



EASA
European Aviation Safety Agency

IMPLEMENTING AND MONITORING EFFECTIVE RISK MITIGATIONS

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Safety Notice.....





- Regulation requirements
- Type of mitigations strategies
- Type of barriers
- Major shortcomings
- Examples



ORO.GEN.200 Management system

(a) The operator shall establish, implement and maintain a management system that includes:

(1) clearly defined lines of responsibility and accountability throughout the operator, including a direct safety accountability of the accountable manager;

(2) a description of the overall philosophies and principles of the operator with regard to safety, referred to as the safety policy;

(3) the identification of aviation safety hazards entailed by the activities of the operator, their evaluation and **the management of associated risks, including taking actions to mitigate the risk and verify their effectiveness;**



AMC2 ARO.GEN.300(a);(b);(c) Oversight

EVALUATION OF OPERATIONAL SAFETY RISK ASSESSMENT

As part of the initial certification or the continuing oversight of an operator, the competent authority should normally evaluate the operator's safety risk assessment processes related to hazards identified by the operator as having an interface with its operations. These safety risk assessments should be identifiable processes of the operator's management system.

As part of its continuing oversight, the competent authority should also remain **satisfied as to the **effectiveness** of these safety risk assessments.**



Risk assessment as such does not reduce the risk.



Quick recap on terminology...



Barrier

All technical, operational and organisational measures that “limit” the severity and/or probability of consequences arising from a hazard

Mitigation (ICAO 9859)

The process of incorporating defences, preventive controls or recovery measures to lower the severity and/or likelihood of a hazard’s projected consequences.

Consequential/Recovery barrier

Protective function or action that contribute to reduce undesired outcome.

ACT ON SEVERITY

Causal / Avoidance Barrier

A function, action or system that contribute to reduce the likelihood (probability) of an undesired outcomes.

ACT ON FREQUENCY/LIKELIHOOD



Type of strategies



Risk Mitigation strategies ICAO



- **Avoidance**
The operation or activity is cancelled or avoided because the safety risk exceeds the benefits of continuing the activity, thereby eliminating the safety risk entirely
- **Reduction**
The frequency of the operation or activity is reduced, or action is taken to reduce the magnitude of the consequences of the safety risk
- **Segregation of exposure**
Action is taken to isolate the effects of the consequences of the safety risk or build in redundancy to protect against them

(ICAO DOC 9859 Ed 4)



Risk Mitigation strategies - SMICG



- **Risk Avoidance**

The risk avoidance strategy is more likely used as the basis for a “go” or “no go” decision

- **Risk Reduction**

Means a reduction of frequency or severity of the consequences of the risks.

- **Risk Transfer Shift**

Ownership of risk to another party.

- **Segregation of Risk exposure**

Action is taken to isolate the effects of risks or build in redundancy

- **Risk Assumption**

It is not usually acceptable to use an assumption strategy to treat high risk associated with a hazard.



Types of barriers



- **Physical**

These are barriers that physically prevent an action from being carried out or an event from taking place.



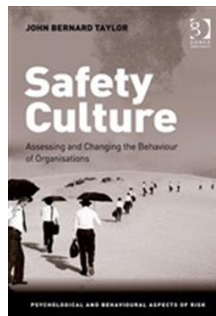
- **Functional**

A functional barrier effectively sets up one or more pre-conditions that have to be met before the action can be carried out.



- **Symbolic**

All kinds of signs and signals are symbolic barriers. A symbolic barrier indicates a limitation on performance that may be disregarded or neglected.



