



Australian Government

Australian Transport Safety Bureau

safe transport



Aviation research

- **Justification?**
- **ICAO Annex 13, Chapter 8.6**

A State having established an accident and incident database and an incident reporting system shall analyse the information contained in its accident/incident reports to determine any actions required.



Aviation research

- **The Power?**
- Transport Safety Investigation Act 2003
 - S.23 (2)

For the purposes of this Act, a ***transport safety matter*** also includes something that affected, is affecting or might affect, transport safety.



Aviation research

- **The Benefit?**
- Primary focus is accident investigation
- The processes and task of an investigation are fairly closely defined.



Aviation research

- **Value-adding?**
- What can be done to increase the value from investigations?



Aviation research

- **Why?**
- To value-add on top of individual accident reports.
- To do something useful with all the data collected from accidents & incidents
- To say 'So What?'.



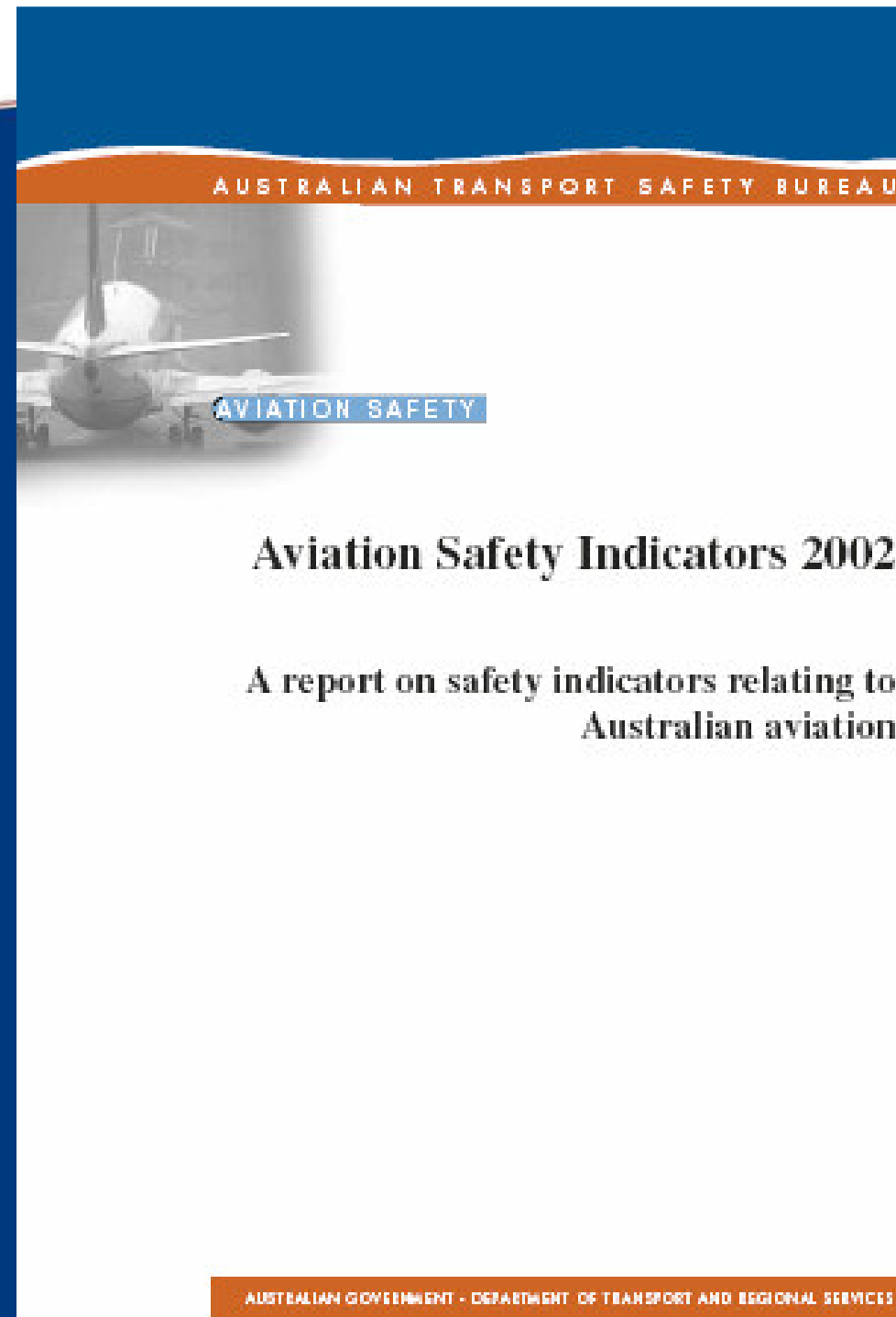
Formal Information sources

- Macro accident data
 - Large numbers of occurrences to identify trends
- Micro accident data
 - Small numbers of certain accident types
- Overseas data for comparison
- Denominator data for rates.



Like What?

- Traditional indicators of safety trends
- Provides an indication of change over time, but no hard connection with safety.





Safety indicators...

- Count and compare rates of events that are often intuitively considered as indicators of the safety health of the industry
- But how much do these indicators relate to safety health?



Safety indicators...

- Some are straight measures of accident rates; low and unreliable

TABLE 1:

Regular public transport accidents, fatal accidents and fatalities by type of operation - 1993 to 2002

	High capacity			Low capacity		
	Accidents	Fatal accidents	Fatalities	Accidents	Fatal accidents	Fatalities
1993	1	0	0	5	1	7
1994	2	0	0	4	0	0
1995	1	0	0	4**	1**	2**
1996	1	0	0	2	0	0
1997	0	0	0	0	0	0
1998	1	0	0	2	0	0
1999	7*	0	0	3	0	0
2000	3	0	0	3	1	8
2001	3	0	0	3	0	0
2002	1	0	0	4	0	0

* Includes 5 accidents where aircraft were on the ground with passengers on board.

