



Australian Government

Australian Transport Safety Bureau

Event Risk Classification (ERC)

Finding out where the problems really lie

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Australia's national transport safety investigator

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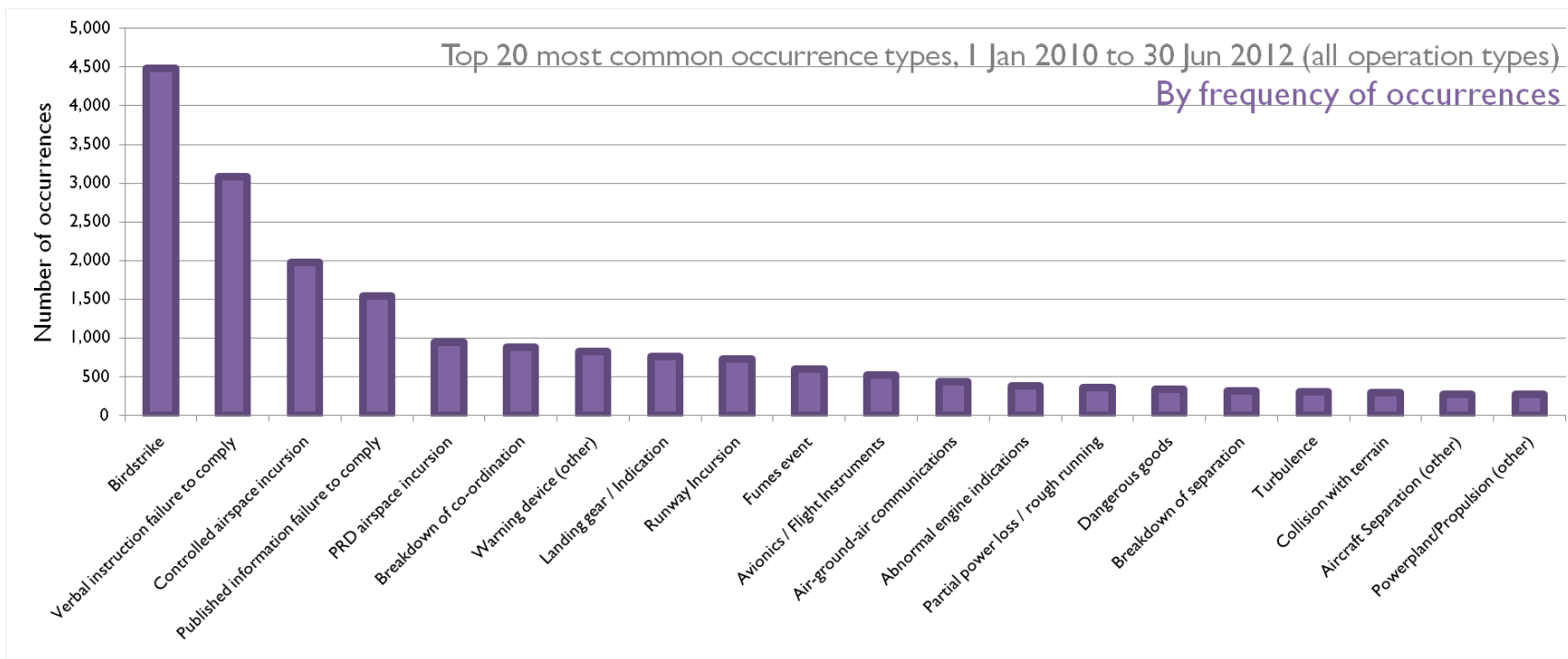
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Proactive investigation – the way forward

- Quarterly trend monitoring of aviation occurrences
 - looks for spikes and troughs
 - targeted distribution of results
- A valuable tool, but...
 - **frequency $\neq$ risk**
 - what if high risk occurrences are happening, but the frequency is consistent over time?

