



NAM/CAR/SAM ADS-B/IMP meeting/workshop

ADS-B Solutions for EMBRAER Aircrafts

Luiz Madeira Junior

EMBRAER Avionics System Engineer

November 13-16, 2017

This information is confidential and property of Embraer and cannot be used or reproduced without written permission.



INTRODUCTION

EMBRAER Aircraft

- Commercial Aircraft
- Executive Aircraft
- Defense and Security

ADS-B OUT Solution



COMMERCIAL AVIATION PORTFOLIO



ERJ 135



ERJ 140



ERJ 145



ERJ 145 XR



EMBRAER 170



EMBRAER 175



EMBRAER 190



EMBRAER 195



E175-E2



E190-E2



E 195-E2

COMMERCIAL AVIATION

ERJ Family



ERJ 135

MODEL YOUR
BUSINESS. YOUR WAY.



37
Rolls-Royce
AE3007
1,750 nm
Mach 0.78

ERJ 145

MISSION VERSATILITY
WITH 50 SEATS



Rolls-Royce
AE3007
50
Mach 0.78
1,550 nm

ERJ 140

CUSTOMIZED
CAPACITY



44
Rolls-Royce
AE3007
1,650 nm
Mach 0.78

ERJ 145 XR

THE XR GOES THE DISTANCE



Rolls-Royce
AE3007
50
Mach 0.78
2,000 nm

Honeywell Primus 1000

Available FMS Systems:

- Universal 1K
- Honeywell NZ-2000

COMMERCIAL AVIATION

E-Jets Family



EMBRAER 170

REGIONAL
REDEFINED



70 - 78



General Electric
CF34-8E engines -
LR and AR

2,100 nm



EMBRAER 175

MORE SEATS. MORE REVENUE.
LOWER UNIT COST.



70 - 88



General Electric
CF34-8E engines -
LR and AR

2,000 nm



EMBRAER 190

REPLACE. RENEW. REDISCOVER.



98 - 114



General Electric
CF34-10E engines -
LR and AR

2,400 nm



EMBRAER 195

MODEL YOUR BUSINESS. YOUR WAY.



108 - 124



General Electric
CF34-10E engines -
LR and AR

2,200 nm



Honeywell Primus Epic

COMMERCIAL AVIATION

E-Jets E2 Family



Honeywell Primus Epic

E175-E2

BEHOLD THE POWER OF 2



80 - 90

GTF PW1700G engines 2,060 nm

←

© 2014 Embraer S.A. All rights reserved. Embraer, the Embraer logo and E-Jets are trademarks of Embraer S.A. in the United States and other countries.

E190-E2

BEHOLD THE POWER OF 2



97 - 114

GTF PW1900G engines 2,850 nm

←

© 2014 Embraer S.A. All rights reserved. Embraer, the Embraer logo and E-Jets are trademarks of Embraer S.A. in the United States and other countries.

E195-E2

BEHOLD THE POWER OF 2



120 - 146

GTF PW1900G engines 2,450 nm

←

© 2014 Embraer S.A. All rights reserved. Embraer, the Embraer logo and E-Jets are trademarks of Embraer S.A. in the United States and other countries.

CUSTOMERS – COMMERCIAL AVIATION



AIRLINES

100

+

COUNTRIES

60

+

AIRCRAFT IN
OPERATION1.7
THOUSAND

+

EXECUTIVE AVIATION PORTFOLIO



PHENOM 100EV



PHENOM 300



LEGACY 450



LEGACY 500



LEGACY 600



LEGACY 650



LINEAGE 1000E

EXECUTIVE AVIATION

PHENOM 100/300



Garmin G1000/3000
Prodigy Flight Deck 100/300



EXECUTIVE AVIATION

LEGACY 450/500



Rockwell Collins
Pro Line Fusion



EXECUTIVE AVIATION

LEGACY 600/650



Honeywell
Primus Elite

LEGACY[®] 600
SUPER MIDSIZE

13 - 14
2
3,400 nm

© 2014 Embraer

This information is confidential and property of Embraer and cannot be used or reproduced without written permission.

The Legacy 600 is a super-midsize twin-engine turboprop aircraft. The image shows the exterior of the aircraft in flight and a view of the cabin interior with beige leather seats and a table.

