BCAST

Mid Air Collision

March, 2016

BCAST

Brazilian Commercial Aviation Safety Team

It is collaborative group composed of Brazilian airlines, ANS (DECEA), Regulatory agency (ANAC), IATA, and Manufacturers (Embraer). It is a subgroup of Brazilian Aviation Safety Team (BAST), similar to US CAST.

MAC Working Group

Objective

Mitigate Mid Air Collision risk by:

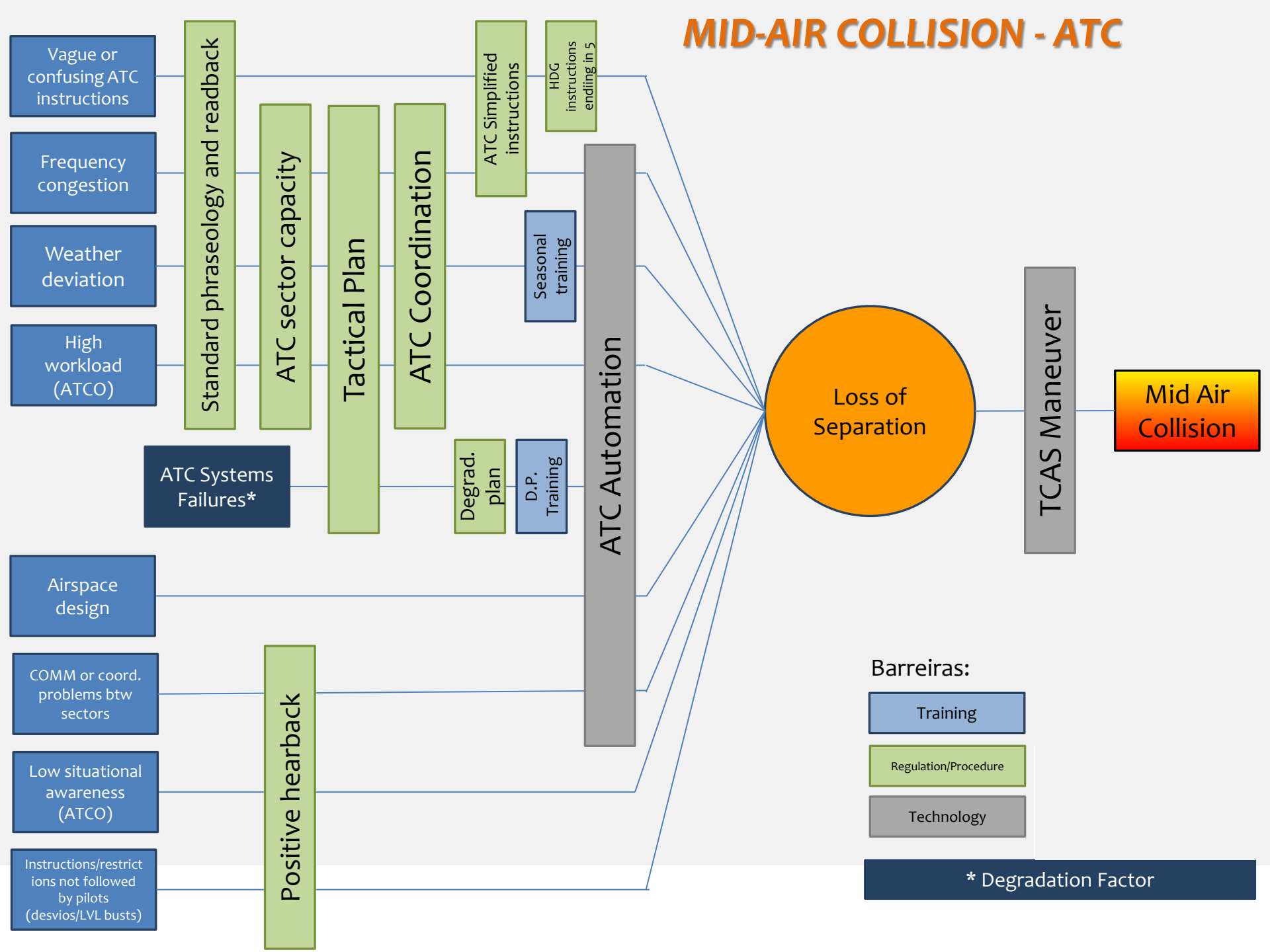
- Reducing the most important reasons why the individual barriers are unsuccessful;
- Improving beneficial influences that may make existing barriers more successful;
- Introducing new barriers;
- Assuring the MAC risk stays as low as reasonably practible.

