Aircraft Global Tracking

ARINC AEEC – Global Tracking

Aug 2017

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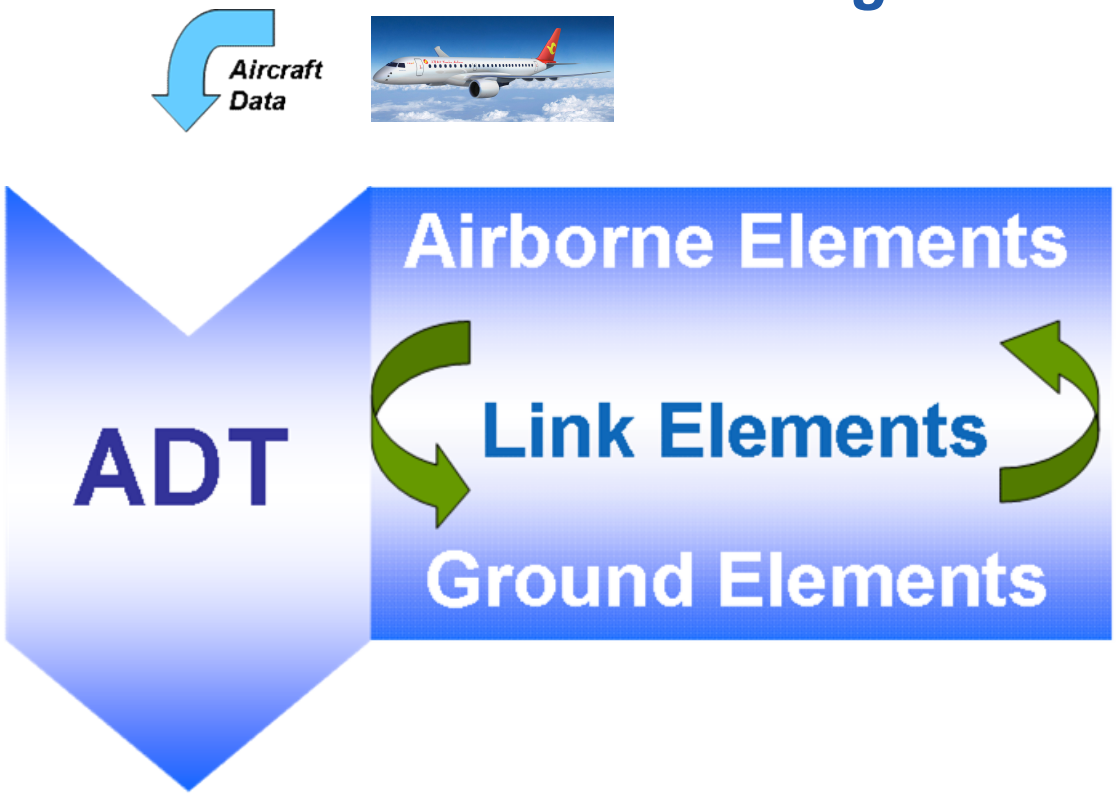
ADT Parts & Functions

Autonomous Distress Tracking system - Identifies the aircraft's distress condition and autonomously transmits information from which the aircraft position can be determined at least once every minute. ADT system shall be resilient to failures of the aircraft's electrical power, navigation, communication systems, as well as to human-machine interface errors (AEEC Global Tracking Glossary)