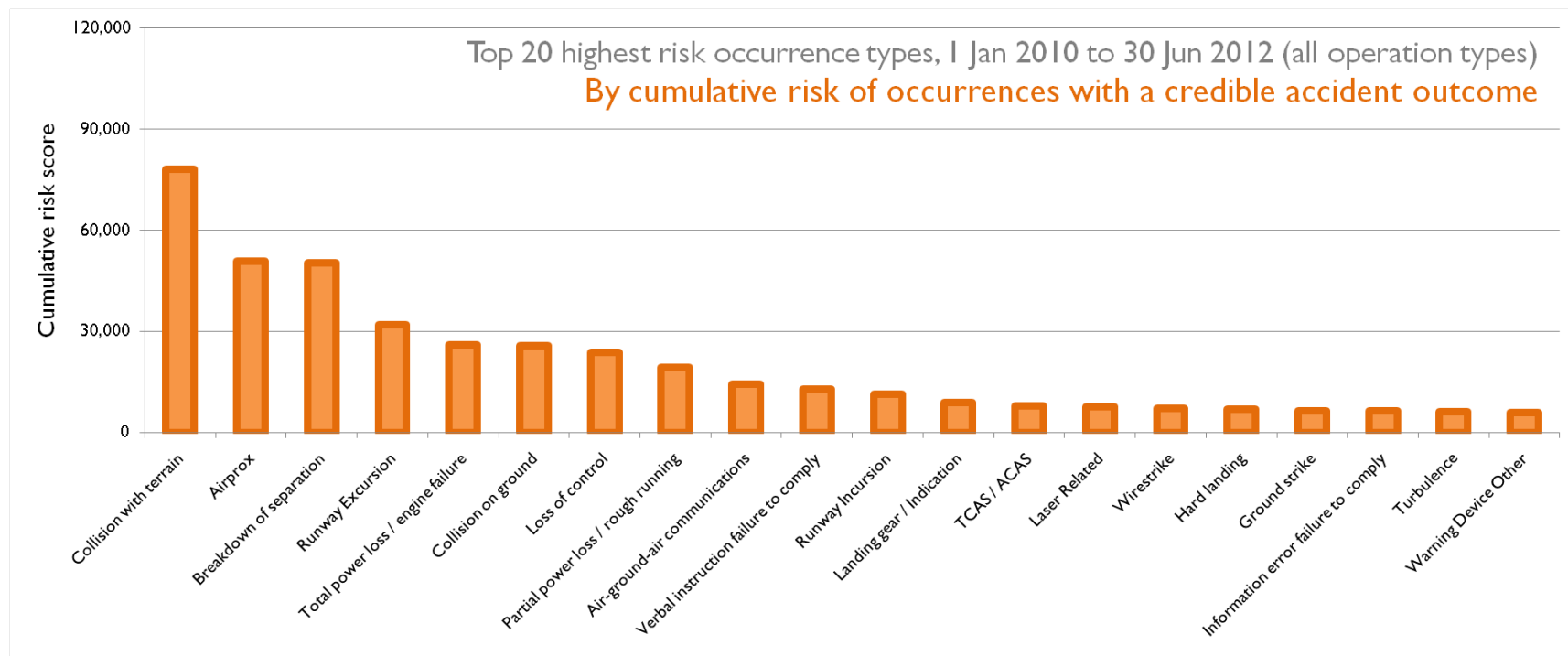
High frequency occurrence types

- Should birdstrikes, airspace incursions, and FTCs be safety and investigation priorities?



High risk occurrence types

- Looking at the cumulative risk for these occurrences gives a different result entirely



What is ERC?

- A risk assessment methodology designed for the aviation industry
- Concept of Aviation Risk Management Solutions (ARMS)
 - not for profit, industry-led working group
- Benefits
 - benchmark investigation decisions
 - analysis

What are we achieving?

- Rapid risk assessment of aviation occurrences
- Focusing limited investigation resources
- Focusing proactive activities such as trend monitoring and research investigations
- Identifying low frequency, high risk occurrences

What are we achieving?

