

*ICAO - South American regional meeting on air
accident/incident investigation (AIG)
Lima, Peru, 18-20 March 2014*



Topics

- Introduction: Embraer at a glance;
- How Embraer is prepared to assist the investigations conducted by the national authorities;
- Aspects about Embraer and accident and incident organizations;

The EMB-110 Bandeirante Prototype at CTA - 1969



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02 January 1970: the birth of EMBRAER



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The first EMBRAER Product – EMB-110 Bandeirante - 1973



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WE HAVE DEVELOPED OUR BUSINESS IN THE AREAS OF:

COMMERCIAL
AVIATION



EXECUTIVE
AVIATION



EMBRAER
DEFENSE &
SECURITY



WE ARE HERE TO SERVE OUR CUSTOMERS



COMMERCIAL AVIATION



Regional Jets

ERJ 135

37 seats
range*: 1,750 nm
LR version
Cruise 0.78 M

ERJ 140

44 seats
range*: 1,650 nm
LR version
Cruise 0.78 M

ERJ 145

50 seats
range*: 1,550 nm
LR version
Cruise 0.78 M

ERJ 145 XR

50 seats
range*: 2,000 nm
XL version
Cruise 0.80 M

* Single-class configuration: pitch 31" - FAR domestic reserves (45 min) + alternate of 100 nm; 91 kg (200 lb) per pax and 76 kg (168 lb) per crew member





E-Jets

EMBRAER 170

70 to 78 seats
range*: 2,100 nm

EMBRAER 175

78 to 88 seats
range*: 2,000 nm

EMBRAER 190

98 to 114 seats
range*: 2,400 nm

EMBRAER 195

108 to 124 seats
range*: 2,200 nm

* AR Version, single-class configuration: pitch 32"- Long-Range Cruise, FAR domestic reserves (45 min) + alternate of 100 nm; 100 kg (220 lb) per pax and 80 kg (176 lb) per crew member.



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Commercial Jets



* Schedule and non-schedule companies, and only E-Jets and ERJ families

EXECUTIVE AVIATION

Ultra-Large	 <p>Lineage 1000[®] BY EMBRAER</p>
Ultra-Long Range	
Large	 <p>LEGACY 650[®] BY EMBRAER</p>
Super Mid-Size	 <p>LEGACY 600[®] BY EMBRAER</p>
Mid-Size	 <p>LEGACY 500[®] BY EMBRAER</p>
Mid-Light	 <p>LEGACY 450[®] BY EMBRAER</p>
Light	 <p>PHENOM 300[®] BY EMBRAER</p>
Entry	 <p>PHENOM 100[®] BY EMBRAER</p>

Prototype Flying

EXECUTIVE AVIATION

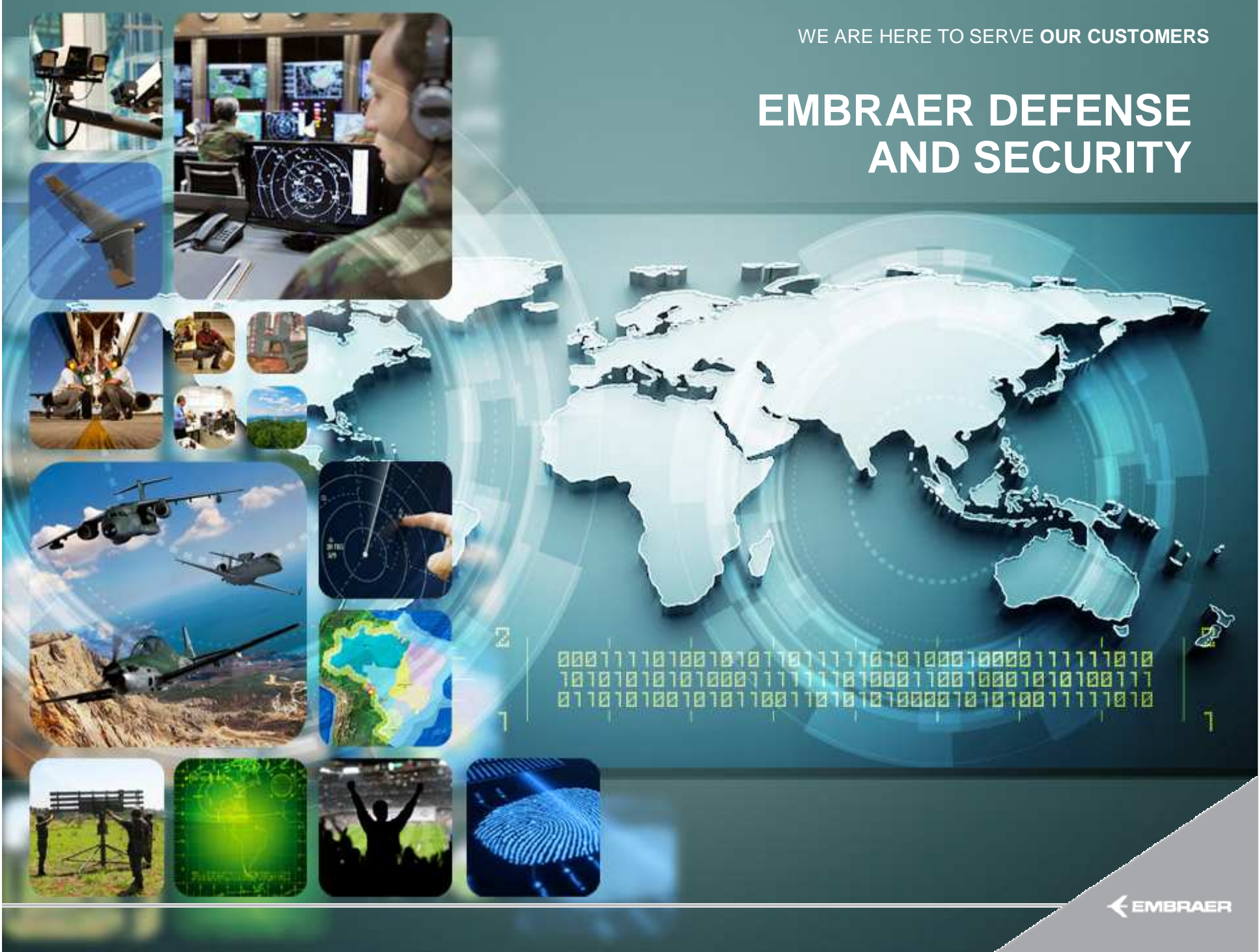


MORE THAN **600** AIRCRAFT DELIVERED
IN OVER **45** COUNTRIES

January/2013

WE ARE HERE TO SERVE OUR CUSTOMERS

EMBRAER DEFENSE AND SECURITY



00011101001010110111101010001000011111010
1010101010100011111101000110010001010100111
0110101001010110011010101000010101001111010

EMBRAER DEFENSE AND SECURITY

Intelligence, Surveillance and
Reconnaissance (ISR) Systems

EMB 145 AEW&C / MP / Multi-Intel

Light Attack and Advanced Training
Super Tucano

Tactical Military Transport

KC-390

Transport of Authorities

Aircraft Modernization

Unmanned Aerial Vehicle (UAV)



