Airbus Support to Annex 13 Investigations

Conducting Aviation Accident Investigations - Training Workshop
12 November 2025

Bernard Besinet / Pierre Labro
Accident Investigators - Airbus

COMMERCIAL AIRCRAFT

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Agenda

Airbus Safety Vision - the permanent quest to reach zero accident

Time	No. of flights by Airbus A/C	No. of passengers in an Airbus A/C
00:00	0	0

→ **IN A YEAR**

> 14,000+ aircraft in operation

> 15 millions flights in 2024

> 2 Bn passengers on Airbus aircraft

→ **IN A DAY**

> 42,000 flights per day

> 6 millions passengers per day

→ **IN A SECOND**

1 Airbus takes-off every 2 seconds

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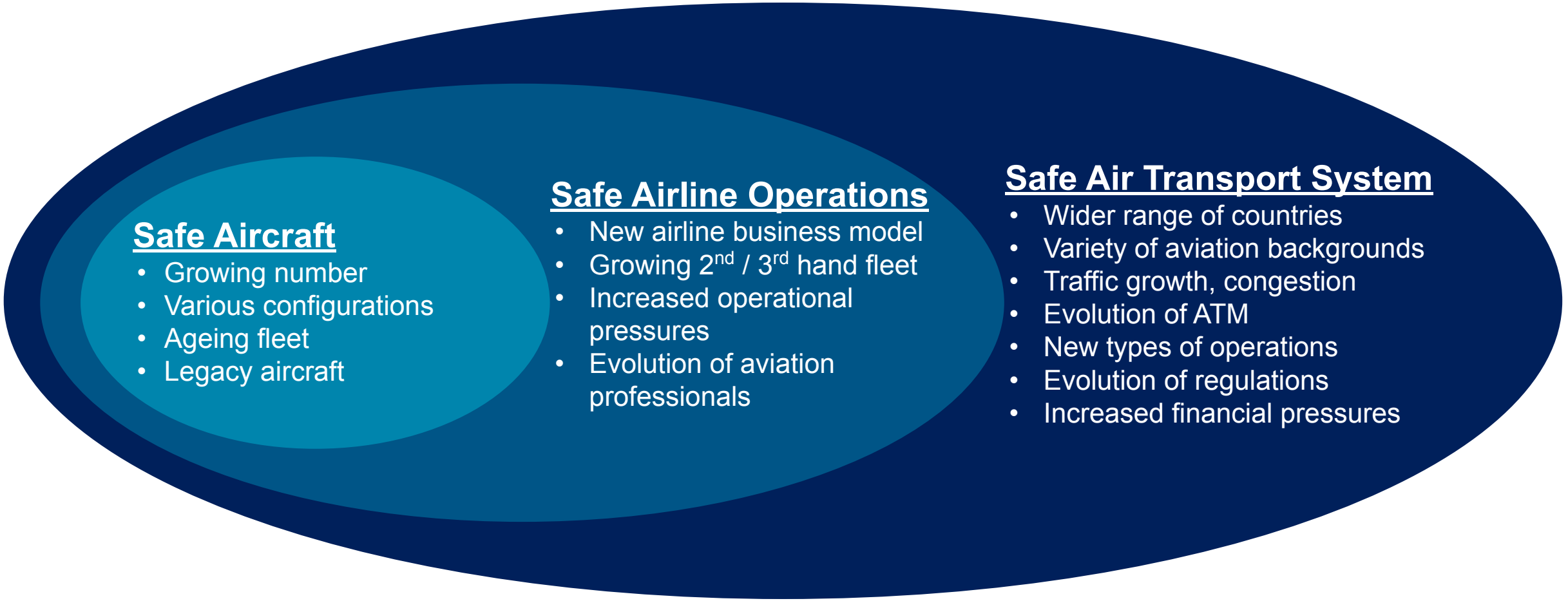
Commercial aircraft

- Commercial jets are advanced machines
- Numerous systems from fly by wire, flight controls, landing gear & braking to cabin pressurisation
  - Advanced software and logics
- Understanding the behaviour of the A/C and the interactions with crews/external environment during an investigation is paramount.
- The role of the manufacturer as a technical advisor to the investigation is key and we are here to support and provide our expertise.

Domains of Safety

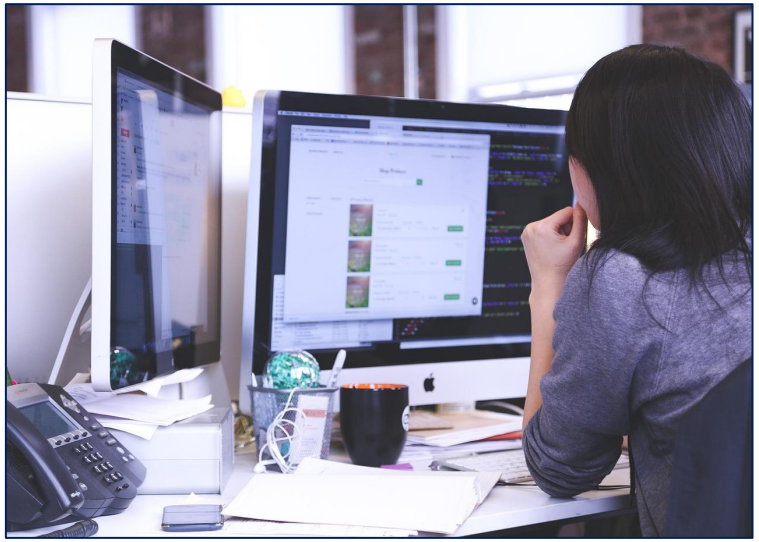


How can Airbus support an investigation?

On-site activities

- Hazards & Risks
- Data collection
- Recommendations on items to quarantine
- On-site report
- Propose next steps

For Airbus, only ~1% of Annex 13 investigations require on-site activity; the remaining 99% are investigated remotely using information shared by the investigator in charge



Investigation phase

- Data Analysis
- Flight Operations
- Manufacturing & Engineering
- Airbus Group wide knowledge and resources

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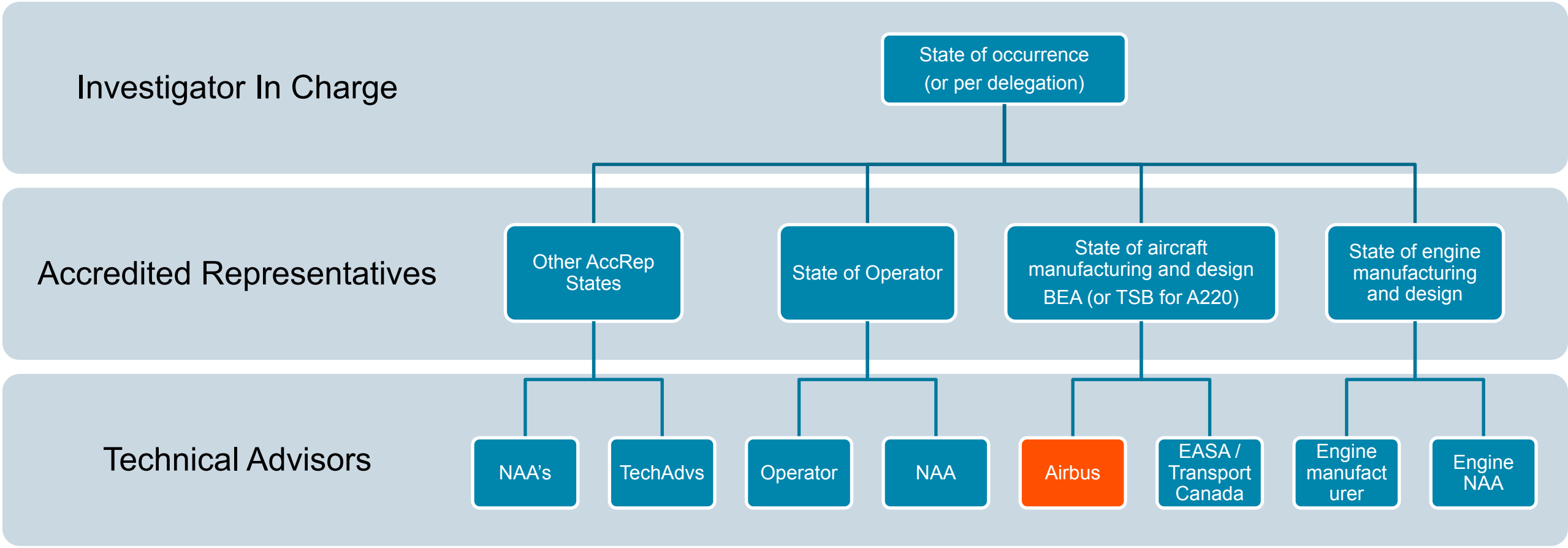
Commission of Investigation

- Industry stakeholders who may support the agencies as Advisers
  - Airbus reports to French BEA or TSB of Canada (A220) as Adviser
  - Other advisors include Operators, National Airworthiness Agencies, Research Centres…