- **Immaterial**

The barrier is not physically present but that it depends on the knowledge of the user in order to achieve its purpose. Immaterial barriers are usually also represented in a physical form such as book or a memorandum, but are often not physically present when their use is mandated





CREDIBILITY

- VERIFICATION
- VALIDATION
- INPUT DATA VALIDITY
(agreed with real-world data)
- RESULT ROBUSTNESS
- USE OF HISTORY
- PEOPLE QUALIFICATION

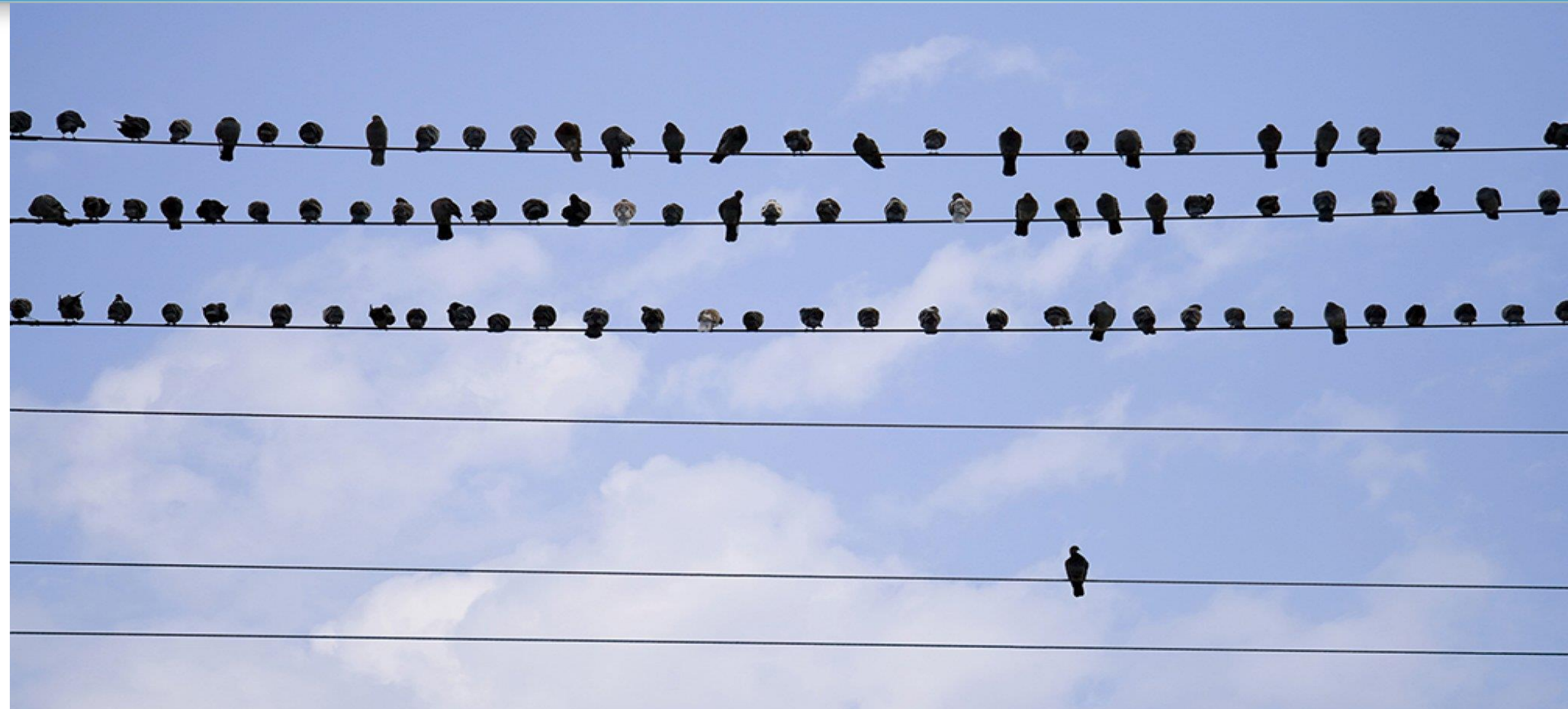




Major shortcomings



Guess who the lonely bird is?







