EUROCAE ED-250: ROAAS MOPS

Runway Overrun Alerting and Awareness System Minimum Operational Performance Specifications

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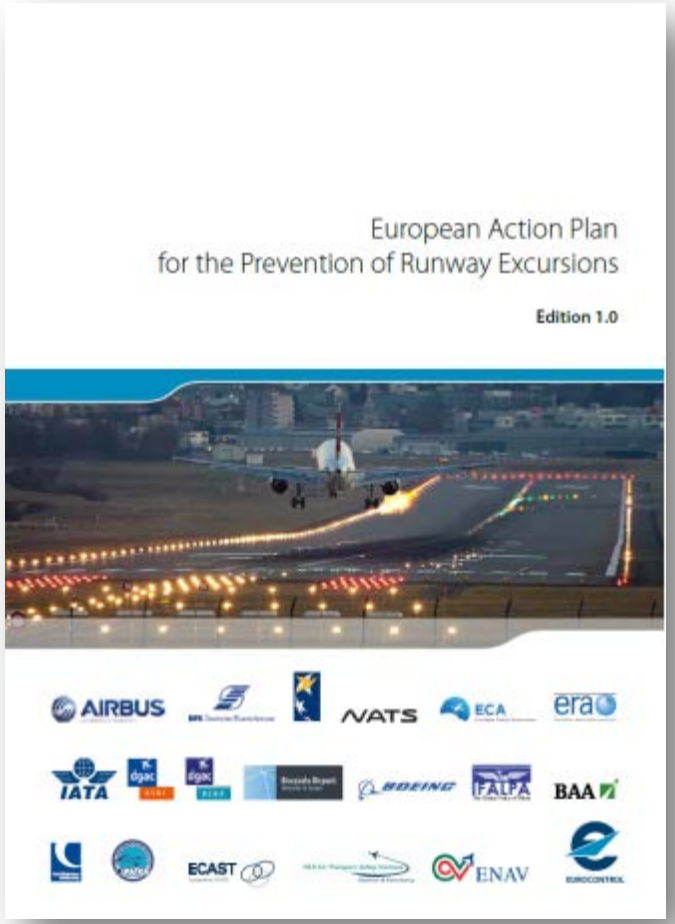
European initiative

- Recommendations in EAPPRE to develop **on board real time monitoring and alerting systems** to assist in land/go around decision and braking management



EUROCAE WG-101

- EUROCAE WG-101 established, kick-off meeting August 2015
  - Deliverable : MOPS for a ROAAS
  - Target duration: 18 months
- Fair cross section of stakeholders community:
  - Europe, US and other regions
  - Aircraft manufacturers, avionics manufacturers, airlines, pilots, authorities , and more…
- **Resulting ED-250 to be published by end of 2017**

"ROAAS 101": what is a ROAAS?