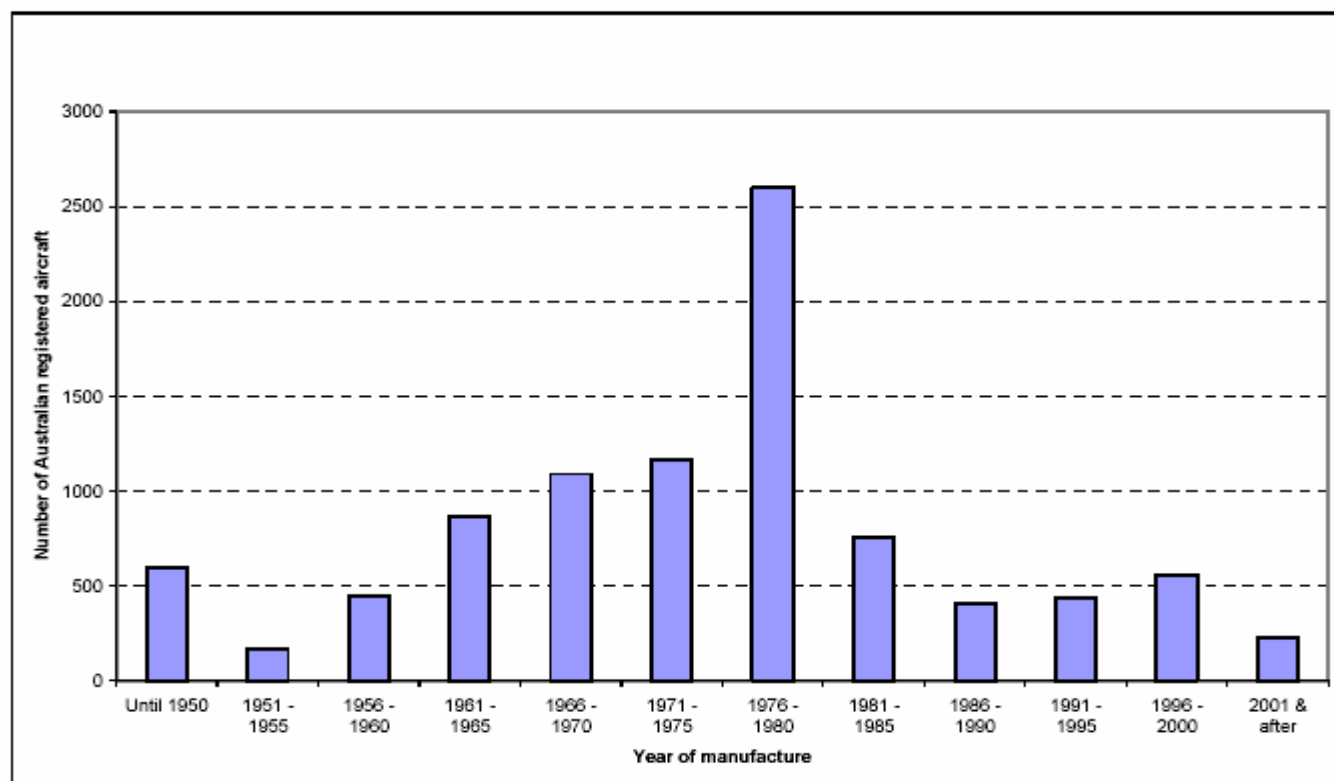
** Includes 1 RPT training flight with two fatalities.



Safety indicators...

- Some are measures of efforts to keep things safe, but we don't know the correlation.

FIGURE 10:
Year of manufacture - fixed wing aircraft - as at 31 December 2002



Source: CASA aircraft register



Safety indicators...

- Watch this space...
- New issue out soon
 - More data
 - Update on previous data



Formal Information sources

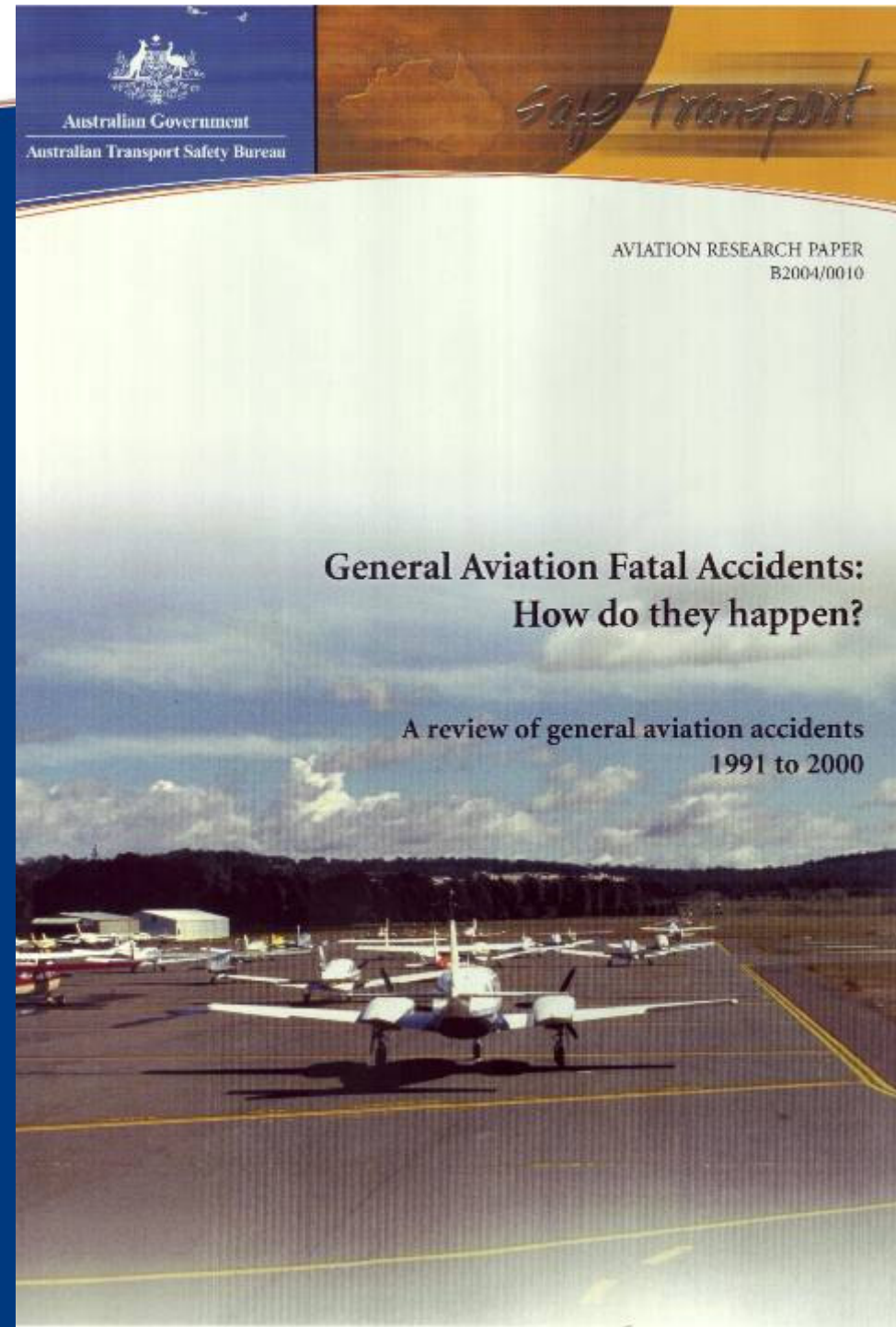
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A practical connection?