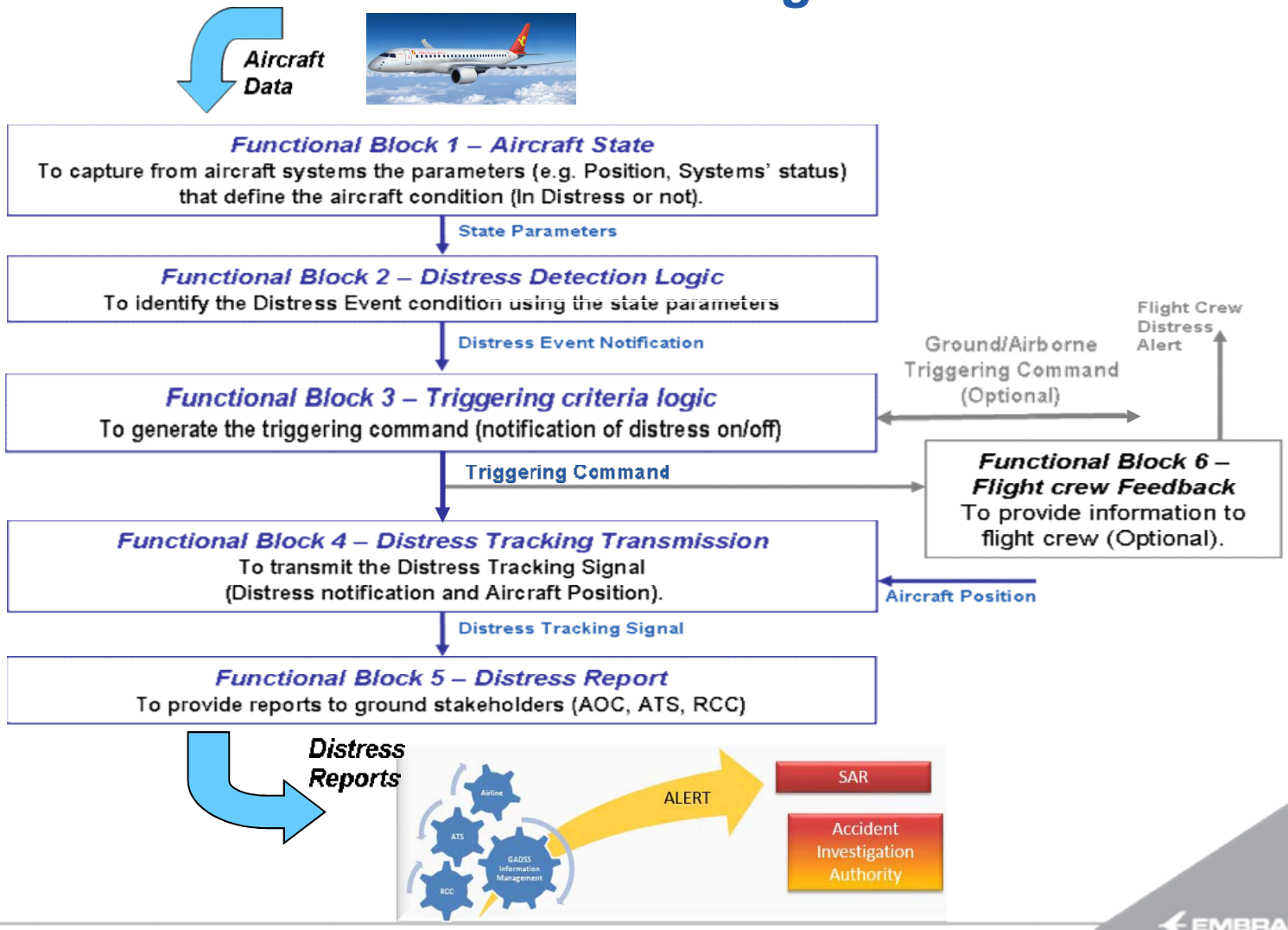
ADT Parts & Functions

ADT Functional Block Diagram



ADT Parts & Functions

ADT Functional Block Diagram



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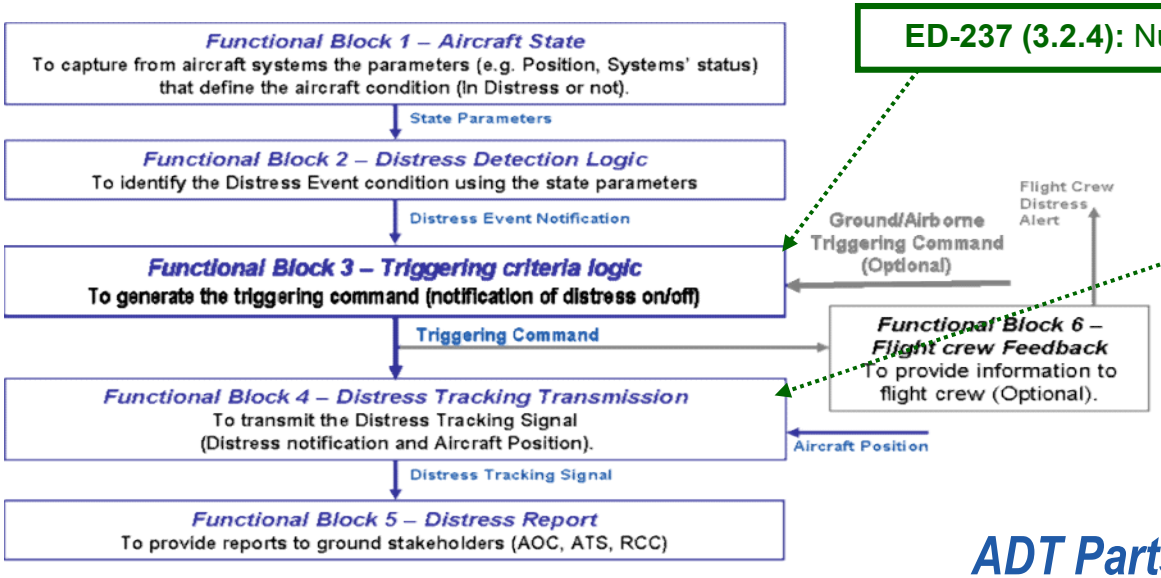
ADT Parts & Functions: Requirements Allocation

Requirements Allocation

Requirement Table

Requirement				ADT Functional Blocks						Architecture Components		
Source	Reference	Phase of Flight	Text	1 - Satate	2 - Distress Logic	3 - Triggering Logic	4 - Distress Tracking Transm.	5- Distress Reports	6 - Flight Crew Info.	Airborne	LINK	Ground