- Picking up high risk occurrences in the 'noise'
- Documenting all likely situations that increase risk
- Informing the public and industry of where the areas of real concern lie
- Flagging high risk occurrences and trends with CASA & operators
- Identifying areas for improvement in the ATSB's occurrence coding and classification system

ERC – a matter of three steps

Step 1 - Worst credible accident outcome

Accident outcome	Outcome description
High capacity catastrophic accident	More than 38 fatalities
Catastrophic accident	Multiple fatalities (7 to 38)
Major accident	1 to 6 fatalities
Injury accident	1 or more injuries (no fatalities), minor damage to aircraft
No accident outcome	No potential for aircraft damage or injuries

ERC – a matter of three steps

Step 2 - Effectiveness of remaining barriers

Effectiveness rating	Definition
Effective	Several good barriers remaining
Limited	An abnormal situation, more demanding to manage, but still a considerable safety margin
Minimal	Some barrier(s) still in place
Not effective	An accident was not avoided, or accident avoided by luck

ERC – a matter of three steps

Step 1 x
Step 2
=
ERC score

	Effective	Limited	Minimal	Not effective
High capacity catastrophic accident	250	503	2,503	12,500
Catastrophic accident	50	102	502	2,500
Major accident	10	21	101	500
Injury accident or minor aircraft damage	2	4	20	100
No accident outcome	1			

That's all well and good, but...

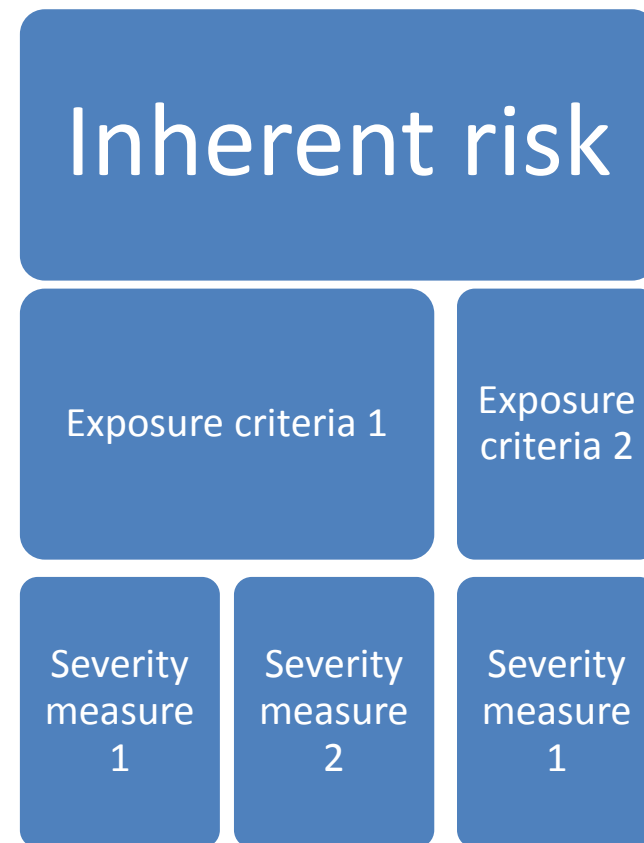
- Occurrences are different
 - aircraft type and size
 - freight, passenger, air transport
 - presence or absence of consequential events or other occurrence types
 - traffic density, location, other aircraft
 - criticality of affected aircraft systems
- There are lots of occurrences reported!
- The same rules can't always apply – do all of these features of an occurrence always affect the outcome?

Having an automatic ERC system

- ‘Answers’ to Steps 1, 2 and 3 are codified as ‘rules’ which occurrences can be tested against
- Every single occurrence must match at least one rule
- What if more than one rule applies?
- Non-specific design

Developing the rules

- Data and experience driven
 - occurrences
 - what tended to happen in different situations
 - the 'typical' experience
- Falling outside the rules
- Ongoing workshop process