- Sort and count
 - Reclassify
 - Themes and trends





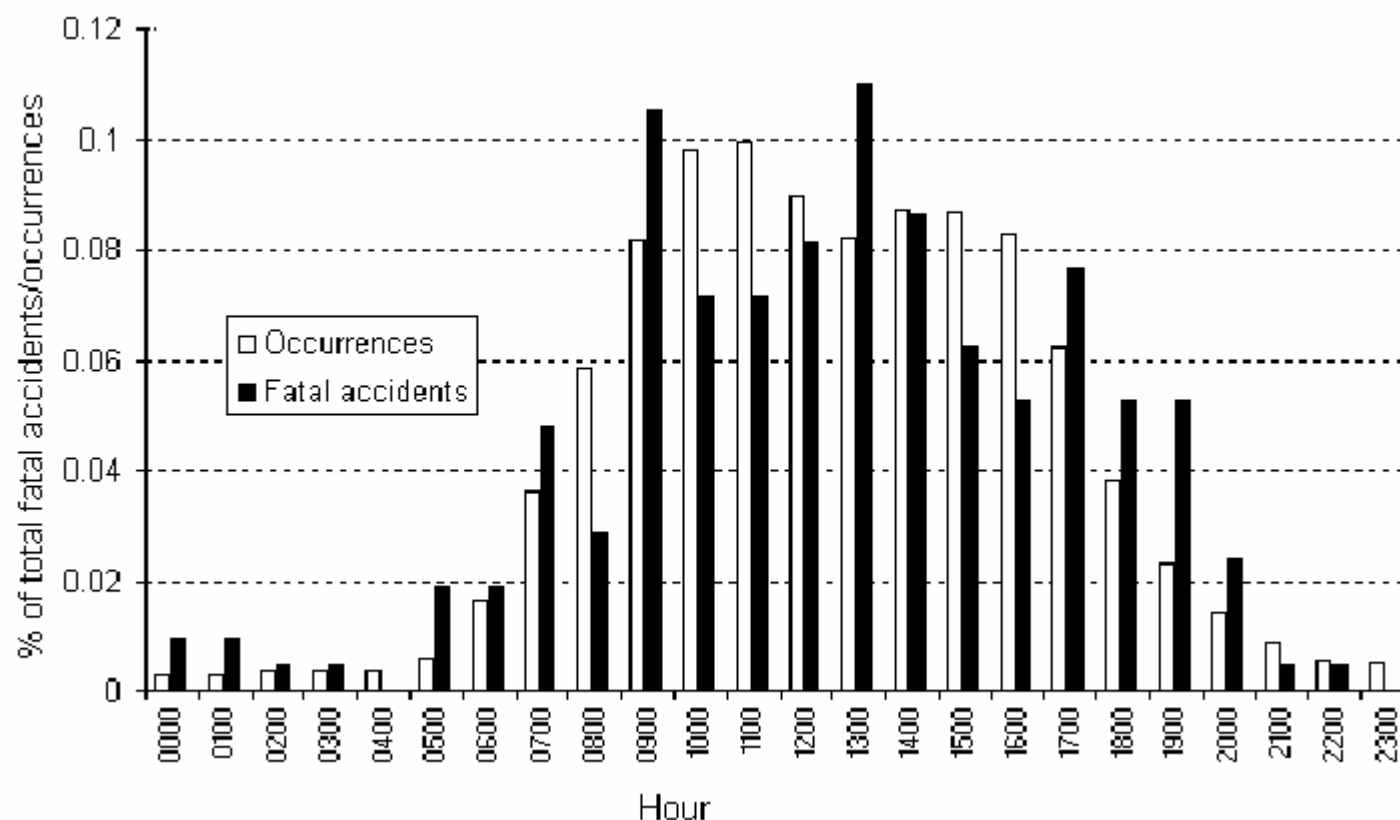
What's killing GA pilots?

- Take 10 years of data, and start from scratch, trying to avoid pre-assumptions
- Try different sorting categories
- Try new sorting categories and see what gets left out
- Try mixing categories
- See what falls out.



What's killing GA pilots?

- Some things are useful
- Some are less obvious.





FLYERS BEWARE SUNDAY NIGHT

“IF you want to live through your flight, avoid getting into an aircraft between 5pm and 9pm on any given Sunday. Australian Transport Safety Bureau studies show that the small window in the evening, particularly at the end of the weekend, is when more fatal accidents occur than at any other time.”

