SASCON 2019

Datenanalyse - Praxisbericht

Ruedi Spring, Flight Safety,
November 2019

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Ablauf

- Grundvoraussetzungen
- Problematik in der Praxis
- Datenquellen
- Risikowährung
- Erstellung von Visualisierungen
- Aussagen anhand Daten
- Event Klassifikation
- Visualisierungsbeispiele
- Fragen

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Grundvoraussetzungen

- Datapool
- Einheitliches Risk Rating
- Ergebnisse Stufengerecht präsentieren
- Daten für konkrete Aussagen brauchen
- Kritisch bleiben

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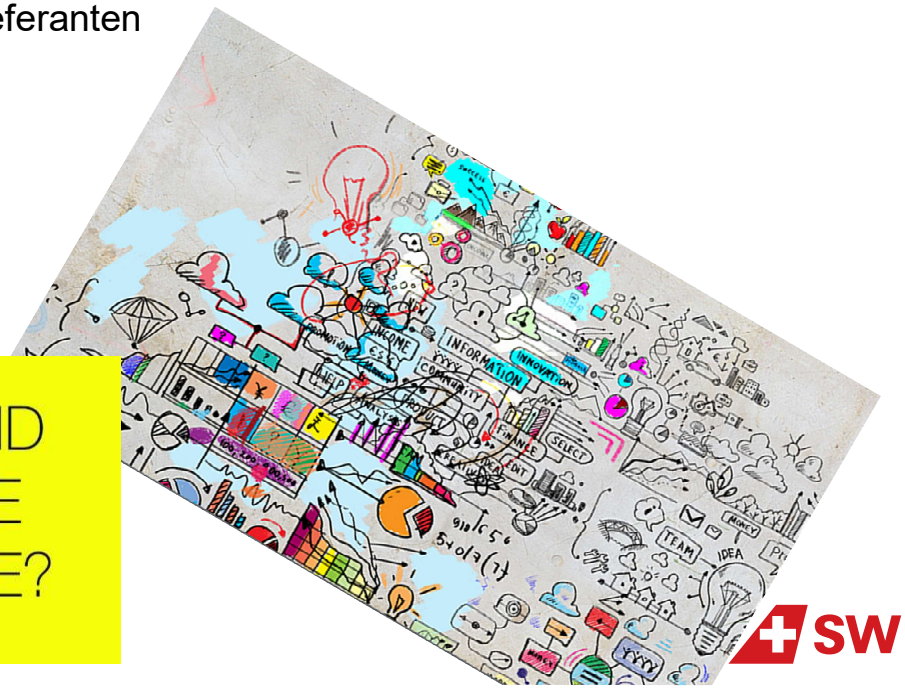
Problematik in der Praxis

- Viele Datenquellen mit unterschiedlichen Qualitäten
- Daten sind «verstreut» auf verschiedenen Systemen
- Diverse Methoden werden angewendet von Fachabteilungen
- Unterschiedliche Risk Ratings von den Datenlieferanten



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Datenquellen

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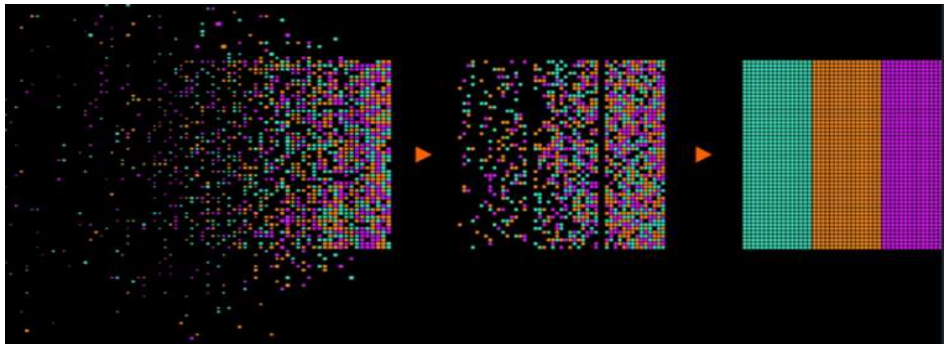
Datapool

- Schlüsselwerte (relevante Daten)
- vergleichbare Daten
- einheitlich und zentral abgelegt
- Echtzeit Zugriff