LEGACY[®] 650
LARGE

13 - 14
2
3,900 nm

© 2014 Embraer

This information is confidential and property of Embraer and cannot be used or reproduced without written permission.

The Legacy 650 is a large twin-engine turboprop aircraft. The image shows the exterior of the aircraft in flight and a view of the cabin interior with white leather seats and a table.

EXECUTIVE AVIATION

LEGACY 600/650



Honeywell
Primus Epic



CUSTOMERS – EXECUTIVE AVIATION



DEFENSE & SECURITY

PORTFOLIO



A-29 SUPER
TUCANO



AEW&C



MULTI INTEL



MARITIME PATROL



KC-390

DEFENSE & SECURITY

A-29



DEFENSE & SECURITY

PORTFOLIO

AEW&C



✓ Aerial Early Warning | Air and Sea Surveillance | Aerial Space Management | Fighter Allocation and Interception Control | Resource Allocation | Electronic Intelligence (ELINT) | Border Surveillance | Search and Rescue Coordination | Fighter and Tanker Vectorization



MULTI INTEL



✓ Direct Tactical Support | Strategic Intelligence | Special Operations | Anti-Terrorism Operations | Environmental Monitoring | Search and Rescue (SaR)



MARITIME PATROL



✓ Maritime Patrol (MP) | Search and Rescue (SaR) | Smuggling, Drug Trafficking and Piracy Repression | Surveillance of Exclusive Economic Zones (EEZ) | Electronic Warfare (EW), Electronic Intelligence (ELINT) | Communication Intelligence (COMINT)



DEFENSE & SECURITY

KC-390

KC-390



New capacity and performance standards in its category
Lowest life-cycle cost in the market
Genuine multimission



This information is property of Embraer and cannot be used or reproduced without written permission.

