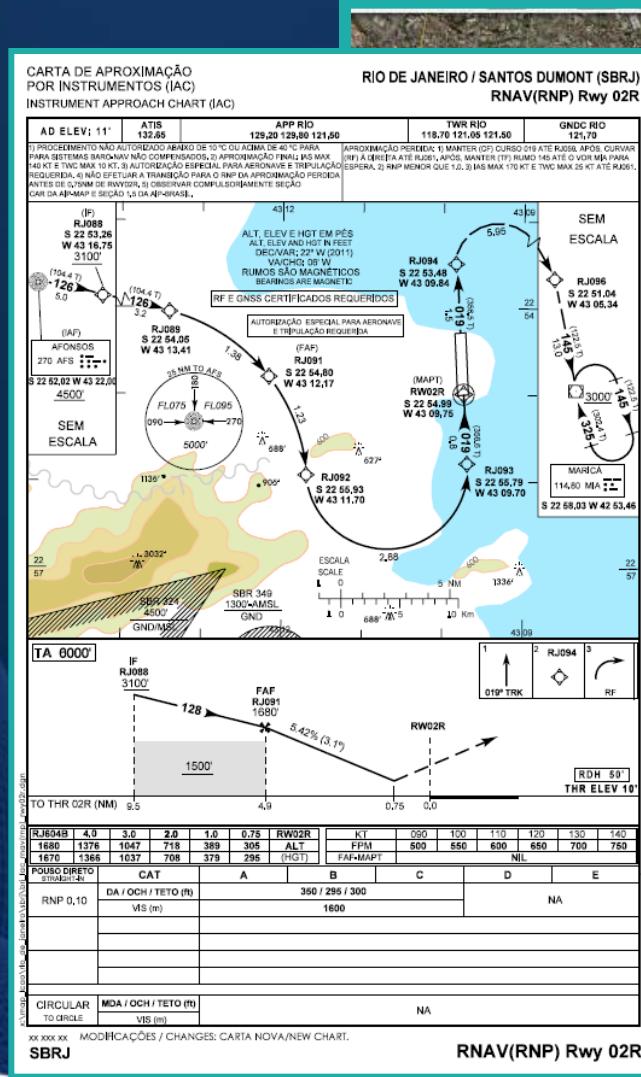


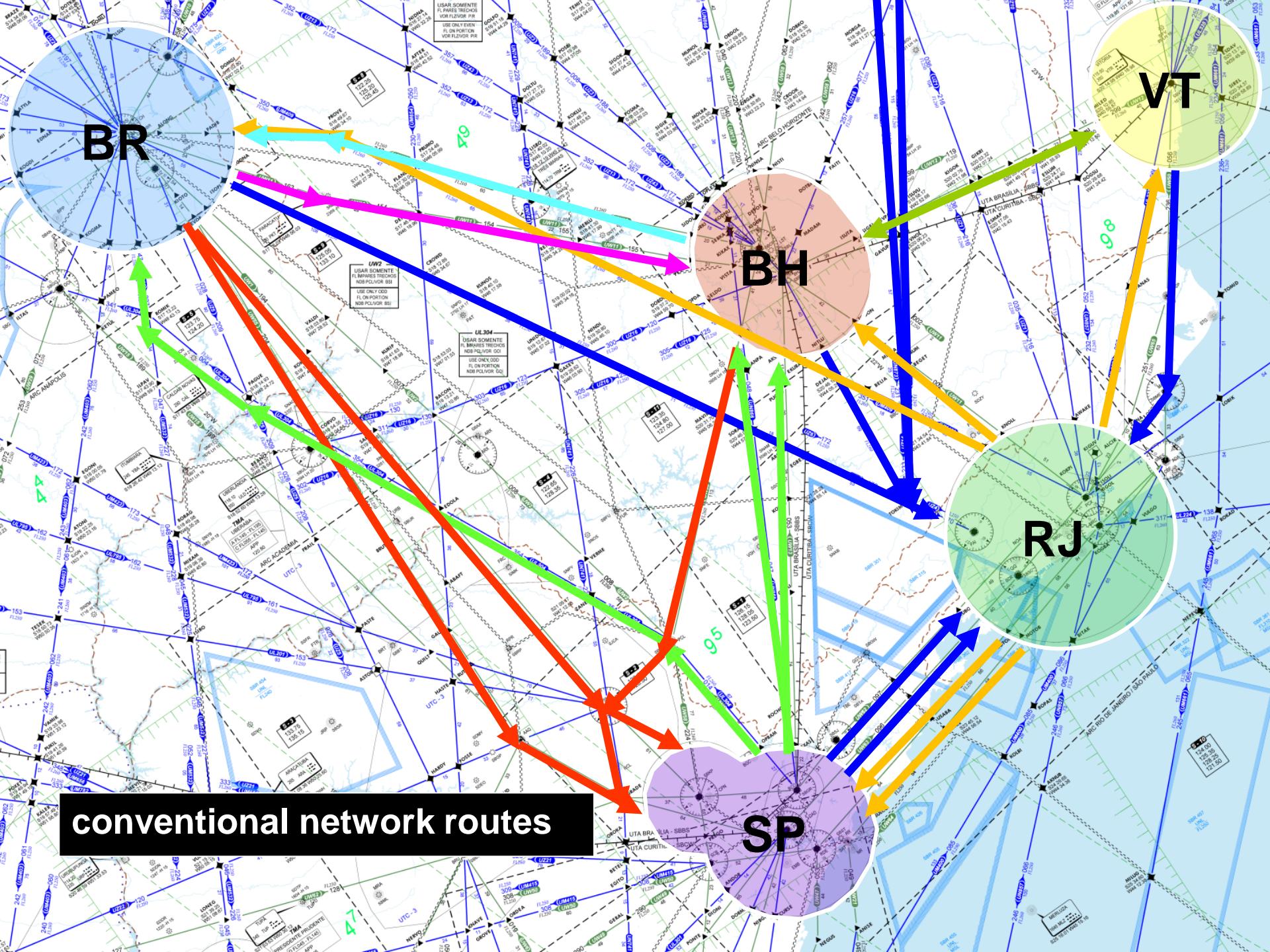
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# RNP AR and RNP APCH w/BARO VNAV Procedures





conventional network routes

# RNAV network routes

SP

RJ

**BR**

BH

VT



# Flexible Use of the Airspace (CRUZEX OPS)



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# Air space modeling and airports

PBN  
Project



Airport  
Studies