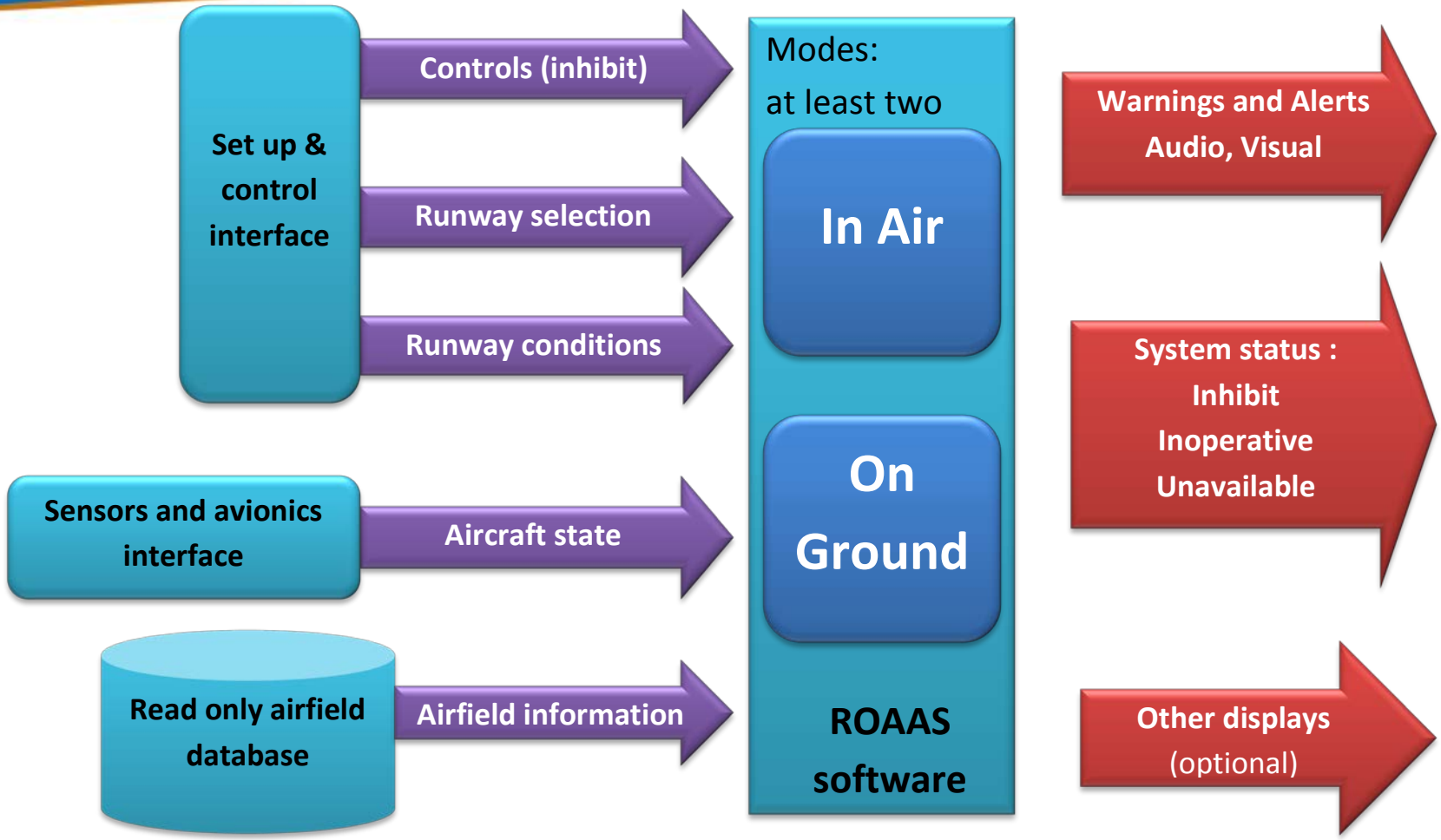
- "System intended to reduce risk of overrun during landing by providing a **timely and distinctive alert** to the flight crew when the airplane is at risk of **not being able to stop** on the **available distance** to the end of the runway"

- ROAAS is intended as a **safety net**
- ROAAS does not alleviate crew **responsibility** to perform a safe landing
- ROAAS is **not a piloting** system