14 May 2005



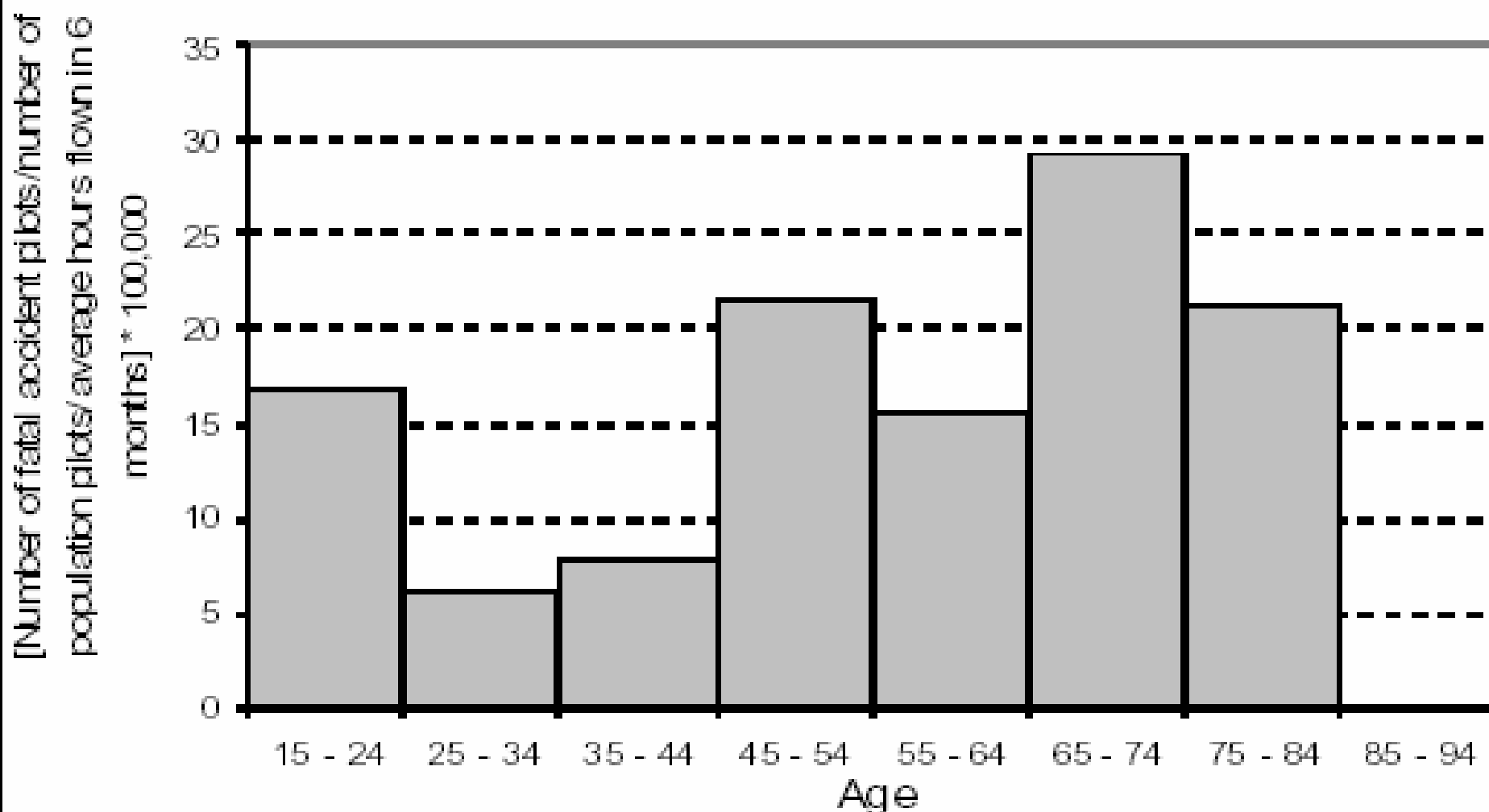
What's killing GA pilots?

- Only one new category..
- Managed Flight into Terrain (MFIT)
- Useful because it collects accidents that could dilute other categories.
- Counts on accident types provided



What's killing GA pilots?

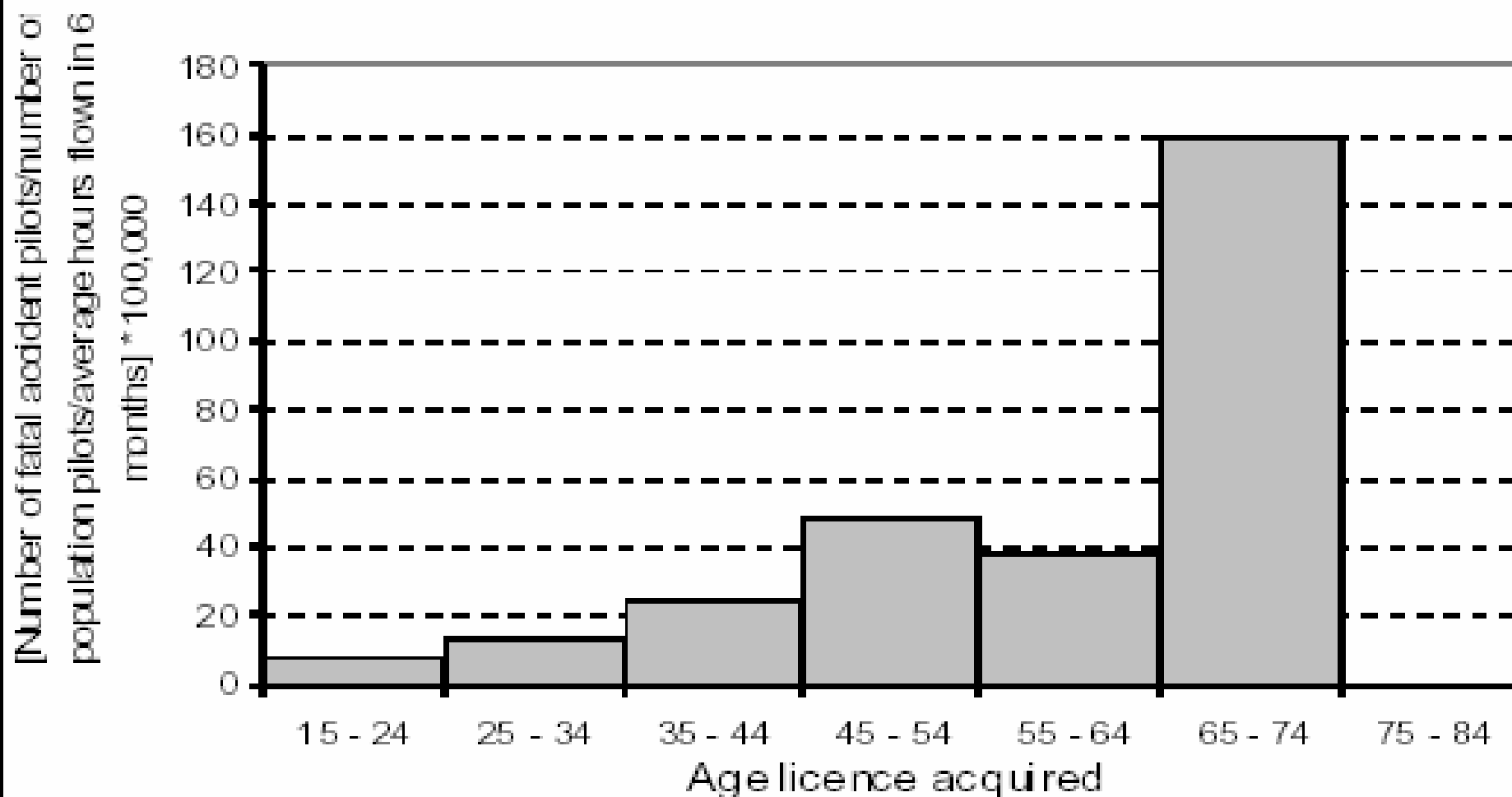
- Numbers:





What's killing GA pilots?

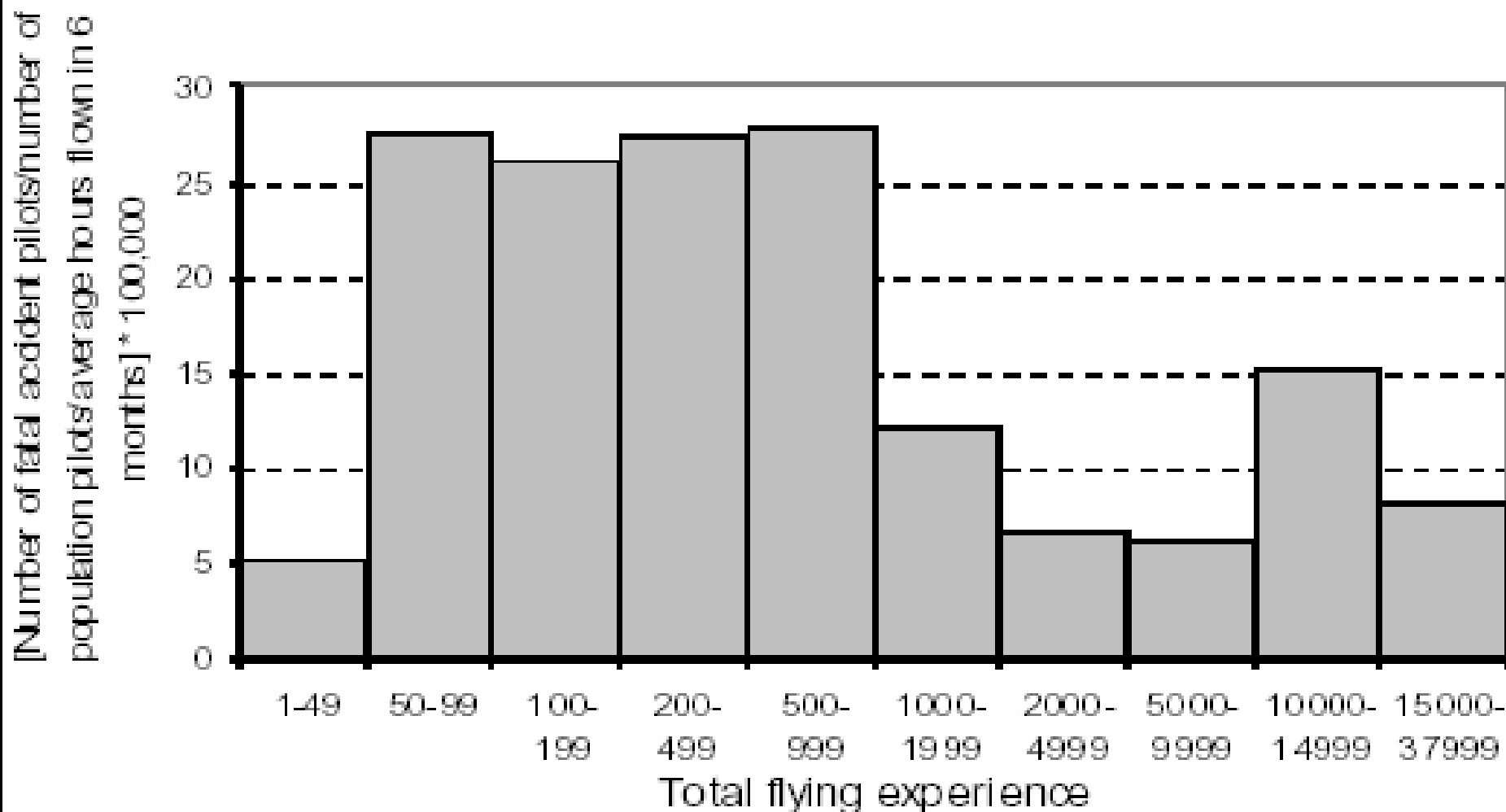
- Numbers:





What's killing GA pilots?

- Numbers:





Relevance?

- If you have the data to compare risks;
- You can choose risks
- You can prioritise risk management efforts
- This paper also provided guidance on where to look next.



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Something to
compare?