20 de setembro airport (Porto Alegre)



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# MODELING PRODUCTS

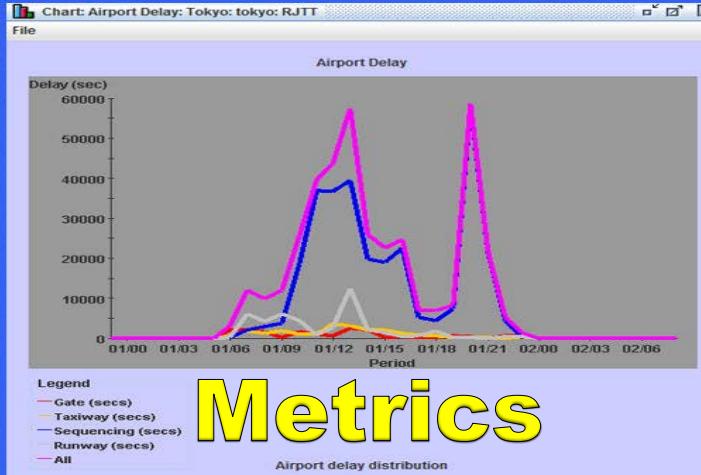
Delays



Consumption



Procedures



Metrics



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# SIMULATION

TWR-3D



LABSIM



Reality through integration  
of the environments



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# GBAS installed at Rio International