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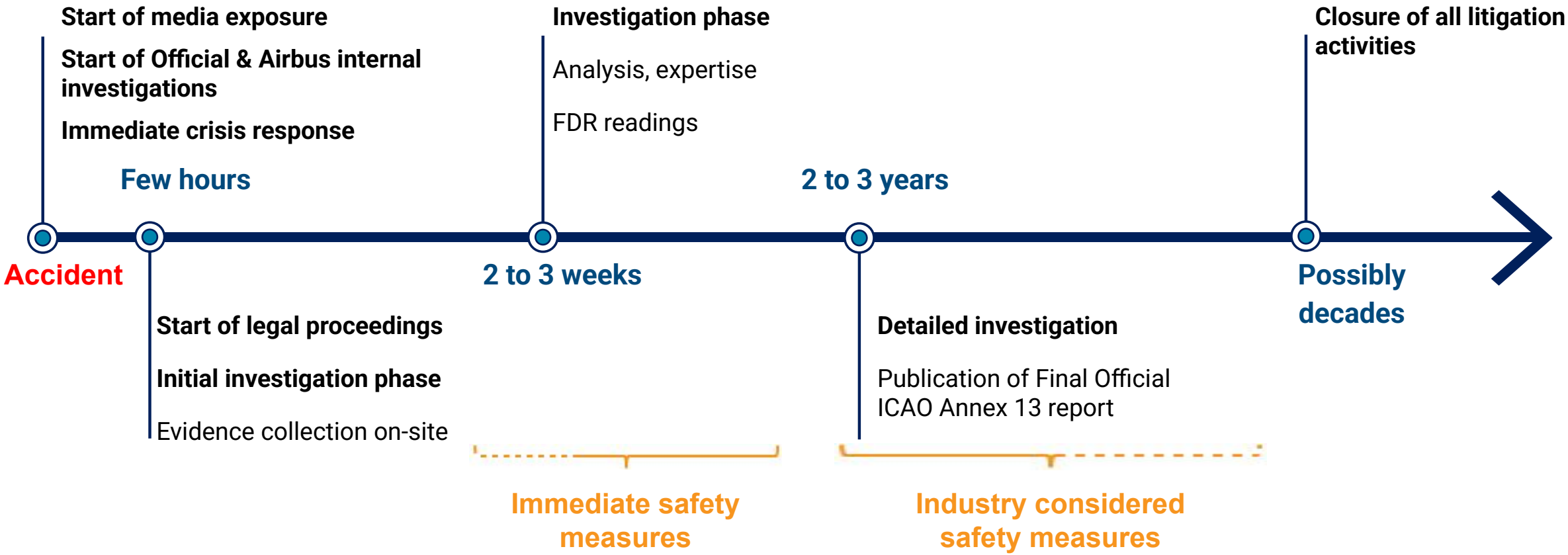
Typical timeline of an investigation



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Activation

Airbus Amber

Airbus accident notification

Emergency Call out

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① **Call first:**
Airtac
+33 **(0)5 61 93 34 00**

② **If no answer Call:**
Flight Safety Hot Line
+33 **(0)6 29 80 86 66**

When calling, please provide:
- Your name, organization and function
- A/C type, operator, location, flight number
- Your phone numbers (cell, office, home)

Event

Social media, BEA/TSB or Airbus network

Airbus Aviation Safety Department

Annex 13 investigation?

NO → **Other process**

YES

- Dispatch internal notification
- Nominate Airbus Lead Investigator*
- Open Crisis Room(s)
- Go Team dispatch
- Internal and external comms

Images from Social Media

*Airbus commercial Lead Investigators are the single PoC for any given investigation
** Hotline available 24/7

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Airbus Go-team

- ~ 100 qualified and trained Field Investigators
- 100+ dispatches
- Capability to deploy to 2 sites simultaneously
- Ready for dispatch within 3-4hrs

Airbus Amber

- Typical composition of an Airbus Go-team
  - 2 Airbus Lead Investigators
    - Aviation Safety investigator
  - Field investigators
    - Specialists in Propulsion, Structure, and Systems
  - Experienced Field Investigator
    - On-site risk management

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Go-team last major dispatches

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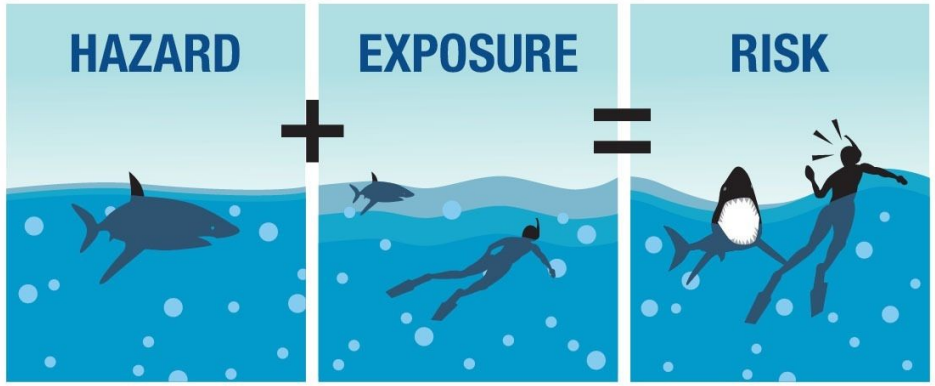
On-site Safety

- Risk assessment methods
- Sharing of risk assessment with all actors on-site
- Proposal for control measures
- Support to Investigation Boards



* Covering all types of risks (Working Environment, Physical, Biological, Materials, Psychological)

At accident site, Safety is the priority

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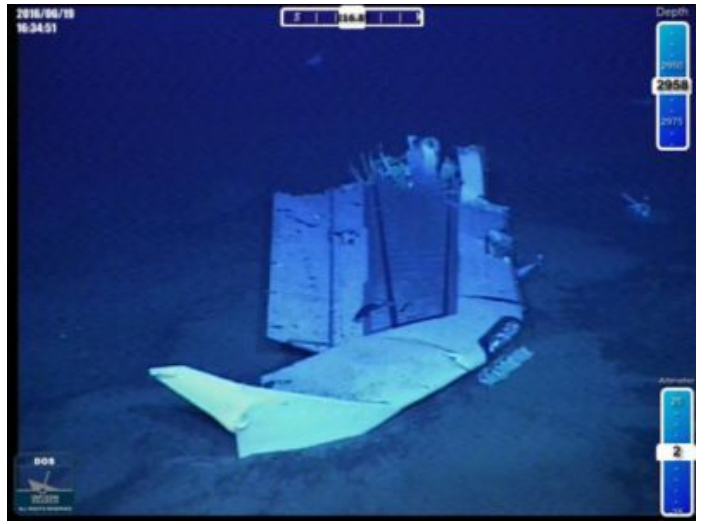
On-Site Activities

- Airbus Go-team:
  - Support the locating of flight data recorders (FDR/CVR)
  - Support the identification of the parts
  - Support the collection and preservation of evidence



- Propose to quarantine relevant hardware for future shop or lab investigations

- As technical advisors, Airbus:
  - Act under the supervision of the Investigation Agencies
  - Follow an agreed action plan
  - Deliver technical advisory and debrief in real time

- The on-site activity may be the only opportunity to collect certain facts and information

Airbus supports the IIC in collecting most of the technical evidence from the accident site

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Satellite Imagery

Picture available within T0 and T0+1 day

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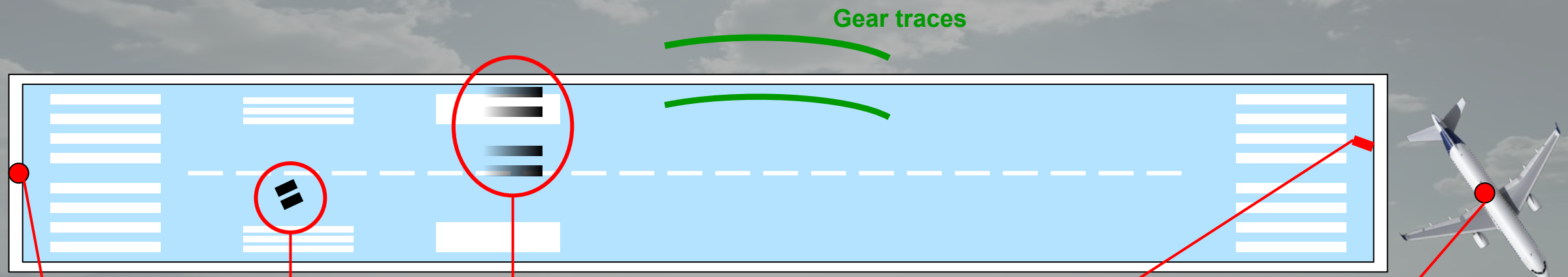
Runway Mapping

