CONFERENCE OMAINTEC 2026 EXHIBITION FM

The 23rd International Asset Facility and Maintenance Management Conference

Safety Risk Management & AI: How is AI Changing Risk Models, and What Responsibilities does this Create?

12-14 January 2026

Riyadh, KSA

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Organized by

OMAINTEC المجلس العربي لإدارة الأصول والمرافق والصيانة Arab Asset, Facility and Maintenance Management Council In Partnership with SAFMMA الجمعية السعودية لإدارة الأصول والمرافق والصيانة Saudi Asset, Facility & Maintenance Management Association

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Who I am?

Simone Bernasconi

Chief Risk and Certification Officer / CEO Advisor at Manta Aircraft
Head of Market Development B2B/B2G /Microlino AG
Founder of Avalle, Editor of Mobilities, Host and creator of meets
Former Head of Advanced Transportation Programs at SUPSI

Competences and Areas of Expertise

Advanced Air Mobility
Future Mobility
Public Transportation
Aviation & Airports
Transportation, SCM
High-Tech Industries
Emerging Technologies

Safety, Risk & Crisis Management
Strategy & Business Development
Innovation & Creativity
Maintenance & Engineering
Certification
Operations
Events, Conferences & Marketing

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With 30 years of experience in various technical, project/program management and executive positions in the aviation and mobility sectors, I have consistently demonstrated my role as a responsible leader by consistently achieving goals in complex and harsh environments. I am an innovator, storyteller, creative engineer, mentor and strategist. I have been on the move around the world for decades and have now settled in Uster (Switzerland) since 2018. I am a father of one daughter and happily married.

My professional life is deeply rooted in my values. I firmly believe that simplicity is the key to success, that innovation goes beyond technology, and that respect is the cornerstone of lasting relationships. I am also certain that mobility is the lifeblood of business, cultural exchange, sustainable development, social inclusion and much more...

About this Workshop

This is not a vacation! We work proactively together!

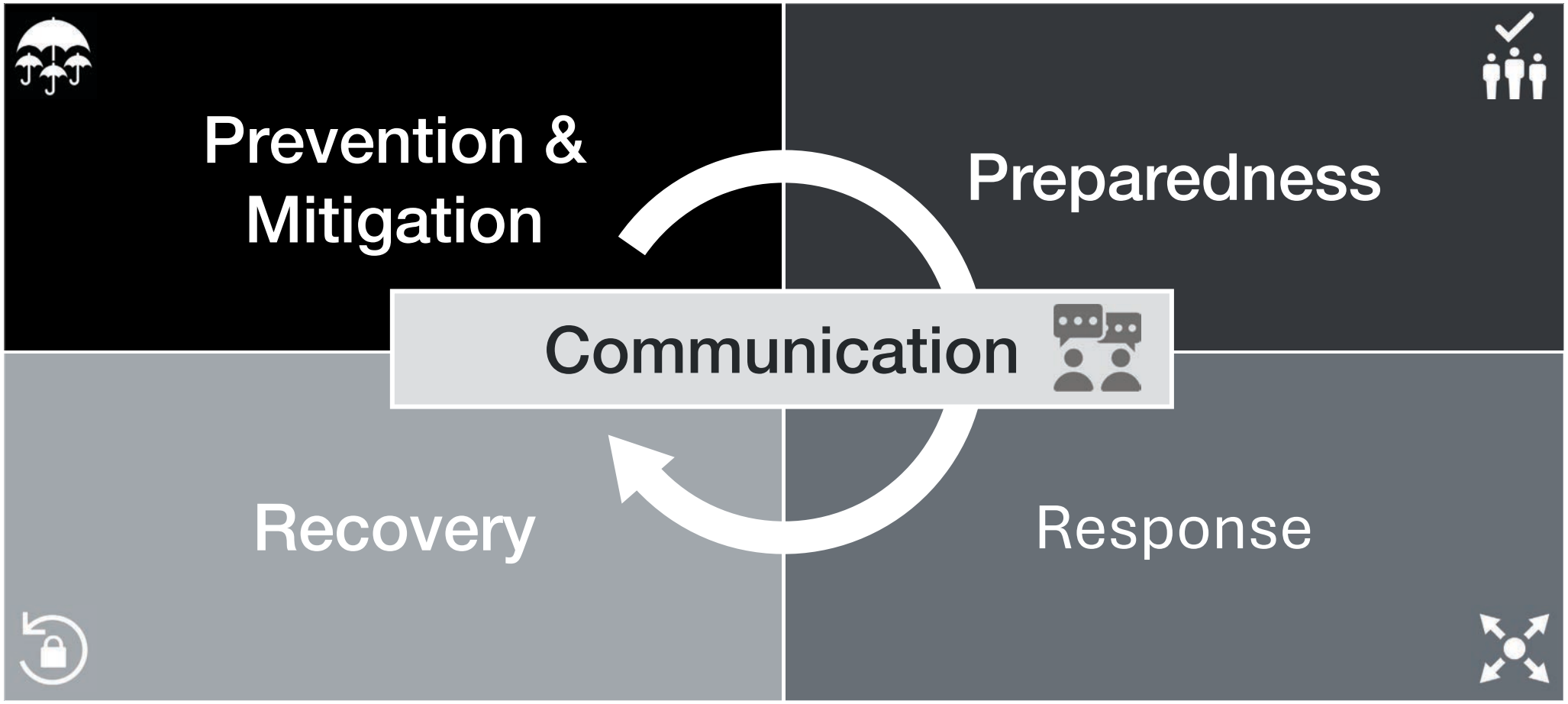
- Mobile phone switch to silent please.
  (you can leave the room if there is any urgency).
- Do not talk when others are speaking.
- Interactive workshop! Your active participation is required.
- Bring your laptop or tablet with you if possible.