- Small number
of midair
collisions in
Australia



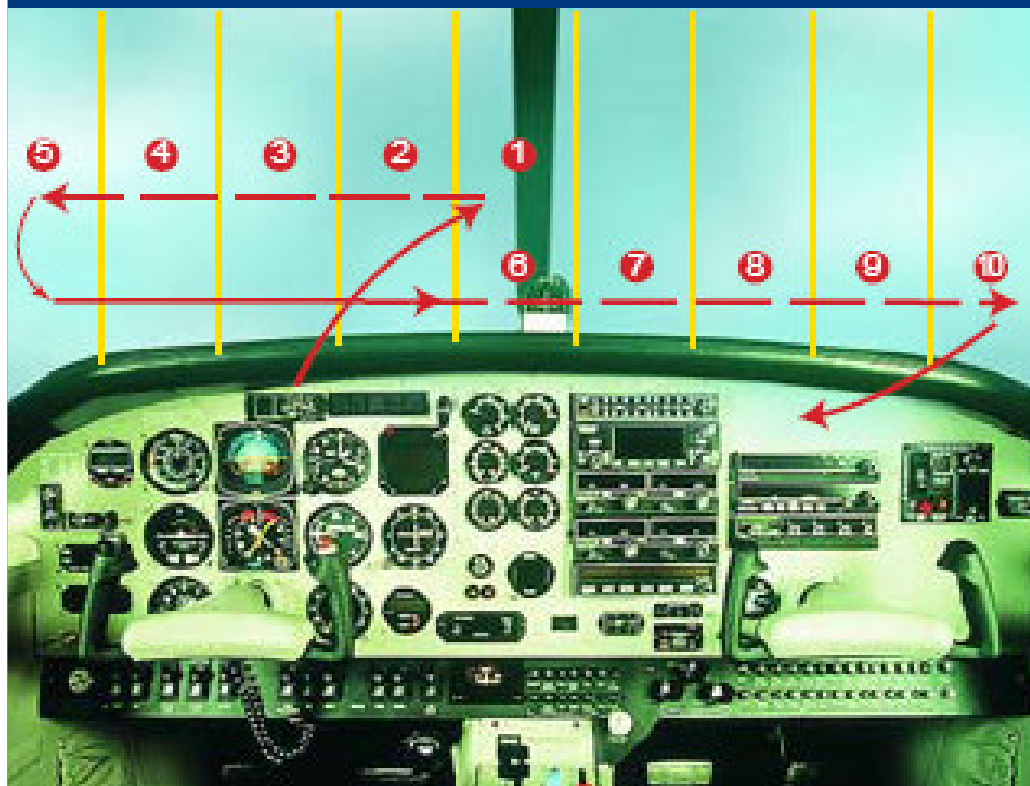
- Compare with
the US.



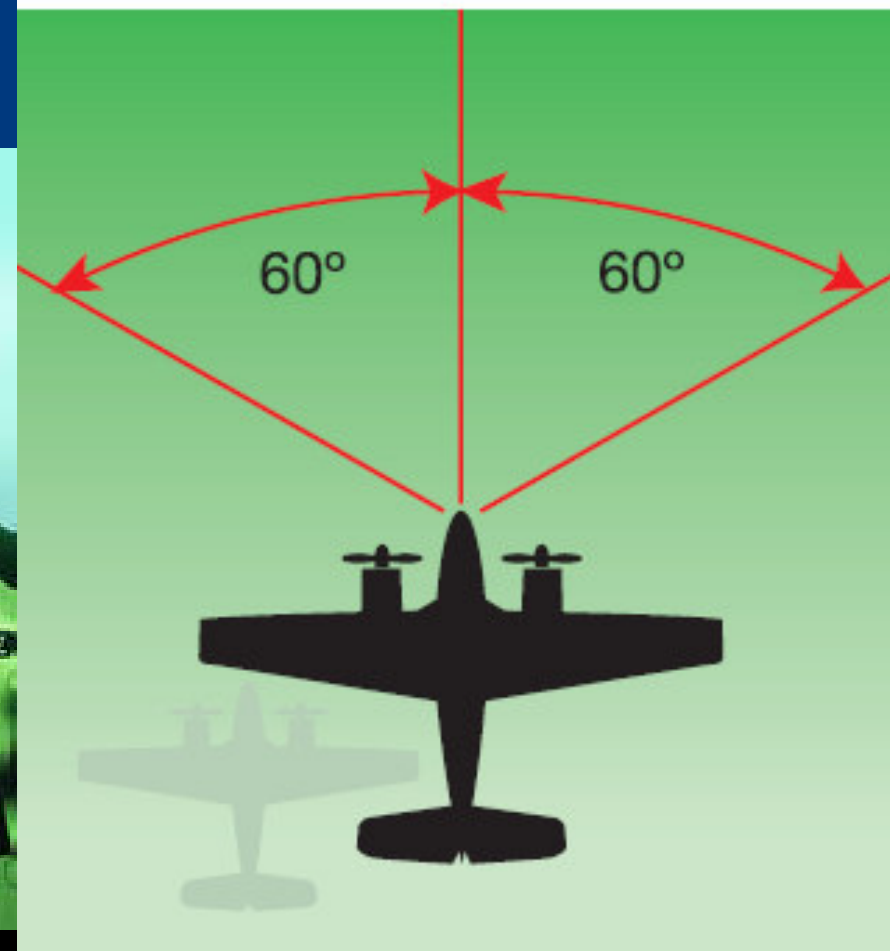
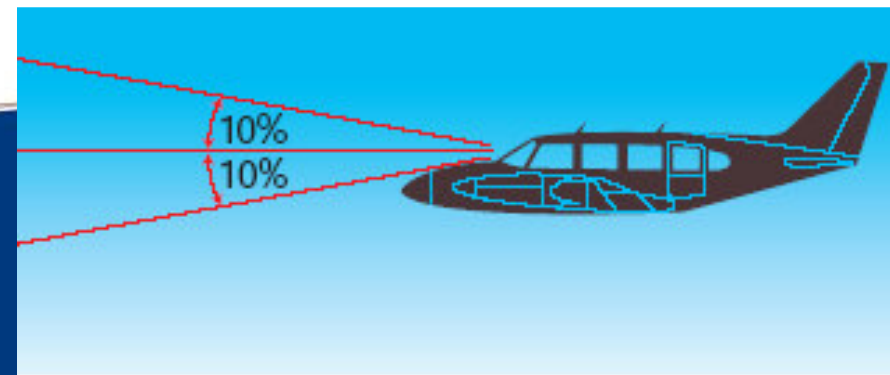
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Safety Advice?

- October 2003



Example 1 The centre-to-side pattern involves moving the eyes methodically from the centre of the visual field to the far left. The eyes then return to the centre and move right. This is followed by a brief scan of the instrument panel before the process is repeated.