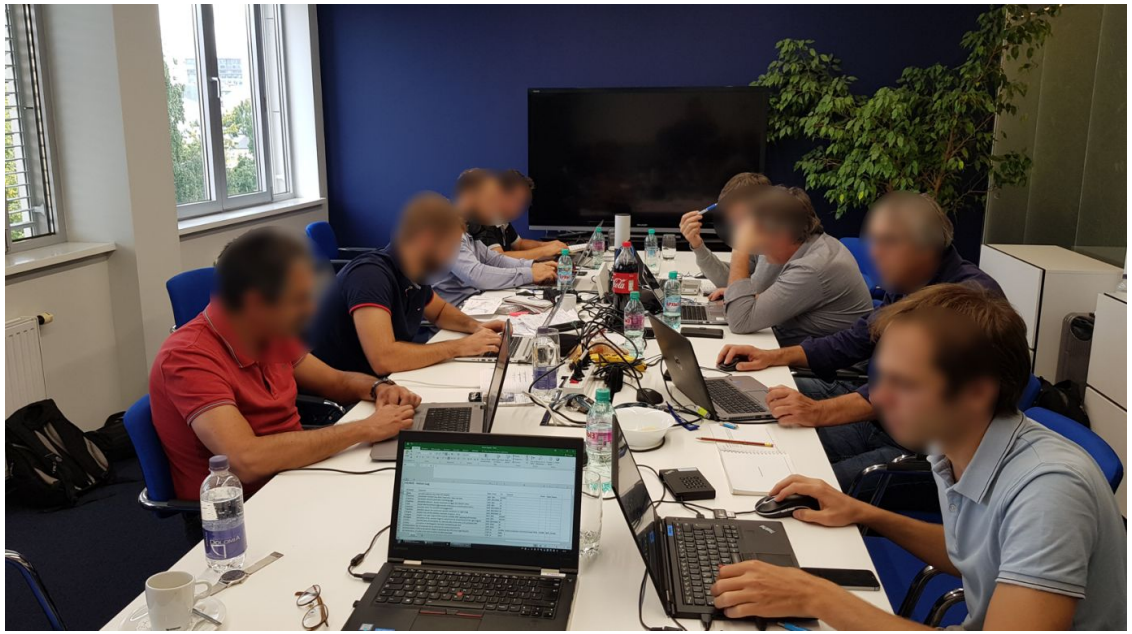
Flight path reconstruction based on FDR data is paramount for event analysis

On-site GPS points required to calibrate the Flight Path



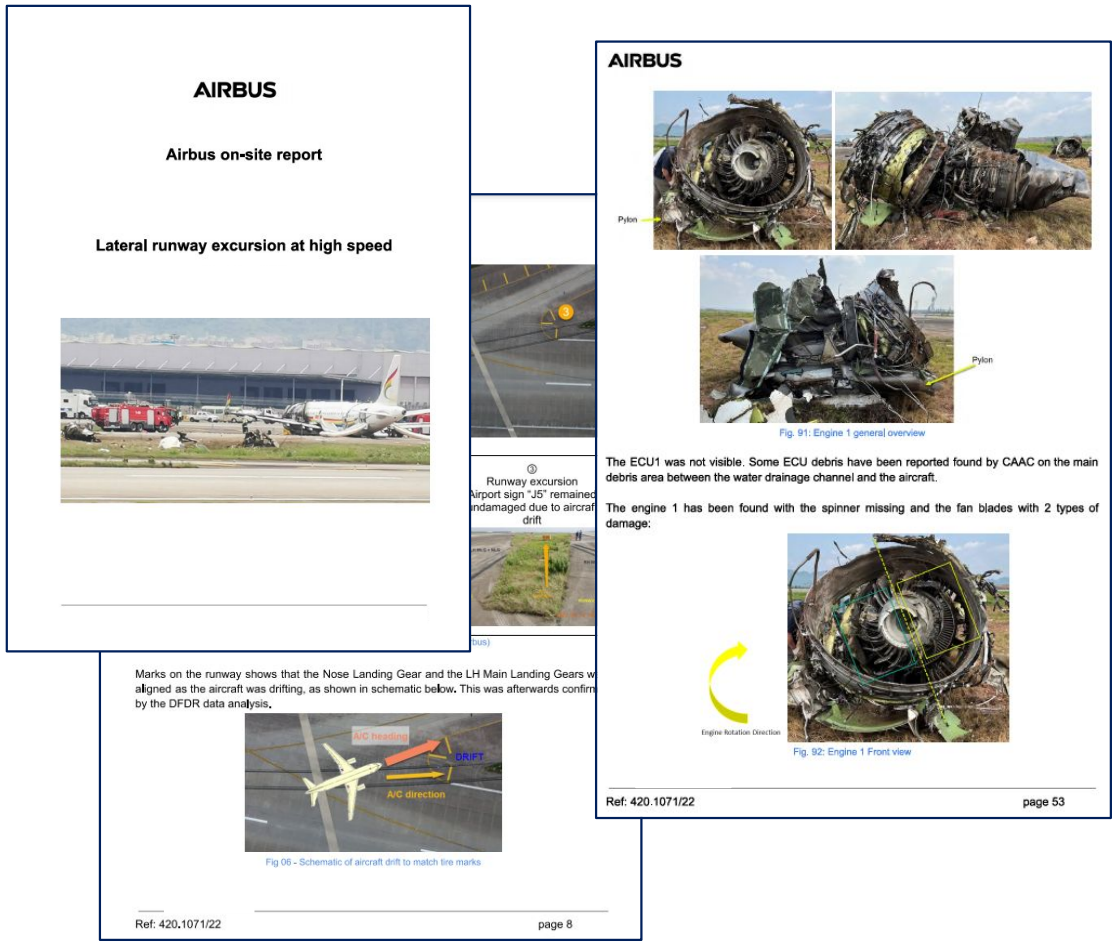
On-Site Report Data

- All information observed and data collected from the accident site is documented in an Airbus on-site report, reviewed by the ACCREP
- This on-site data supplements the information from the flight recorders
- Provides a detailed description “as found” of the wreckage parts, identifying specific elements and conditions
  - Parts may have been modified, due to the impact forces, the Search and Rescue, firefighting, recovery, displacement, etc.



On-Site Report - Distribution

- The onsite report is submitted to the commission of the investigation
  - Document facts:
    - Risk Assessment
    - Site mapping
    - Detailed description of findings
    - When possible, conclude on some investigation axis from the site evidence
    - Propose parts for quarantine
    - Propose next steps
  - Content is agreed by all parties before leaving the site