PERCEPTIONS

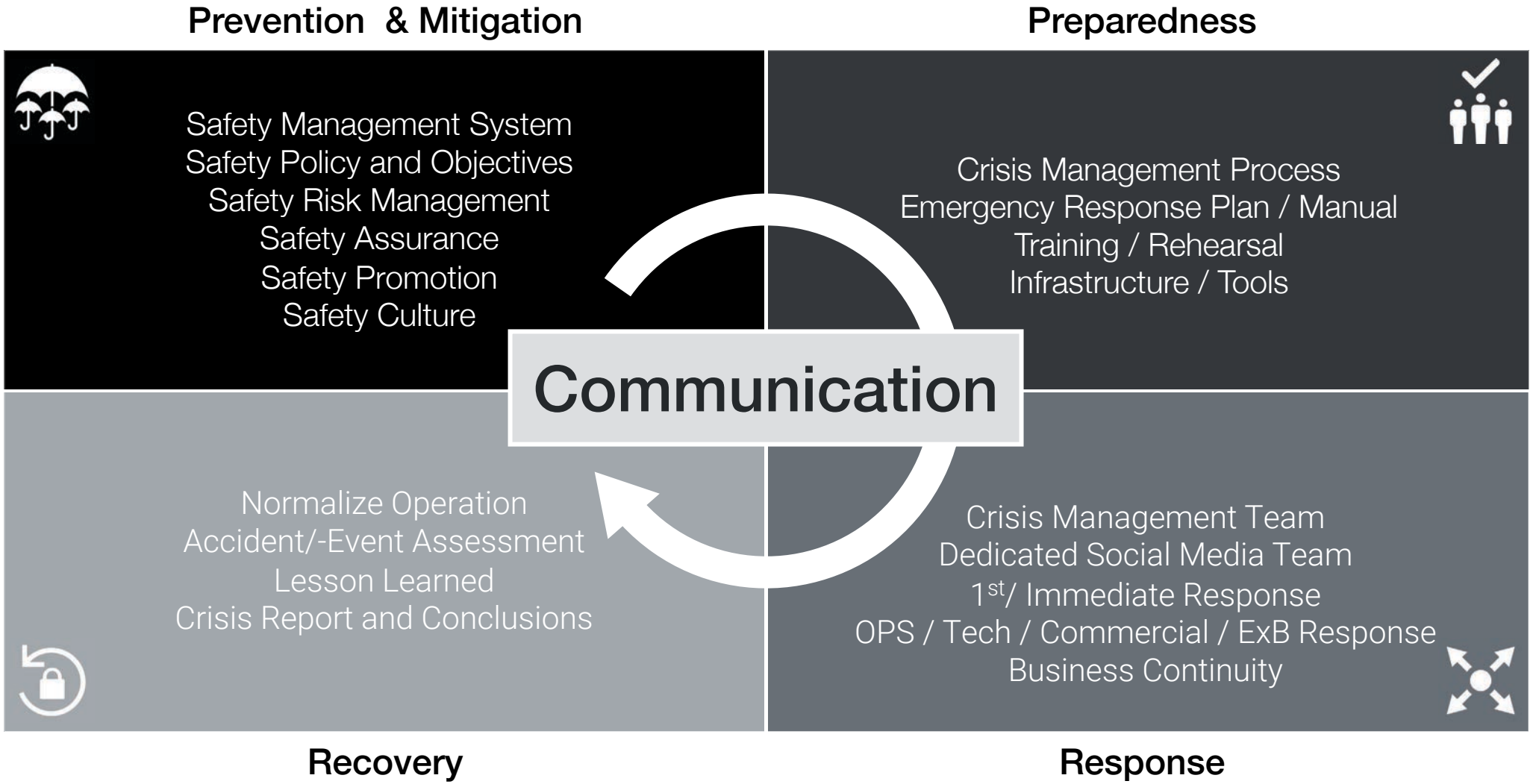
Contents

PART 0 | RECAP OMAINTEC 2025 & INTRO
PART 1 | CONTEXT & SHIFT
PART 2 | HOW AI CHANGES RISK
PART 3 | RESPONSIBILITY & GOVERNANCE
PART 4 | SCENARIOS
PART 5 | LEADERSHIP ACTIONS
PART 6 | SRM TOOLS
PART 7 | CONCLUSION AND DISCUSSION

CRISIS MANAGEMENT STANDARD APPROACH



CRISIS MANAGEMENT STANDARD APPROACH



CRISIS MANAGEMENT STANDARD APPROACH

Prevention & Mitigation

Safety Management System
Safety Policy and Objectives
Safety Risk Management
Safety Assurance
Safety Promotion
Safety Culture

Preparedness

Crisis Management Process
Emergency Response Plan / Manual
Training / Rehearsal
Infrastructure / Tools

5C: Concern, Commitment, Competency, Clarity, and Confidence.