EMBRAER DEFENSE AND SECURITY

OVER **50** ARMED FORCES IN **48** COUNTRIES



Note: Except undisclosed customers

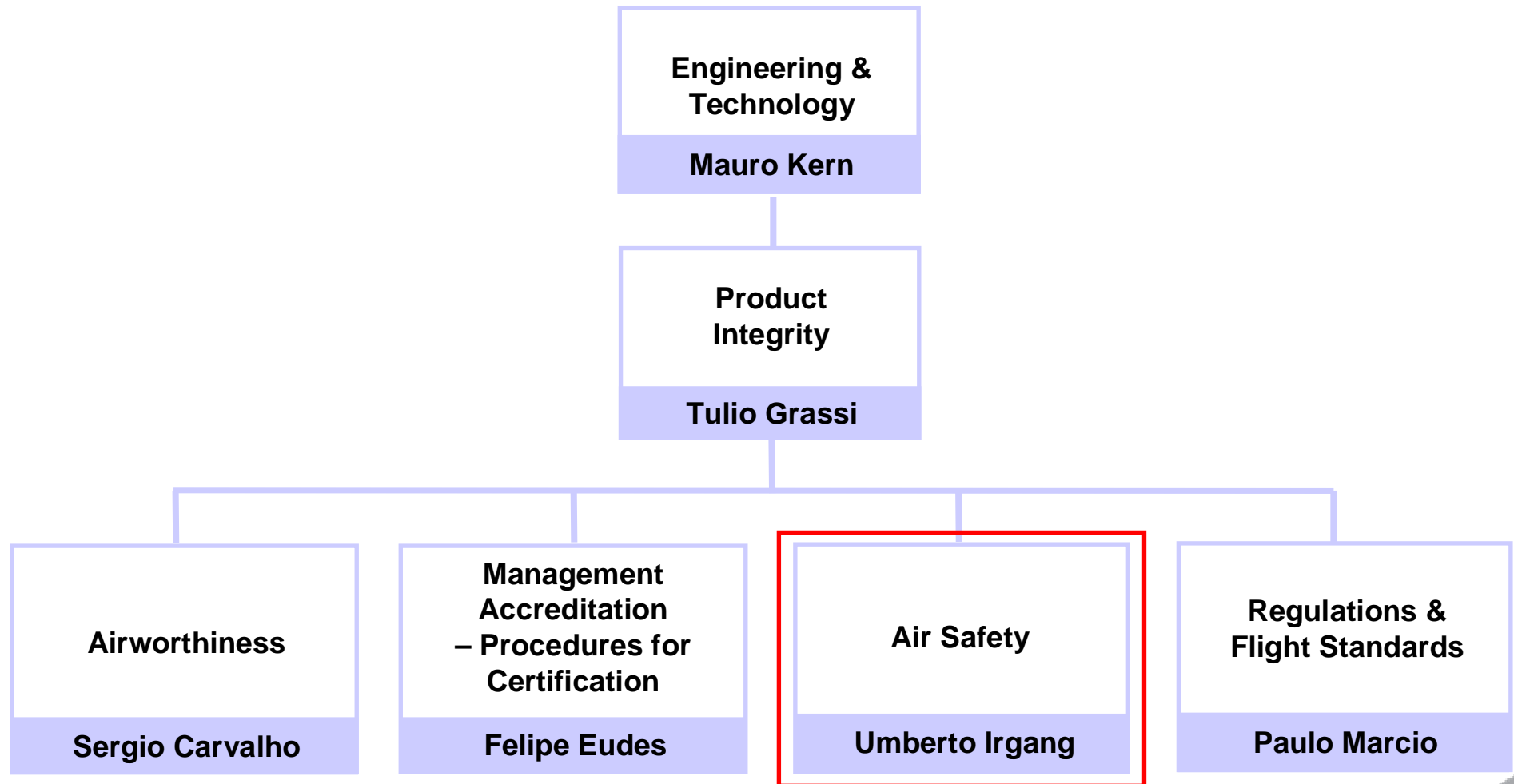
January/2013



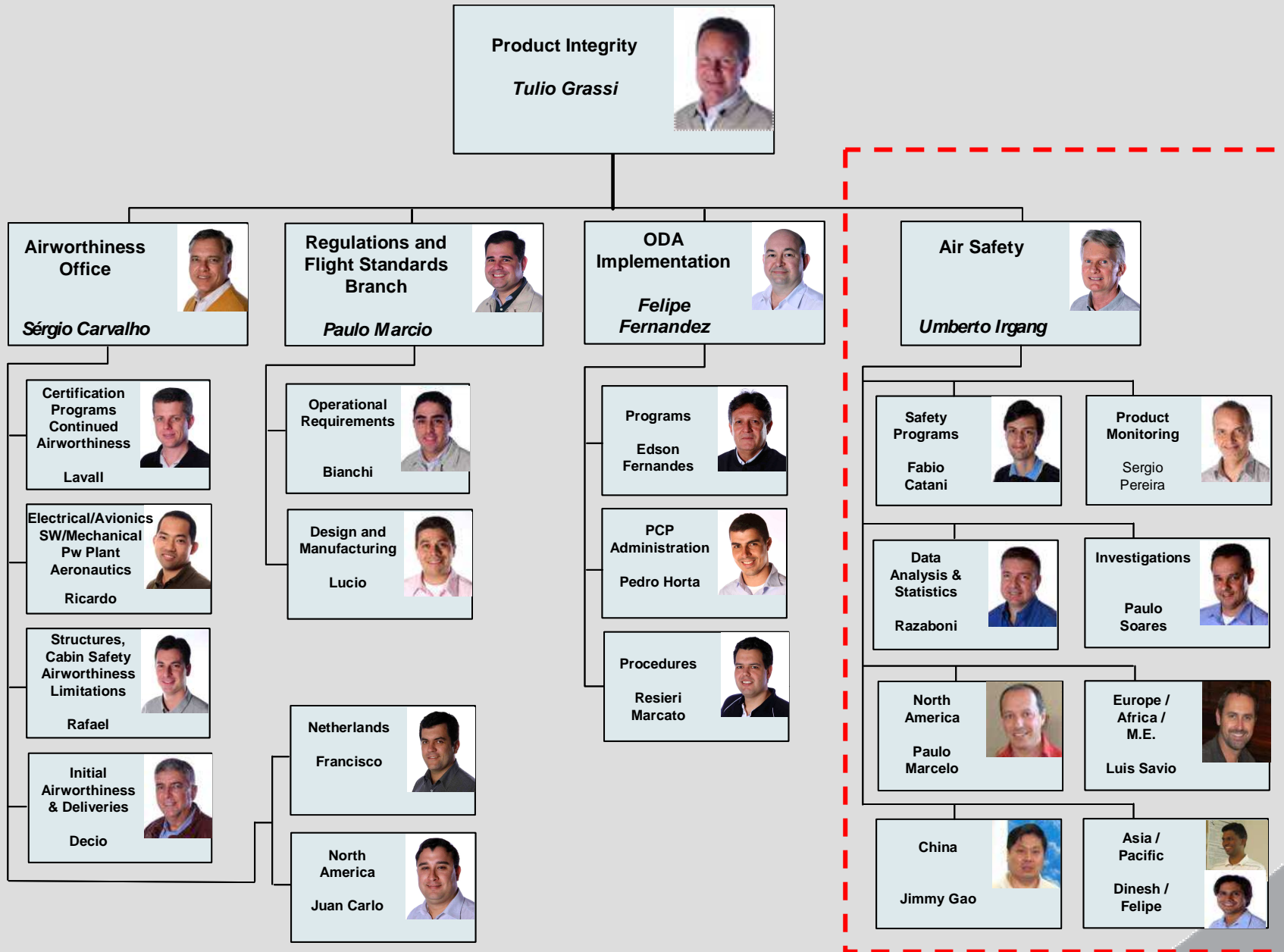
Topics

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Organizational Position



Organizational Structure

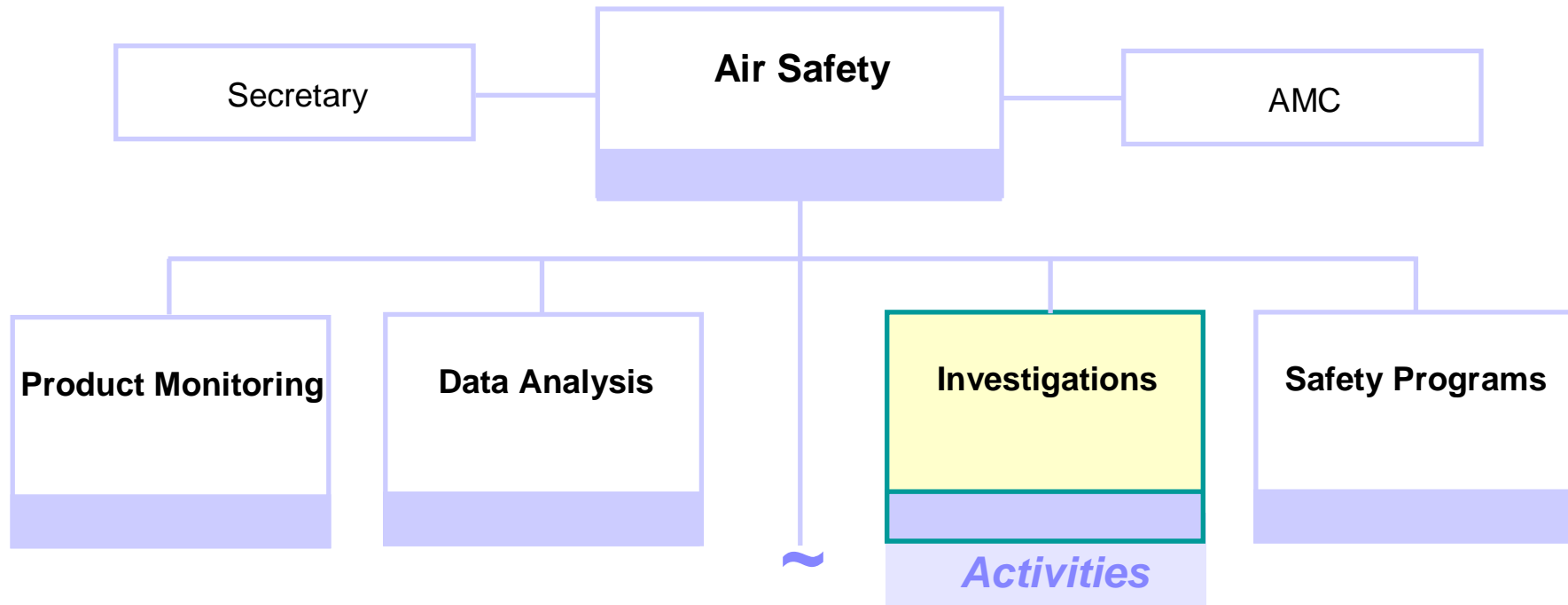


The Embraer Air Safety Team



- Continuous training in accident investigation
- International experience
- Development of new investigation techniques

Embraer Safety Team: Activities & Processes



• Official Investigations.....	ENS-007076
• Embraer Crisis Management Plan.....	ENS-002711
• Communication to Operators (ERFR).....	ENS-002710
• Reporting Process.....	ENS-002712
• Air Safety Technical Advisory Reports.....	ENS-007075
• Operational Factors Monitoring.....	ENS-008244
• Survival Factors Monitoring.....	In preparation