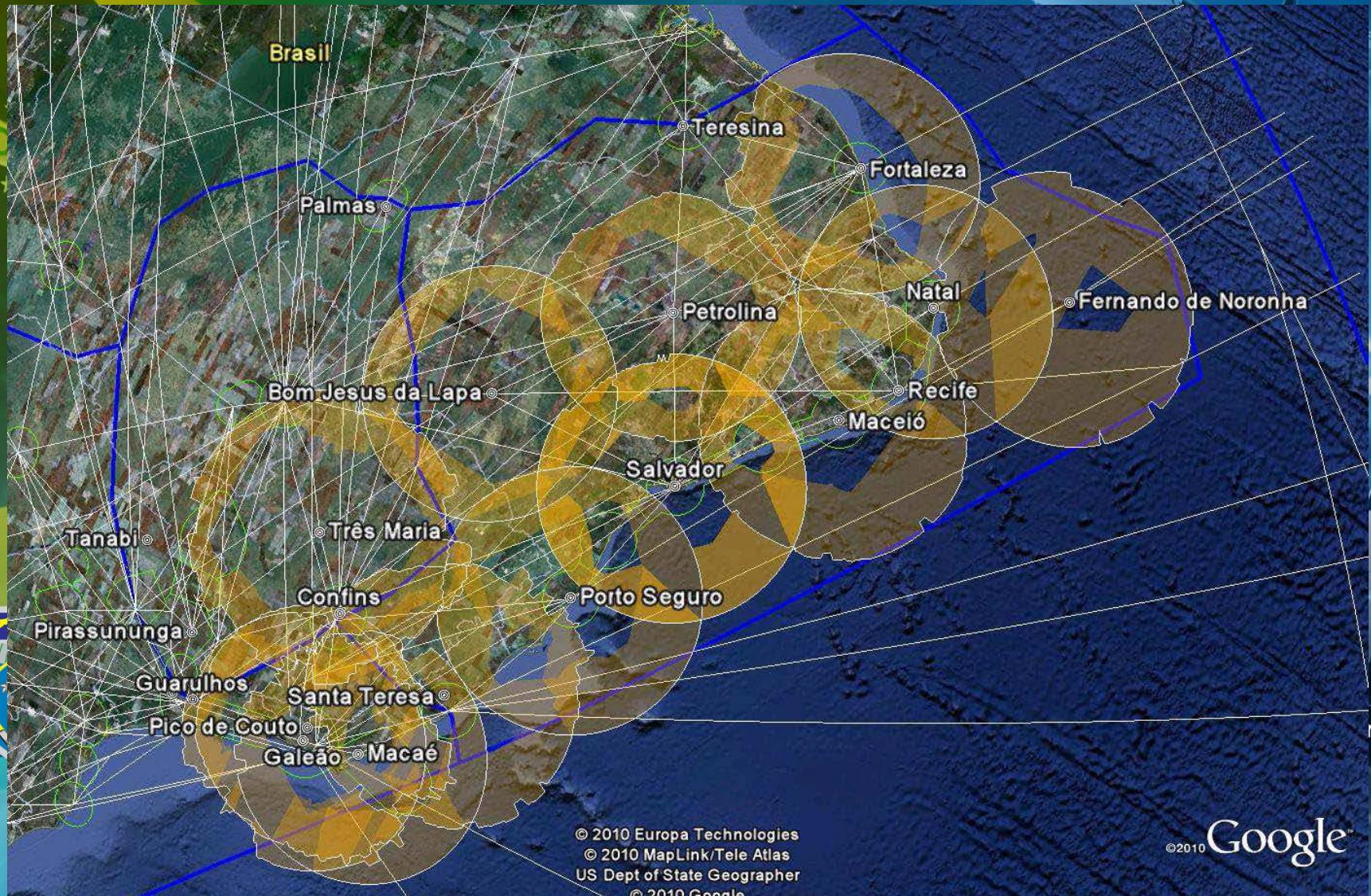
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