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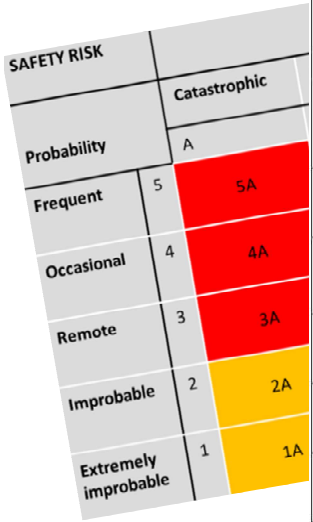
Einheitliches Risk Rating



Event Severity Classification Matrix

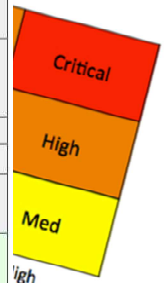
Question 1: If this event had escalated into an accident outcome, what would have been the most credible accident scenario An/A0 to A5?
(answer below)

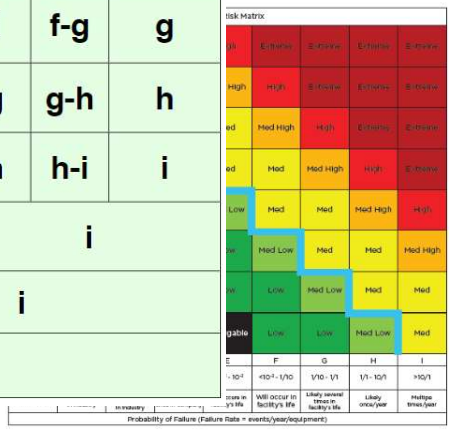
Question 2: What was the effectiveness of the remaining barriers between this event and the most credible accident scenario E0 to E12? (answer below)

Probability

	None												Normal 99,9999%
	E0	**E1**											**E12**
Severity	***Alternative* Question 2**: What is the likelihood that this event leads to the most credible accident scenario?												
	1 out of 1	1 out of 3	1 out of 10	1 out of 30	1 out of 100	1 out of 300	1 out of 1.000	1 out of 3.000	1 out of 10.000	1 out of 30.000	1 out of 100.000	1 out of 300.000	1 out of 1 mio.
Loss of aircr… multiple fatalities …e) *Catas… (S5)* – **A5**	a	a	a	a-b	b	b-c	c	c-d	d	d-e	e	e-f	f
Several fatal… serious injuries, serious dama… craft (almost lost) *Serious … – S5)* – **A4**	a	a-b	b	b-c	c	c-d	d	d-e	e	e-f	f	f-g	g
1 or 2 fataliti… serious injuries, major … he aircraft *Majo… S4)* – **A3**	b	b-c	c	c-d	d	d-e	e	e-f	f	f-g	g	g-h	h
Serious in… injuries and/or substar… e to aircraft *Serio… (S3)* – **A2**	c	c-d	d	d-e	e	e-f	f	f-g	g	g-h	h	h-i	i
Incident with… d/or damage to … *Inc… S3)* **A1**	d	d-e	e	e-f	f	f-g	g	g-h	h	h-i	i		
Minor injurie… mage to aircraft *Minor Inju… age (S2)* – **A0**	e	e-f	f	f-g	g	g-h	h	h-i	i				
Incident with… and/or less than minor s… age or less *Incident … or S0)* – **An**	f	f-g	g	g-h	h	h-i	i						

Severity





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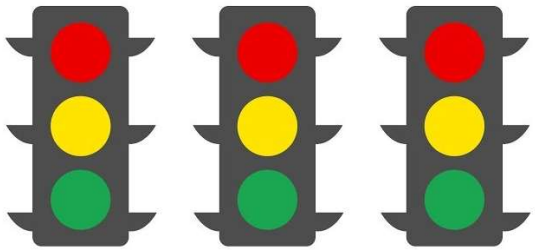
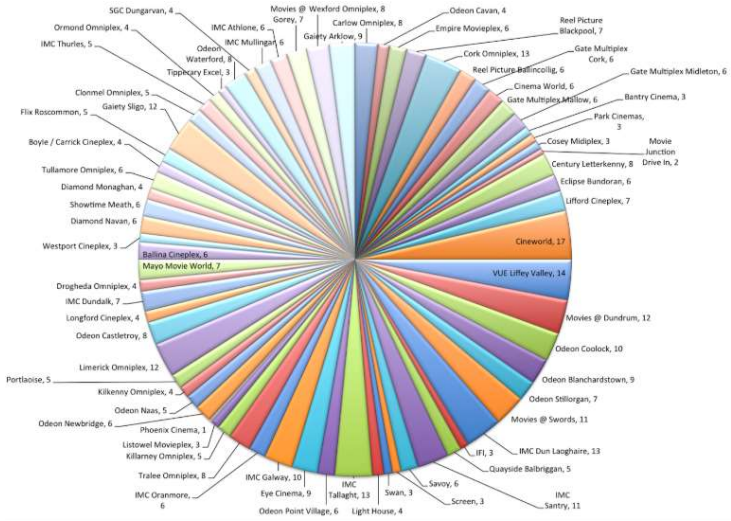
Empfänger gerechte Dashboards