Observation:

We have not studied Unmaned Aircraft Systems (UAS) issues... Yet!

Methodology

- Hazards and safety barriers identification;
  - Bow-tie analysis.
- Data collection and research;
  - Pilots and ATCOs survey;
  - Skybrary (articles and tool kits);
  - FDX;
  - New sources of information;
- Detailed Implementation Plan (DIP).


MID-AIR COLLISION - ATC
Vague or confusing ATC instructions
Frequency congestion
Weather deviation
High workload (ATCO)
Standard phraseology and readback
ATC sector capacity
Tactical Plan
ATC Coordination
ATC Simplified instructions
HDG instructions ending in 5
Seasonal training
ATC Systems Failures*
Degrad. plan
D.P. Training
ATC Automation
Airspace design
COMM or coord. problems btw sectors
Low situational awareness (ATCO)
Instructions/restrictions not followed by pilots (desvios/LVL busts)
Positive hearback
Loss of Separation
TCAS Maneuver
Mid Air Collision
Barreiras:
Training
Regulation/Procedure
Technology
* Degradation Factor

Data collection and research

- Pilots and ATCOs survey:
  - Based on simplified Bow-tie diagrams (pilots and ATCOs);
  - Perception of the main stakeholders about hazards and safety barriers.

Why?

To determine priorization of actions in the DIP.

Data collection and research

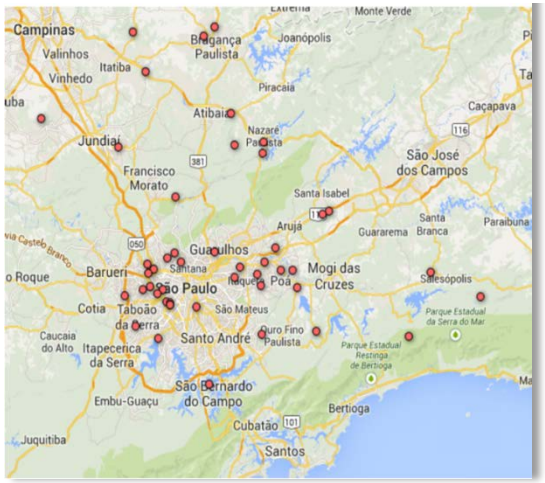
- Skybrary research (articles and tool kits) highlights:
  - 70% of level busts are due to miscommunication between pilots and ATCOs;
  - 40% of level busts occurs between FL 100 and FL 110;
  - Main hazards that lead to a loss of separation:
    - Weather deviations;
    - Level busts;
    - Bad coordination between ATC sectors;
    - Frequency congestion
    - Use of non standard phraseology;
    - Airspace design;
    - Vague ATC instructions and miscommunication;
    - Call sign confusions.

- **Conclusion:**

  Human factors are directly related in to the majority of loss of separation events.

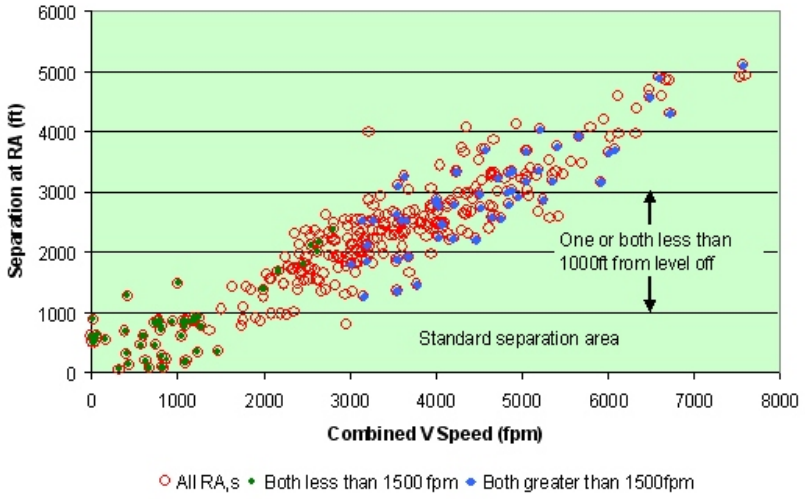
Data collection and research

- FDX program:
  - Great source to identify where TCAS RA events are taking place;
  - May be used as a KPI after DIPs;
- Limitation of FDX:
  - Impossible to separate events by severity.