GADSS	3.2.3	Distress	Valid Distress Signal/Aircraft Position transmission shall be resilient to aircraft electrical power failures;				YES			YES		

ADT Functions



Examples

ED-237 (3.2.4): Nuisance rate for triggering logic < $1x10^{-5}$

GADSS (3.2.1): ADT function shall provide aircraft position at a 1 min or better rate once distress detection takes place

GADSS (3.2.3, discussions): Airborne ADT function design shall meet a Minor failure condition severity classification

ADT Parts

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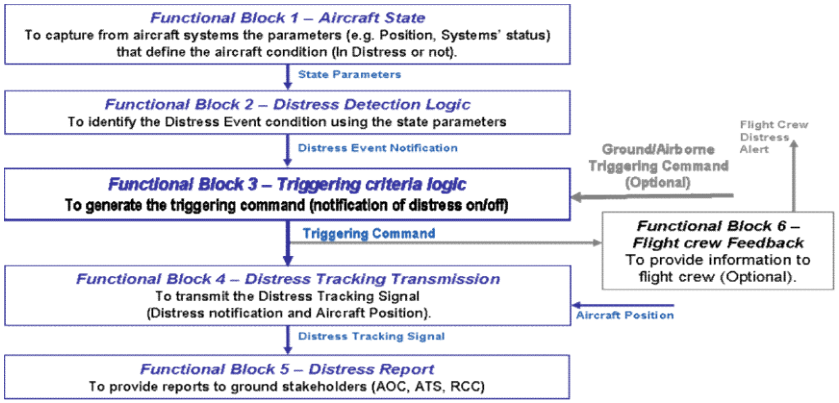
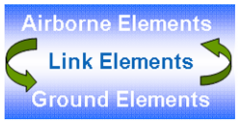
ADT Parts & Functions: Implementation Architectures