**ENS =
Embraer
Normative
System**

Investigations Group



Paulo Soares



Carlos Eduardo (Cadu)
Investigations



Frederico Moreira
Investigations



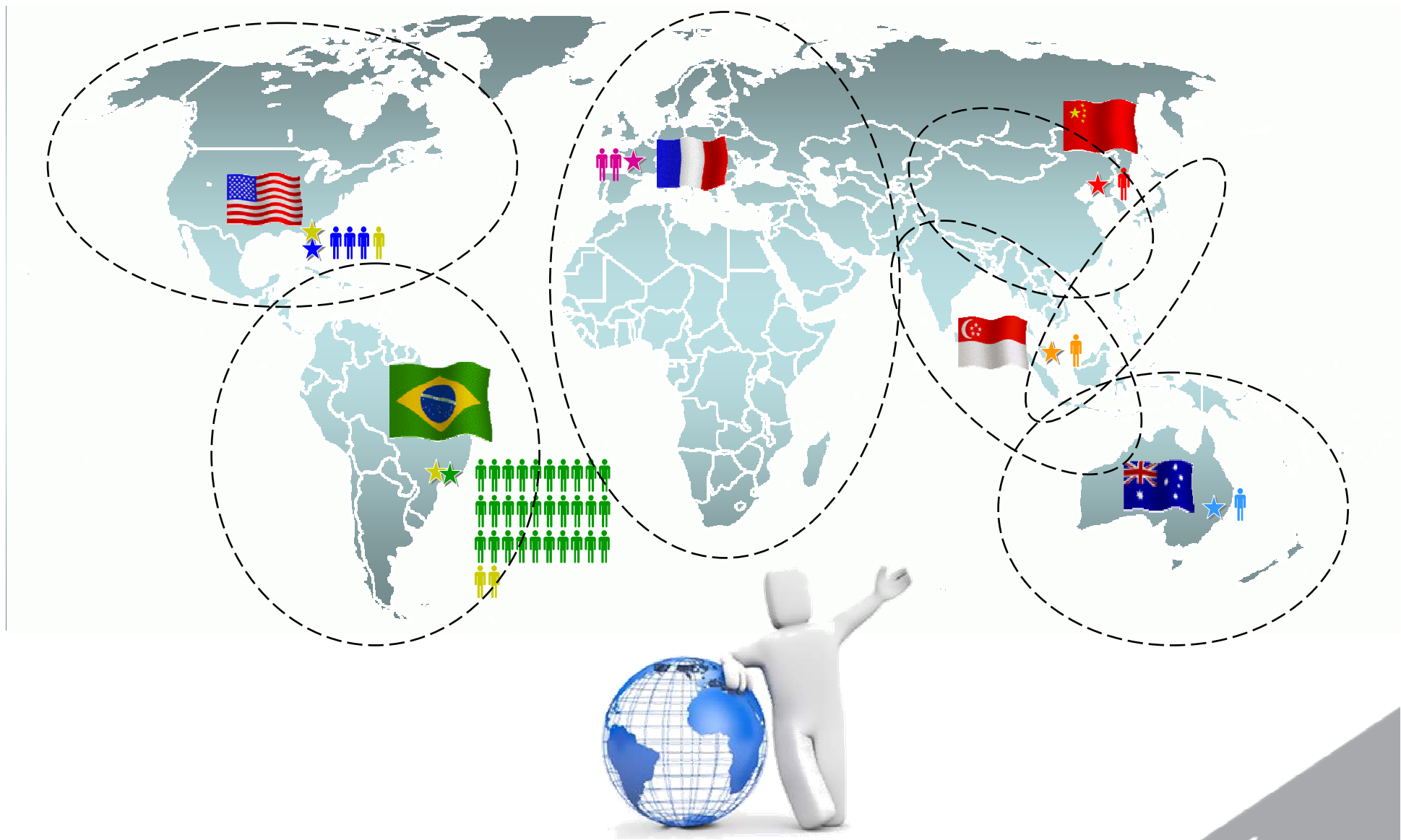
Jose Pistilli Junior
Investigations
&
Cabin Safety



Fabio Bonnett
Investigations
&
Operational Aspects

ENS - 007076

Embraer Air Safety offices to assist the Regions of the World



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Embraer Air Safety Actuation



Embraer Air Safety Actuation

Embraer Air Safety Institutional Representation

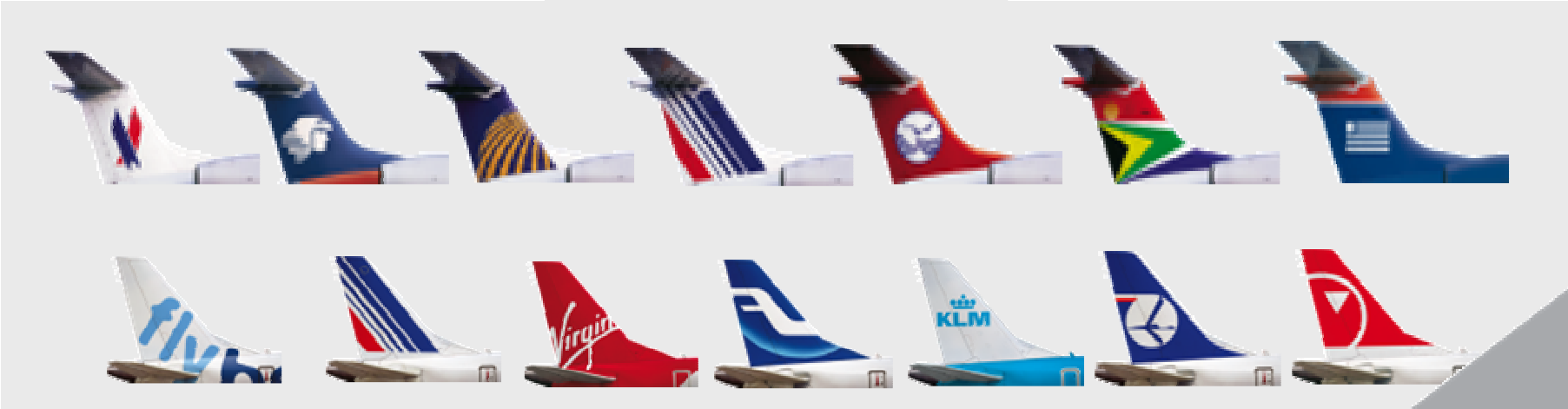
Investigation Authorities



Embraer Air Safety Actuation

Embraer Air Safety Institutional Representation

**Customers
(Flight Safety Officers)**



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Embraer Air Safety Actuation

Embraer Air Safety Institutional Representation

Institutions and flight safety forums



***Go-Kit and
Personal Protection***

Personal Protection



- **Low Temperature Clothes**
- **Insect Repellent ...others**

Go-Kit Support Equipment

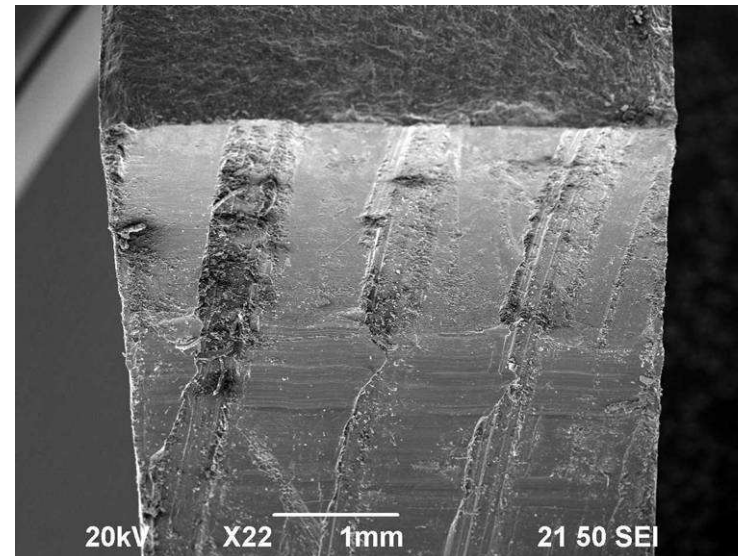
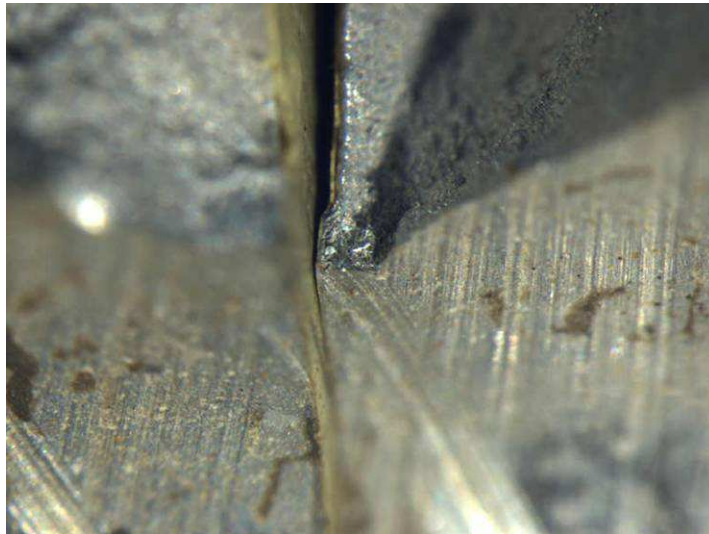
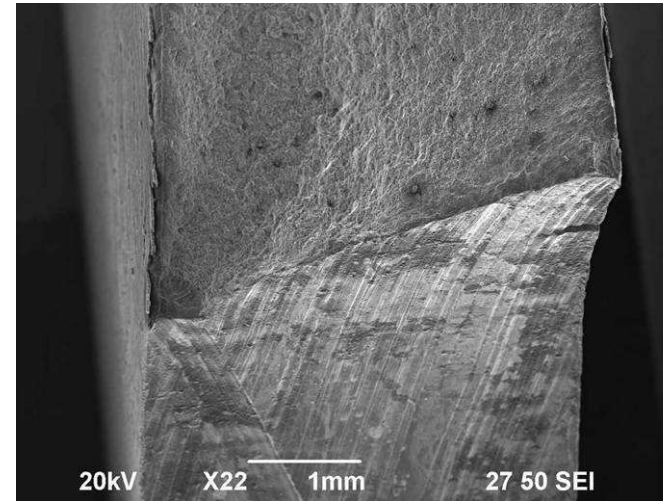
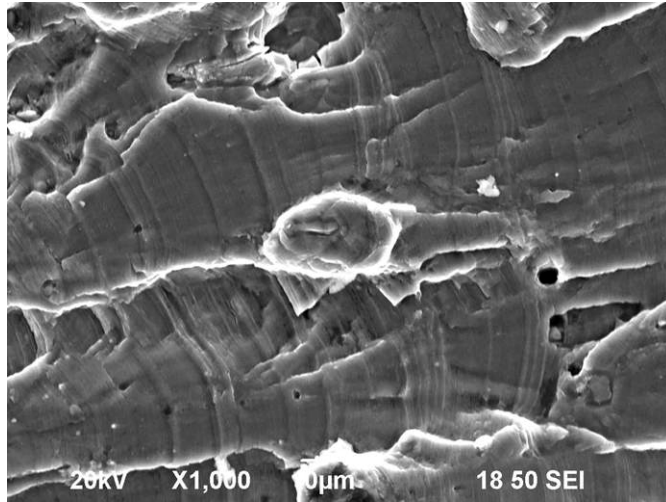
- GPS
- Digital Cameras
- Water proof cameras
- Compass
- Ipads
- Long Distance Walk-Talk
- Measuring Tapes
- Marker pens
- Others ...