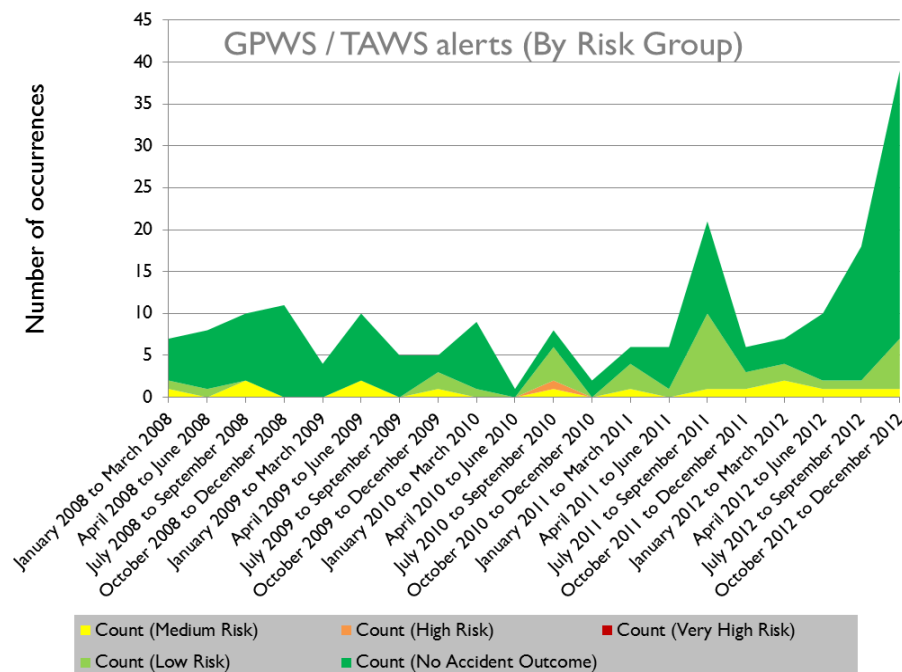
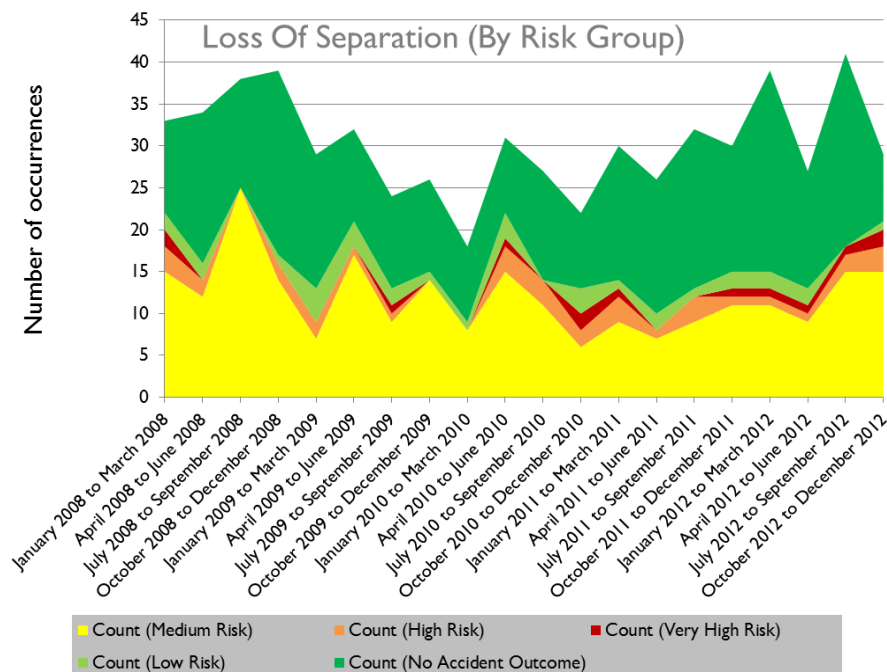
EXPOSURE CRITERIA →			SEVERITY MEASURES		
ERC Rule	Risk classification	# of matches	ERC Rule	Risk classification	# of matches
Is the aircraft single-engined?	No change to risk on this basis alone Step 3 = Low risk (1)	1,011	Was the bird ingested into the engine of the single-engined aircraft?	Step 1 – Injury accident or damage Step 2 – Effective Step 3 = Low risk (2)	5
			Did the bird strike result in a partial or total power loss?	Step 1 – Major accident Step 2 – Minimal Step 3 = Medium risk (101)	2
			Was the pilot required to perform an in-flight engine shutdown as a result of abnormal engine indications resulting from the birdstrike?	Step 1 – Major accident Step 2 – Minimal Step 3 = Medium risk (101)	2
Is the aircraft multi-engined?	No change to risk on this basis alone Step 3 = Low risk (1)	11,265	Was the bird ingested into only one engine?	Step 1 – Injury accident or damage Step 2 – Effective Step 3 = Low risk (2)	808
			Were birds ingested into multiple engines?	Step 1 – Injury accident or damage Step 2 – Limited Step 3 = Low risk (4)	15
			Did the bird strike result in a partial or total power loss?	Step 1 – Injury accident or damage Step 2 – Limited Step 3 = Low risk (4)	6
			Was the pilot required to perform an in-flight engine shutdown as a result of abnormal engine indications resulting from the birdstrike?	Step 1 – Injury accident or damage Step 2 – Limited Step 3 = Low risk (4)	8