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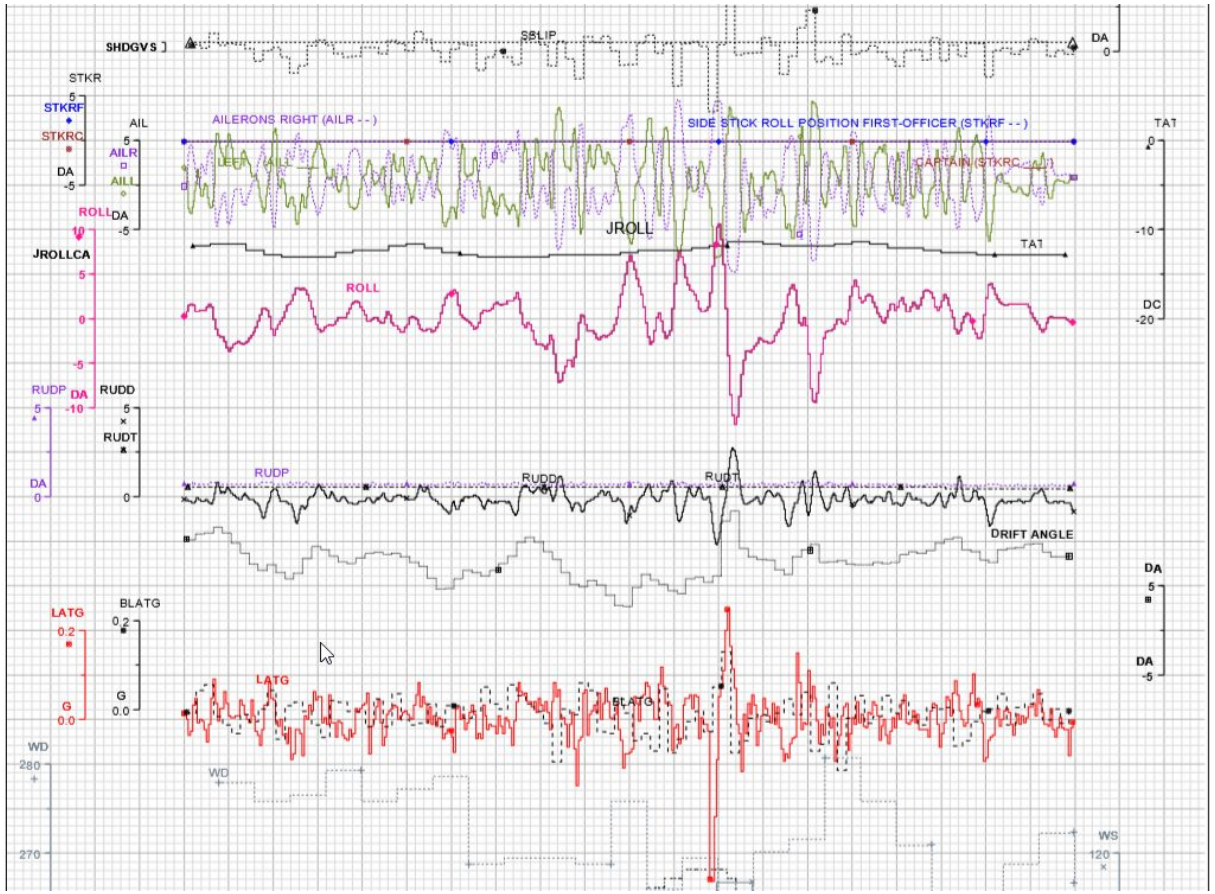
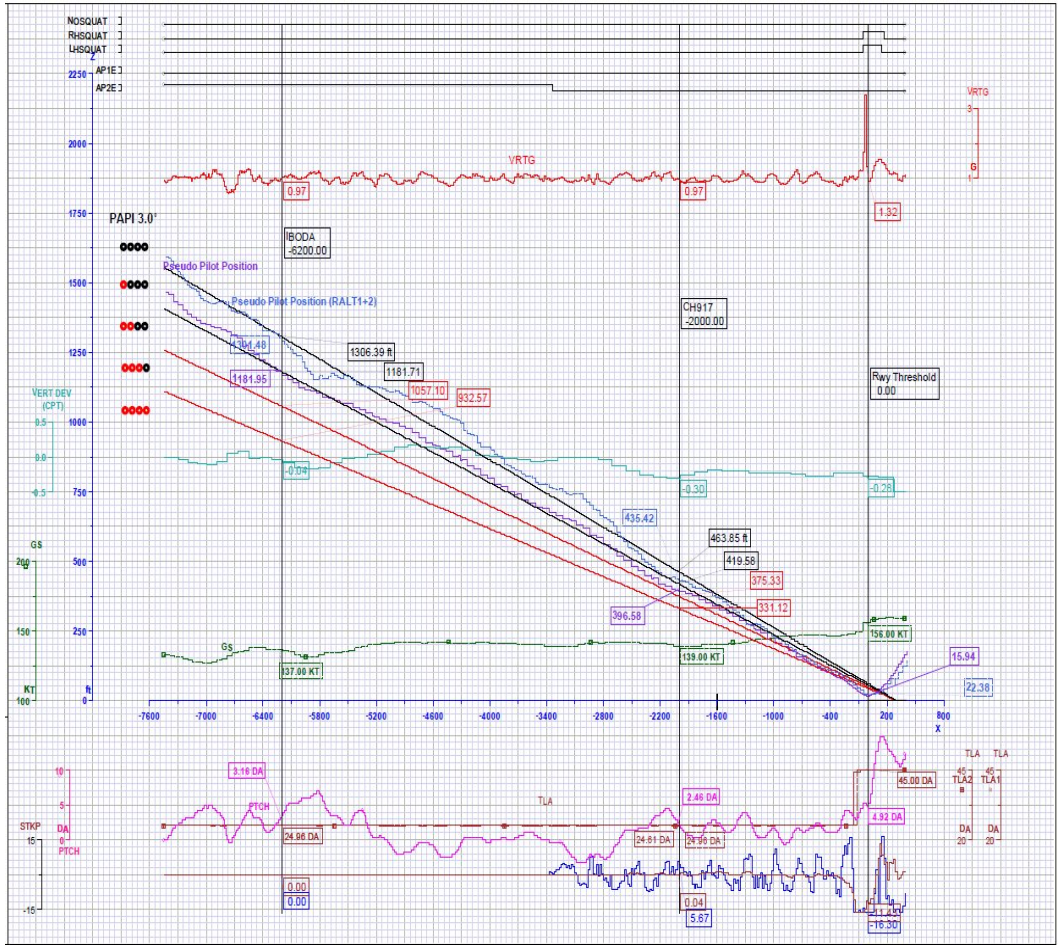
Flight Data Recorders Analysis





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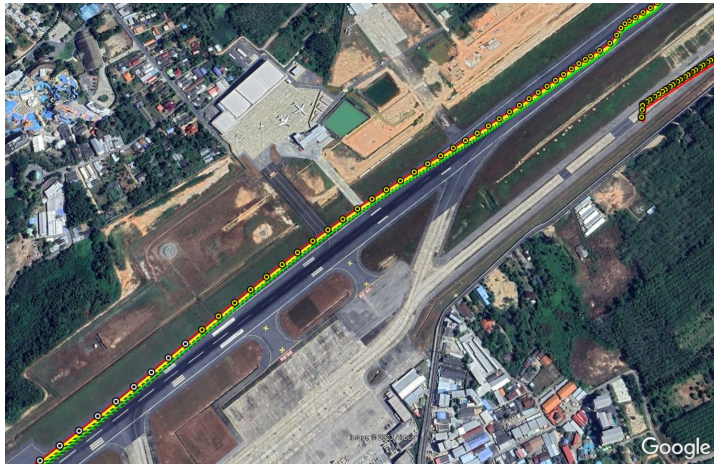

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Modelling & Handling Quality Tools

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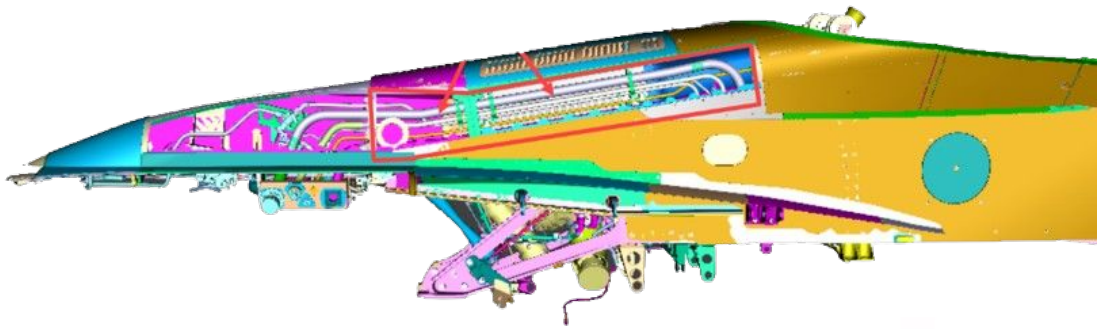