***Facilities and resources
available to assist the
investigations***

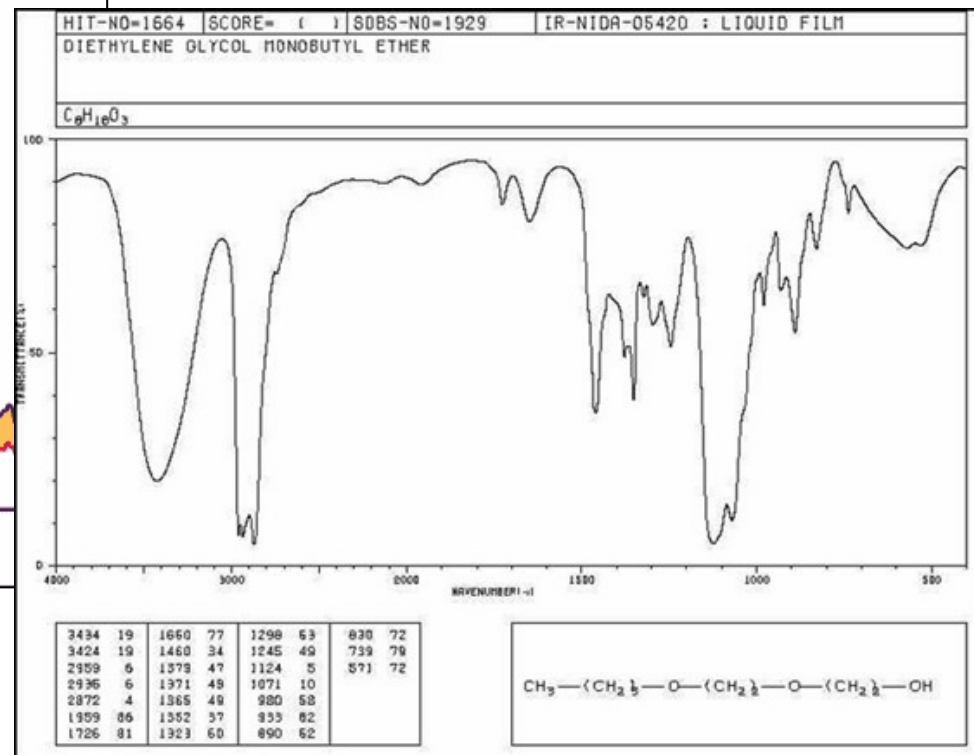
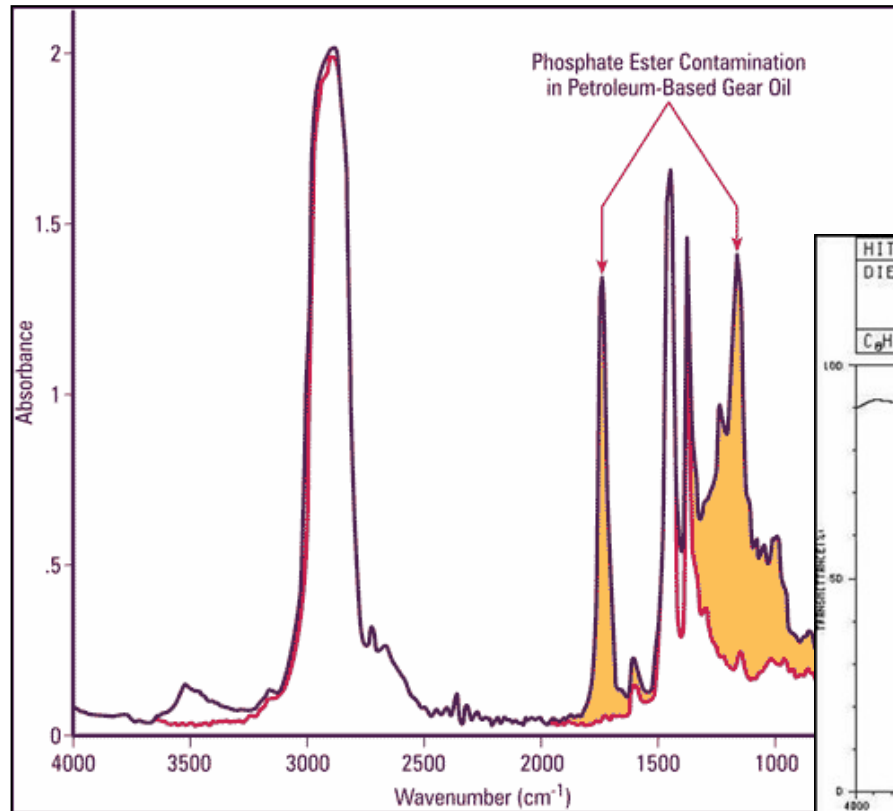
Assisting Investigations