Is the aircraft a helicopter or gyrocopter?	No change to risk on this basis alone Step 3 = Low risk (1)	201	Did the bird strike the tail or rotor areas of the helicopter or gyrocopter?	Step 1 – Major accident Step 2 – Minimal Step 3 = Medium risk (101)	22
Is the aircraft small (less than 5,700 kg MTOW)?	No change to risk on this basis alone Step 3 = Low risk (1)	2,110	Did the bird strike the propeller, engine, or windscreen of the small aircraft?	Step 1 – Injury accident or damage Step 2 – Effective Step 3 = Low risk (2)	78
			Did the small aircraft strike a large bird (pelican, goose, eagle etc.)?	Step 1 – Major accident Step 2 – Minimal Step 3 = Medium risk (101)	137
Is the aircraft large (more than 5,700 kg MTOW)?	No change to risk on this basis alone Step 3 = Low risk (1)	9,787	Did the large aircraft strike a large bird (pelican, goose, eagle etc.)?	Step 1 – Injury accident or damage Step 2 – Limited Step 3 = Low risk (4)	369
Did the aircraft have two engines?	No change to risk on this basis alone Step 3 = Low risk (1)	10,618	Did the bird strike result in a partial or total power loss?	Step 1 – Major accident Step 2 – Limited Step 3 = Medium risk (21)	6
			Was the pilot required to perform an in-flight engine shutdown as a result of abnormal engine indications resulting from the birdstrike?	Step 1 – Major accident Step 2 – Limited Step 3 = Medium risk (21)	8
Were there no aircraft associated with the birdstrike?	No change to risk on this basis alone Step 3 = Low risk (1)	1,882	Was the carcass that of a large bird (pelican, goose, eagle etc.)? Assume that it probably struck a large aircraft.	Step 1 – Injury accident or damage Step 2 – Limited Step 3 = Medium risk (101)	59