- Stufengerechte Informationen bereitstellen
- Einfach zu interpretieren
- Thematik sollte auf einen Blick erkennbar sein
- Keine redundanten Informationen



VS.



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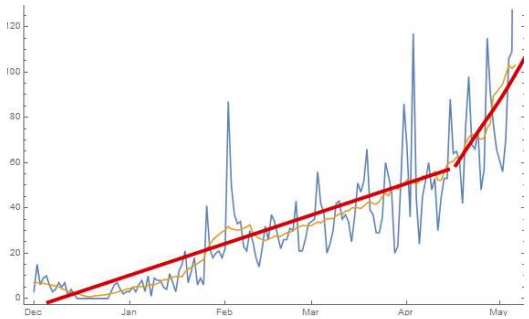
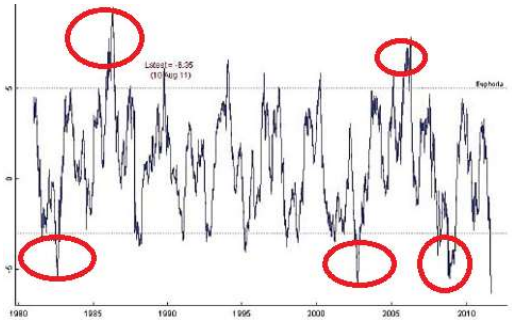
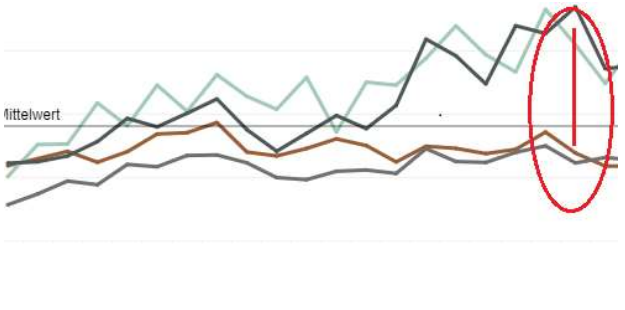
Aussagen anhand Daten

