New technology in civil aviation and the future of flying –

the changing regulatory environment and the promise and challenges of the technology

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New Zealand transport sector strategic outcomes

Inclusive access

Enabling all people to participate in society through access to social and economic opportunities, such as work, education, and healthcare.

Economic prosperity

Supporting economic activity via local, regional, and international connections, with efficient movements of people and products.

Healthy and safe people

Protecting people from transport-related injuries and harmful pollution, and making active travel an attractive option.

Environmental sustainability

Transitioning to net zero carbon emissions, and maintaining or improving biodiversity, water quality, and air quality.

Resilience and security

Minimising and managing the risks from natural and human-made hazards, anticipating and adapting to emerging threats, and recovering effectively from disruptive events.

A transport system that improves wellbeing and liveability

What is special about rapidly escalating technology innovation?

Civil Aviation is largely regulated through prescriptive standards & technology change is currently leading standard development

Regulatory Context

ICAO international standard development takes circa 5+ years

Domestic standard development takes another 2- 5 years – if high priority

Works – only just - for:

or

Safety performance:

Jet and Turboprop world fleet
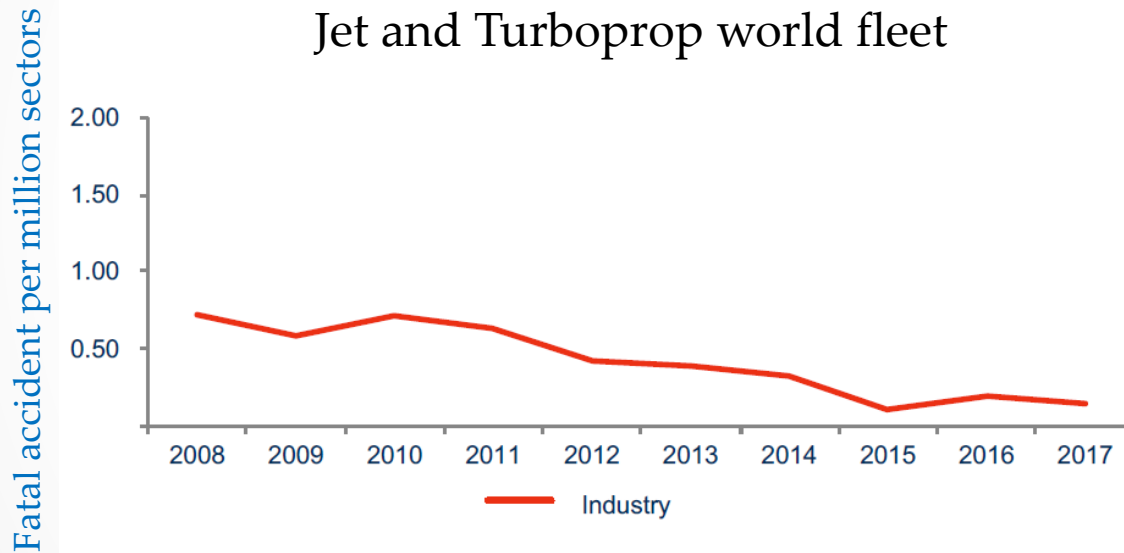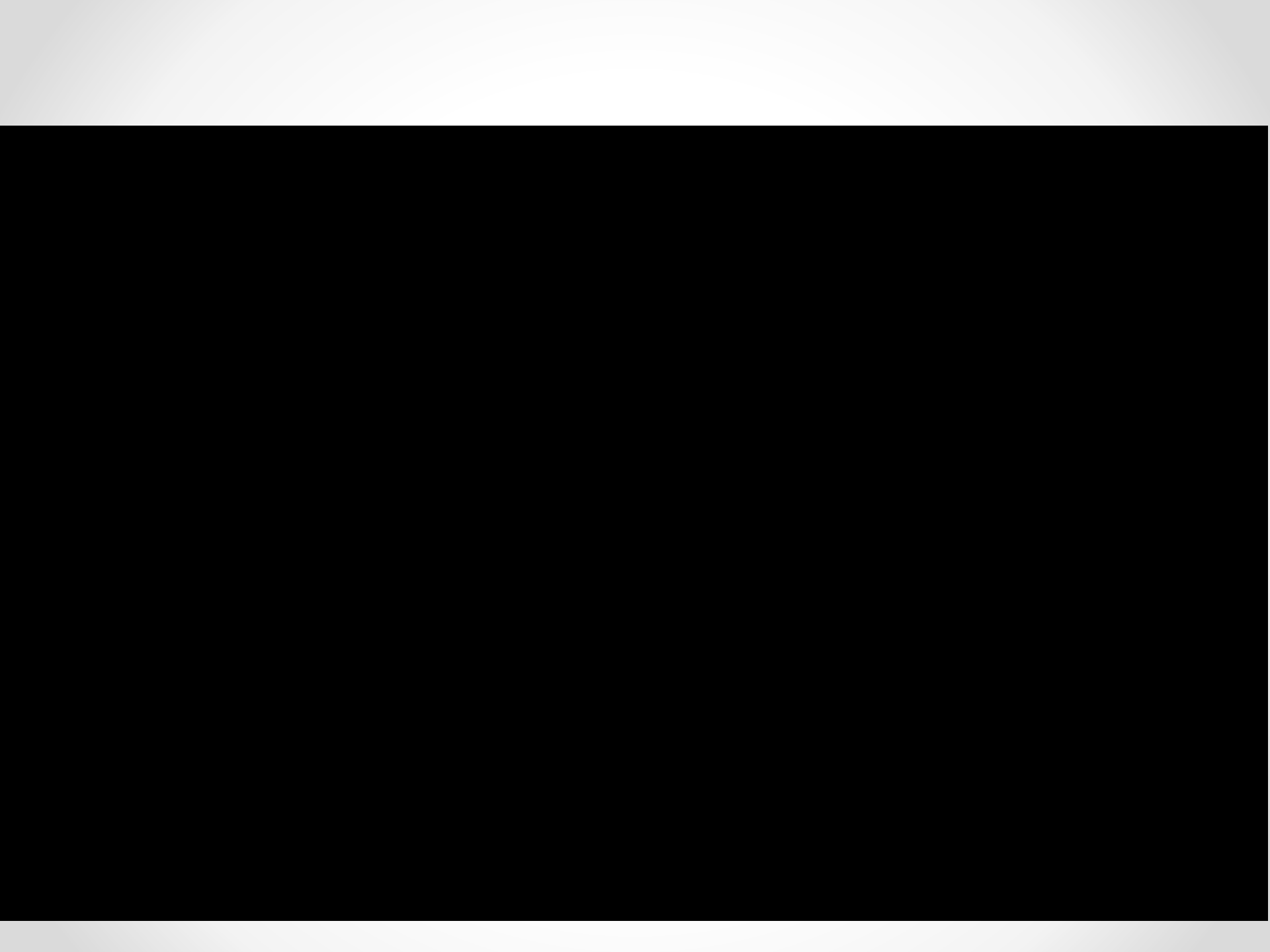
But it doesn't work for this lot