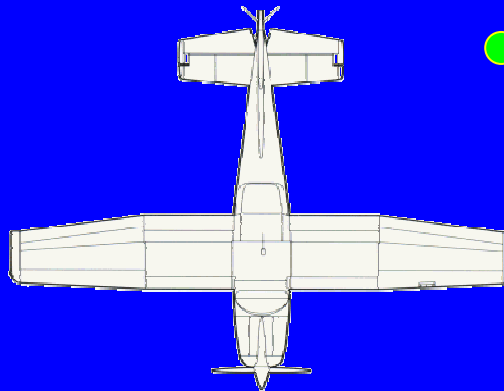


The threat of mid-air collision can be reduced by scanning 60 degrees to the left and right and 10 degrees up and down.

Collision direction

● — Non-fatal

● — Fatal

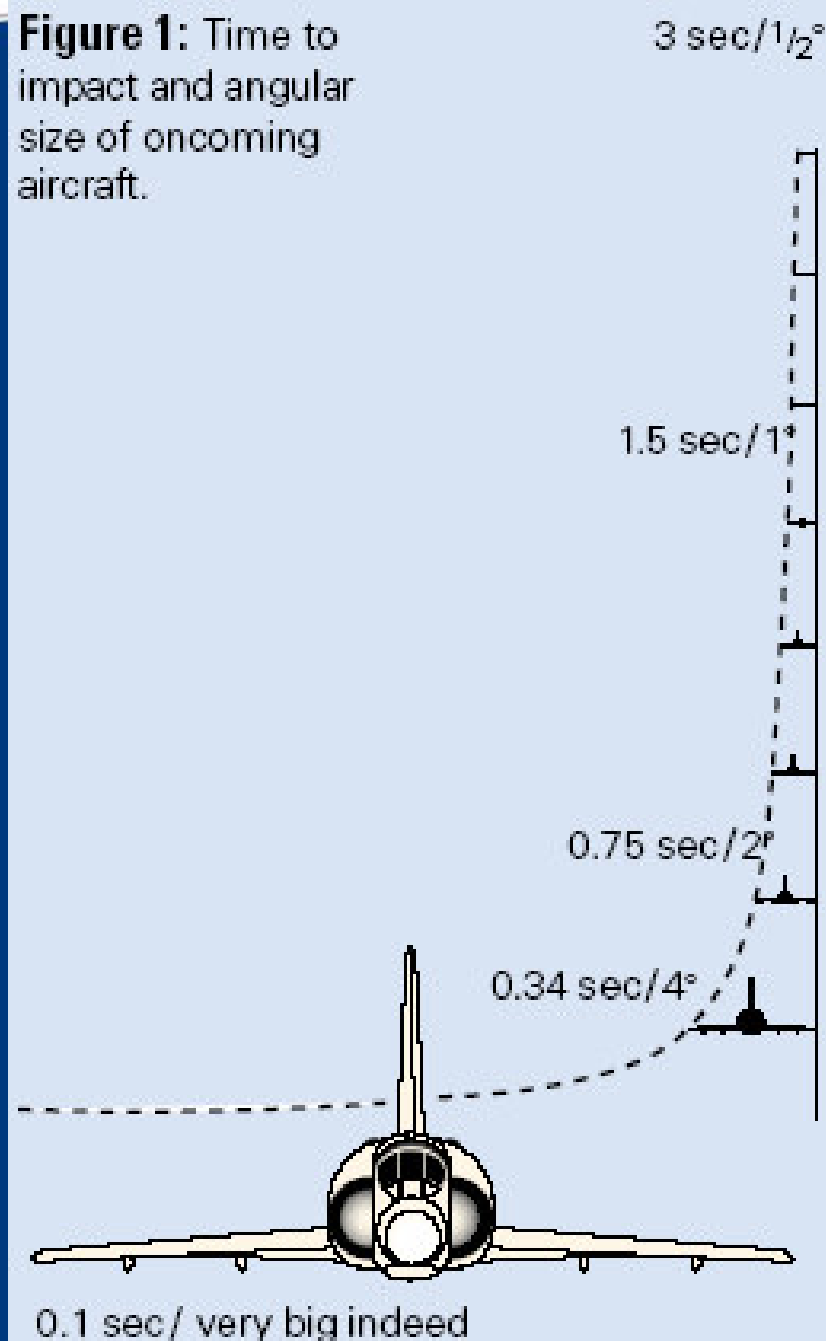


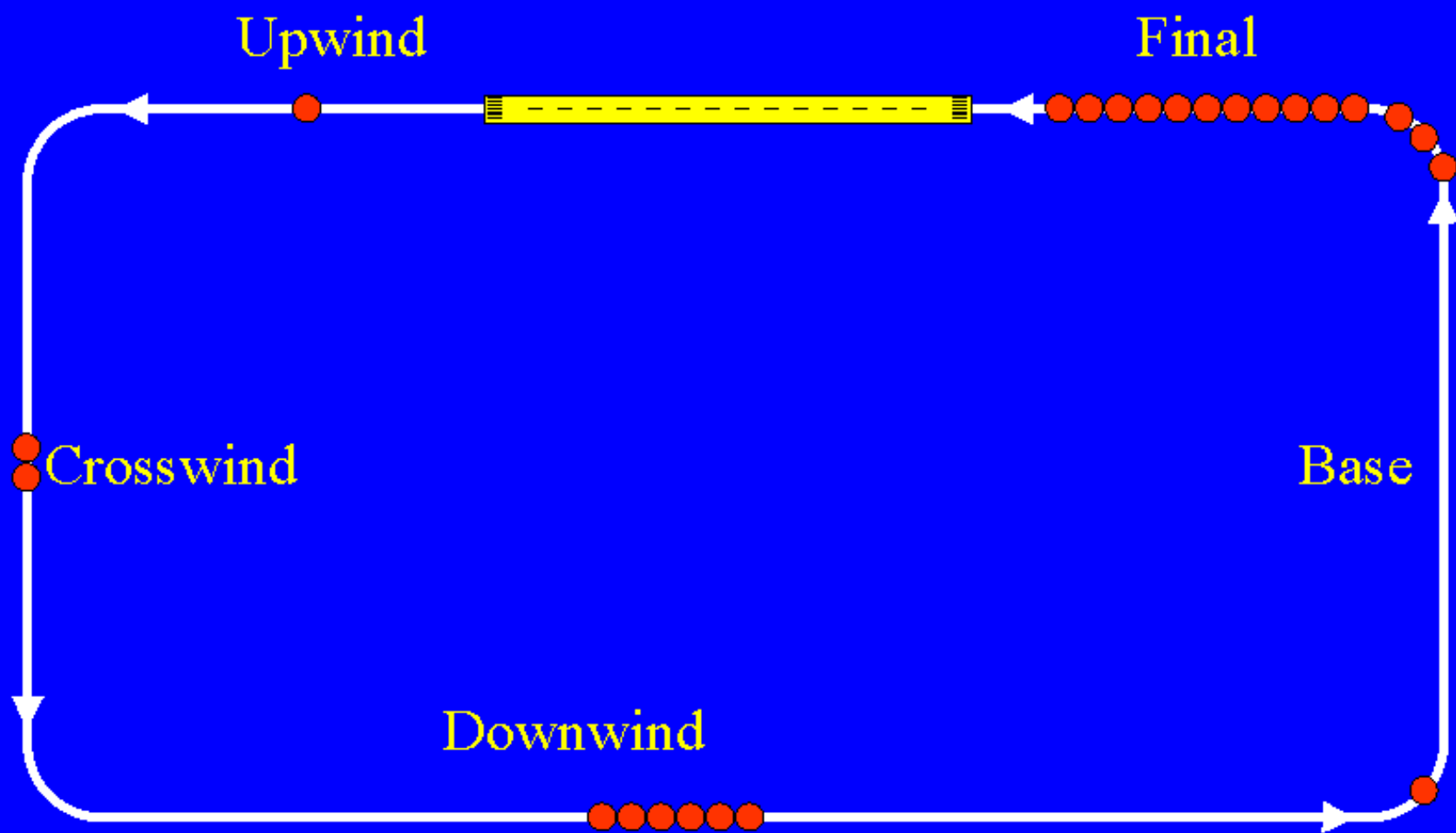


Safety Advice?

- Feb 2005

Figure 1: Time to impact and angular size of oncoming aircraft.







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What to count against?

- Try different denominators
- Flight hours, miles travelled, years, active population, total population
- Different data, different sources.



Less Formal Information sources

- Issues that become perceived as important
- Issues that become evident from research papers
- Issues that become evident or prevalent from accident investigations



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Is this a safety Issue?

- Collate up to date information
- Separate myth from fact.

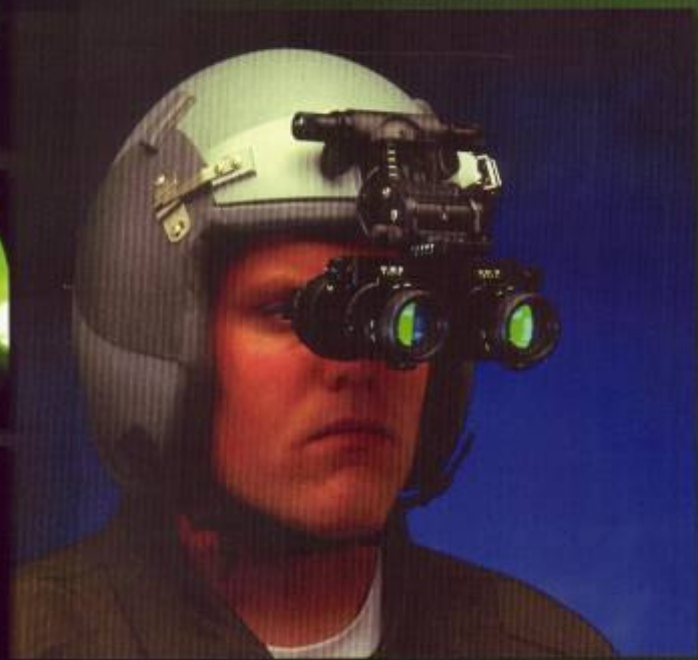
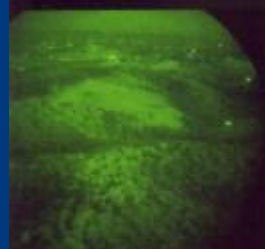


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AVIATION RESEARCH PAPER
B2004/0152

Night Vision Goggles in Civil Helicopter Operations



April 2005



Perception of risk

- Count NAS 2b safety indicators...
 - Showed with confidence that we confidently could not show anything.
- Distraction...
 - Can anything useful come from a coding process?



Less Formal Information sources

- Issues that become perceived as important
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Less Formal Information sources

- Issues that become perceived as important
- Issues that become evident or prevalent from accident investigations
- Issues that become evident from research papers



Multi-engine risks