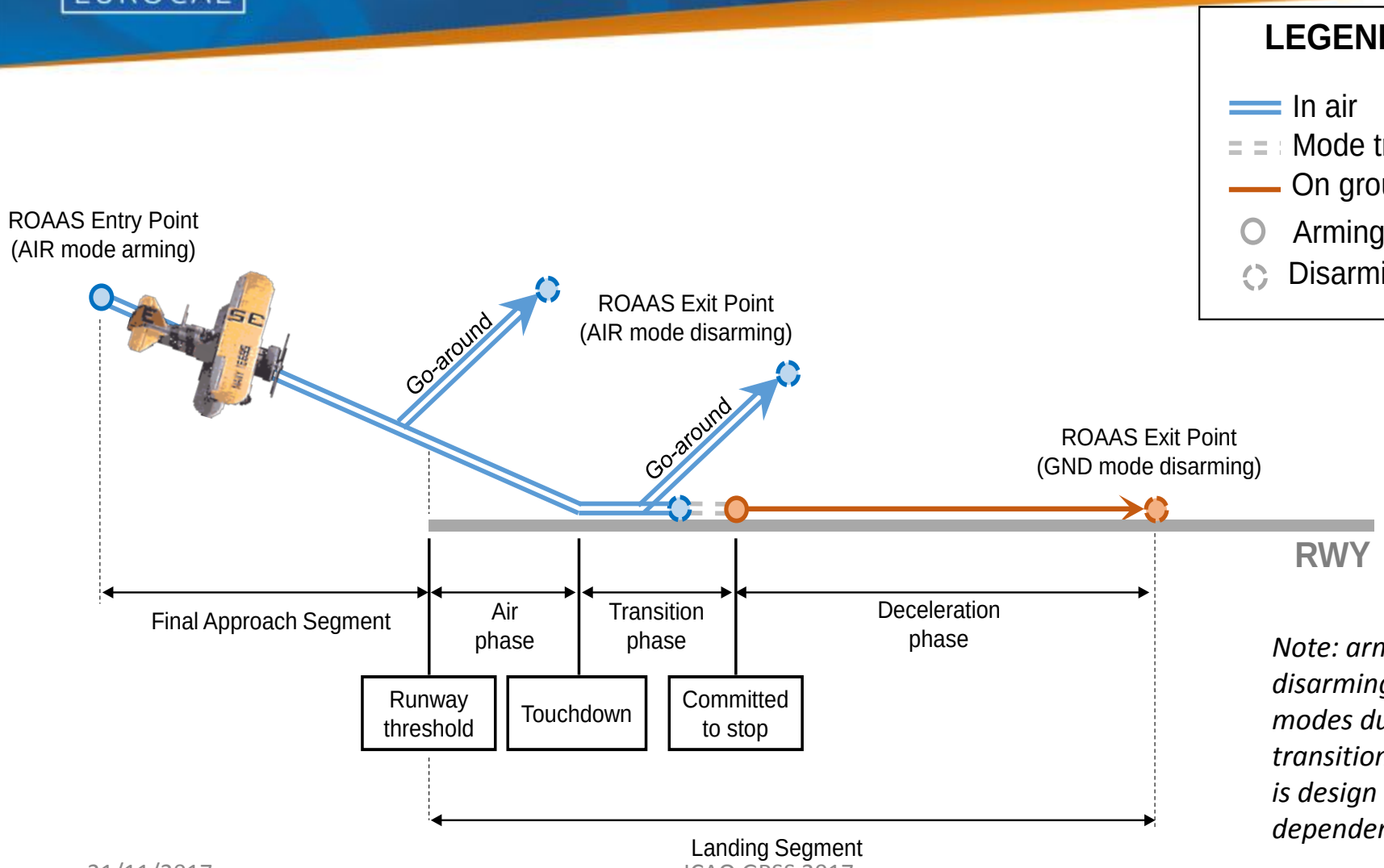
Principles

- **On-board software** running in boxes/avionics
- **Computes stopping point** at landing in **real time**
  - Is based on A/C sensors information, giving access to position, energy state
  - Models A/C landing performance, with possible input of runway conditions (friction) , and possibly operation type (e.g steep approach)
- **Compares** this stopping point **to the end of the runway** intended for landing, taken from a Runway database.
- **Raises an alert** if the computed stopping point lies beyond the end of the runway
- Depending on implementation, phase of flight and mode raising the alert, **flight crew** reacts per **procedure**