ADT Functions

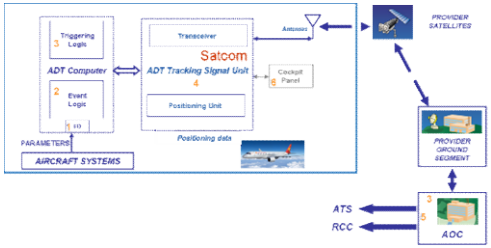


Functions Allocation

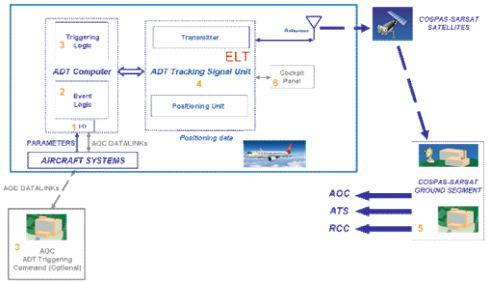
ADT Parts



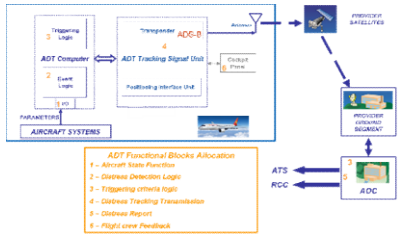
Architecture Candidates



SATCOM Based



ELT Based



ADS-B Based

Architecture classification according Distress Transmitter

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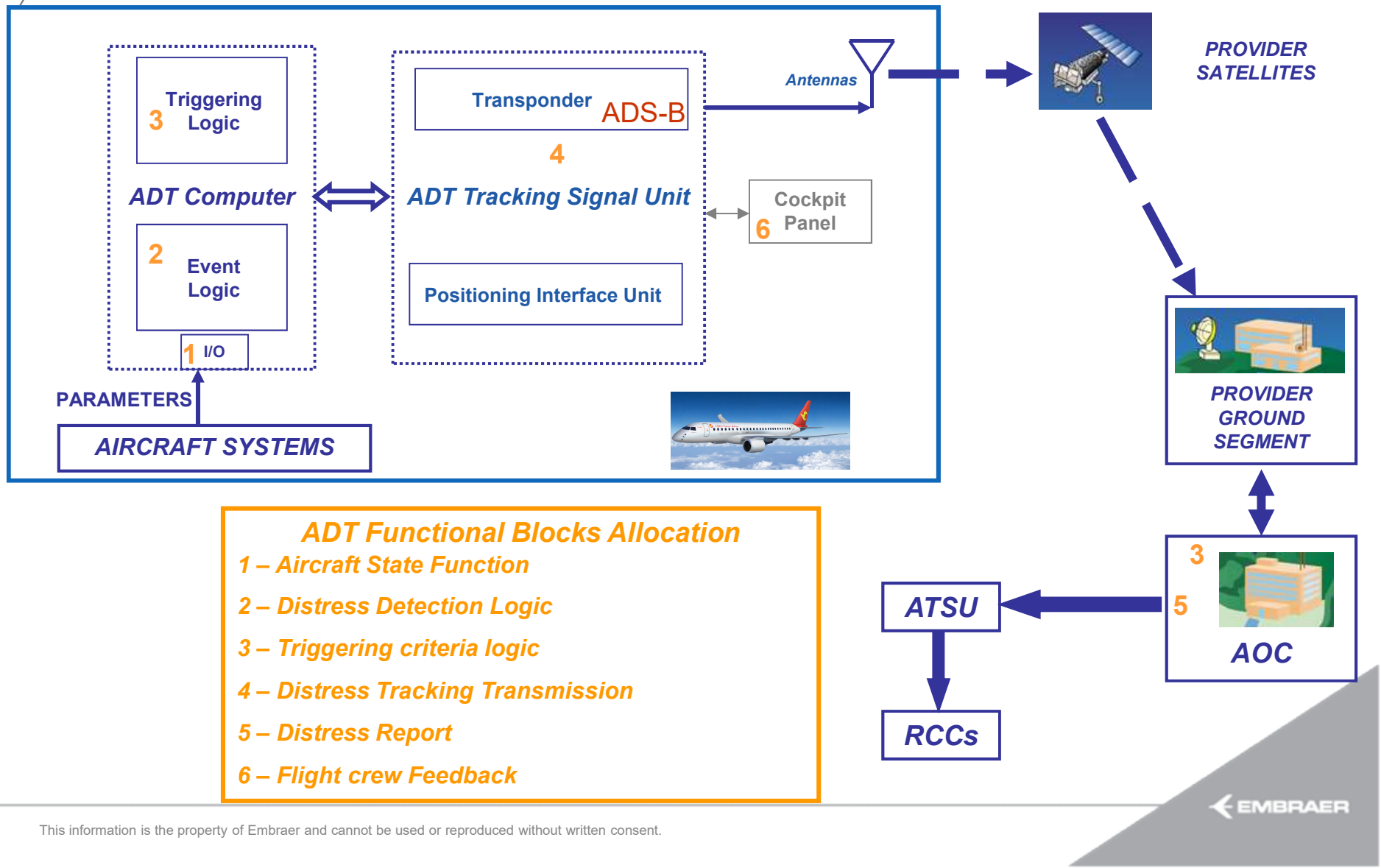
ADT Parts & Functions: Implementation Architecture – ADS-B