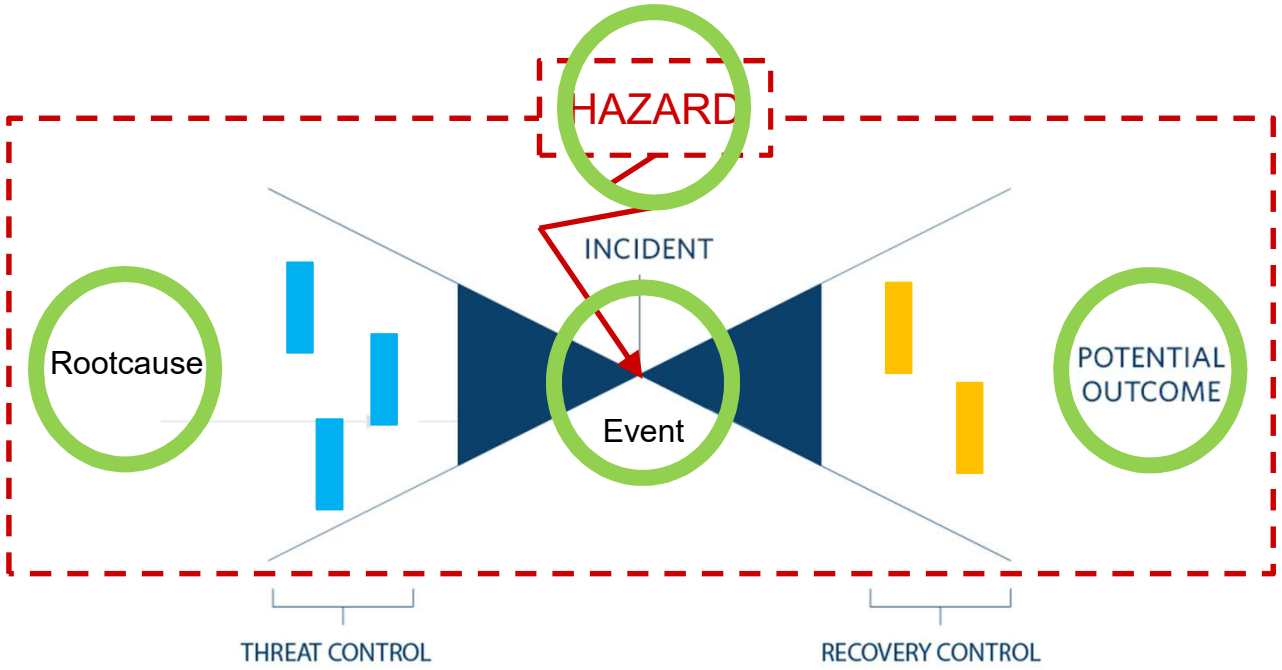
- Auf Trends & Hotspots aufmerksam Machen
- Peaks müssen erklärbar sein
- Soll Bauchgefühl von Fachexperten bestätigen / widersprechen
- Anreiz schaffen für Detailanalyse







Event Classification Standard
Terminology



Key Questions:

1. What happened?
2. Why did it happen?
3. In which «environment»* did it happen?
4. If escalation: possible accident outcome?

Story!

*Hazard:

The condition, object or activity with the potential to cause harm.

Event Classification Standard
Terminology

Hazard:

The condition, object or activity with the potential to cause harm.

References:

- CGE Academy
- Cranfield University
- ICAO SMM

Top Event:

This is the moment when control is lost over the hazard. There is no damage or negative impact yet, but it is imminent. This is the unwanted state!

References:

- EASA ECCAIRS Occurrence Database

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SWISS

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Story!

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HzLvl1	HzLvl2
ENV	Airport Layout and Facilities
ENV	ANSP / ATC
ENV	Cabin Occupants
ENV	RPAS / Drone
ENV	Traffic Congestion
ENV	Dangerous Goods
ENV	Security
ENV	Weather
ENV	Wildlife
ENV	Other
HUM	Application of Procedures
HUM	Human Performance & Limitations
HUM	Inexperienced Crews
HUM	Unfitness to Fly
HUM	Other
ORG	Aircraft Ground Handling
ORG	Crew Staffing
ORG	New Systems, Products and Processes
ORG	IT Systems / Support
ORG	Operational Interfaces
ORG	Operational Pressure
ORG	Ops Policies / Manuals
ORG	Training
ORG	Other
TEC	Design of Technical Equipment
TEC	Maintenance Performance
TEC	Maintenance Procedures
TEC	Behaviour / Malfunction of Technical Equipment
TEC	Other

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Story!

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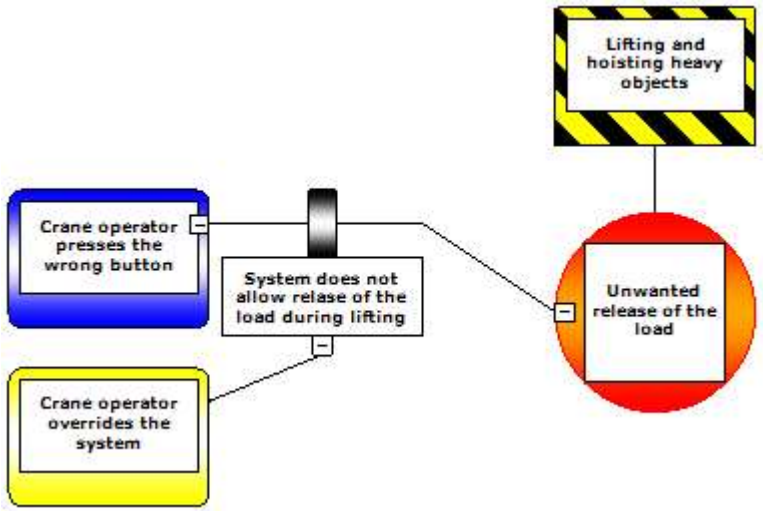
Event Classification Standard
Terminology

Rootcause / Contributing Factors:

Whatever causes your top event (also known as threats). There can be multiple threats. Some threats only affect the effectiveness of barriers.