INTRODUCTION

EMBRAER Aircraft

- Commercial Aircraft
- Executive Aircraft
- Defense and Security

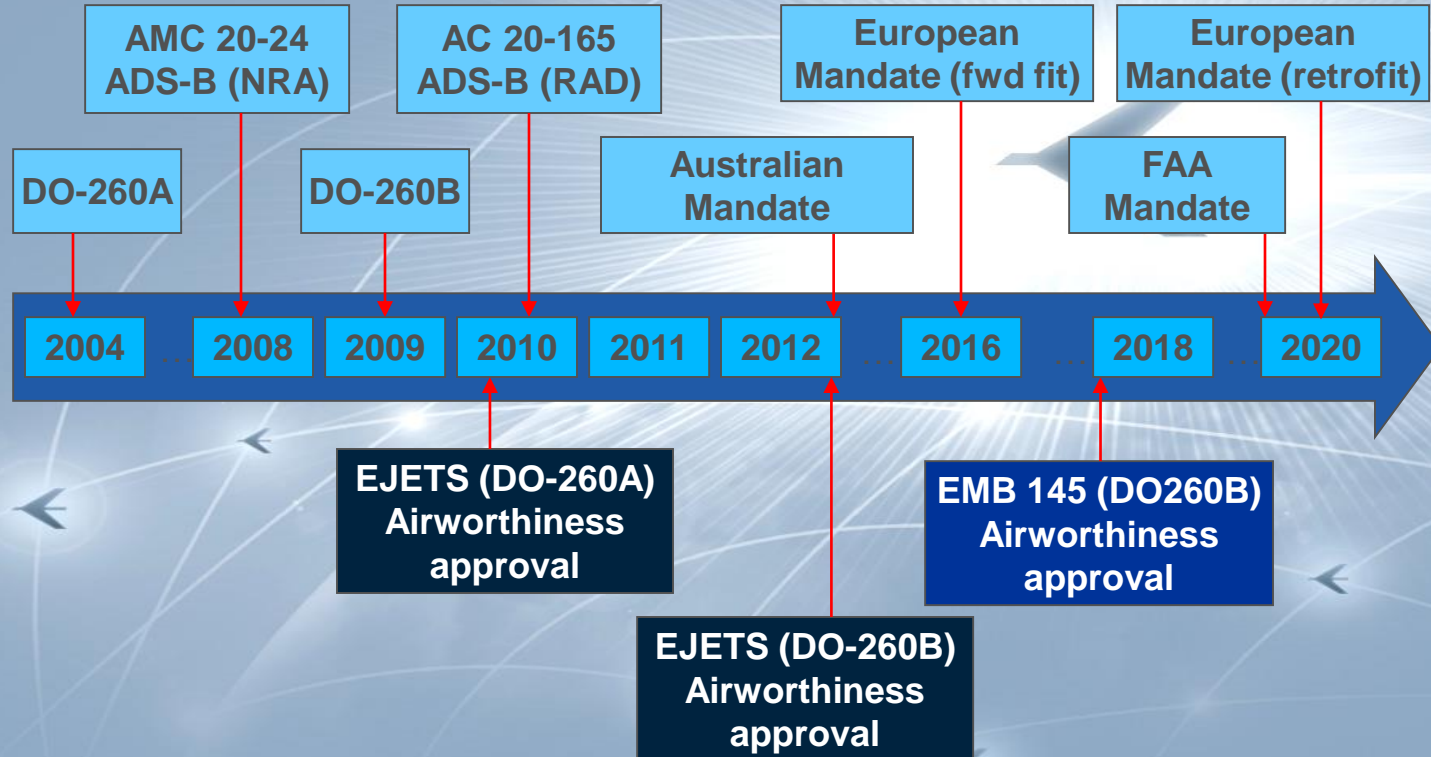
ADS-B OUT Solution



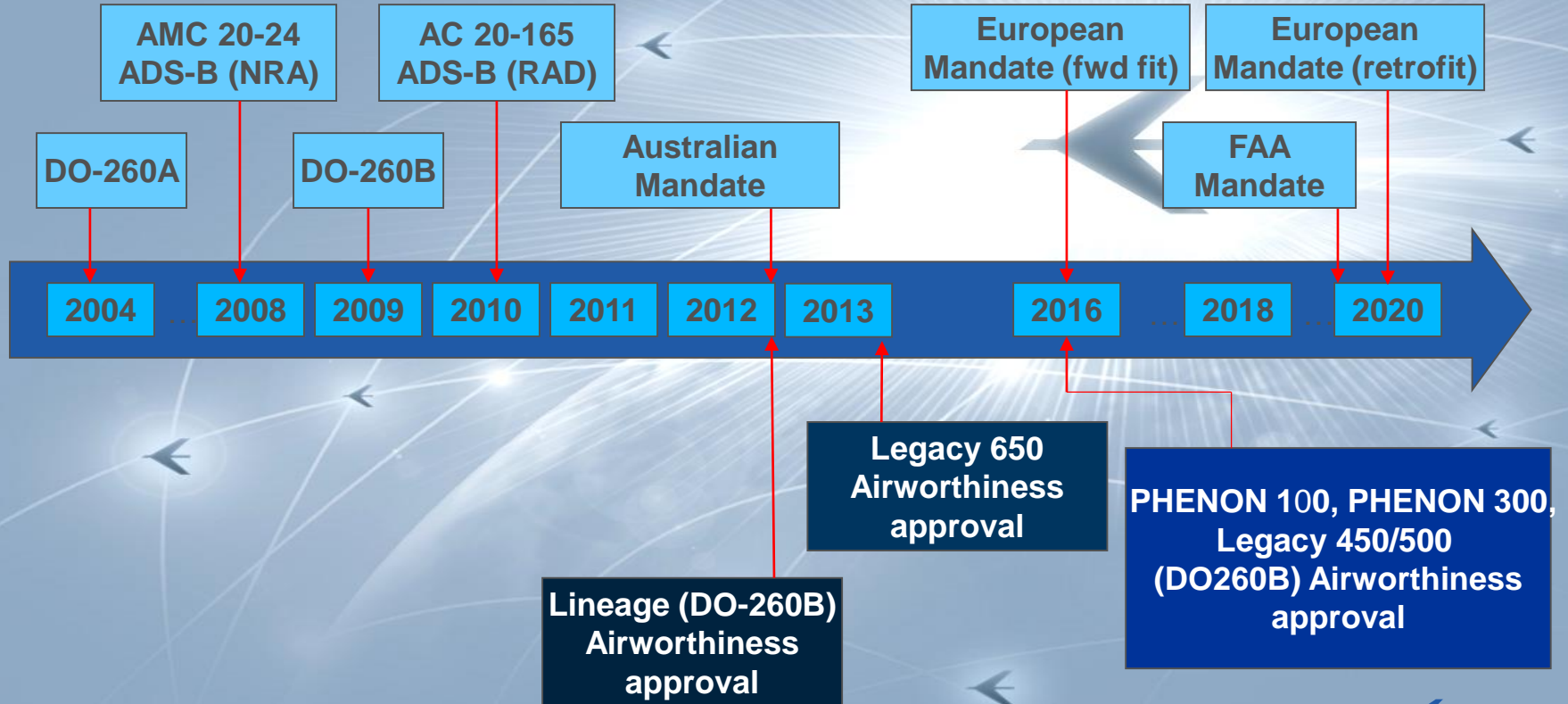
... FOR A SAFER SKY

- Participations on regulatory mandates
- Joining forces with industry in working groups for new specification standards
- Promoting debates with suppliers, operators and regulators