Laboratory for material analysis



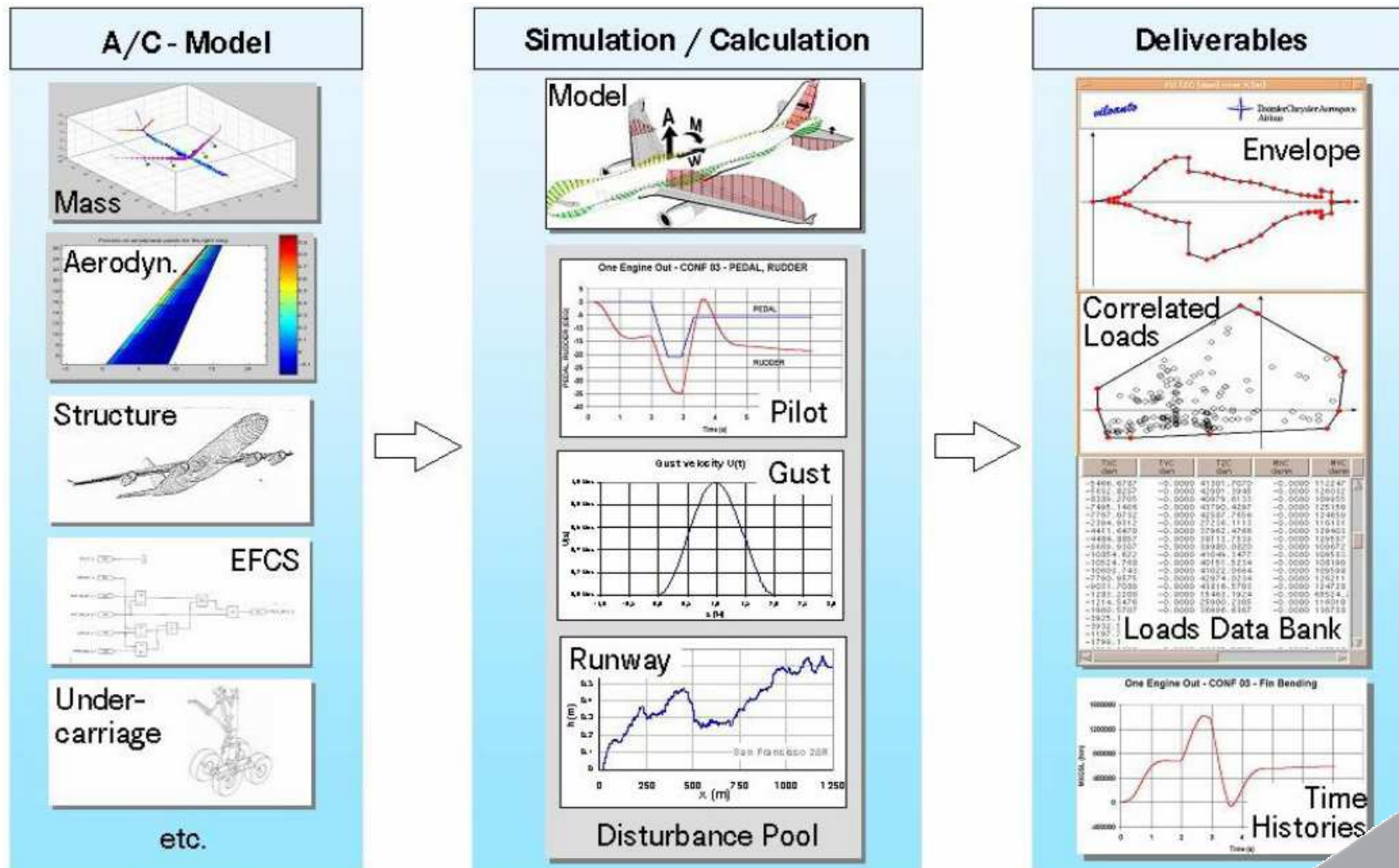
Assisting Investigations

Laboratory for fluid spectrum analysis



Assisting Investigations

Computer Simulations



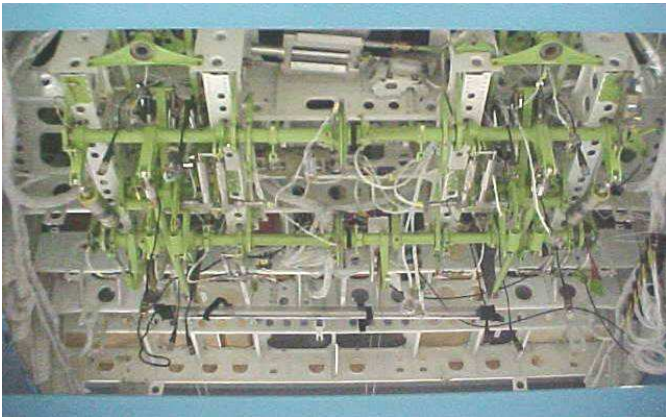
Assisting Investigations

Computer Simulations

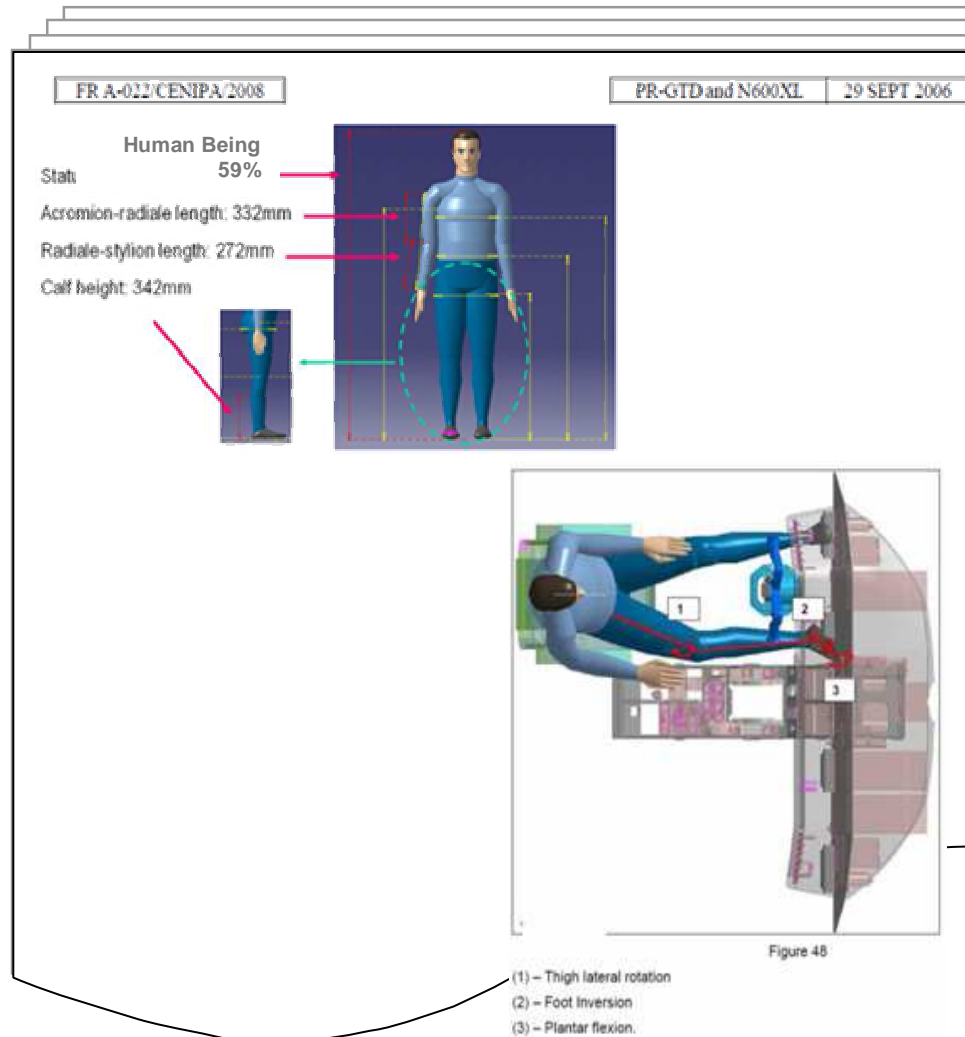


Assisting Investigations

Iron Birds & Integration Labs



Ergonomic Analysis

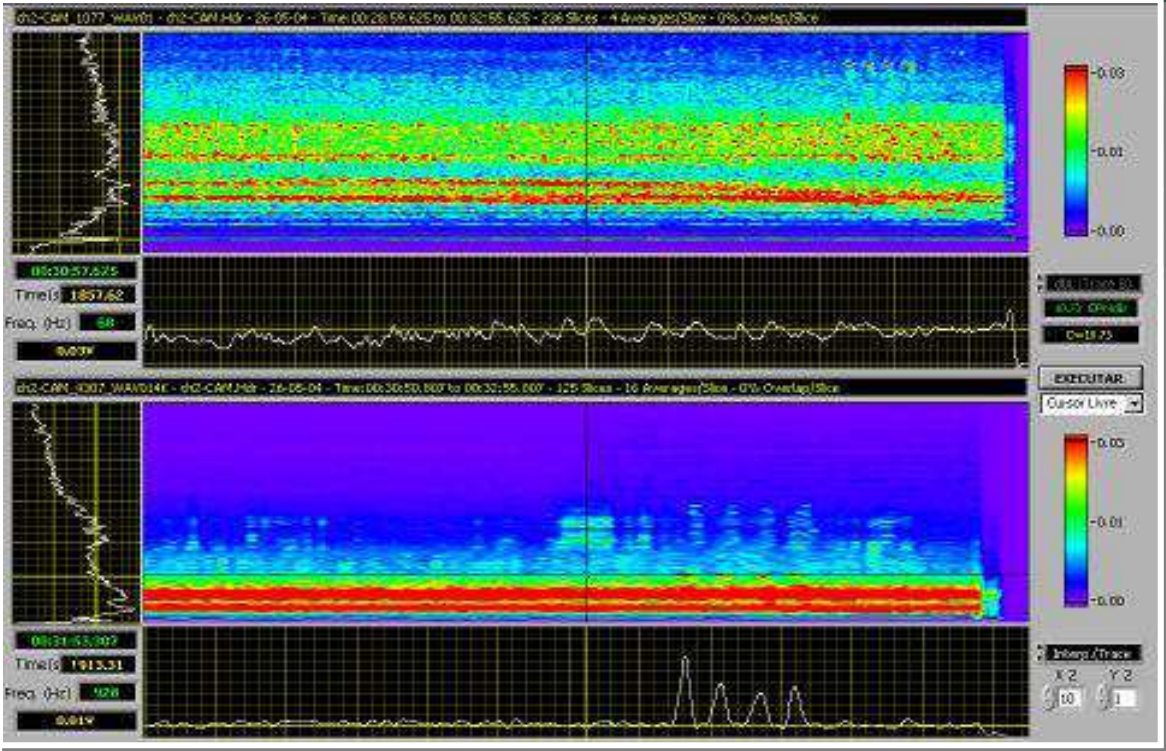
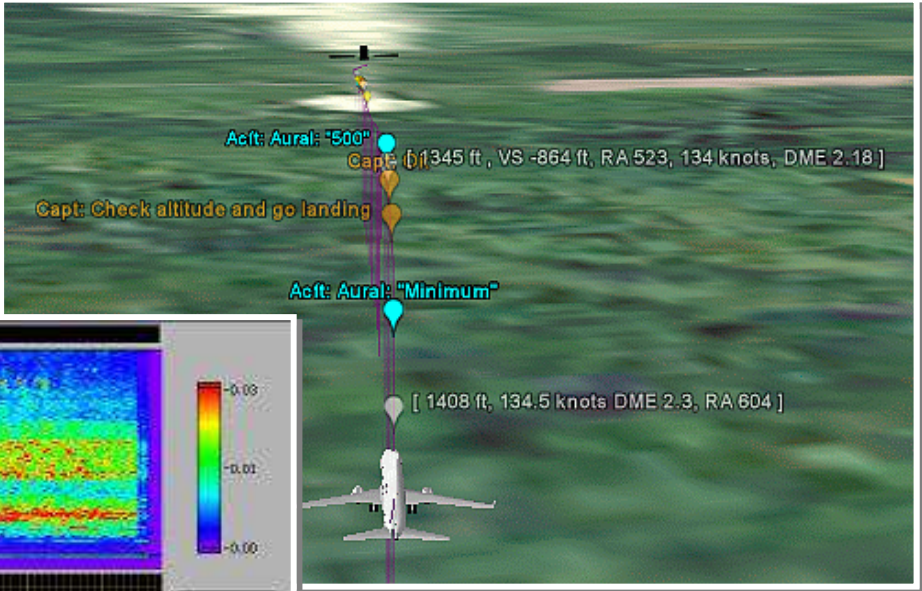


Virtual Human Body

- Thigh flexion;
- Thigh abduction;
- Thigh rotation;
- Leg flexion;
- Leg rotation;
- Planter flexion; and
- Foot inversion.