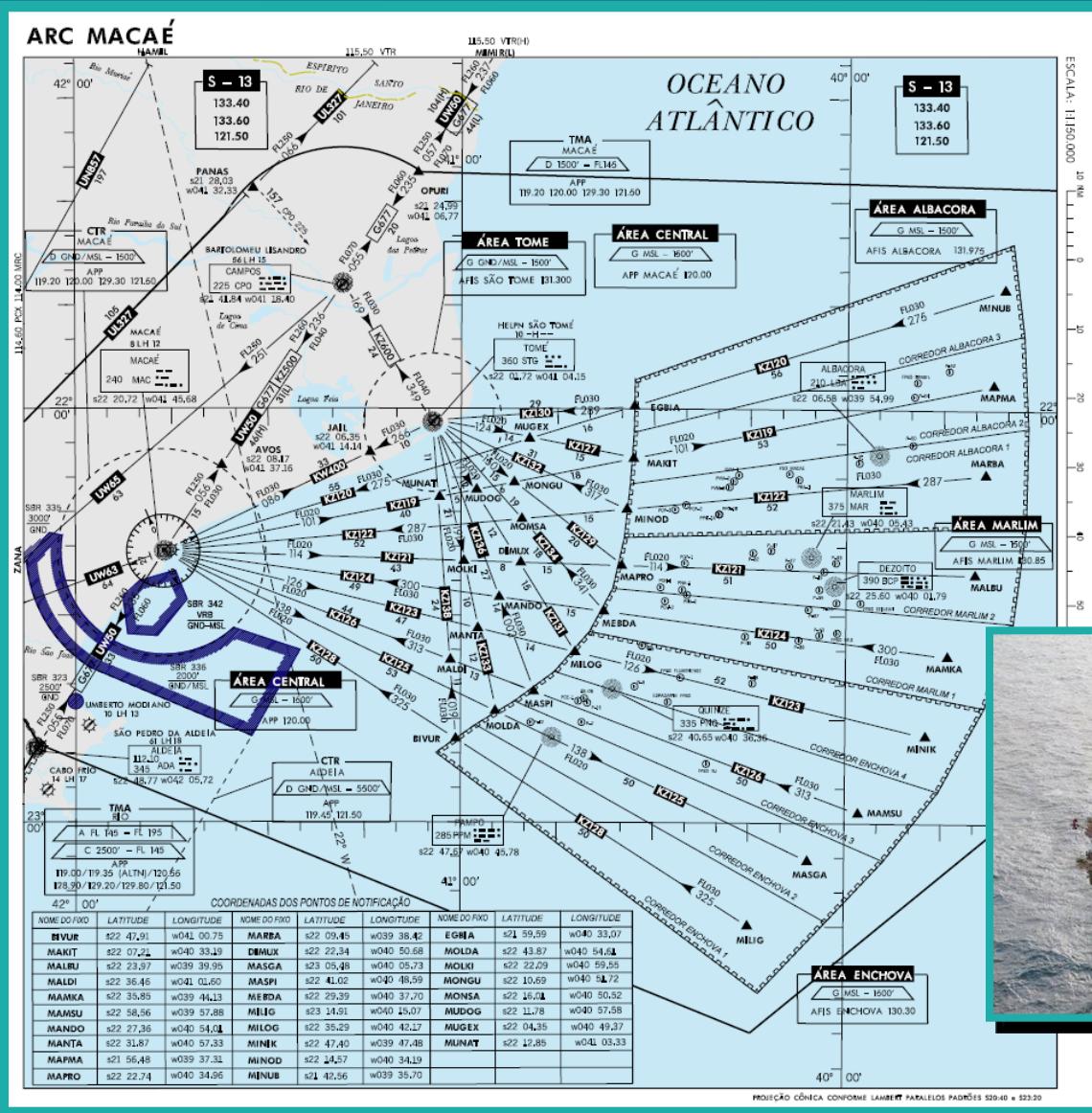