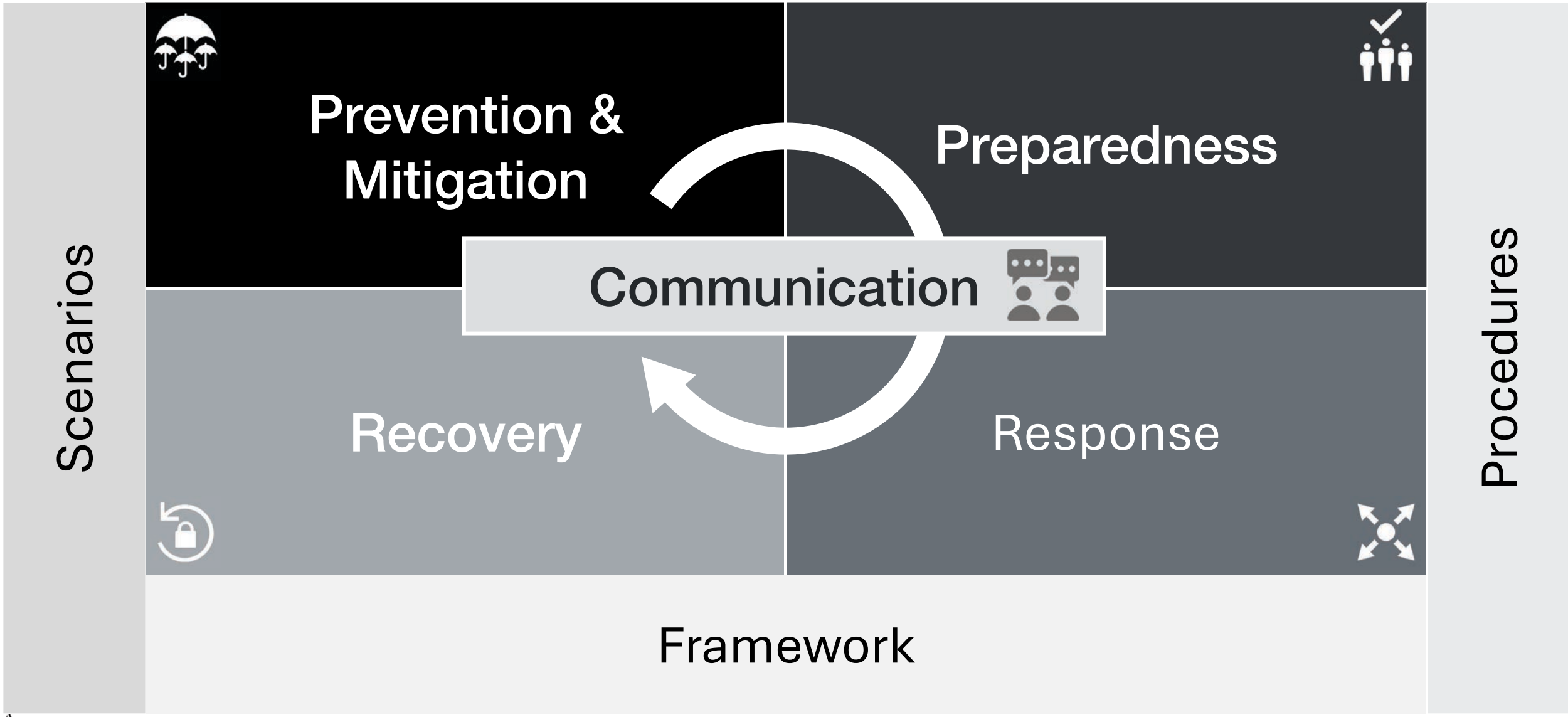
Recovery

Normalize Operation
Accident/-Event Assessment