Data collection and research

- Information from other sources:
  - Airlines of the WG that do not have implemented the Eurocontrol recommendation of reducing V/S before levelling off had 4 times more TCAS RA events during the same period.



Data collection and research

- Information from other sources:
  - 1st step: TCAS RA as a mandatory report;
  - 2nd step: crosscheck FDM x Safety Reports;
  - 3rd step: downgrade events in FDM database;
  - 4th step: data consolidation;
  - 5th step: hotspots identification.

Possible improvements in data collection

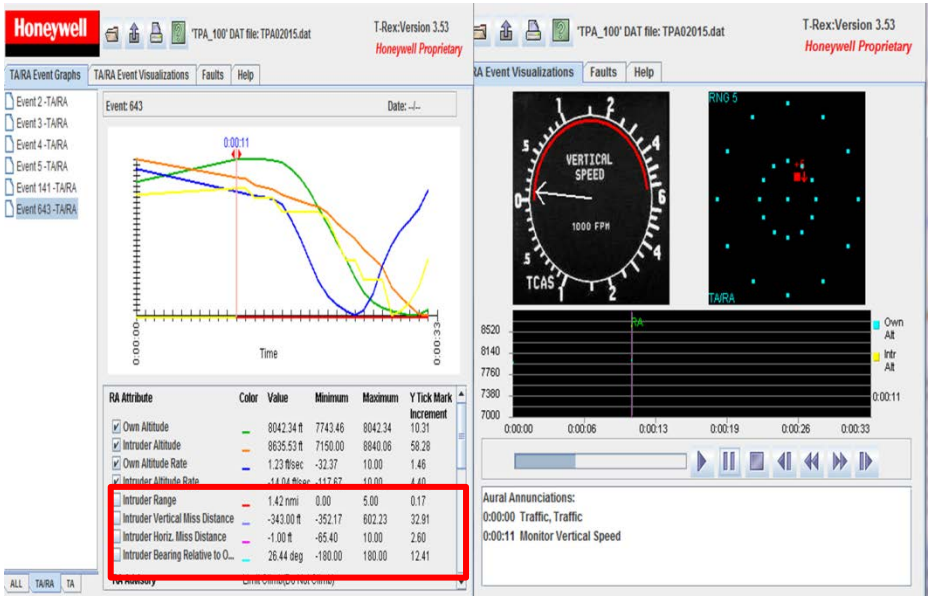
- Enhancements of FDM and TCAS Systems to segregate events by severity
  - FOQA Systems receive TCAS warnings and evasive maneuvers from the TCAS Computer, but...
  - There is more information stored in TCAS memory that are only accessible after a download made by the TCAS manufacturer.

Possible improvements in data collection

TCAS computer stores information about the traffic intruder, including vertical and horizontal distances.

Exporting this data to FDM Systems would enable the development of severity classes.

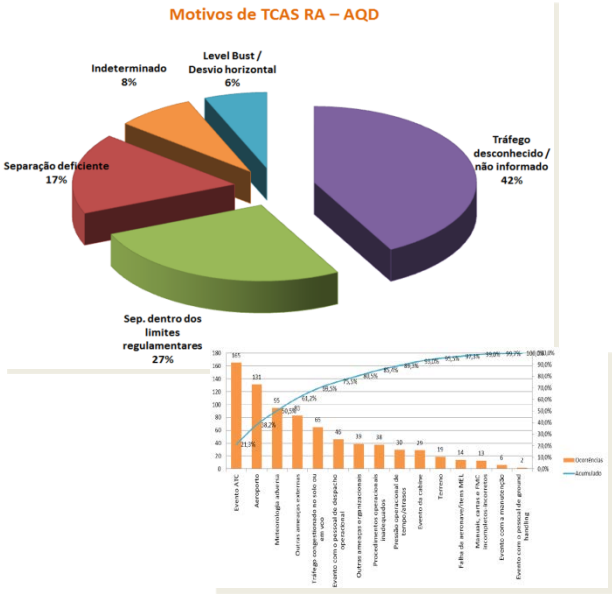
Sharing all this through FDX would allow us to detect where the problems are really happening.