# ADS-B Continental





# Multi-lateration and ADS/B



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# CLIMATOLOGICAL AND METEOROLOGICAL RESEARCH

⇒ CLIMATOLOGICAL DATA BANK CERTIFICATION - SGQ  
⇒ PREPARATORY MEASURES FOR USUAP AUDIT 2014

BDC



## IONOSPHERE

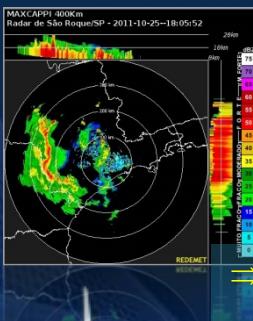
- ⇒ MODELING – SOUTH AMERICA
- ⇒ GPS ALIMETRIC ERROS
- ⇒ GBAS



## PRODUCTS TO SISCEAB

## DATA MINING

- ⇒ SHORT-TERM FORECAST – MM5/WRF
- NEURAL NETWORK FOR FOG AND THUNDERSTORM FORECASTS –
- Search tool – WECA

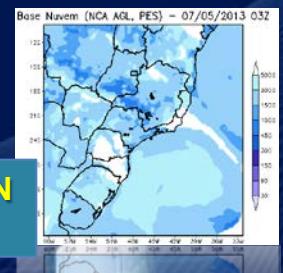


## WEATHER RADAR

- ⇒ STRUCTURING A RADAR IMAGE DATA BANK

## NUMERICAL MODELING

- ⇒ WRF and MM5 PARAMETERIZATION  
(restrictors of visibility)

