

(Careful) Disruption for Safety

Pascal Traverse

Formerly, Airbus – General Manager for Autonomy Technology

LAAS – UCLA – AIRBUS
1983 – 1984 – 1985

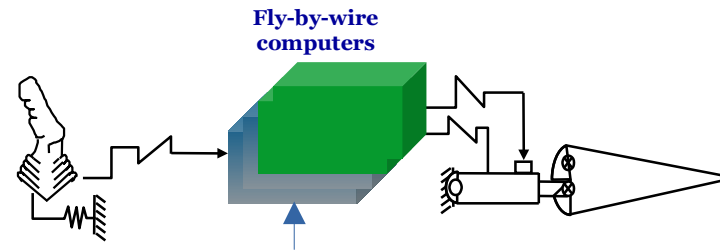
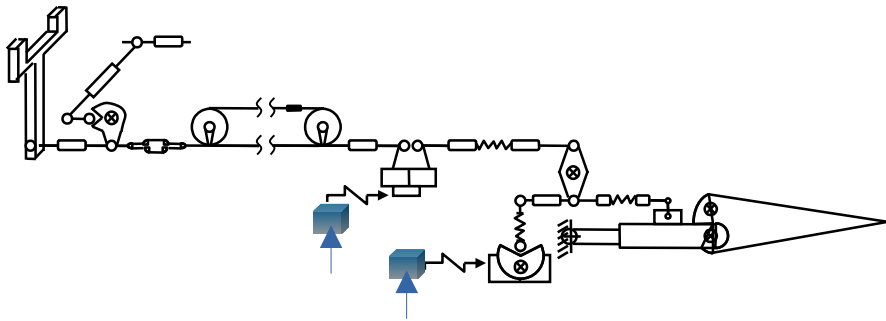
The Past Shapes the Future

89th Meeting of the IFIP Working Group 10.4 on Dependable Computing and Fault Tolerance

May 4-7, 2026 - Kaunas, Lithuania

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What is it about?



=> Flight Envelope Protections
=> Weight saving

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A320 Fly-by-Wire

Disruption?



AIR SAFETY IS AMERICA READY TO FLY BY WIRE?

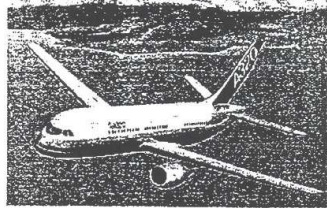
By Jim Beaton
April 2, 1989

IN JUNE, a new plane hits the American skies. Northwest Airlines will become the first U.S. carrier to take delivery of the European Airbus A320 -- the most advanced passenger aircraft in the world, and already one of

THE INDEPENDENT ON SUNDAY 30 SEPTEMBER 1990

Questions over Airbus safety raised

By Peter Koenig



QUESTIONS about the safety of Airbus Industrie's A320 passenger airliner will be raised this evening on Channel Four's Equinox programme.

An Airbus A320, the first passenger airliner whose flight deck is entirely controlled by computer, crashed at an air show in Habsheim, France, in June 1988 and killed three people.

recorder and flight data recorder should be subjected to an independent replay and analysis."

Rejecting his criticism on Friday, a French government official declared: "The inquiry was conducted in conformance with international standards. It

An A320 crashed and killed three people at a French air show

"The A320 is perfectly safe," he said. "If we had any doubts, it would not be flying."

Airbus Industrie, based in Toulouse, has delivered 110 A320s to airlines at a list price

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Search RISKS

THE RISKS DIGEST

Volume 16 Issue 16
Wednesday, 15th June 1994

Forum on Risks to the Public in Computers and Related Systems

ACM Committee on Computers and Public Policy, Peter G. Neumann, moderator

Please try the URL privacy information feature enabled by clicking the flashlight icon above. This will reveal two icons after each link the body of the digest. The shield takes you to a breakdown of Terms of Service for the site - however only a small number of sites are covered at the moment. The flashlight take you to an analysis of the various trackers etc. that the linked site delivers. Please let the website maintainer know if you find this useful or not. As a RISKS reader, you will probably not be surprised by what is revealed...

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- Congressman Jack Brooks' Statement on Crypto
David Banisar
- WSJ article: RFI hoses medical equipment
Robert Allen
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Robert Cassett
Peter Ladkin
Wesley Kaplow
Pete Mellor
Kaplow again
Bob Niland
- Info on RISKS (comp.risks)

<= Limitation of pilot authority

<= Software in critical applications

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A320 Fly-by-Wire

Careful?



A300 N°3 1983 & 1985



Concorde 1978

=> Proven Architecture
=> Early tests with pilots

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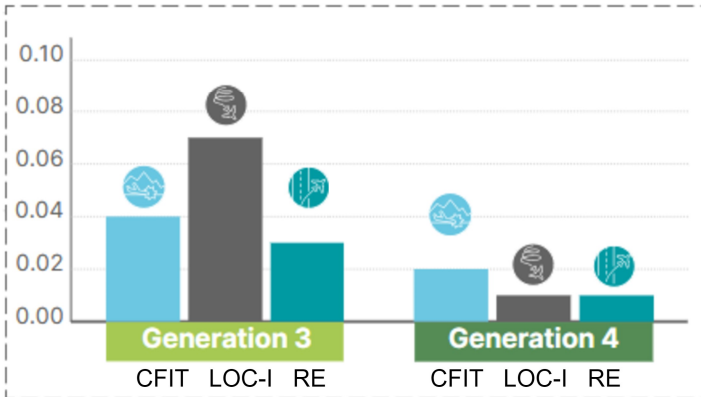
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A320 Fly-by-Wire

Safety?

