



EASA
European Aviation Safety Agency

Balloon Analysis

SM1 Department

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Balloon analysis – Background

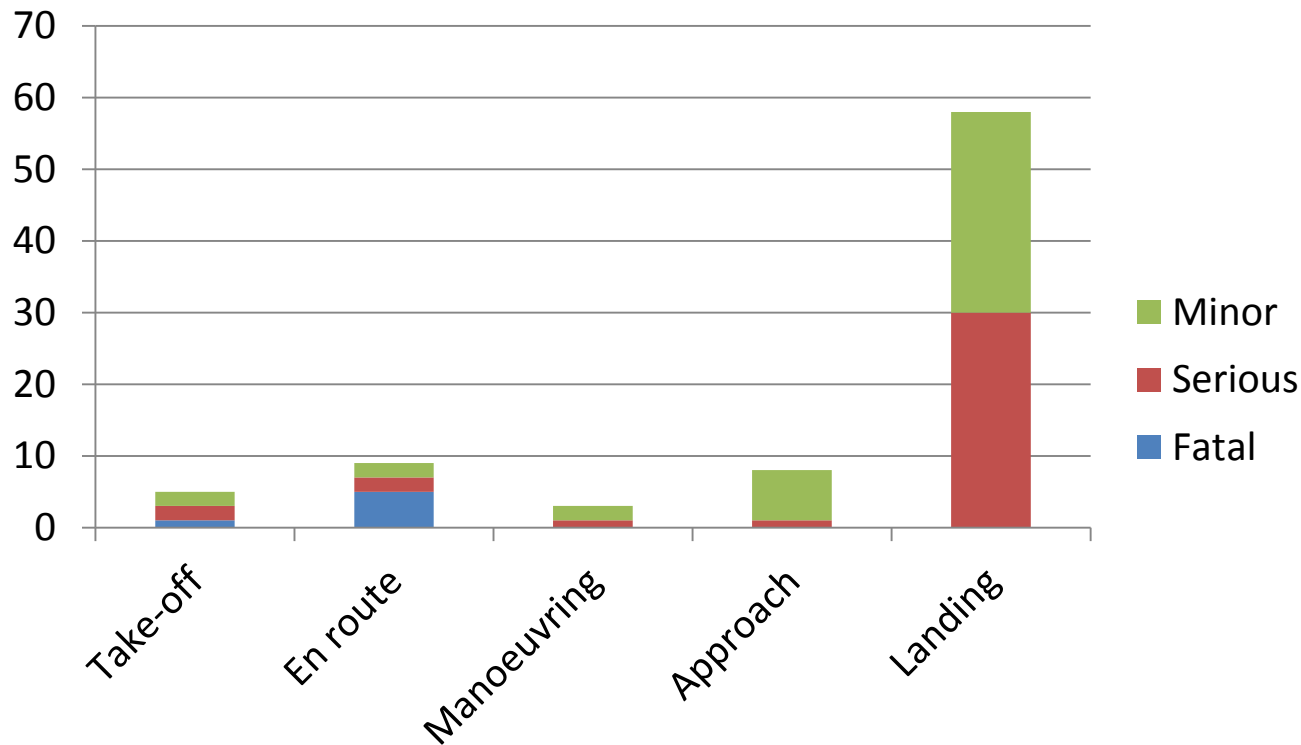
- Goals of the analysis:
 - Identify the most recurrent factors contributing to the identified Key Risk Areas and Safety Issues.
 - Develop data-driven approach to the Balloon SRP with the intention of improving the safety of hot air ballooning.