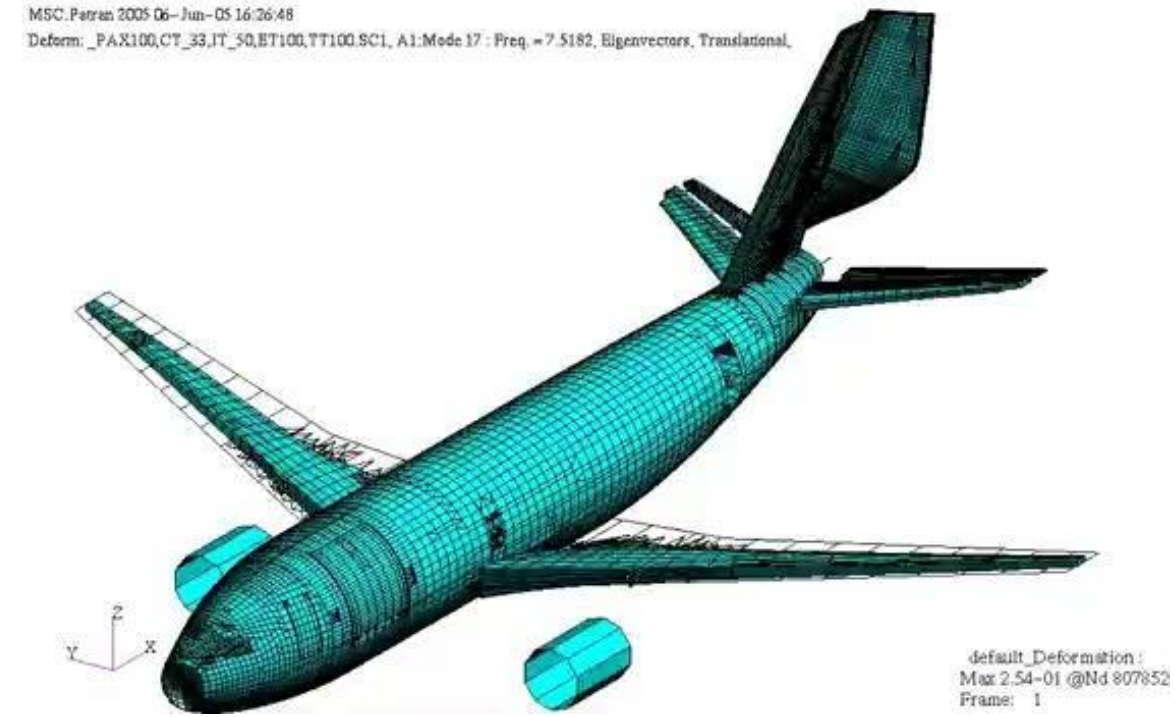

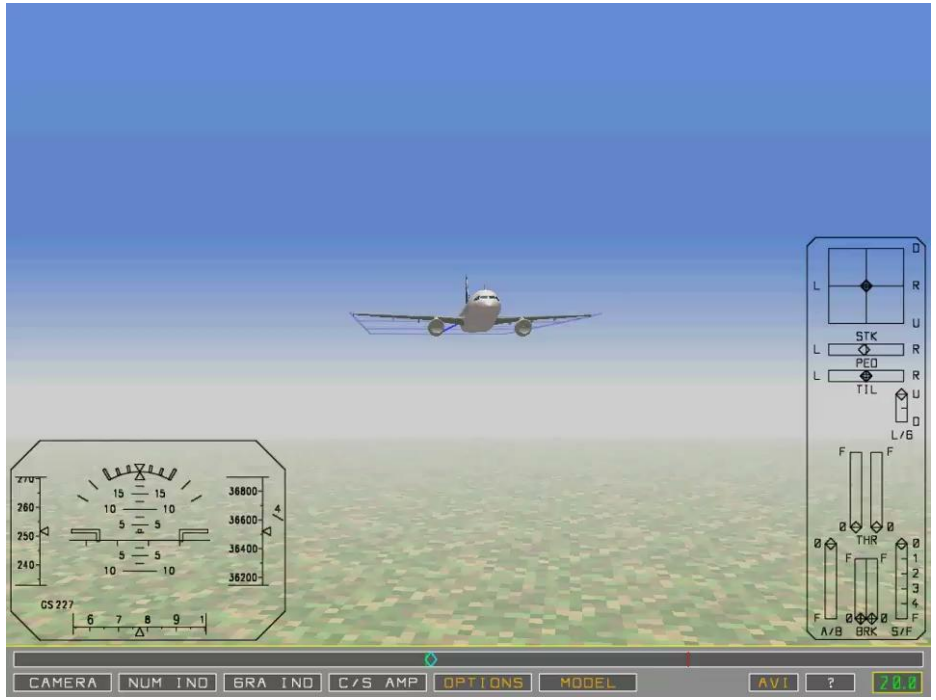

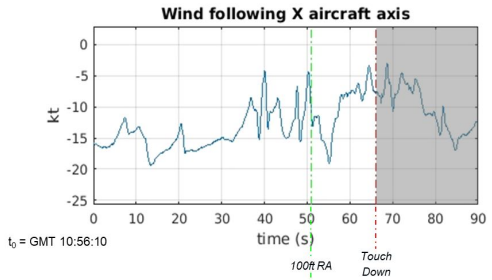

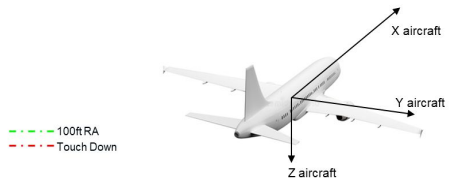

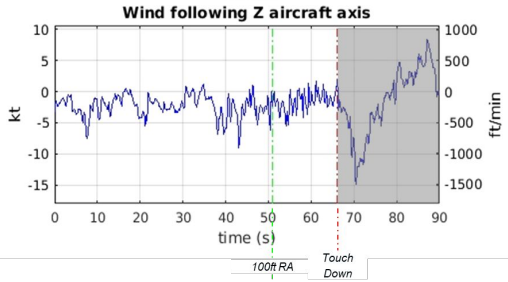

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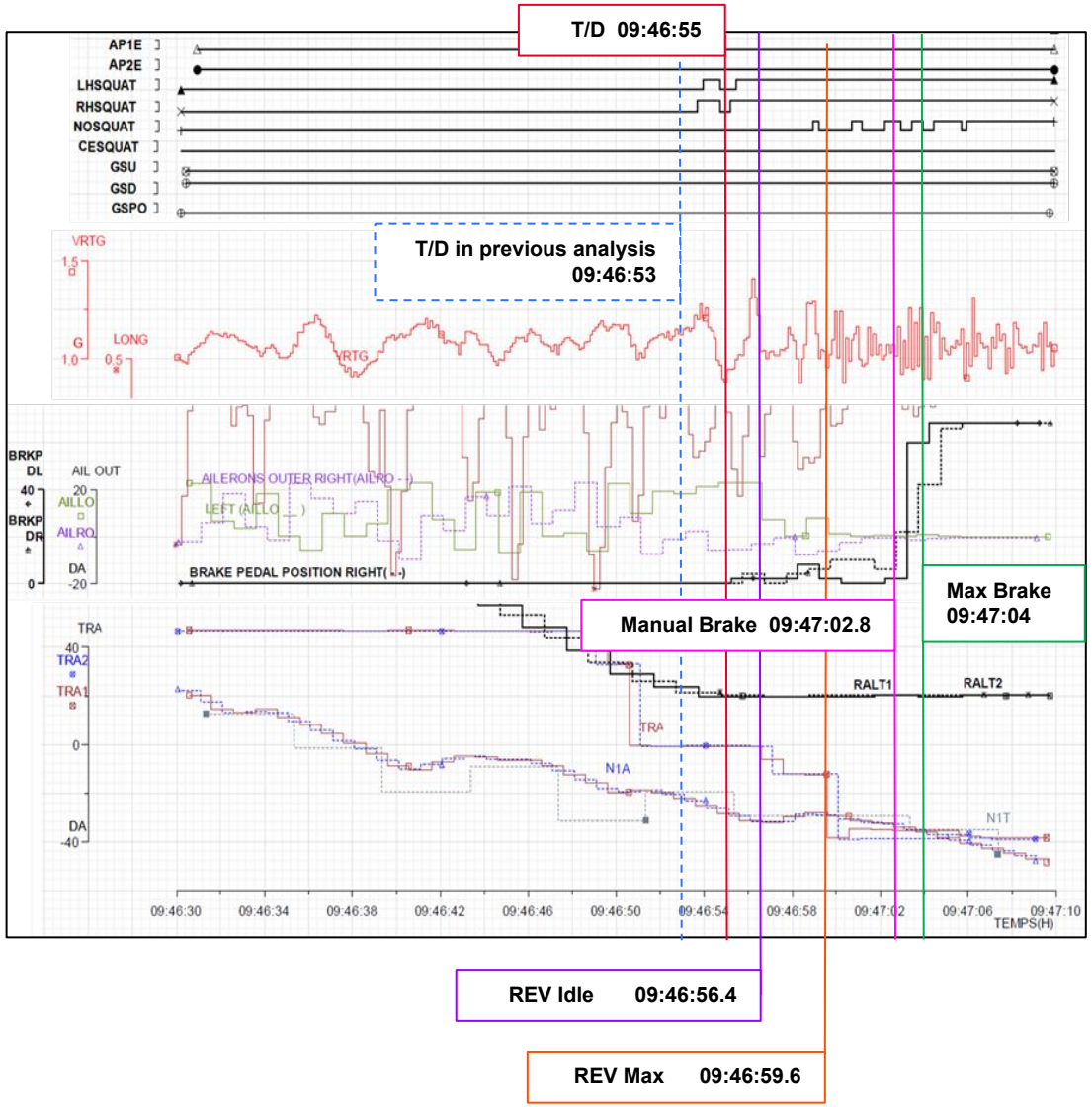
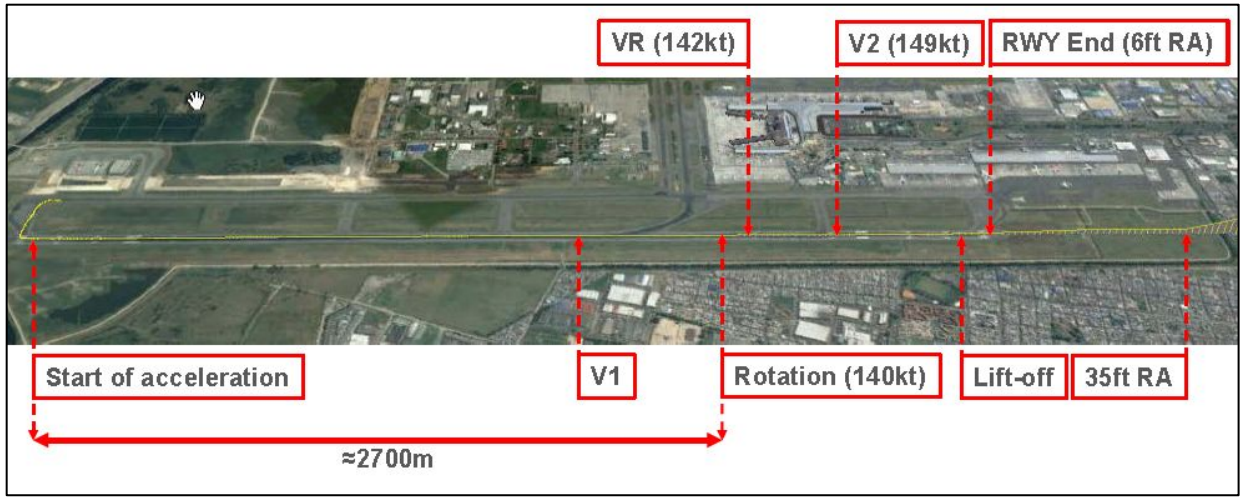
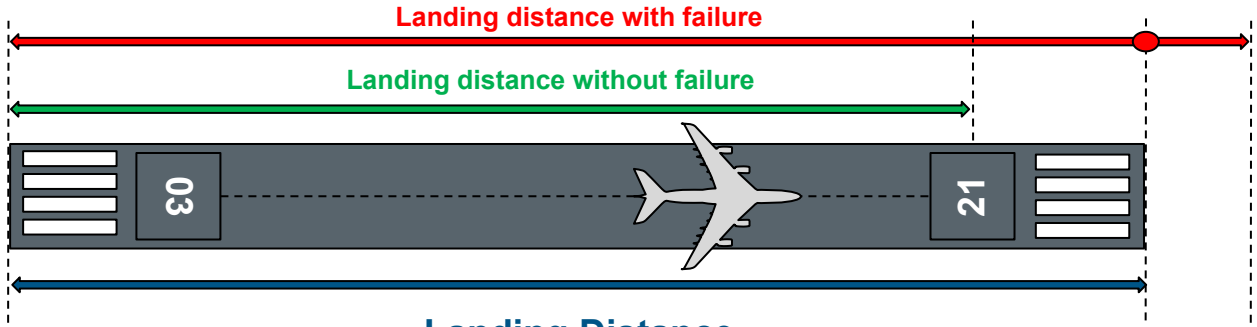
Performance studies