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Story!

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Event Classification Standard
Terminology

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Whatever causes your top event (also known as threats). There can be multiple threats. Some threats only affect the effectiveness of barriers.

→ SWISS rootcause list

Key Questions:

1. What happened?
2. Why did it happen?
3. In which «environment»* did it happen?
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Story!

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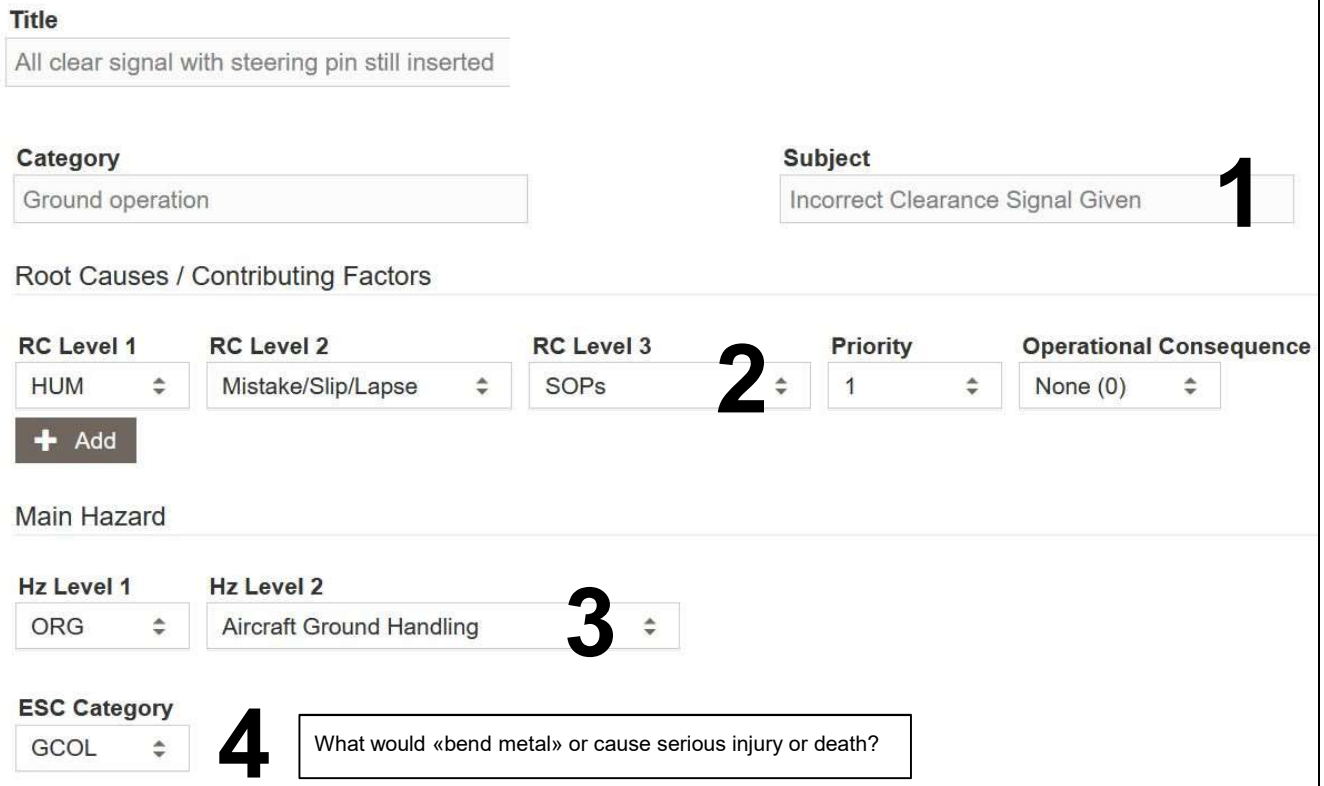
Event Classification Standard
SRS Tab Examples