Possible improvements in data collection

- Loss of separation reports and trends from ATC systems.

Algorithm

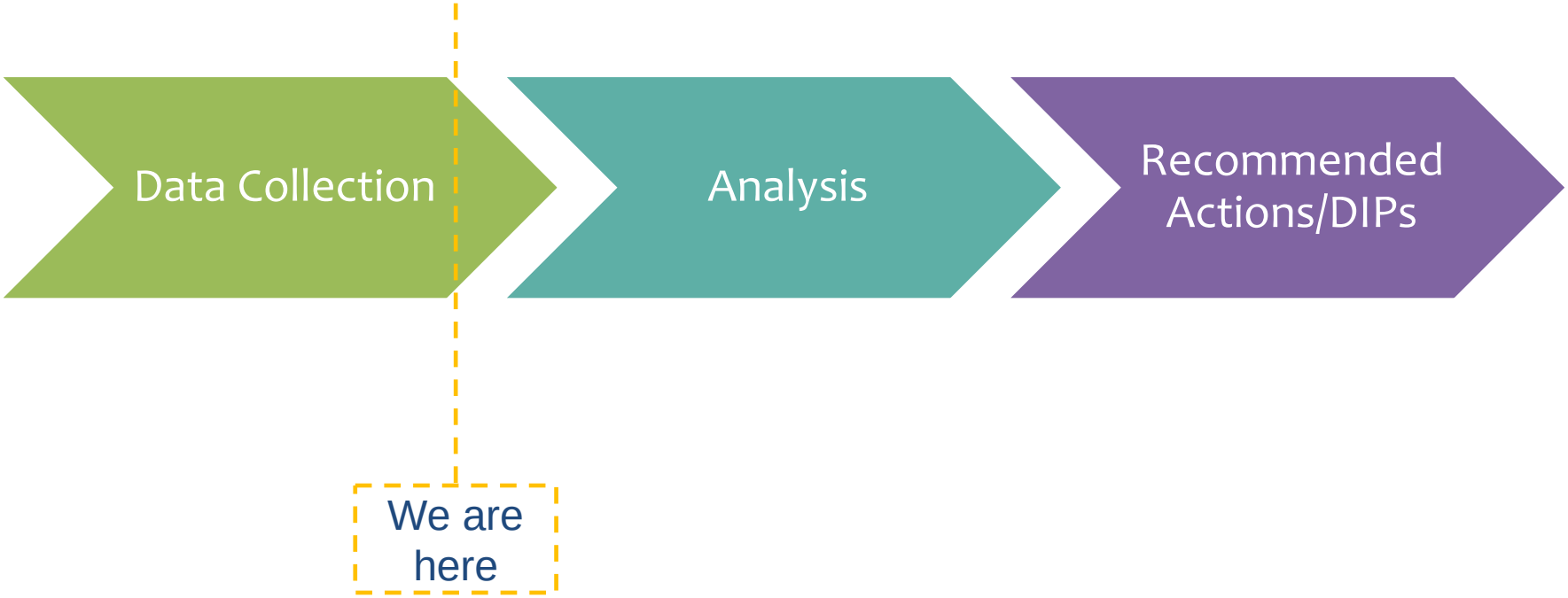


Possible actions/DIPs

Possible actions to be part of DIPs:

- Use of standard phraseology campaign;
- Level Bust tool kit implementation;
- Video lectures for pilots and ATCOs during initial and recurrent training;
- “ATCOs in the flight deck”;
- Algorithm for Call sign validation;
- Enhancements in data collection and data sharing (TCAS/FDX/ATC Systems) and...
- **Focus on Human Factors!!!!**

Where are we now?



Keep in touch!

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