Year	2010	2011	2012	2013	2014	Total
Non-Fatal	14	26	22	27	15	104
Fatal	1	3	3	3	1	11
Total	15	29	25	30	16	115



Behind the data

➤ Annually are on average 23 reported Balloon accidents in Europe



Distribution by flight phase vs. injuries in ballooning 2010-2014



Most Common Event Types

- Aircraft Handling
 - Hard / Bounced landing
 - Control of Manual Flight Path
- Balloon Specific Events
 - Basket Tipped Over
 - Person fell/ejected from Basket
 - Envelope Ripped
 - Basket Caught in Obstacles
- Medical and Injury
 - Injuries due to Other Sources
- Terrain/Obstacle Conflict (CFIT)
 - Collision with Cable/Wire
 - Collision with Tree/Tall Vegetation
- Weather and Environmental Encounters
 - Unexpected Weather
 - Turbulence
 - High Wind
 - Windshear/Microburst

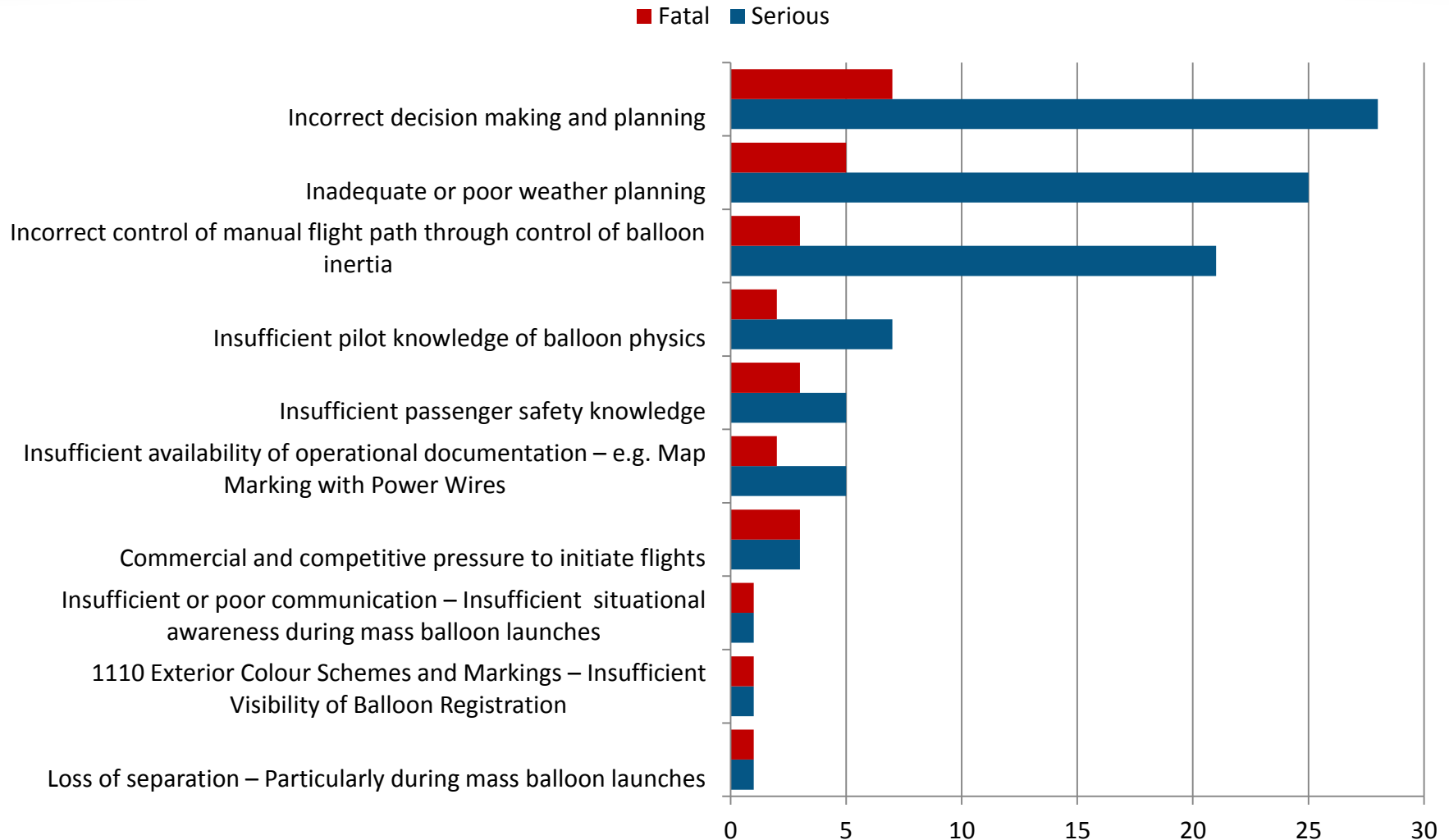


Balloon analysis – Results/Conclusions

- The identified safety issues are strongly supported by the available data.
- Modifications on ADREP taxonomy still needed for better connection between identified safety issues and event types.
- Top 5 safety issues are:
 - Incorrect decision making and planning;
 - Inadequate or poor weather planning;
 - Incorrect control of manual flight path through control of balloon inertia;
 - Insufficient pilot knowledge of balloon physics;
 - Insufficient passenger safety knowledge.



Balloon analysis – Results/Conclusions



Distribution of Balloon accidents by safety issues and injury level 2010-2014



Balloon analysis – Results/Conclusions

- Main Contributors to Balloon Accidents
 - Balloon upset due to rapid movement of an air mass around it, either atmospheric or geographic in nature.
 - Late identification of wires in the flight path.