What can we do with ERC?

- Graphical 'risk profile' for occurrence types, and show changes over time
- Pick out high risk occurrences at a glance
- Identify whether an occurrence might qualify as a serious incident
- Have an evidence-based discussion about investigation

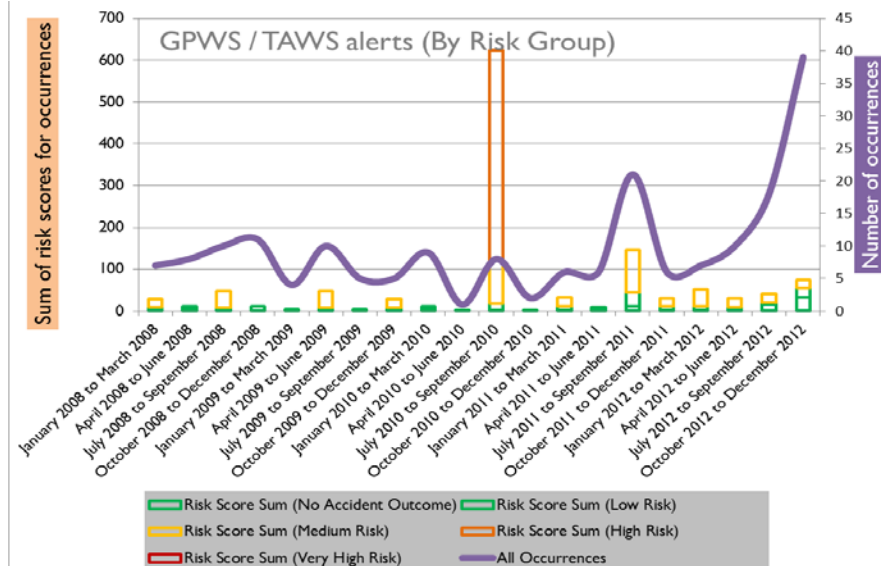
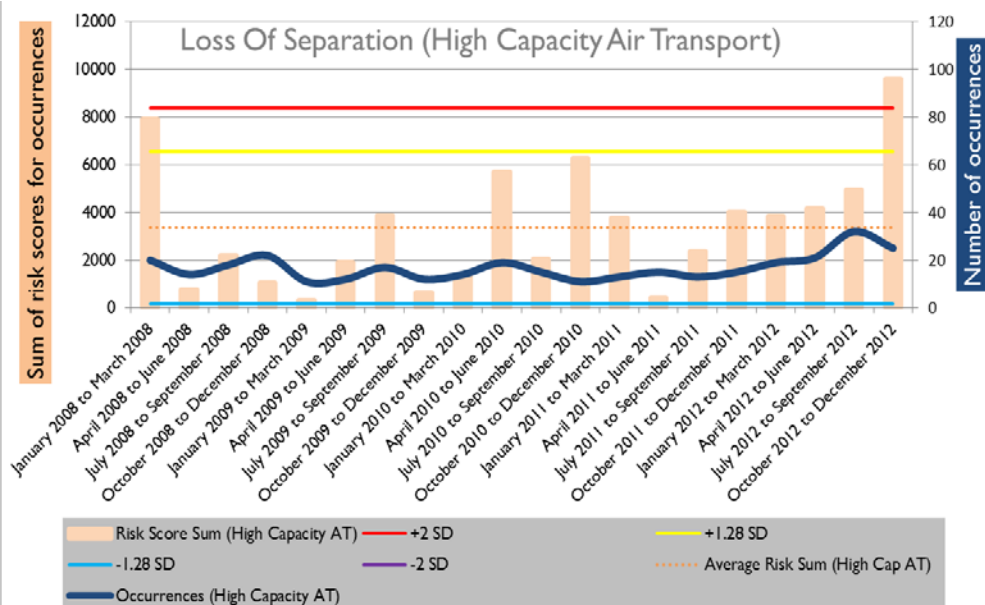
What can we do with ERC?

- Is it all 'just an increase in reporting'?



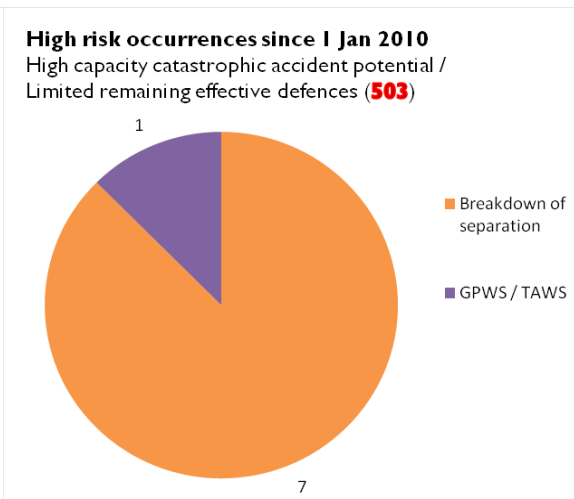
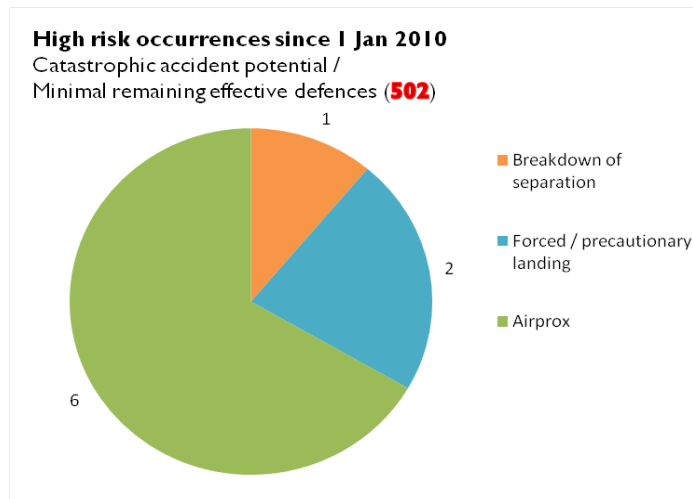
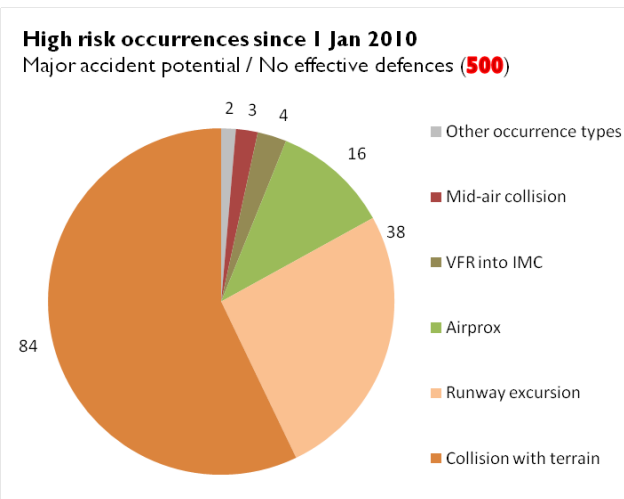
What can we do with ERC?