ROAAS context

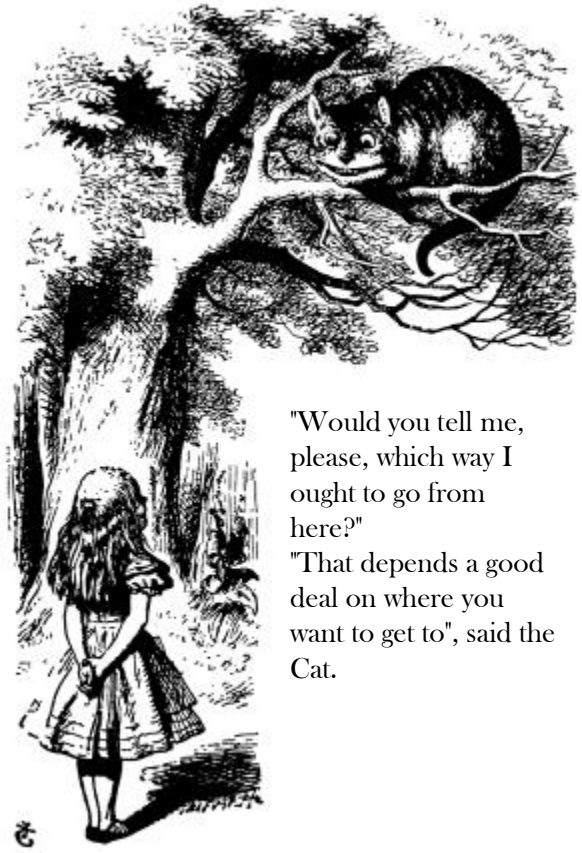


ROAAS Flight phases



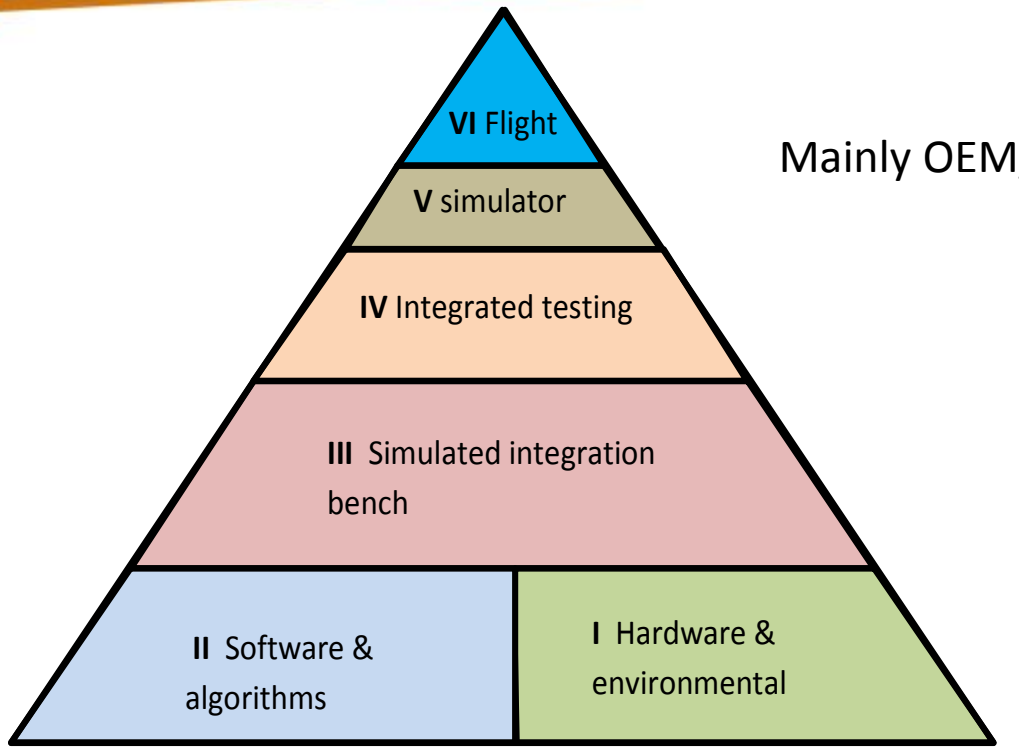
Note: arming and disarming of modes during transition phase is design dependent

ROAAS and Runways



- Selection of runway intended for landing (manual or automatic)
- Necessary data found in ROAAS runway database
  - No data= ROAAS unavailable
  - Database supplier will create the database with the accuracy and coverage specified by the ROAAS manufacturer
  - Temporary updates by flight crew for NOTAMs or other reasons are possible

