FocusOn ...
Investigating Air Traffic events

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ATC-Related Investigations: Regulatory Requirements and Practical Experience

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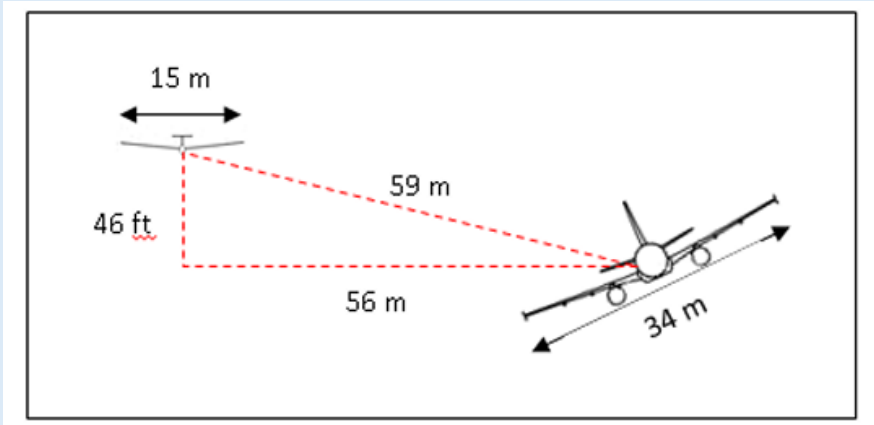
What are we talking about?

Runway Incursion Milan-Linate
2001; 118 fatalities

Mid-air collision, Ueberlingen,
2002, 71 fatalities

Runway Excursion, Munich
2011, no fatalities

Airprox Airbus A320 - Glider, Hamburg
2019, no fatalities



Agenda

01	General Aspects
02	Requirements imposed by regulations
03	Investigation practise and experience
04	Conclusions

01 General Aspects

Question:

Is an investigation in the ATC area a “special” investigation for Annex 13 investigators?

My answer: no and yes

„Official“ safety investigation:	
Responsibility:	AIA / SIA
Access to:	almost everything and everyone according to Annex 13 and EU-996/2010
Independence:	complete
Safety Recom.:	yes
Final report:	publicly available

„Internal“ safety investigation:	
Responsibility:	Air Navigation Service Provider
Access to:	internal information
Independence:	partial
Safety Recom.:	internal safety actions
Final report:	internal report, for SMS

01

ATC actions often influence accident sequences

Many occurrences involve ATC indirectly, even without controller error:

- runway incursions,
- loss of separation,
- CFIT or incorrect altitude assignments,
- wrong runway use,
- breakdown of coordination between sectors/FIRs,
- communication misunderstandings,
- surveillance or technology failure.

Important to note:

The AIA / SIA must determine whether ATC contributed **systemically**, even if the controller performed correctly

01

ATC safety assessments can prevent future accidents

ATC investigations allow AIA / SIA to identify:

- procedural weaknesses
- workload and staffing issues
- technology limitations
- phraseology deviations
- human factors challenges
- coordination gaps between units or FIRs
- systemic organisational failures

Important to note:

The output -**safety recommendations**- reduces risk for the entire aviation system.

01 Challenges in ATC Investigations

Human Factors complexity

- Investigating ATC involves detailed human-factor elements:
- controller workload and traffic complexity,
- situational awareness at the time,
- fatigue due to shift patterns,
- supervisory support,
- distraction or interruptions,
- team dynamics in multi-position operations,
- cognitive overload in peak traffic periods.

Important to note:

The investigation methods are very similar to those we use when investigating operational aspects in the cockpit.

Only the environment is different.

01 Challenges in ATC Investigations

Variations in National ATM Regulations and Procedures

Europe has:

- Single European Sky (SES) framework
- EASA ATM/ANS requirements (e.g. SERA)
- National ANSP procedures
- Local tower/sector instructions
- Military ATC provisions

Important to note:

- Investigators must navigate **multiple layers of regulation**, often inconsistent, outdated, or not harmonised.

02 Requirements Derived from ICAO Annex 13

Independence of the Investigation

Annex 13 requires that the investigation be:

- **Independent from the ANSP**, the regulator, and the operator involved.
- Free from external pressures (political, judicial, ANSP, or regulatory influence).

Important to note:

- ATC is part of the aviation system. If the system fails—or nearly fails—Annex 13 requires the AIG to determine **how and why**.