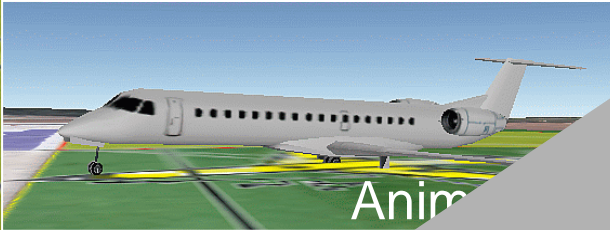
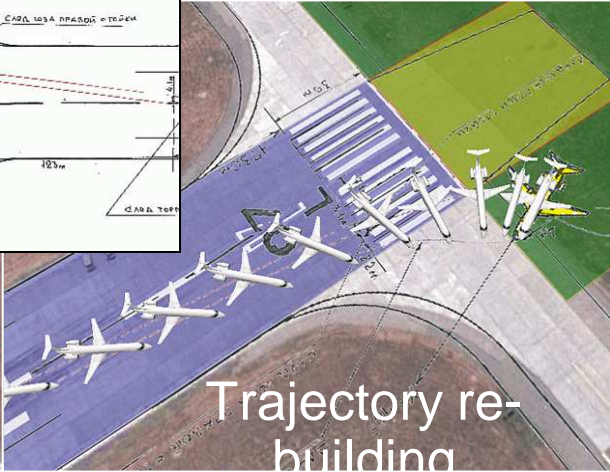
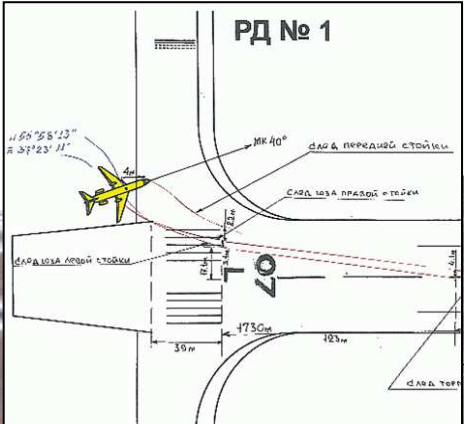
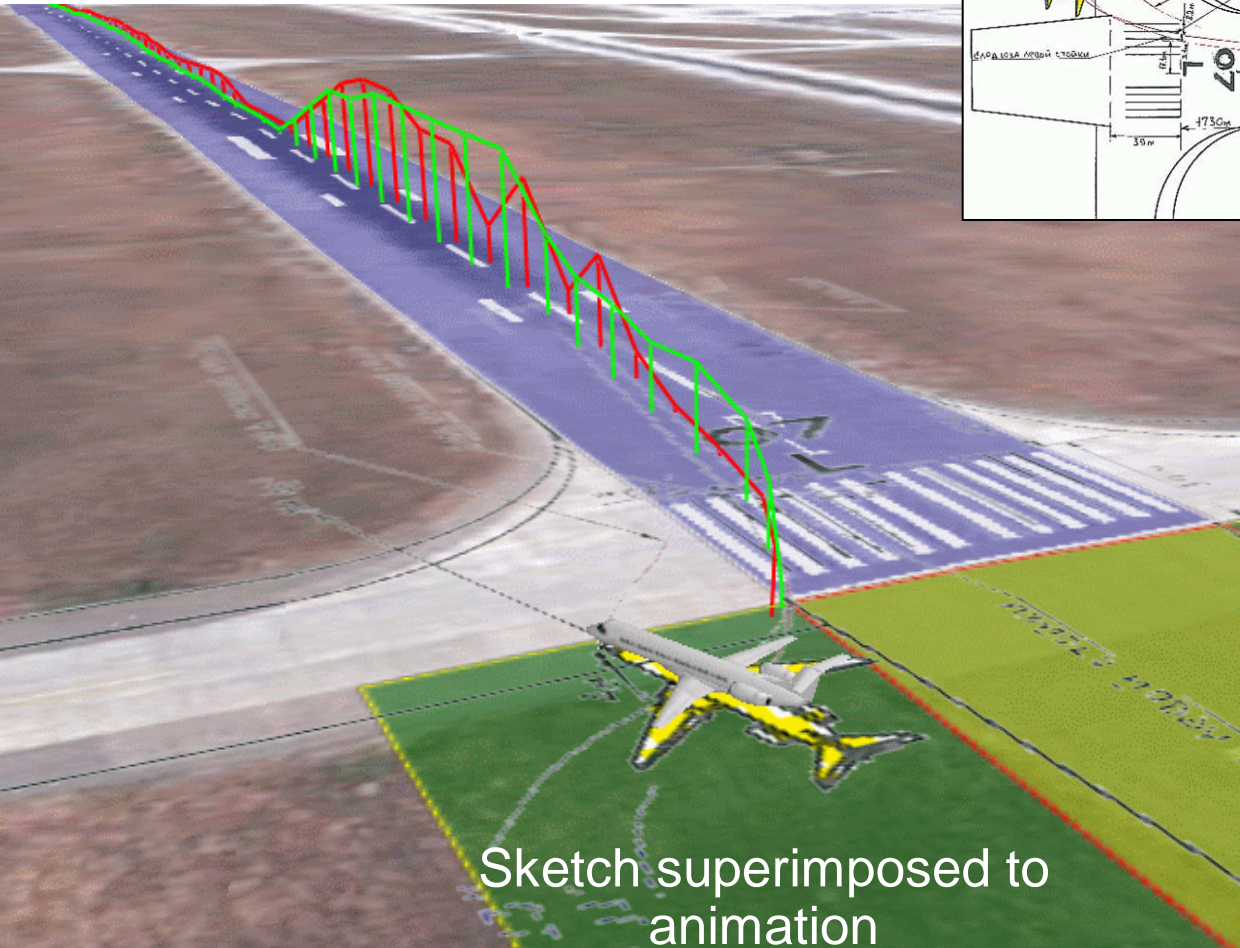
Assisting Investigations

CVR Spectrum Analysis

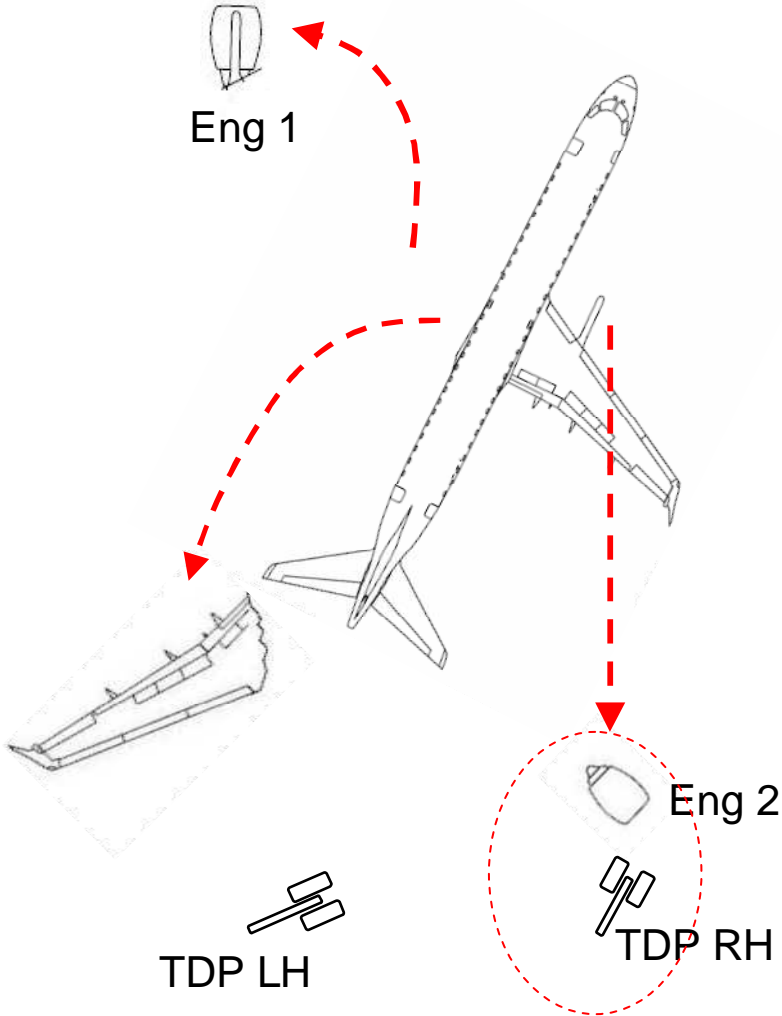
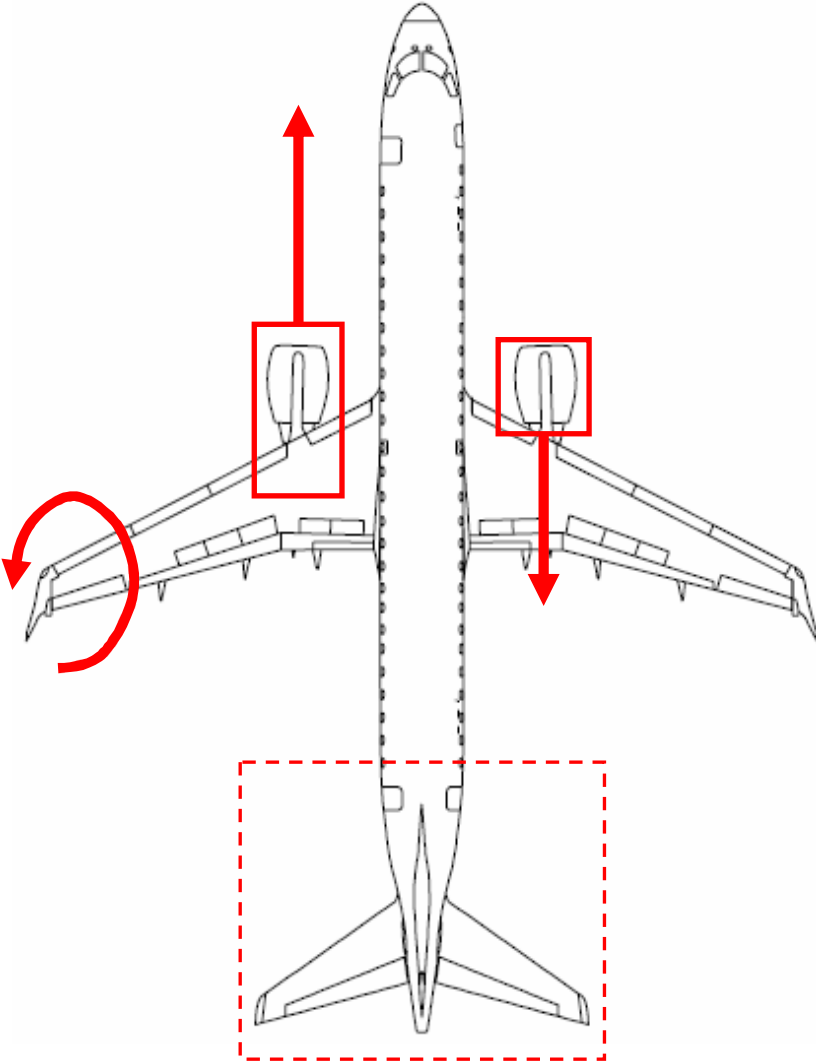


Assisting Investigations

Flight Data Analysis



Crash Dynamics



Topics

- Introduction: Embraer at a glance;
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- Aspects about Embraer and accident and incident organizations;

SIPAER (Brazilian Investigation and Prevention System)

SIPAER

What is it ?