- Tracking field data for system improvements
- Pioneering new developments

ADS-B OUT Timeline (Commercial Aviation)



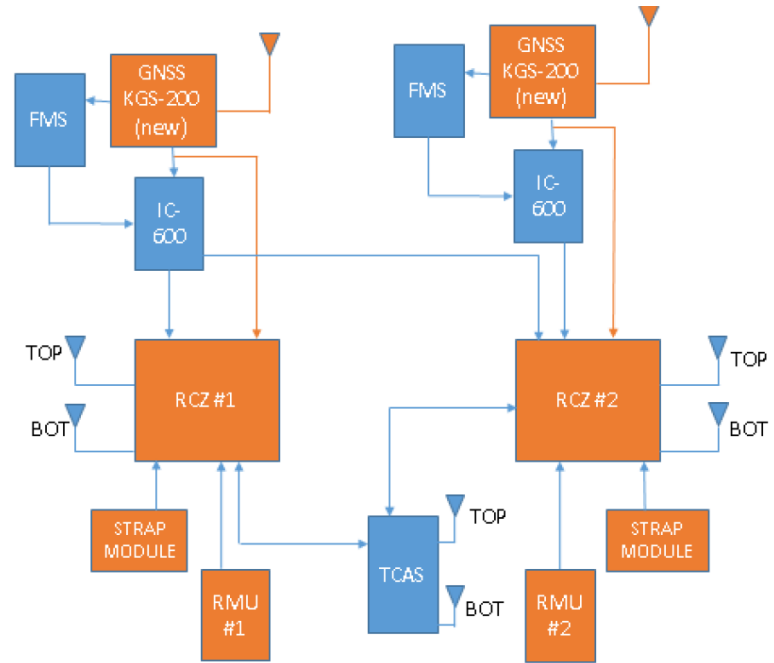
ADS-B OUT Timeline (Executive Aviation)



ERJ 145

ADS-B OUT

- Economically feasible
- High integrated radio architecture
- Legacy avionics
- Fleet near operational sunset
- Technical definition and possible solutions was already finished