Landing Distance Available (LDA)

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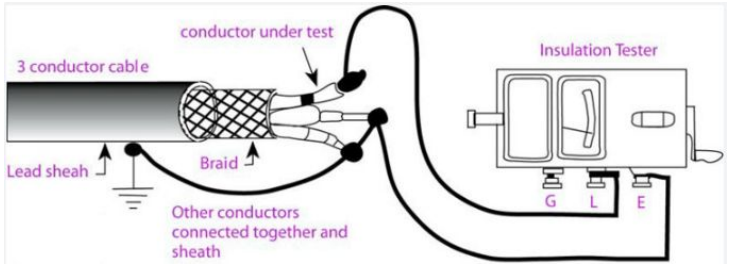
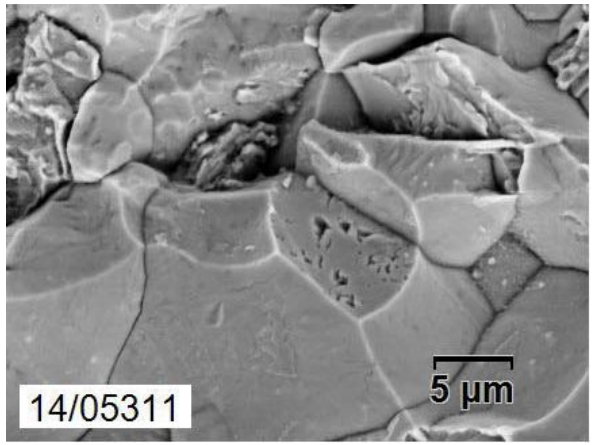
Tests and Examination Labs

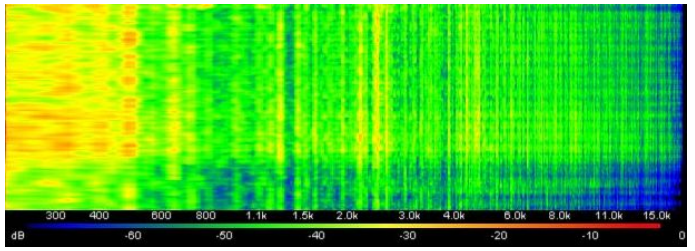


Airbus and its network own various facilities where tests / examinations can be performed:

- Airbus group
- Engine manufacturers
- Equipment manufacturers
- Specialised laboratories

Some examples: Wiring, current ingestion on computers, EMI, Fire, fracture analysis, audio analysis, etc.





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Surface Layout

Simulators

Airlines training simulator

- Real cockpit - motion - visual
- Simulated systems
- Frozen systems configuration
- No recorder

Example of use case

Replay an operational event to assess adherence to SOPs or human factors aspects

Development simulators

- Real cockpit - no motion - visual
- Real systems ⇒ ability to match A/C systems configuration
- Ability to simulate complex failures
- Mass recording for post analysis

Examples of use case

Replay technical event
Ability to install real equipments from the event A/C

Simulators and Aircraft “0”

Simulators may be a mean to replicate or investigate accident scenarios

The added values, compared to engineering desktop simulations:

- Observe the human / machine interface
- Experience the dynamic of a sequence of events
- Tests with some real aircraft systems
- Capability to investigate complex system failure modes and consequences
- Massive data recording for post-analysis

A simulator has limitations.
Beyond these limitations, the simulator is not fully representative of the reality
Tests program mandatory to keep this complex mean efficient
To be used for major incidents or accidents or on ad’hoc request

Operational Expertise – Procedures and Training

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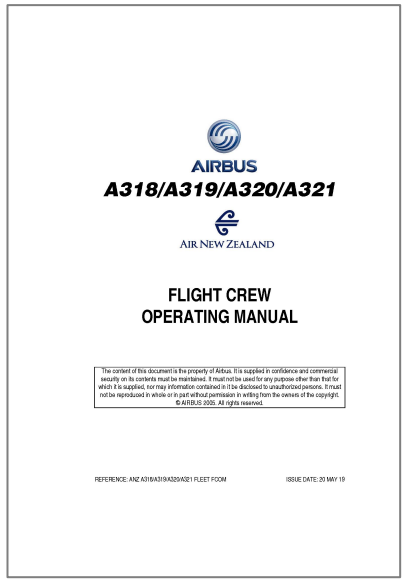