SIPAER (Brazilian Investigation and Prevention System)

CBA – Brazilian Aeronautical Code



Presidência da República Casa Civil Subchefia para Assuntos Jurídicos

LEI Nº 7.565, DE 19 DE DEZEMBRO DE 1986.

Dispõe sobre o Código Brasileiro de Aeronáutica.

O PRESIDENTE DA REPÚBLICA, faço saber que o Congresso Nacional decreta e eu sanciono a seguinte Lei:

CAPÍTULO VI

Sistema de Investigação e Prevenção de Acidentes Aeronáuticos

Art. 86. Compete ao Sistema de Investigação e Prevenção de Acidentes Aeronáuticos planejar, orientar, coordenar, controlar e executar as atividades de investigação e de prevenção de acidentes Aeronáuticos.

SIPAER (Brazilian Investigation and Prevention System)

SIPAER - Sistema de Investigação e Prevenção de Acidentes Aeronáuticos

CBA Art. 86. Compete ao Sistema de Investigação e Prevenção de Acidentes Aeronáuticos planejar, orientar, coordenar, controlar e executar as atividades de investigação e de prevenção de acidentes aeronáuticos.



The “Machine”

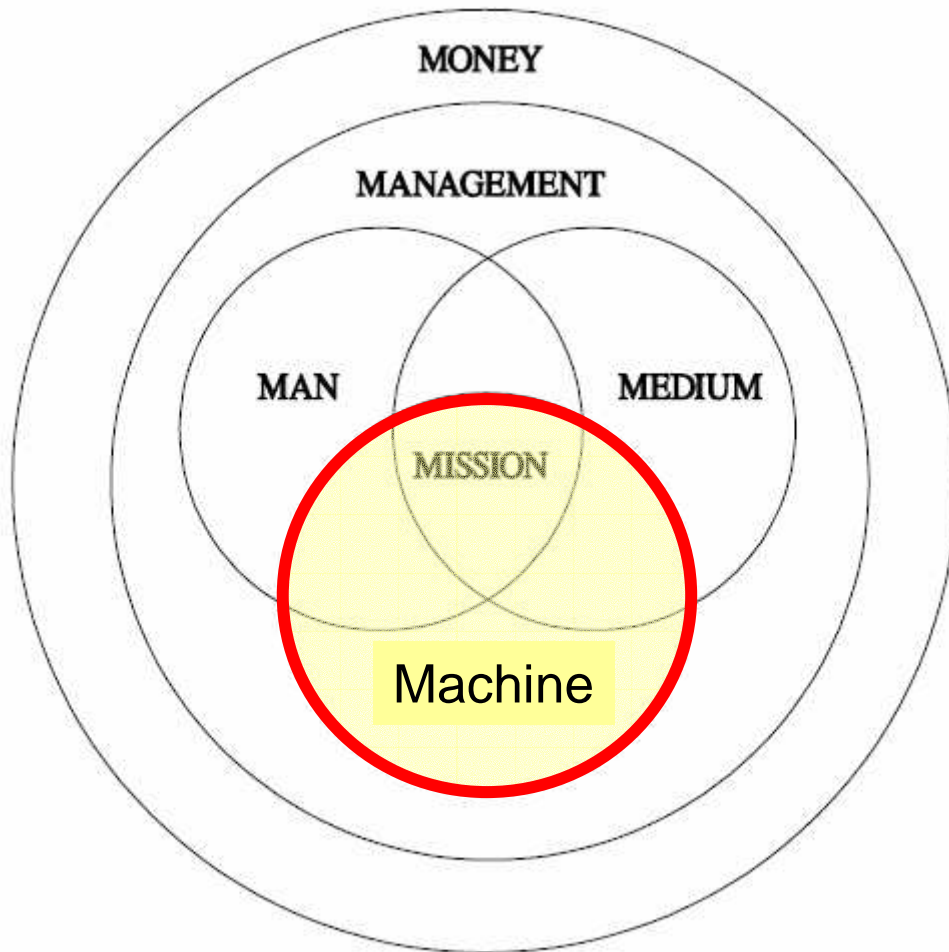


Figure 3.3.1 The Six “M” Model for Organizational Investigation

ICAO Doc 9756-AN/965 Manual of Aircraft Accident and Incident Investigation
Part III — Investigation

The interface with CENIPA and other authorities

Quick designation



MINISTRY OF DEFENCE
COMMAND OF AERONAUTICS
AERONAUTICAL ACCIDENT INVESTIGATION AND PREVENTION CENTER (CENIPA)
SHIS QI 05 – ÁREA ESPECIAL 12 – VI COMAR
71.615.600 – BRASÍLIA – DF (BRAZIL)
Telephone: + 55 61 3365 1004 – E-mail: cenipa@cenipa.aer.mil.br

Official Document nº 037/DIPAA/4004
COMAER Protocol nº 67012.003856 /2010-59

Brasilia, 25 August 2010.

To Civil Aviation Administration of China – Office of Aviation Safety

Address: 155 Dongsí Street West, Dongcheng
Beijing 100710, China / E-mail: yf_mao@caac.gov.cn
Tel.: (+86) 10-6409 1911 / Fax: (+86) 10-6405 2829

Subject: EMB-190 Accident – B3130, on 24 Aug 2010.

Dear Sir,

1. In reference to the accident involving the EMB 190 (registered B3130) on 24th August 2010 in Yichun Airport, China, we would like to thank you for the notification. As State of Manufacture, we would also like to appoint Major Marcio Vieira de Mattos as Brazil's Accredited Representative (non-travelling), and Mr Paulo Soares Oliveira Filho, Mr Athos Morais Salustiano dos Santos, Mr Gao Jian Min, Mr Siu Ying Yeung, Mr Chen Yuanping, Mr Xu Shixin and Mr Chen Qi as Advisers from EMBRAER, in accordance with ICAO Annex 13. If you need further information, we'll be glad to help you.

ERJ-190, CFIT, China

Designation of
Accredited
Representative and
Advisors by CENIPA:

Accident date:
24.Aug.2010

Designation Letter:
25.Aug.2010

Aircraft Accident Investigation protocols

As advisor of CENIPA, Embraer can assist in:

- Participating in all areas of the investigation:
 - Visiting accident scene and examine wreckage
 - Obtaining witness information and suggesting areas of questioning
 - Accessing all relevant evidence and documents
 - Participating in read-outs of recorded media
 - Participating in off-scene investigation activities and testing
 - Making assumptions in respect of various elements of investigation
- Assisting the IIC and the Accredited Representative in reviewing and commenting upon draft reports.

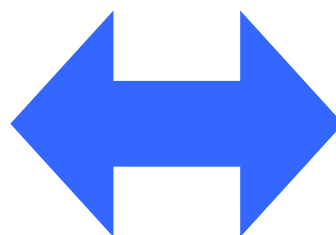
Working together with the Brazilian Investigation Authority (CENIPA)

Team work in training



CPAA – Prevention
CPAA – Human Factors
CPAA – Material Factors
CIAA – Investigations

...



Aircraft Systems and
Familiarization
Instructors for specific
topics on investigation
Lectures

Working together with the Brazilian Investigation Authority (CENIPA)

Contributing to Formal Investigation Trainings with CENIPA



Aircraft Training for Investigation Authorities

Aircraft Systems and Familiarization Training for Investigators

CENIPA	Brasil
JIAAC	Guatemala
JIAAC	Argentina
BEA	France
DGAC	Costa Rica
DGAC	Ecuador
AeroCivil	Colombia
NTSB	US



Sharing Experience and Knowledge

Embraer Training Videos



Sharing Experience and Knowledge

Dedicated visits to the authorities

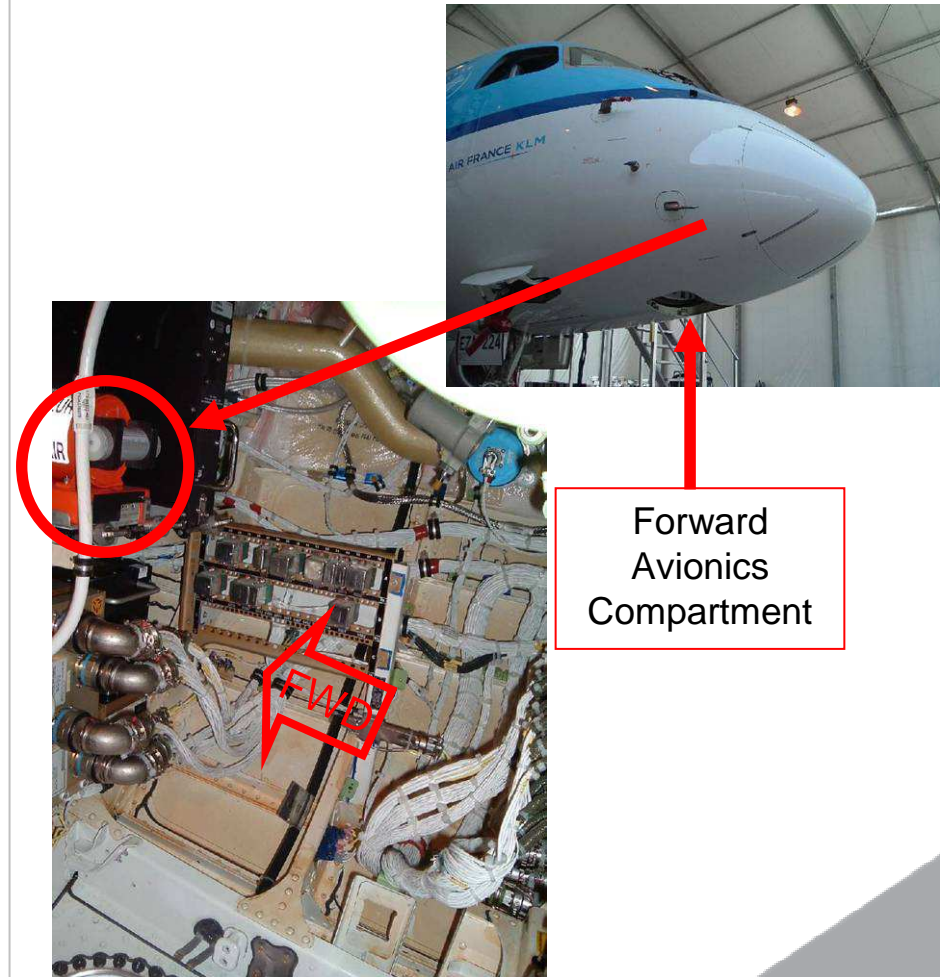


EMBRAER-170/175/190/195 and Lineage
FDR - Flight Data Recorder and CVR - Cockpit Voice Recorder