So how should States respond to rapidly escalating technology innovations in the aviation sector?

Carefully

&

Systematically

But also with an open mind and acting in the public interest.

Lessons from international experience

- Establish the objectives early
  - Type of intended operation
  - Vehicle and software certification standards

- Define an acceptable outcome/level of risk

- Focus on the outcome rather than the means

New Zealand approach

- Interim Rule Structure
  - Part 101: prescriptive operating limitations
  - Part 102: performance-based approach if wishing to Operate outside Part 101 limits

- Use of JARUS SORA

Technology isn't just about 'drones'

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Hierarchy of control:

Past
1. Pilot
2. Computer

Fly-by-wire

Present
1. Computer
2. Pilot

Future
Computer

Current Hierarchy

1. Computer
2. Pilot

- QF 72

- Air France 447

- B737 MAX

It is inevitable that this – or something similar will happen:

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But consider that while the probabilities and consequences of adverse events, and hence the "risks," are typically assumed to be objectively quantified by members of the risk assessment community - much social science analysis rejects this notion, arguing instead that such objective characterization of the distribution of possible outcomes is incomplete at best and misleading at worst. These approaches focus instead on the effects that risky outcome distributions have on the people who experience them.

Perception of Risk Posed by Extreme Events: Slovic and Weber: 2002

So its not quite as simple as:

this
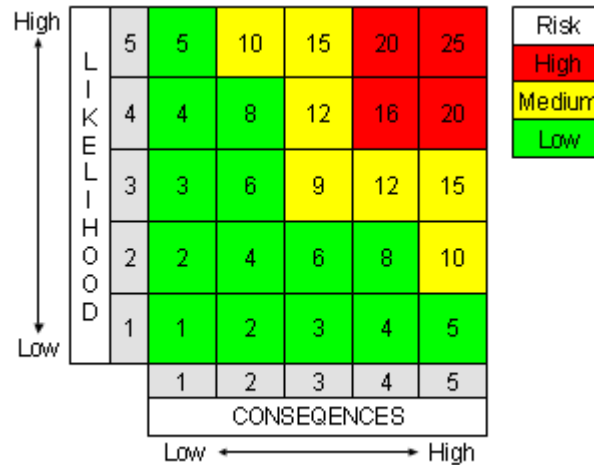
or

this

$$P < 1 \times 10^{-7}$$

Think

- B737 MAX

- Risk perception

- Dread factors

End