ADT Functional Blocks Allocation

1 – Aircraft State Function

2 – Distress Detection Logic

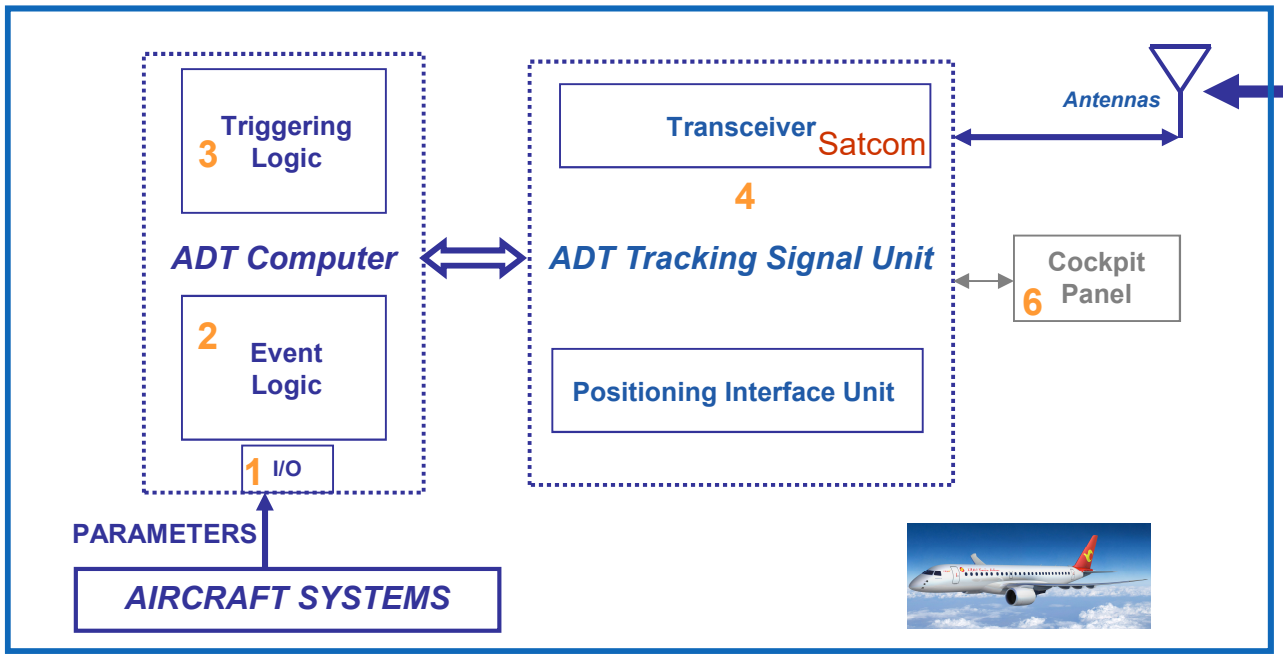
3 – Triggering criteria logic

4 – Distress Tracking Transmission

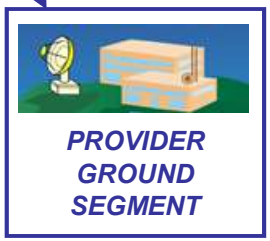
5 – Distress Report

6 – Flight crew Feedback

ADT Parts & Functions: Implementation Architecture - SATCOM



PROVIDER SATELLITES



ATSU

RCCs

ADT Functional Blocks Allocation