ACCESS – REAR UNIT



ACCESS – FRONT UNIT



EMBRAER-170/175/190/195 and Lineage
FDR - Flight Data Recorder and CVR - Cockpit Voice Recorder

LINEAGE ACCESS TO DVDR REAR UNIT



Rear Baggage Compartment

EMBRAER-170/175/190/195 and Lineage

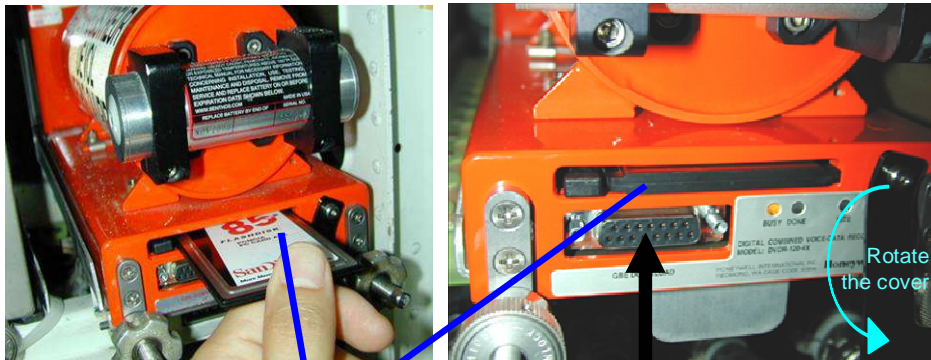
FDR - Flight Data Recorder and CVR - Cockpit Voice Recorder

Honeywell DVDR Downloading FDR Data

L3 Comm CVDR

The Honeywell DVDR has an built-in PCMCIA slot which enables the user to download the data recorded in FDR portion by using only a memory card (task number 31-31-00-970-801-A). **Alternatively**, it is also possible to download the FDR data by using a Hand Held Download Unit (HHDLU) connected to the RS-422 interface connector on the DVDR unit front panel (task number 31-31-00-970-802-A). **CVR audio can not be downloaded on wing.**

The L3 Comm CVDR does not have the PCMCIA slot facility for FDR download. The download must be done by using the FA2100 Portable Interface Unit. Refer to Alitalia AMM task number 31-31-00-970-802-A.



PCMCIA Card

Note: the PCMCIA card must contain a specific file inside, a file called 'atc_key.txt'. Otherwise the download data will be encrypted and EMBRAER does not have any toll to decrypt the data.



Honeywell Hand Held Download Unit
PN: 964-0446-021



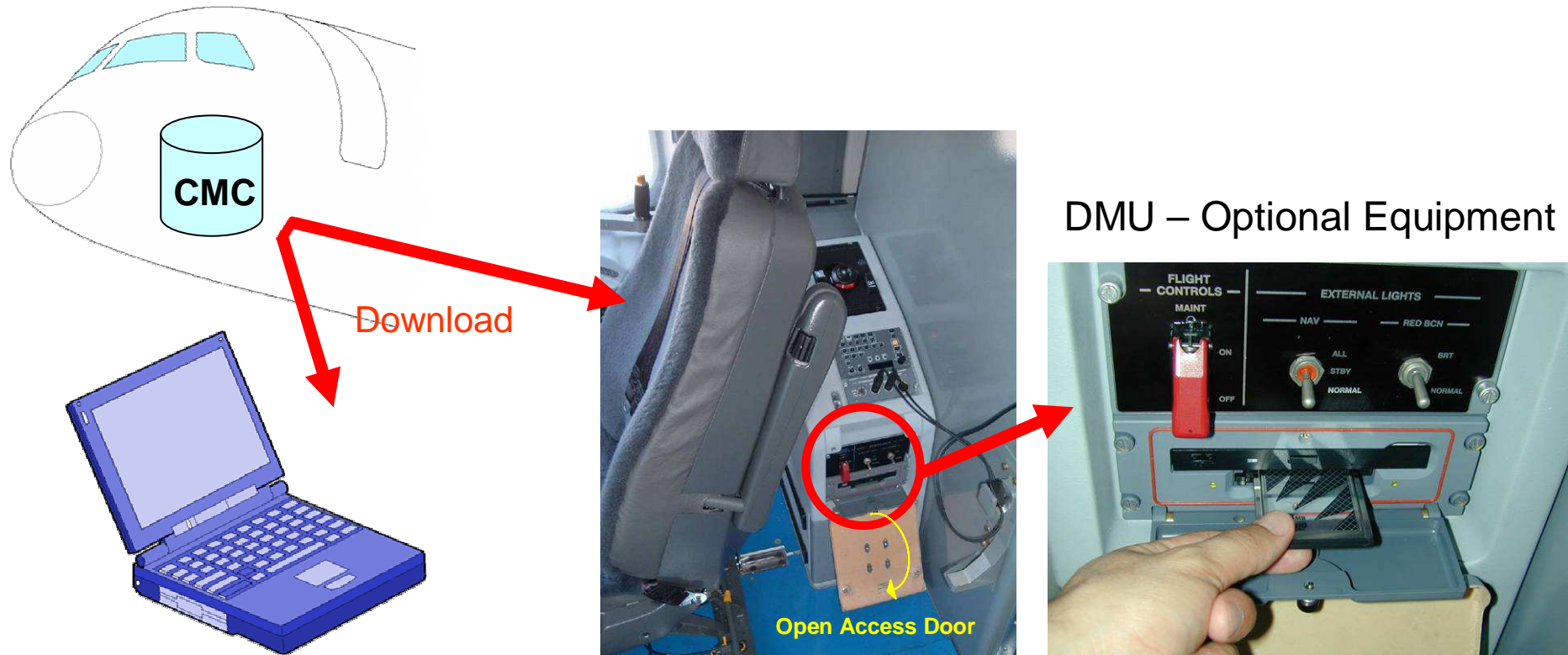
Loosen the screw to open the cover to get access to the DVDR connector.



L3 Comm FA2100
PN: 964-0446-021

EMBRAER-170/175/190/195 and Lineage
CMC – Central Maintenance Computer (On-Board Diagnostics System)

Downloading CMC data



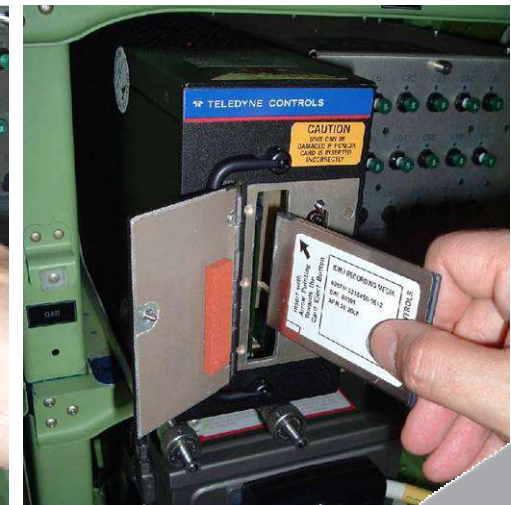
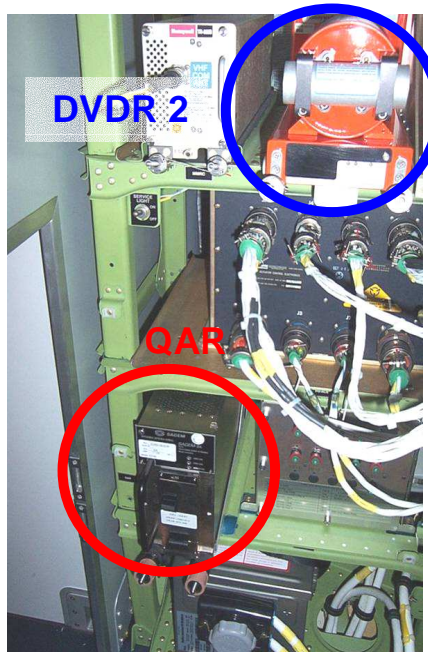
EMBRAER-170/175/190/195 and Lineage
 QAR – Quick Access Recorder

Location

Avionica Mini QAR

Sagem QAR

Teledyne QAR



Sagem QAR

P/N ED35E109-04-00
 Delivered by EMBRAER
 ~1200 parameters
 512 wps
 Data frame Docs.:
 170EBD062 (170)
 190EBD203 (190)

Teledyne QAR

P/N 2235400-06
 Alitalia, Hainan
 ~2000 parameters
 1024 wps
 Data frame Docs.:
 ARD-ACAA01-IDMU
 (issued by Teledyne)

Avionica Mini QAR

P/N 804-0105-03
 Flybe

Needs

- More preliminary reports from investigation authorities;
- New technologies requires new investigation techniques (we are working on it):
 - Software Investigation
 - High Integrated Systems
 - Glass Cockpit and HMI
 - Space Weather

Questions



 **EMBRAER**
Commercial Jets

A young boy with blonde hair, wearing a grey t-shirt and blue shorts, stands on a sandy beach. He is using a long wooden stick to draw the word "THANK" in the sand. The word is formed by a line of small, dark objects, possibly shells or pebbles. The background shows the ocean with gentle waves and a clear blue sky. The text "THANK YOU !" is overlaid in the center of the image.

THANK YOU !