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Datenerfassung

Number	AC type	Registration	Category	Subject	Title	Tag	Station	Event severity	Hz Level 1	Hz Level 2	Risk units	Status
2863390	CS1	HBJBA	AIRPROX	ACAS/TCAS RA	TCAS RA activation		ZRH					New
2859591	CS1	HBJBI	AIRPROX	ACAS/TCAS RA	TCAS RA ROMA FIR		NAP	d-e	ENV	ANSP / ATC	0.032	Closed
2857396	CS3	HBJCN	AIRPROX	ACAS/TCAS RA	TCAS RA in descent "LEVEL OFF'		GVA	d-e	ENV	ANSP / ATC	0.032	Closed
2855291	CS3	HBJCN	AIRPROX	ACAS/TCAS RA	TCAS RA		DME	e	TEC	Behaviour / Malfunction (	0.01	Action
2853334	A320	HBIJD	AIRPROX	ACAS/TCAS RA	TCAS RA due to severe turbulan		BCN	e	ENV	ANSP / ATC	0.01	Closed
2851749	A321	HBIOD	AIRPROX	ACAS/TCAS TA	faulty TCAS (TA) warning		ZRH	i			0.000001	Closed
2843007	A333	HBJHC	AIRPROX	ACAS/TCAS RA	TCAS RA on final approac	ERM	NBO	c-d	ENV	ANSP / ATC	0.32	Closed
2843007	A333	HBJHC	AIRPROX	ACAS/TCAS RA	TCAS RA on final approac	CCI	NBO	c-d	ENV	ANSP / ATC	0.32	Closed
2842235	A321	HBIOH	AIRPROX	ACAS/TCAS RA	TCAS RA		ZRH	d-e	ENV	Traffic Congestion	0.032	Closed
2840386	A333	HBJHE	AIRPROX	ACAS/TCAS RA	TCAS RA		JFK	e	ENV	ANSP / ATC	0.01	Closed
2838609	A333	HBJHB	AIRPROX	ACAS/TCAS RA	TCAS RA in at 1000ft		JFK	d-e	ENV	ANSP / ATC	0.032	Closed
2833563	A319	HBIPT	AIRPROX	ACAS/TCAS RA	TCAS RA		AGP	d	ENV	ANSP / ATC	0.1	Closed
2827567	CS3	HBJCG	AIRPROX	ACAS/TCAS RA	TCAS RA London arrival		LHR	d-e	ENV	ANSP / ATC	0.032	Closed
2822594	A320	HBIJE	AIRPROX	ACAS/TCAS RA	TCAS RA during descent		ZRH	d-e	ENV	ANSP / ATC	0.032	Closed
2819136	CS1	HBJBF	AIRPROX	ACAS/TCAS RA	TCAS RA		GVA	d	HUM	Human Performance & Li	0.1	Closed
2815487	A333	HBJHC	AIRPROX	ACAS/TCAS RA	TCAS RA		EWR	d-e	ENV	ANSP / ATC	0.032	Closed
2815181	CS3	HBJCL	AIRPROX	ACAS/TCAS TA	TCAS TA on short final		ZRH	i			0.000001	Closed
2808962	A320	HBJLR	Technical	3445 ACAS/TCA	Transponder not working/TCAS		ZRH	i			0.000001	Closed
2806737	A320	HBJLS	AIRPROX	ACAS/TCAS RA	TCAS RA		ZRH	d-e	ENV	ANSP / ATC	0.032	Closed
2802288	CS3	HBJCS	AIRPROX	ACAS/TCAS RA	TCAS RA on 5NM Final ILS 14 ZR		ZRH	d-e	ENV	ANSP / ATC	0.032	Closed

- Pilot rapportiert Vorfall vis SRS
- Flight Data Monitoring registriert Vorfall ebenfalls
- Event wird durch beide Abteilungen bewertet
- Informationen werden gesammelt und Ratings abgestimmt
- Daten fliessen in zentralen Speicher für die Auswertung

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Zusammenfassung

- Solider Datapool mit konsolidierten Daten
- Einheitliche Risikowährung
- Stufengerechte Dashboards
- Fachexpertise miteinbeziehen

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Fragen

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Thank you

A STAR ALLIANCE MEMBER

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