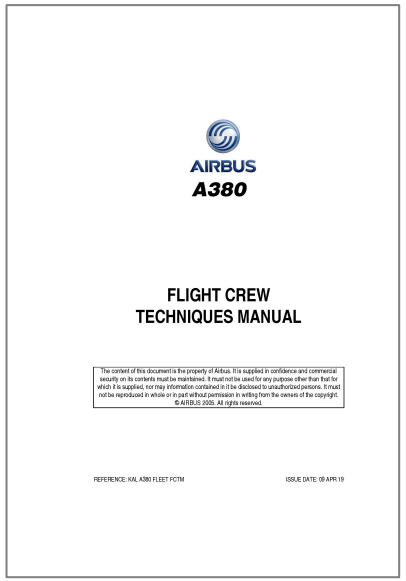

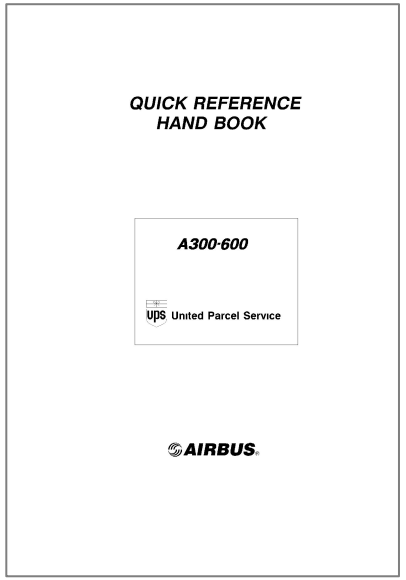

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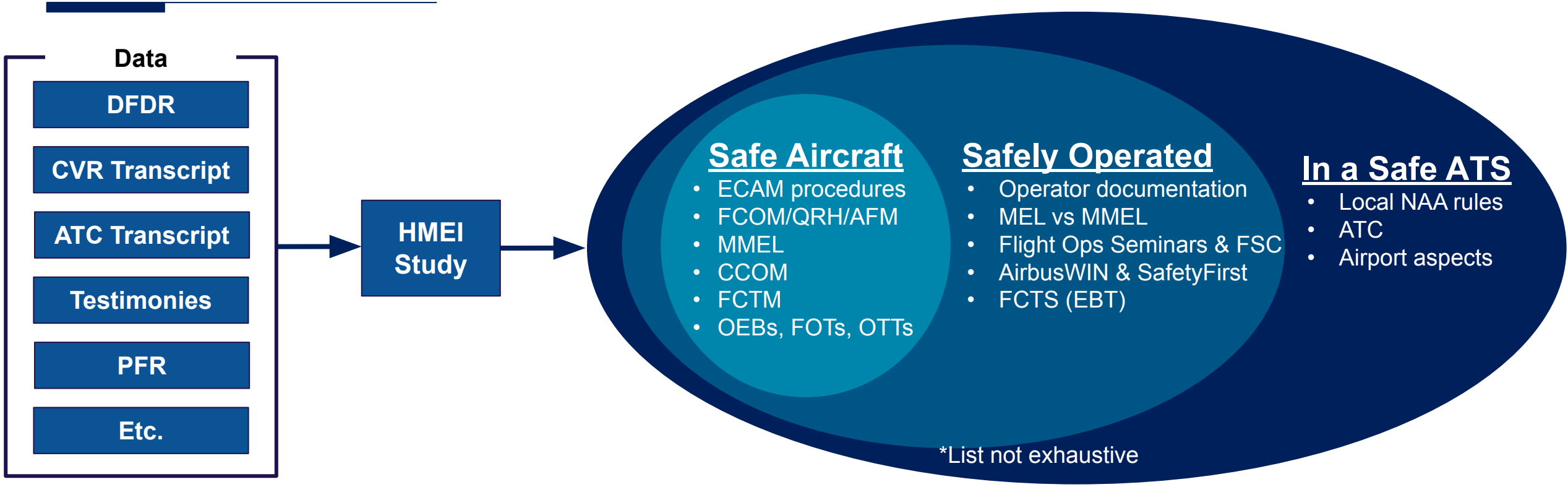
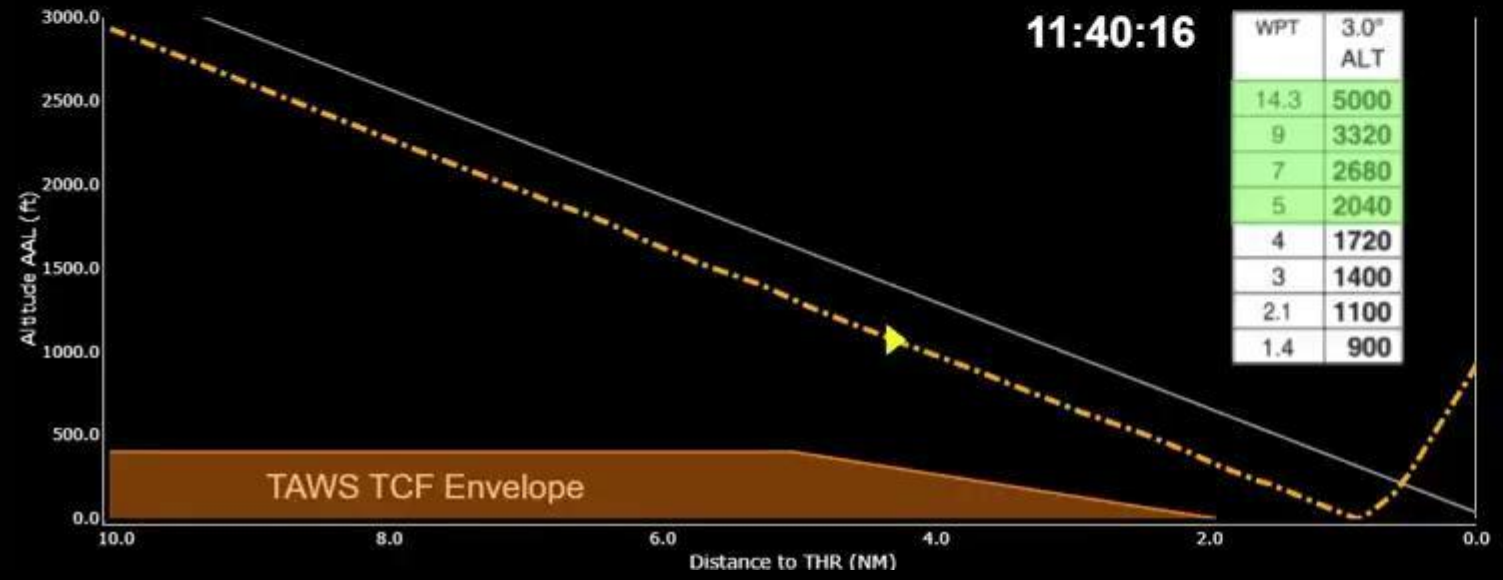
Operational Expertise – Human Machine & Environment Interaction

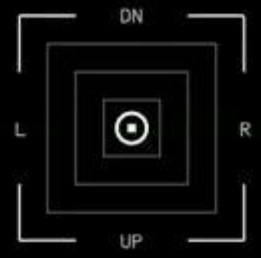


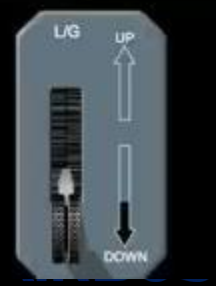
- An analysis method developed by Airbus that provides a comprehensive understanding of Human, Machine and Environment Interactions (HMEI)
- Contributes to human factors / human performance analysis conducted by the SIAs
- Captures lessons learned and identifies key findings for potential safety enhancements in the 3 safety areas
- The robustness and accuracy of the HMEI analysis are directly affected by the volume and quality of the data available
- Airbus can support this activity by providing HF experts, Flight Ops experts, Expert pilots, TRIs/TREs, etc
- Airbus understands the sensitivity of such data (in particular elements of the CVR), and has developed robust processes to ensure the respect of the confidentiality requirements

Animations

Airbus Amber





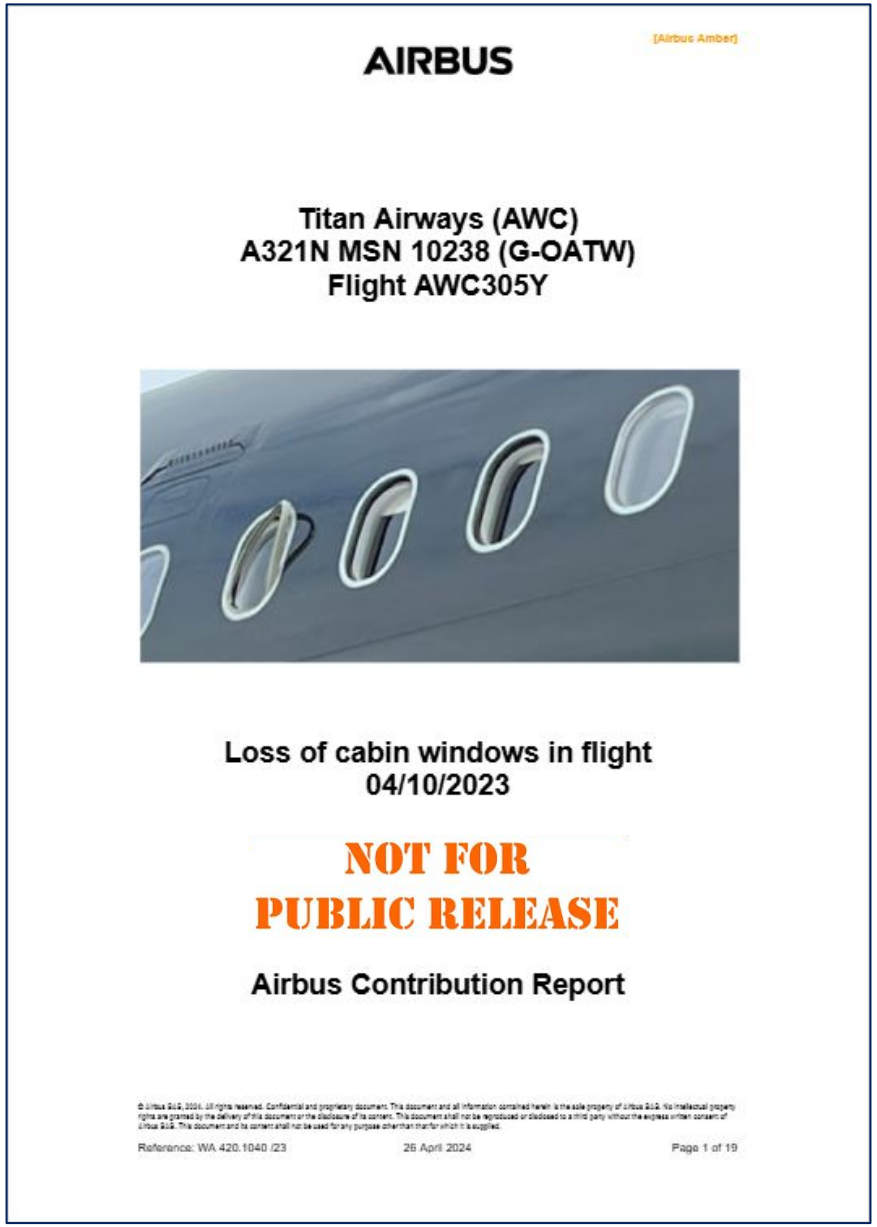


Airbus Contribution Report

Airbus Amber

- Description of the relevant aircraft systems and structure
- Full event analysis, including:
  - Flight data readout
  - Engineering simulations and studies (Handling Qualities, Wind & loads assessments, performance, etc.)
  - Results of laboratory and simulator sessions
  - Pireps and aircraft data analysis (PFR, TSD, etc.)
  - Etc.
- Relevant operational and maintenance documentation
- All relevant information to support understanding of the event and its analysis