Testing guidelines

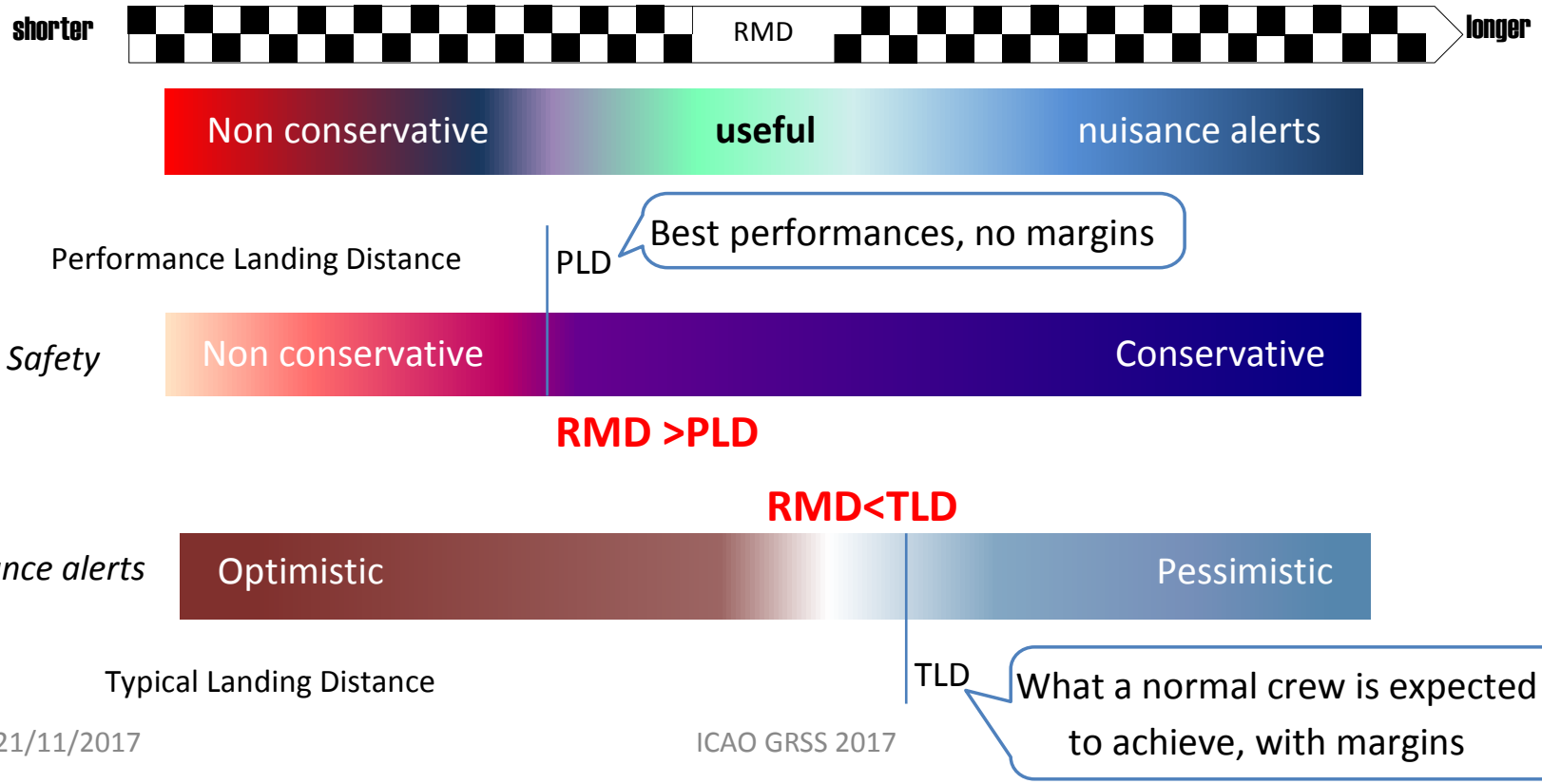


Mainly OEM/ integrator

Mainly ROAAS manufacturer

Testing the on-board ROAAS model

- "**RMD**: ROAAS Model Distance" computed on board
- Testing the design by **off-line comparisons** with **high fidelity** aircraft performance **models**
  - multiple combinations of input conditions to cover the domain certified for ROAAS



Conclusions

- ED-250 ROAAS MOPS results from a **consensus** on **minimum** requirements, leaving **flexibility** to ROAAS manufacturer and integrator.
- ED-250 represents a major **step forward** for runway **safety**. Created **by** the **industry**, **for** the **industry**, it establishes a true **baseline** which future ROAAS manufacturers can use to ease the development and design.
- It is expected that this will result in more ROAAS being **available** on the market and **encourage adoption** of these technologies by aircraft operators.
  - The MOPS is only the **beginning**

With many thanks from the chairman to all working group members

Happy landings !

Thanks to group members representing:

- Airbus
- ATR
- BAE Systems
- Boeing
- Bombardier
- Dassault Aviation
- EASA
- Embraer
- Eurocae
- Eurocontrol
- European cockpit association
- FAA
- Garmin
- General Electric
- Gulfstream
- Honeywell
- IANS
- IATA/ Air France
- IFALPA
- Lufthansa
- Lufthansa Technik
- Rockwell Collins
- RTCA
- Thales Avionics
- Zodiac Aerospace

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