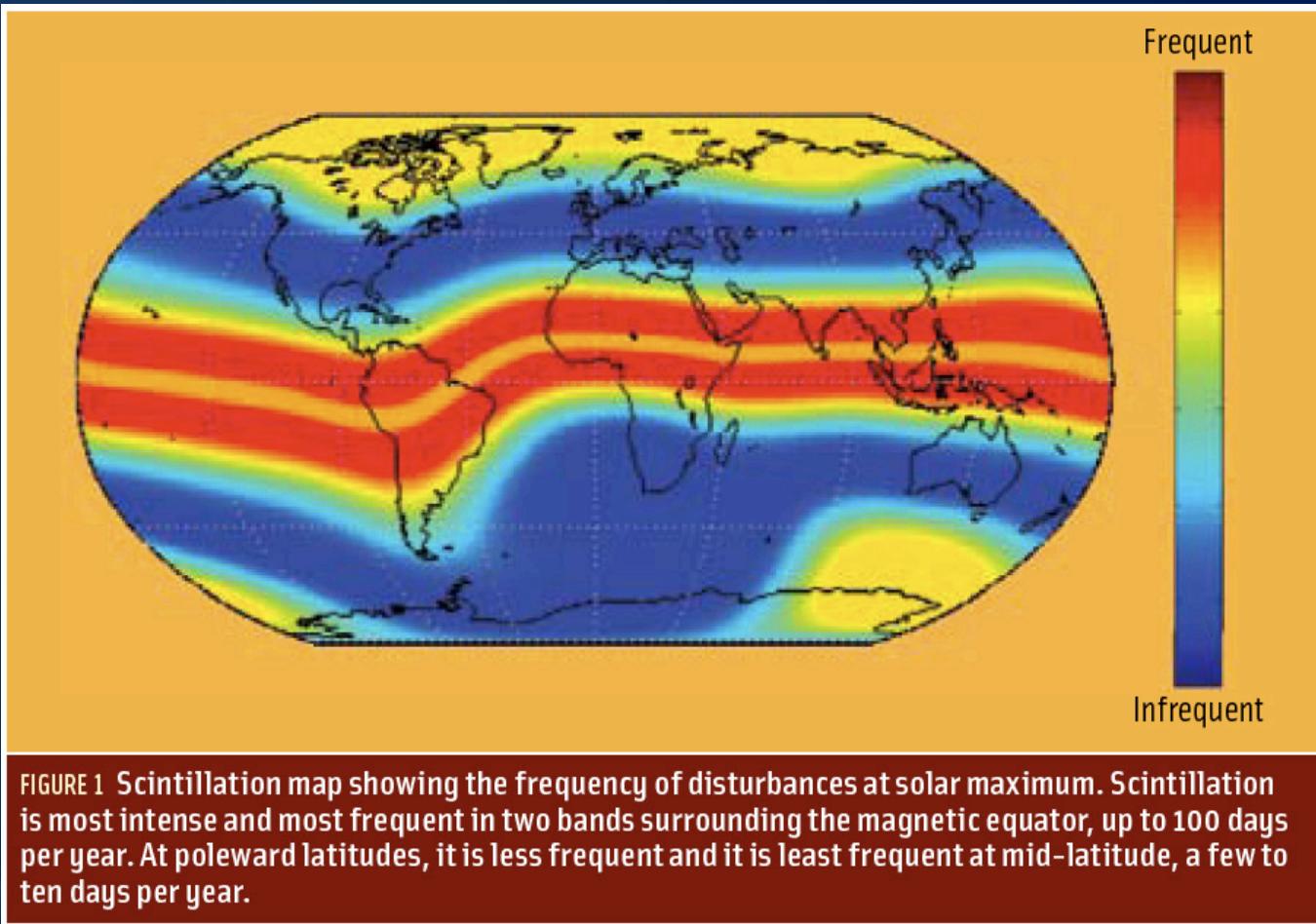


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# Brazilian Ionosphere X GNSS Technologies & safety requirements accomplishment



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# SIRIUS

COM

PBN

ADS-B

ATM

AUTOMATION

SAGITARIO

SIGMA

OCCUPANCY RUNWAY  
APPROACH IMPROVED  
CONFLICTING ROUTES



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# ATM Automation

# SAGITARIO





# SISCEAB CERTIFICATION (NEW CONCEPT)

PRODUCTS

SYSTEMS

SOFTWARES



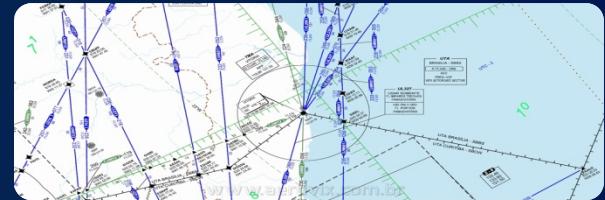
RADARS



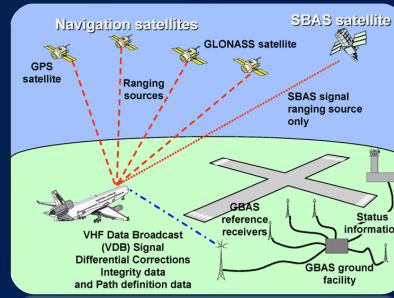
VOR / DME



SURVEILLANCE FUNCTION



CHARTS AND PROCEDURES



NEW TECHNOLOGIES  
(GBAS)

and services ...



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# Emergent Challenges



Enabling **INTEGRATION** of new technologies through **concept, product or system tests**, contributing for **developments, modelings and validations** of SISCEAB interest



Diversification and domain of knowledge – **INTELLECTUAL PROPERTY**

Integration of academic, commercial interests and operational needs

Dynamic use of environment with resource-savings in partnership use

Acquisition of patents (NIT / IFI) **INFORMATION X KNOWLEDGE**



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# SALAMON Project

*Metodology of Mission Multidimensional Assessment*



**Developing a methodology for assessing the impact of events causing failures in conducting operations of airspace control and air defense.**



**Simulation Environment/  
Infrastructure Emulation - C2 ITA/GMU Testbed**



**ICEA Simulators and C2 ITA/GMU Testbed integration**



**Modeling of Cyber Attacks against the protocols related to Air Navigation**



**Method Application in preparation for the World Cup and Olympics with integrated training of technical and operational areas (Simulated Technical Room).**



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# ATM Research

Cost reductions, increasing of airspace capacity



Developing studies, aiming to optimize the use of airspace and maintain appropriate safe levels.



Estimating the daily amount of gas emitted by civil aviation of regular transport



Modeling of meteorological condition influence in fuel consumption.



Modeling of the new airway network based on PBN concept.



Optimizing the use of airway network and airport infrastructure.



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# Human Factors Research

*Optimizing training*



- Development of new teaching methods



**Research on performance related to the training and the use of new teaching methods**

**Adaptation of training and qualification courses to the new scenarios – SIRIUS Project**

**Impact of English language use in operating capacity of SISCEAB**

**Relationship between training and airspace complexity**



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# Thank you very much.

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