- Based on facts - No speculation
- Accuracy - Information duly validated
- Concise - The information needed
- Completeness - All issues addressed and any actions taken are documented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[Airbus Amber]

Titan Airways (AWC)
A321N MSN 10238 (G-OATW)
Flight AWC305Y

Loss of cabin windows in flight
04/10/2023

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Airbus Contribution Report

Reference: WA 420.1040 /23 26 April 2024 Page 1 of 19

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Airbus Comments to an Annex 13 Draft Report

Airbus, as technical advisor to the state of manufacture and design, provides the state investigation board with its comments in a specific format within 30 days (extendable to 60 days upon requirement from the ACCREP)

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Airbus comments to final draft report

CORE COMMENTS				
Ref.	Applicable paragraphs	Commented extract	Reason for proposed change	Proposed amendment
IV.	Page 6 Air Conditioning System Lines 9-14	The conditioned air is at a temperature and flow rate that is suitable to enter the mixer unit where it is mixed with the cabin air prior to distribution to the flight deck and cabin to maintain a comfortable environment. Trim valves allow untreated bleed air to mix downstream of the mixer units to optimise temperature regulation. The temperature in each zone can be selected and set from the AIR COND panel on the flight deck.	Terminology correction. Add information on cockpit supplied with from air pack 1 only during normal system operation.	The conditioned air is at a temperature and flow rate that is suitable to enter the mixer unit where it is mixed with the recirculated cabin air prior to distribution to the flight deck and cabin to maintain a comfortable environment. Trim valves allow ~~untreated~~ hot bleed air to mix downstream of the mixer units to optimise temperature regulation. During normal pack operation with the trim air system operative the cockpit is only supplied with air from the pack 1 mixed with the recirculated air. The temperature in each zone can be selected and set from the AIR COND panel on the flight deck and can be fine-tuned for each cabin zone through the temperature control panel installed on the FAP (Flight Attendant Panel).

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Airbus Answers to Safety Recommendations

All Safety Recommendations relevant to Airbus are captured

- The ones directly addressed to Airbus are answered with 90 days
- The ones addressed to EASA / FAA in an Airbus context are captured for position also within 90 days

Safety recommendations addressed to other manufacturers are captured for Airbus internal evaluation within 6 months

Answers are duly validated by the “Airbus Investigation Committee”

Ideally the safety recommendations are discussed and addressed during the course of the investigation

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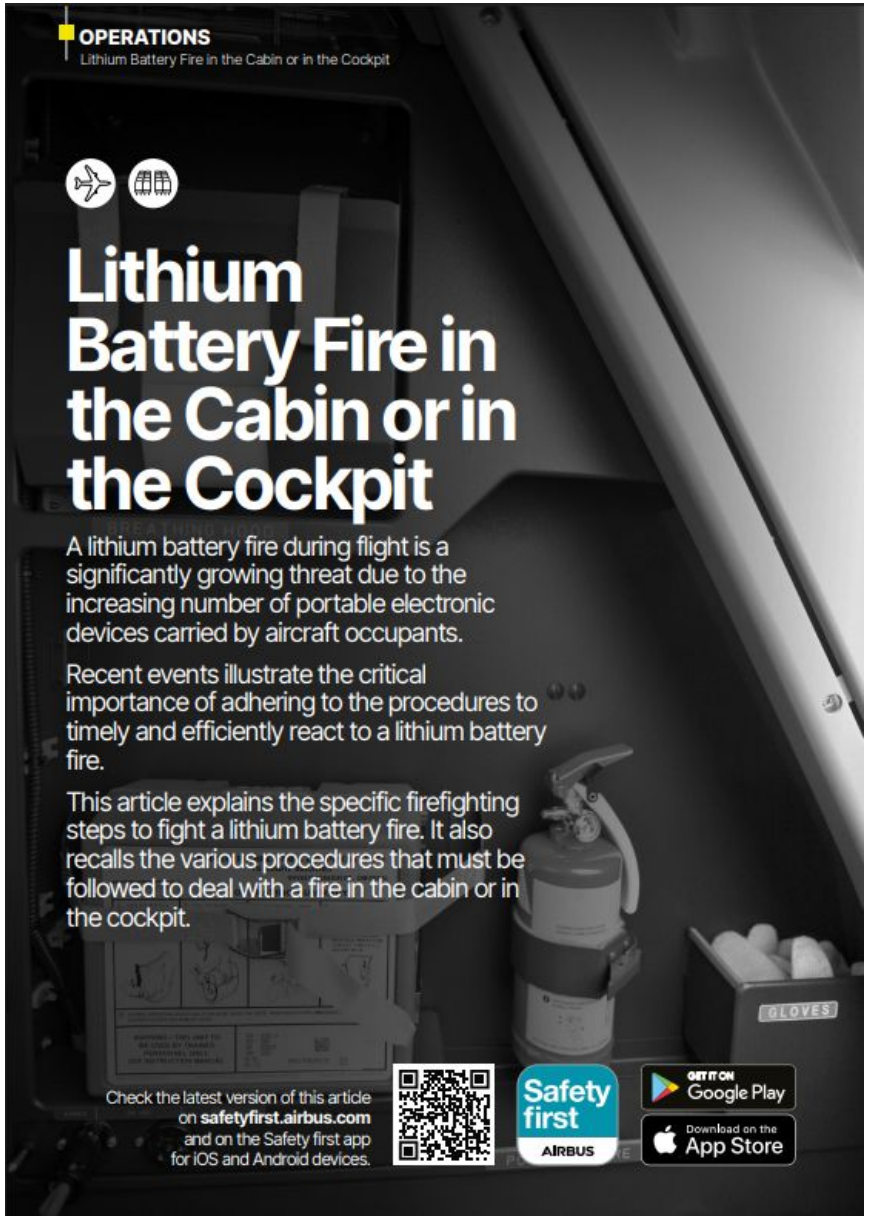
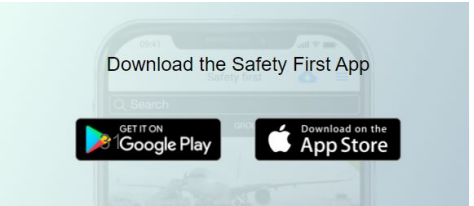
Communication

- The Airbus Safety first magazine contributes to the enhancement of safety for aircraft operations.
  - It contains information and lessons learnt about safety topics related to the design, maintenance, and operation of Airbus aircraft
- WIN (Worldwide Instructor News) provides instructors and pilots with information from the Airbus Flight Operations and Training
  - It contains videos, presentations, and articles that deal with topics that Airbus considers necessary to highlight for better understanding
- The aim of sharing this safety information is to share lessons learnt and help prevent accidents by increasing the awareness of the crews





Visit:
https://safetyfirst.airbus.com/
https://airbus-win.com

WIN
AIRBUS

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Airbus Events with SIA

Airbus days for SIAs

- Introducing future technologies
- Explaining training and operational concepts
- Providing investigation return of experience
- Explaining Airbus safety strategy
- Every 2 years, duration 2.5 days
- Next seminar 2027

Airbus regional seminars

- To better know each other : "Break the ice!"
- For Airbus to understand SIA constraints and concerns
- How Airbus is organized to support an Annex 13 investigation
- To get feedback from Airbus experience (Safety on accident site, useful information to recover, etc.)
- Awareness of investigation means that Airbus is able to provide
- As required, duration 3 days

Conclusion

- In an investigation, the role of Airbus is to provide its expertise and resources to support the Safety Investigation Authorities, and to take away any learning from an event that may help improve the safety of Airbus products and the air transport system
  - A team of trained and experienced field investigators to assist the on site activity
  - Available experts from throughout the Airbus Group
  - Access to test and simulations means

- Fully documented facts and analyses with two key deliverables:
  - On site report
  - Airbus contribution report

- A collaborative approach throughout an investigation allows a full analysis of the event
  - Corrective actions to be identified and timely implemented

Our collective objective is to prevent recurrence

Airbus Investigation Values

- Comply with regulations and industry standards
- Never give up in front of the investigation challenges
- Do not miss an opportunity to prevent or enhance - Do not accept recurrence
- Collaborate throughout the industry to capture and disseminate the lessons learnt

Airbus Aviation Safety Investigators

ISL

Stéphane COTE

Airbus nominates one single point of contact to manage any Annex 13 investigation: the Airbus Lead Investigator (ALI). Today 10 ALIs:

Will retire in May 2026
Dedicated to transfer of knowledge

Albert URDIROZ

8 ALIs

Xavier BARRIOLA

Bernard BESINET

Denis CADOUX

Hélène CARROLS

Sundeep GUPTA

Pierre LABRO

Thomas LEPAGNOT

Jordane SOULA-OUDOT

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Any questions?

Thank you for your attention

Thank you