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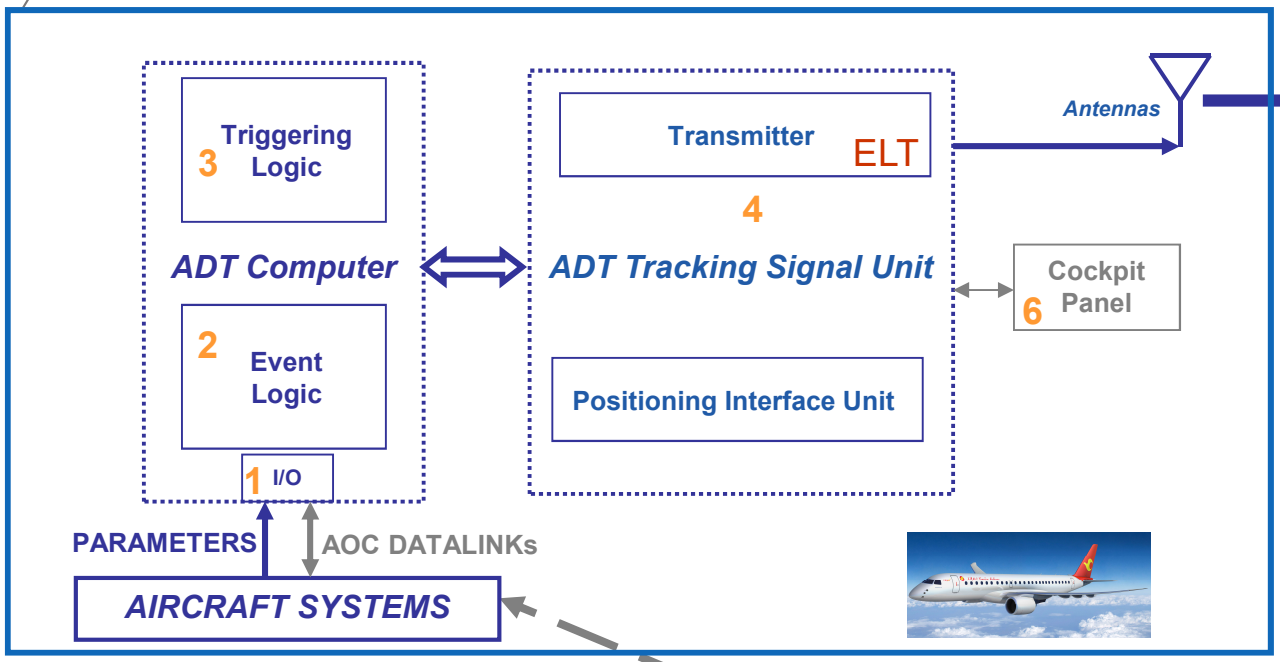
ADT Parts & Functions: Implementation Architecture - ELT



COSPAS-SARSAT SATELLITES

COSPAS-SARSAT GROUND SEGMENT

5

RCCs

ATSU

AOC DATALINKs (Including Satcom)

3 AOC ADT Triggering Command (Optional)

ADT Functional Blocks Allocation

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Conclusions and recommendations