- Risk profile by operation type or other filters



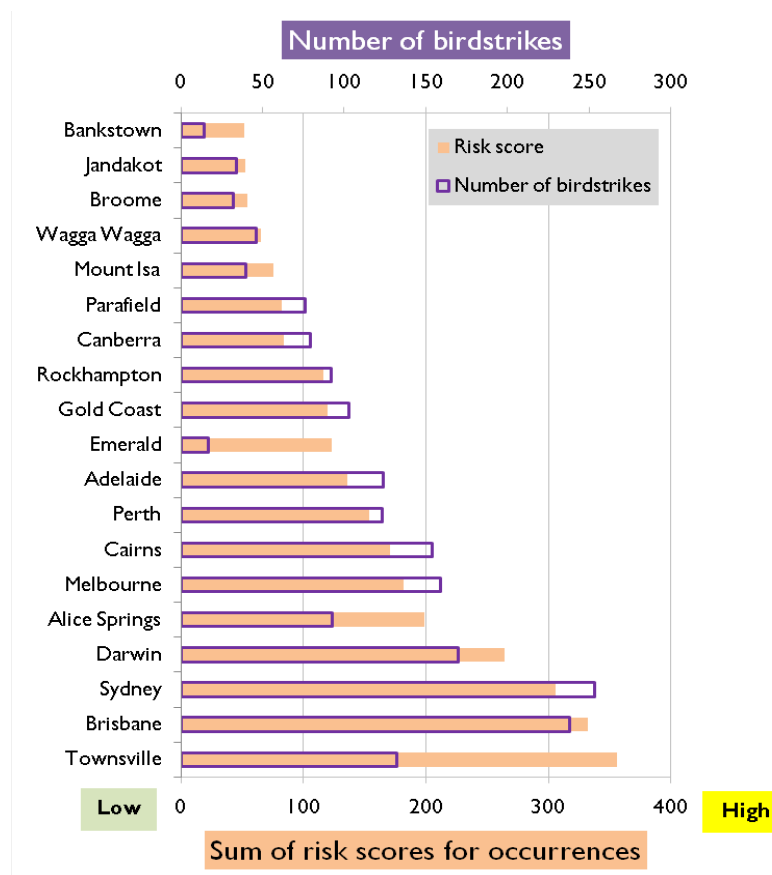
What can we do with ERC?

- What are the high risk issues by operation type?



What can we do with ERC?

- Identify high risk hotspots
 - birdstrikes
 - LOS
 - ATC errors
 - near collisions



What can we do with ERC?

Very high	Investigate and take action immediately
High	Investigate
Medium	Possibly investigate or inform research
Low	Database entry
No accident outcome	Database entry

Where to from here?

- Ongoing review of existing rules, developing new rules
- Further integration of ERC into research and investigations
- On-the-fly assessments when notifications are received
- Design is flexible and adaptable
 - intention to expand to Australian national rail occurrence dataset

Thank you for listening