02 Requirements Derived from ICAO Annex 13

Mandatory Notification and Preservation of ATC Evidence

Annex 13 obliges the investigating authority to obtain and preserve:

- ATC voice recordings (controller–pilot, intercom, coordination lines)
- Transcripts of communications
- Radar and surveillance data (SSR, PSR, ADS-B, etc.)
- Flight progress strips (paper or electronic)
- ATC logs, shift plans, duty rosters
- System status logs (outages, alarms, degraded modes)

Important to note:

- The State/ANSP must **immediately protect and preserve** these data in case of an investigation.

02

Requirements Derived from EU Regulation 996/2010 (EU Member States)

Mandatory Cooperation of ANSPs and Controllers

EU 996/2010 imposes binding obligations:

- ANSPs **must provide investigators immediate access** to:
  - Controllers and supervisors
  - ATC systems and workstations
  - System logs and maintenance records
  - Training records and licensing information

Important to note:

- Controllers are required to cooperate through **non-punitive interviews**.

02

Requirements Derived from EU Regulation 996/2010 (EU Member States)

Mandatory Data Preservation

ANSPs must:

- Secure ATC recordings “**without delay**”
- Ensure **no overwriting** or automatic deletion
- Provide copies in a readable format to investigators

Rights of Investigators

The AIA / SIA must be given:

- Unrestricted access to ATS premises
- Access to test, record, and copy ATC data
- Permission to conduct operational reconstruction
- Interviews in private, without employer presence

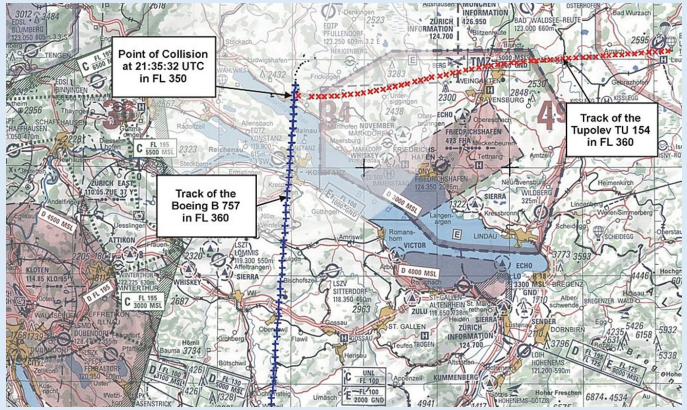
03

Ueberlingen Accident: Safety Recommendations

11 out of 19 Safety Recommendations were directly related to **ATC services, ATC procedures, or ANSP organisational deficiencies**.

These include recommendations addressing:

- ATCO staffing,
- workload,
- system redundancies,
- maintenance and alarm functions (STCA, conflict alert),
- handover procedures,
- radar and communication system reliability,
- supervisor roles,
- emergency procedures.



03 Is there a need to have specialised ATC investigators?

Ideally: yes

A well-resourced AIA /SIA should have:

- **One or more full-time ATC investigators**
- With backgrounds as controllers, supervisors, or ANSP safety managers
- Trained in Annex 13 investigation methodologies

This allows fast response to serious incidents:

- Loss of separation
- Runway incursions
- Level busts
- Communication failures

In practice: many AIA / SIA do NOT have them

- Smaller States or those with low traffic volume often cannot maintain such staff.

Important to note:

If the AIA / SIA does not have:

- **Use advisors from another State**

Possible sources:

- Another AIA with ATC specialists
- ANSP-independent ATC experts with investigation certification
- EUROCONTROL Support Teams
- ICAO Regional Accident Investigation Groups (RAIGs)

03 Use ANSP personnel only under strict limits

If no other option exists:

- ANSP staff may help **explain systems**, **extract data**, **clarify procedures**
- BUT they must **not** analyse events, interpret controller actions, or influence conclusions
- Their role is purely technical support, not investigative judgement
- This preserves independence.

Important to note:

Doc 9756 warns:

- *ANSP personnel may provide factual information but should not perform evaluative functions.*

04 Conclusions

- Independent investigation is essential
- ATC involvement is systemic, not incidental
- ATC investigations depend on complete data preservation
- Human factors are central
- Regulatory complexity is a challenge
- Specialised ATC expertise is highly beneficial

Thank you very much for your attention!

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