- A number of serious accidents under asymmetric power
 - Examine all multi-engine power loss accidents

Strong correlation between ‘loss of control’ and fatalities.



Targeted research

- A difficult issue?
- Help from the research process itself
- Help from the results of research



Targeted research

- **Night Vision Goggles**
- Industry keenly awaiting progress on approval process
- Progress happened during the writing of a paper on the benefits and limits of civil NVG use



Targeted research

- **Locust campaign management**
- Several accidents
- The process of researching management methods coincided with a significant change in management methods
- Jolly good!!



What have we done?

- We have provided a big picture of what affects risk, based on all the data relating to specific issues
- We have analysed specific issues that appear prevalent or relevant
- We do the odd bit of 'blue-sky' hunting for information based on safety management theory



What have we done?

- We have supported outside research efforts into matters that may affect aviation safety
- We have collaborated with investigators and investigations on issues, and enabled more detailed examination of the issues
- We have had more freedom to 'research' than is available under the procedures and restrictions inherent in an accident investigation



What have we done?

- It's not that 'cool', but...
- We have provided harder evidence on the issues that affect aviation safety than you can get from investigations alone
- We have enhanced the safety benefits that you can get from a process of investigations alone.



What have we done?

- We have added value to the safety-related information provided by the ATSB.

Thank you

June 2005