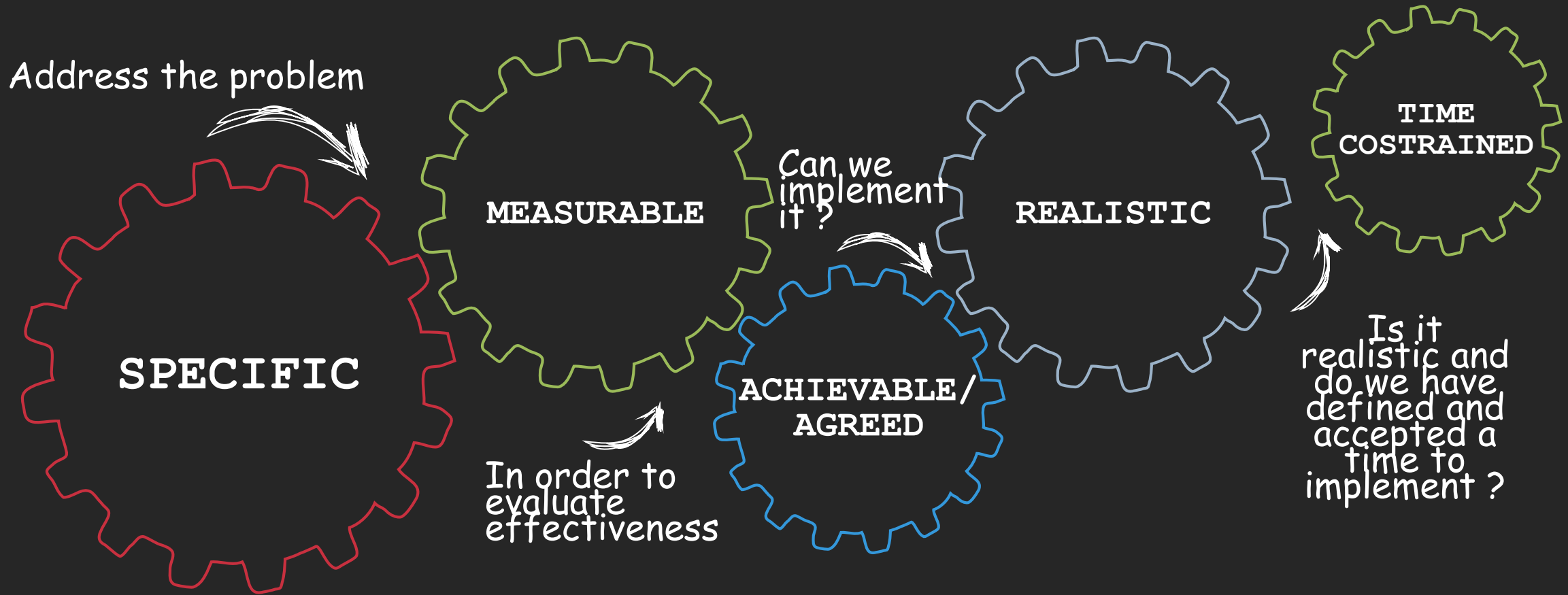
Measure and monitor the effectiveness





S.M.A.R.T concept

MITIGATION HAS TO BE : S.M.A.R.T





EXAMPLES



Examples...

No	Activity title	Procedures	Event	Hazards	Risks	Initial risk level	Actions agreed	Actions implemented	Resulting risk level	Closure validated
			Flaps over-speed	Flaps overspeed	Possible damage to A/C	3C	Preventive Include in GRT	14/02/2017		14/02/2017 3A
			VLS above target speed	Overspeed in approach below 2000'	Unstabilized approach	3C	Preventive Include in GRT	14/02/2017		3A
			Cargo compartment not secured by net	Issues with baggage loading	Possible movement of cargo	3C	Preventive Ask ground handling company for preventive actions	20/01/2017	A ground handling company will publish a reminder	20/01/2017 3A
			ACFT operated two sectors with expired daily check	Operating without valid check	Continuous airworthiness is not ensured	2D	Preventive Sign contracts with maintenance providers		Contract signed	11/05/2017



Examples...