- The requirements that are more important for Architecture Analysis are those that define the ADT System Operation, from detection of the distress event (including the scenarios' definitions) to how the report of distress should be informed to the stakeholders. They define the objectives that the ADT system design shall meet.
- Some of the requirements analyzed by the group are system design requirements, almost low level design. Some of them should be discussed with the ICAO and other authorities.
  - Example: ***GADSS 3.2.5.2 (5 seconds to start Distress transmission after the detection of the distress condition)***. *It restricts the recovery time of system before the distress declaration*
- The final reference architecture and minimum requirements' list should lead to an agreed functional block diagram and system parts.
- It is advisable to use the current infrastructure of the ELT/COSPAS SARSAT system to perform the communication of distress with RCCs. This does not preclude the use of any other technology but just requires an integration with airborne ELT system.


Thank You
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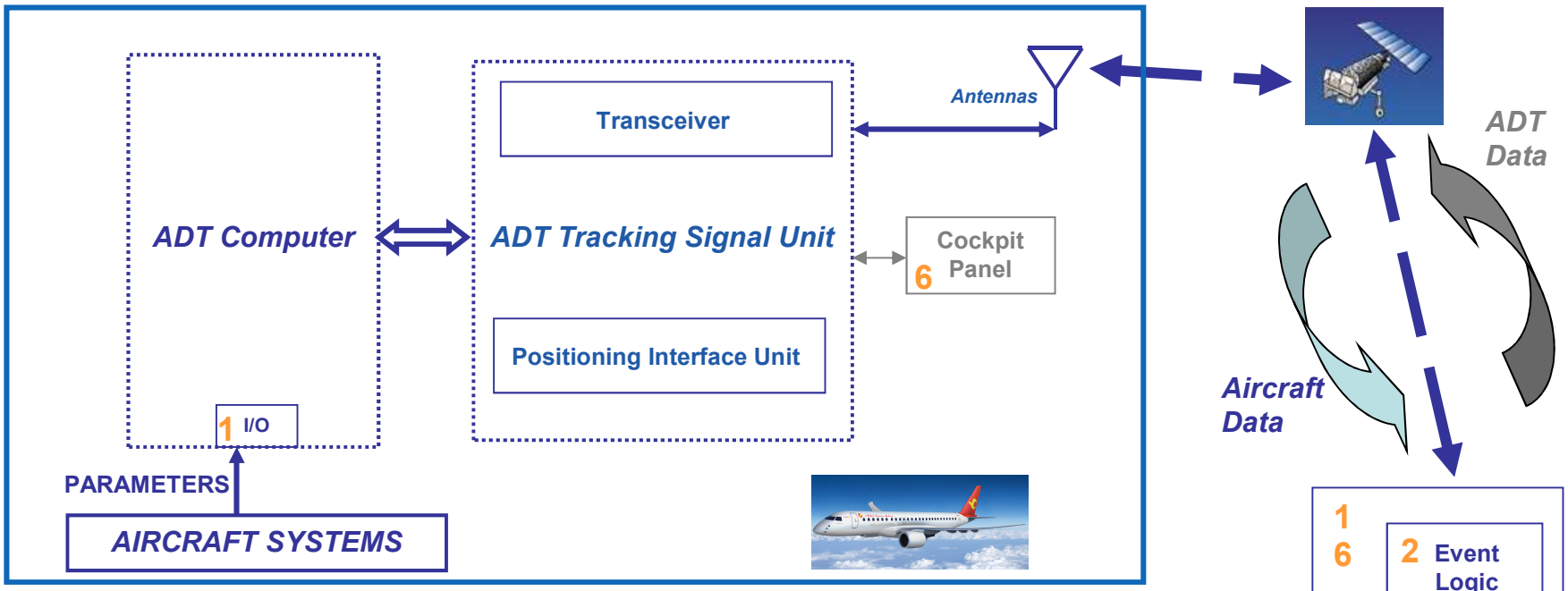
Backup Slides

ADT Parts & Functions: Implementation Architecture – Ground Processing



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