 - Collisions with terrain or objects caused by lack of:
 - Situational awareness,
 - Understanding of balloon physics in different environmental conditions
 - Pilot's view obscured by sunlight or other meteorological phenomena.



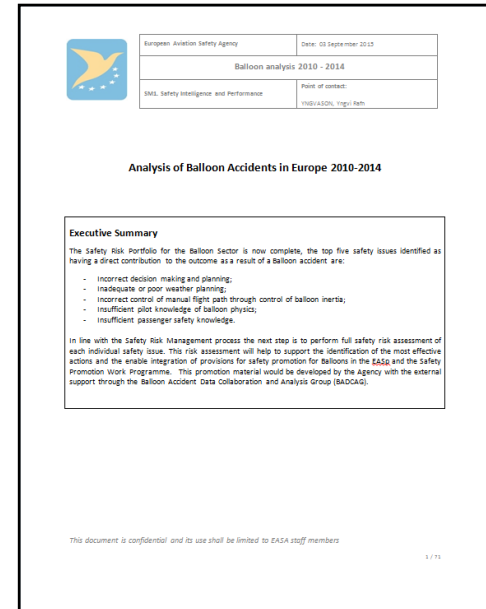
The Current Portfolio for Balloons

	GA - Balloons		Outcomes									
	Safety Issue	SYS	ARC	CTOL	OTHR	WSTR W	FIRE	LOC-I	MAC	TURB	CFIT	EME
Operational	Inadequate or poor weather planning		•	•	•	•				•		
	Incorrect control of manual flight path through control of balloon inertia		•	•					•		•	
	Loss of separation – Particularly during mass balloon launches								•		•	
Technical	Propane system fire		•				•					
	1110 Exterior Colour Schemes and Markings – Insufficient Visibility of Balloon Registration								•			
	Sharp edges on baskets											•
Human	Insufficient pilot knowledge of balloon physics		•	•	•				•		•	
	Commercial and competitive pressure to initiate flights		•	•	•	•						
	Incorrect decision making and planning		•	•	•	•		•	•			
	Insufficient or poor communication – Insufficient situational awareness during mass balloon launches								•		•	
Organisational	Insufficient passenger safety knowledge	•	•									
	Insufficient availability of operational documentation – e.g. Map Marking with Power Wires		•	•								



Next steps

- Perform a full Risk Assessment of the individual Safety Issues in relation to the outcomes
- Develop Safety Promotion material based on this analysis report and the upcoming risk assessment.





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Comments or Questions?

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