SAG 21/02/2016	Erroneous parameters for take-off	Entering erroneous data	Unsuccessful take-off	3C	Preventive	Check current EASA's regulation and check with XXX procedures	31/05/2017	EASA regulation was presented	15/05/2017	
HI SAG 23/02/2016	In order to larger availability of the pilots, HR would like to change qualification criteria	Lack of experience/skills	The crew members won't react properly in the critical situation due to the lack of skills and knowledge.	3C	Preventive	Include updated requirements in the next revision	01/05/2017	Requirements were updated	29/04/2017	3B
SAG 21/02/2016b	Airspace usage limitations due to threat of weaponry	Usage of weaponry	Airplane damage due to firing/shooting Passenger injury due to firing/shooting	2D	Preventive	Discuss with OCC about possible barriers, in case a flight route crosses affected airspaces	17/07/2017	Depending on route the OCC must review CZIB	15/07/2017	2B
	High bank angle on approach (33degrees) for a few seconds	High bank angle	Risk of steep spiral dive	3C	Preventive	Include in the upcoming review	31/03/2017	Reviewed with a Chief pilot	20/03/2017	3B



Type of operation	Description of hazard	Safety barriers in place	Undesirable event(s)	Current risk category			Future mitigation and measures	Future risk category			In place Y/N?	Documents to be revised	Responsible by when	Additional measures or comments	Restricted to XYZ use Y/N?
				Likelihood	Severity	Result		Likelihood	Severity	Result					
	Fatigue - slower reactions reduced ability to process information memory lapses absent-mindedness decreased awareness lack of attention underestimation of risk reduced coordination	Experienced company staff	Delays/ Incidents - failure to communicate, failure to understand ATC Clearances, etc	3	3	9	Fatigue training for flight crews	3	2	6	Yes	SM M, ed 2, rev 3		Additional measures or comments	No
	Fatigue - Pilot - night flights	Initial and recurrent fatigue management training to crew members, personnel responsible for preparation and maintenance of crew rosters and management personnel concerned. Excel file updated each month with WOCL Hours encroachment	Procedural errors ATC Clearances misunderstood Runway incursion Lack of communication in the cockpit	4	3	12	Encourage flight crews to proactively report fatigue/ Carefully monitor WOCL encroachments	3	3	9	Yes	SM M, ed 2, rev 3	Ongoing		No



Examples...

Context	Hazard category	Current Level of Risk	Mitigation and control procedure	revised level of risk	Further mitigation measures	Responsibility	Validation
Organisation	Flight Operations in Europe	Severity C	OCC and familiarization period	Severity C	Nominate d persons meeting to update existing situation	AM, FLT OPS, CREW	
	Change of employees (new pilots and nominated persons) because big airlines are hiring	Likelihood 4	Close communication with line training commander and flight examiners	Likelihood 3			SM 2 months form the change of nominated persons
	Deficiency in communication (NP's not properly informed)	Tolerability 4C	<p>Management in proper condition (right personnel hired for the job, better to base nominated persons where the most of operations are conducted)</p> <p>Management of change process properly conducted when new nominated persons are hired (select new nominated persons when know how is still in house and knowledge can be passed to the next nominated persons)</p>	Tolerability 3C	<p>Software monitorin g</p> <p>hire mid-european personnel as nominated person vacancy</p>		<p>CREW TRG: 2 months from the change of nominated persons</p> <p>CM training audits should include checking new employees training syllabuses</p>



Examples...

Context	Hazard category	Current level of safety	Mitigation and control procedure	Revised risk level	Further mitigation measures	Responsibility	Validation
Organization	Workload due to small amount of employees, Nominated Persons need to do also other tasks beyond NP job description	Severity B	AM shall be aware of existing work amount and hire new employees if required	Severity B	NP meeting to update on the situation	AM	
		Likelihood 4	Priority of work should be clearly described and delegated practicable	Likelihood 3			
		Tolerability 4B	Company reserve should be used as required	Tolerability 3B			



Examples...

Event Risk Classification for every Occurrence report **(OK)**

Every ERC becomes an hazard **(not OK)**

- Almost 1700 hazards in a year
- 280 risks assessment
- More then 1000 mitigations
- All discussed in SRB

Results:

- **No real understanding on where the risk is**
- **no data aggregated** to help in prioritize risks
- **fault feeling** that you are managing risks



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Thanks for your attention

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