



EASA
European Aviation Safety Agency

European Risk Classification Scheme Development

IORS Workshop

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An agency of the European Union 

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Introduction

- ERCS mandated by Regulation (EU) 376/2014 to be implemented by May 2017
- Development tasked to EASA from the European Commission in late 2014
- Development Group established - includes involvement from Design and Maintenance organisations
- 6 meetings held in 2015 to develop initial ERCS matrix
- Task 1 on initial development of the ERCS matrix was completed in 2015
- Task 2 for 2016 now focusses on refining the processes, testing, guidance, training material and implementation



Key Points of Implementation

- Regulation (EU) 376/2014 only requires the Competent Authorities to use the ERCS
- Organisations can use any recognised/ documented risk classification scheme
- This means if you already have an occurrence risk classification process ERCS does not change anything for you or your organisation
- ERCS is however designed to be simple and attractive to encourage as many organisations as possible to use it
- One thing is vital – good risk classification requires good reporting and investigation processes



ERCS Matrix

Potential Accident Outcome											
Extreme catastrophic accident with significant potential fatalities (100+)	X/10	X/9	X/8	X/7	X/6	X/5	X/4	X/3	X/2		X/1
Significant accident with significant potential for fatalities and injuries (19-100)	S/10	S/9	S/8	S/7	S/6	S/5	S/4	S/3	S/2		S/1
Major accident with potential for some fatalities/serious injuries (2-19) or major aircraft destroyed	M/10	M/9	M/8	M/7	M/6	M/5	M/4	M/3	M/2		M/1
Single Individual fatality/serious injury or substantial damage accident	I/10	I/9	I/8	I/7	I/6	I/5	I/4	I/3	I/2		I/1
Minor Injury accidents and Minor Damage	E/10	E/9	E/8	E/7	E/6	E/5	E/4	E/3	E/2		E/1
	A/0										
	10	9	8	7	6	5	4	3	2		1
	1,000M	100M	10M	1M	100,000	10,000	1,000	100	10		1
	1.E-09	1.E-08	1.E-07	1.E-06	1.E-05	1.E-04	1.E-03	1.E-02	1.E-01		1.E+00
	remaining barriers predicted to fail 1 in 1,000M times	remaining barriers predicted to fail 1 in 100M times	remaining barriers predicted to fail 1 in 10M times	remaining barriers predicted to fail 1 in 1M times	remaining barriers predicted to fail 1 in 100,000 times	remaining barriers predicted to fail 1 in 10,000 times	remaining barriers predicted to fail 1 in 1,000 times	remaining barriers predicted to fail 1 in 100 times	remaining barriers predicted to fail 1 in 10 times		Realised accidents
	LIKELIHOOD OF ACCIDENT OUTCOME CATEGORIES										



Process – Based on 2 Questions

- Question 1 - What is the most credible accident outcome?
- For the occurrence being scored, if it had escalated into an accident, what type of accident would it have been? (Importantly, this is an accident outcome and not what actually happened – the ERCS is designed to address potential risk)
- Process broken into 2 steps



Question 1 – Step 1

- Consider occurrence being scored and use the a look-up table based on the list of reportable occurrence to determine the most credible accident outcome
- For Technical Events a further list links system failures to most credible accident outcome based on the aircraft system involved
- Types of Outcome: Damage, Injuries, Airborne Collision, Aircraft Upset, Excursions, Ground Collision, Obstacle/ Terrain Collision, Fire



Question 1 – Step 2

- From the Outcome Category the Degree/ Seriousness (the row score) is calculated depending on the aircraft involved
- Criteria based on the size/ capacity of the aircraft (not actual number of passengers)
 - Large Commercial Aircraft (CS25) 100+ POB
 - Small Commercial Aircraft (CS25/29) 19-100 POB
 - Small Ac (CS23/27) less than 19 POB
 - Small Ac (Uncertified) less than 19 POB
 - No aircraft - potential for fatalities/ injuries



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Single Individual fatality/serious injury or substantial damage accident	I/10	I/9	I/8	I/7	I/6	I/5	I/4	I/3	I/2		I/1
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	A/0										
	10	9	8	7	6	5	4	3	2		1
	1,000M	100M	10M	1M	100,000	10,000	1,000	100	10		1
	1.E-09	1.E-08	1.E-07	1.E-06	1.E-05	1.E-04	1.E-03	1.E-02	1.E-01		1.E+00
	remaining barriers predicted to fail 1 in 1,000M times	remaining barriers predicted to fail 1 in 100M times	remaining barriers predicted to fail 1 in 10M times	remaining barriers predicted to fail 1 in 1M times	remaining barriers predicted to fail 1 in 100,000 times	remaining barriers predicted to fail 1 in 10,000 times	remaining barriers predicted to fail 1 in 1,000 times	remaining barriers predicted to fail 1 in 100 times	remaining barriers predicted to fail 1 in 10 times		Realised accidents
	LIKELIHOOD OF ACCIDENT OUTCOME CATEGORIES										



Process – Question 2

- What is the likelihood of the occurrence escalating into the potential accident outcome
- Uses a weighted barrier model for each outcome category
- Barriers Score – First two below give the score
 - Stopped/ Worked – prevent accident
 - Not Reached/ Expected to Work – likely to have prevented the accident if it had been reached
 - Not Applicable – not relevant to occurrence
 - Failed



Example Barrier Model

Airborne Collision (All Traffic Controlled)		
Barrier Definition in Context of the Accident Outcome	Barrier Scoring	Result
Airspace design and procedures effective at avoiding conflicts	2	
Flt Crew planning ensures an that the route planning is clear before departure and avoids potential conflicts. Covers the various flight operations management functions that supports the conduct of a safe flight.	2	
ATC Airspace management/planning & execution at the operational level ensures that factors such as traffic levels and conflicts are considered in advance. Covers the various flight operations management functions that supports the conduct of a safe flight.	2	
Flt Crew compliance with ATC & Airspace Procedures through taking the correct action on the information provided through the Rules of the Air, all ATC and Airspace procedures and the directions given by controllers.	3	
ATC Conflict detection and resolution during the controlling of aircraft once they are airborne to identify potential collisions and resolve them effectively.	2	
Availability, accuracy and controller compliance with ground-based Safety Nets (e.g. STCA).	3	
Flt Crew Conflict detection and resolution through actively maintaining good situational awareness during a flight concerning both their own position and other aircraft that may affect them.	2	
Availability, accuracy & flt crew compliance with onboard collision avoidance equipment (TCAS)	3	
See and Avoid	1	
Actual Mid Air Collision with Fatalities/ Life Changing Injuries	1	
	21	



Some Observations

- The ERCS process requires information
- Therefore it will require improvements to the reporting and investigation process – e.g. better guidance on what information to provide for different types of occurrence
- ERCS will lead to
 - Changes to taxonomy – part of current Strategic Taxonomy Review
 - Update to mandatory fields and list of reportable occurrences in Regulation 376



Further Work

- Further testing and refinement of ERCS Matrix and Process
- Develop easy translation from other Risk Classification Processes (e.g. ARMS/ RAT)
- Develop supporting guidance and training material
- Support technical implementation in ECCAIRS, SMS Software and provide standalone tools
- Support ERCS evolution and develop longer term reporting improvements



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Comments or Questions?

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