Average fatal accident rate



Average fatal accident rate (per million flights) per accident category 1958-2025

- Controlled Flight Into Terrain
- Loss Of Control In flight
- Runway Excursion

<= Flight Envelope Protection (LOC-I)

3 Glass cockpits & FMS

From 1980

Electronic cockpit displays, improved navigation performance and Terrain Avoidance Systems, to reduce CFIT accidents

A300-600, A310, Avro RJ, F70, F100, B717, B737 Classic & NG/MAX, B757, B767, B747-400/-8, Bombardier CRJ, Embraer ERJ, MD-11, MD-80, MD-90

A300-600

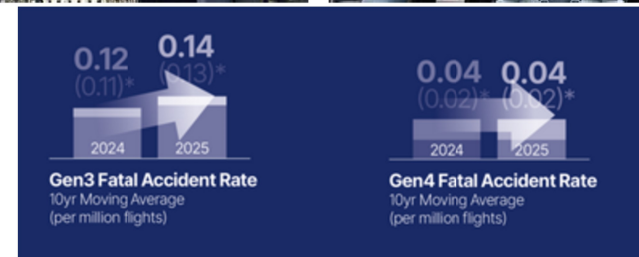
4 Fly-By-Wire

From 1988

Fly-By-Wire technology enabled flight envelope protection to reduce LOC-I accidents

A220, A318/A319/A320/A321, A330, A340, A350, A380, B777, B787, Embraer E-Jets, Sukhoi Superjet

A350 XWB



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Safety?



Next?



=> Give time and data to the crew, in all conditions, to assess the situation and make a good decision.

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Disruptive Cockpit - DISCO



What is it about?

=> *Give time and data to the crew...*

Automation
Perception
Navigation
Human-Machine Interface

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Careful?

- Independent assessment panel
- Feedback from airline pilots
DISCODECK
- Integrate the technologies
DISCOBENCH
- Fly the critical technologies
ATTOL - take-off and landing
DRAGONFLY - continued safe flight and landing
OPTIMATE - taxi

Disruptive Cockpit - DISCO



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Disruptive Cockpit - DISCO



Disruption?



DISCO technologies could pave the way to SPO

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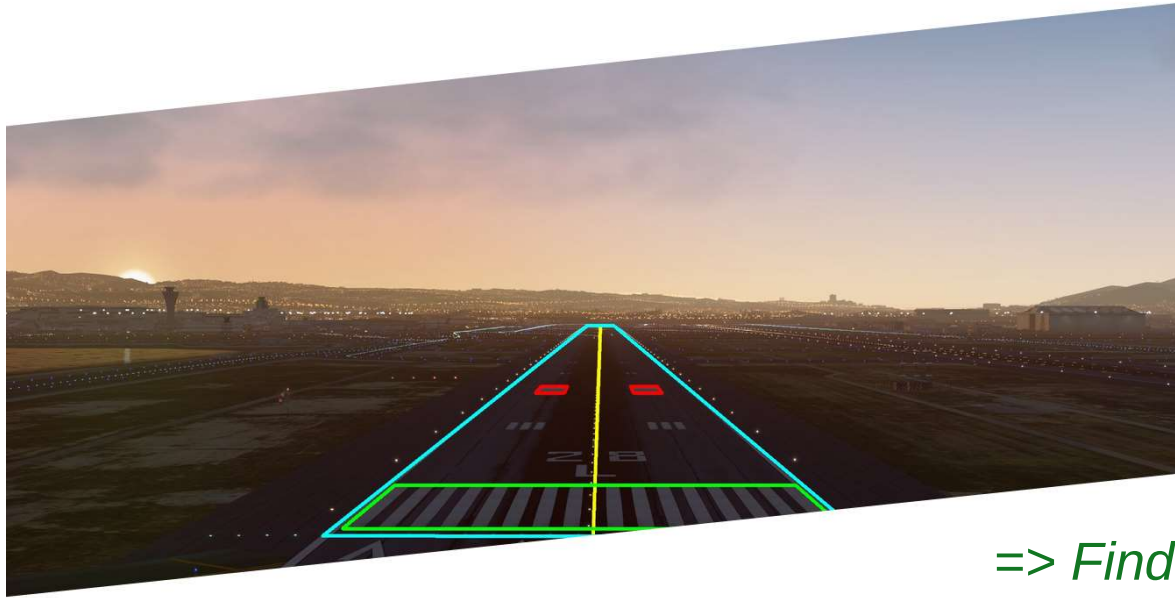
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Flying AI



=> Finding the airport, then the runway.

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Flying AI

Advisor

Frequent Support

- => ATC messages
- => document search
- => trajectory

***Virtual
Co-Pilot***

Rare Support

- => detection of incapacitation
- => continued safe flight and landing

Savior

Exceptional Support

- => invention of a solution

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Advisor

**Virtual
Co-Pilot**

Savior

Frequent Support

Rare Support

Exceptional Support

=> No stress
=> "Major"

=> Remote Activation
=> Limitations
=> Vote?

=> Extremely Remote
Stressed Crew Activation

DAL C?

DAL B?

DAL B?

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Thank you for the invitation,
your attention and your questions!

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Some References

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