**New GNSS units
and antennas**

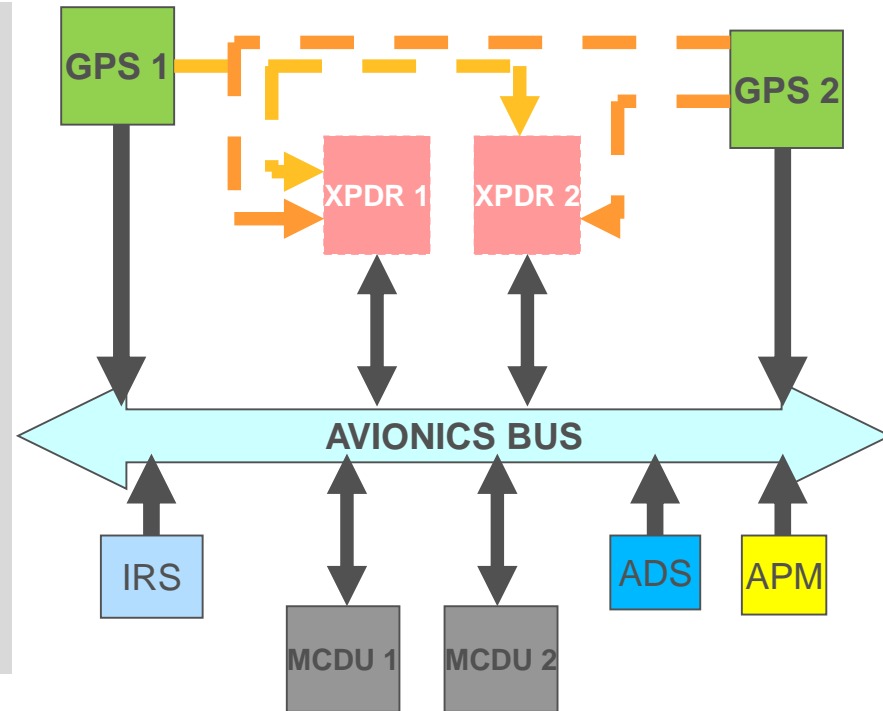
**RMUs
Upgrade**

**RCZs
Upgrade**

EJETs E1 & E2

ADS-B OUT

- Developed under DO-260B standards (TSO C166b)
- Uses GBAS GNSS (TSO C145/146) as position source
- Compliant with all current requirements (FAA, EASA, CASA)
- Improved function availability due to the Dual GPS connection for each transponder
- Low GPS data latency
- Provides function status on Crew Alerting system and on MCDU radio page.

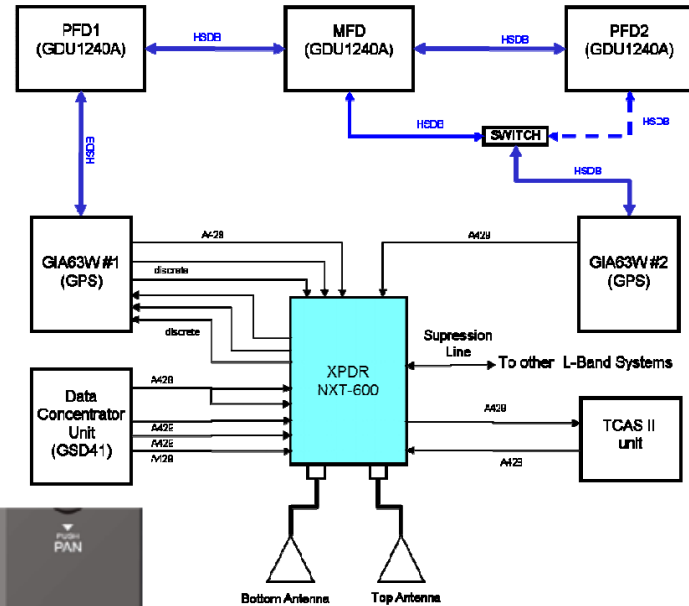


ADS-B IN Applications

- No foreseen mandate
- Potential operational Benefits for equipped aircraft (best equipped, best served)
- Some applications are still under trial phase
- Big Improvements in safety and traffic management is expected

Phenon 100 | ADS-B OUT

- Developed under DO-260B standards (TSO C166b)
- TCAS I – Garmin / GTX 33ES
- TCAS II – ACSS / XPDR replacement (4Q2017)
- RCZ 852 → NTX 600



Mode 3/A code entry IDENT



Phenon 300

ADS-B OUT

- Developed under DO-260B standards (TSO C166b)
- G1000 TCAS II – ACSS
- G3000 TCAS II – ACSS

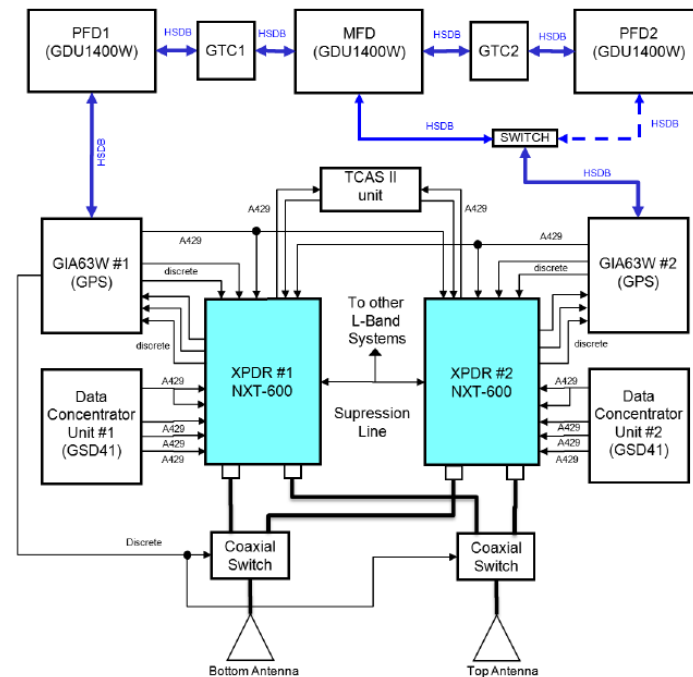


IDENT function

Mode A code entry



XPDR Failure Indication



Note: The second transponder is optional.

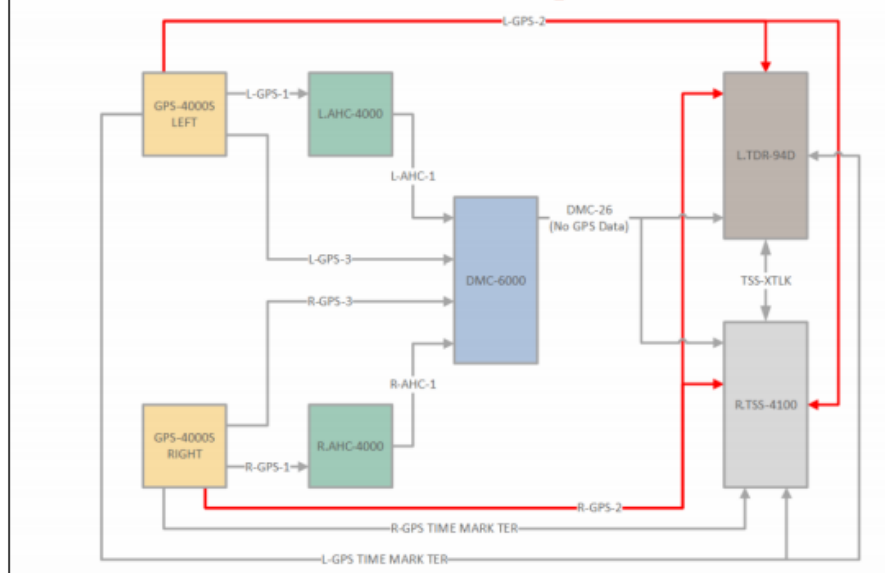
FIGURE 2 – Transponder Architecture (Dual Configuration)

Legacy 450/500

ADS-B OUT

- Developed under DO-260B standards (TSO C166b)

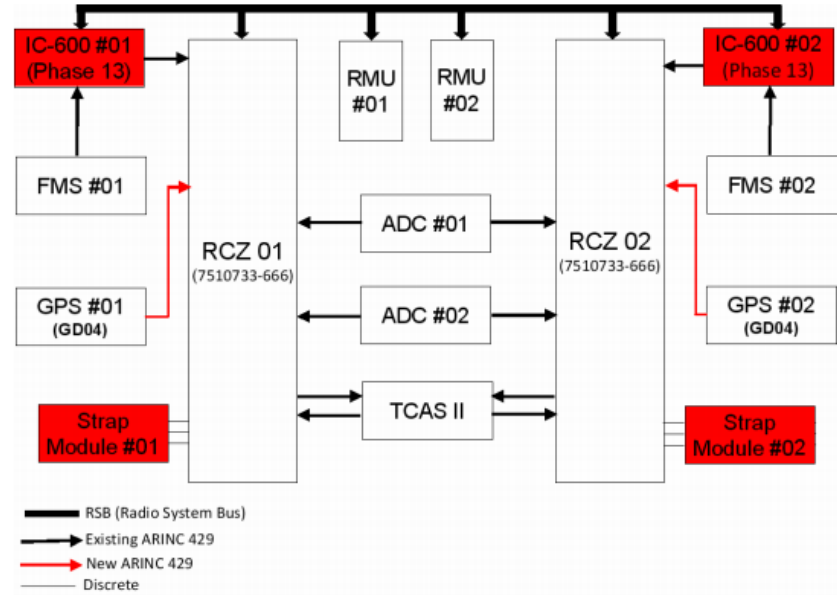
Desired GPS to TDR/TSS Wiring



Legacy 650

ADS-B OUT

- Developed under DO-260B standards (TSO C166b)





Thank You!!



E-JETS E2

THE FLEETSMART SOLUTION

Luiz Madeira Junior

luiz.madeira@embraer.com.br / +55 12 39273691