Lesson Learned
Crisis Report and Conclusions

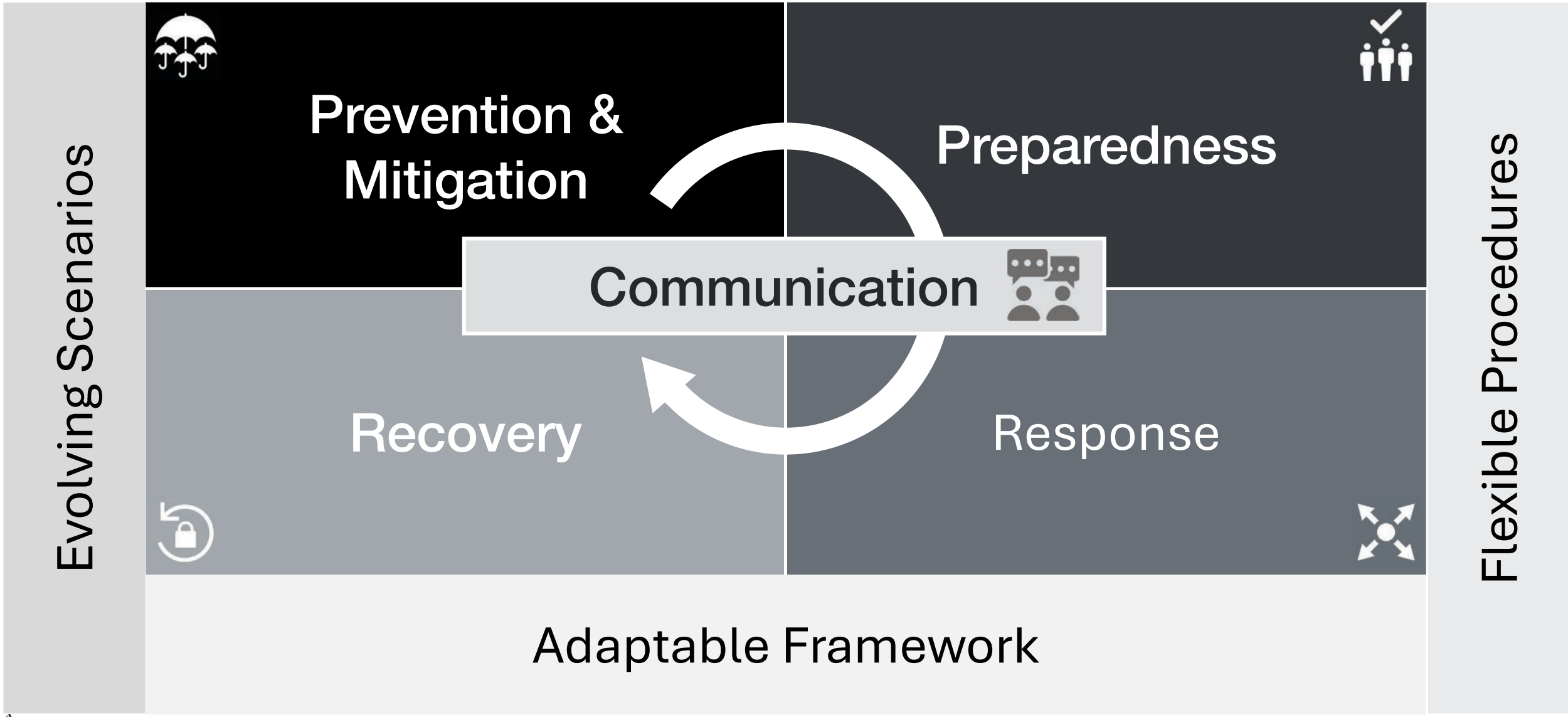
Response

Crisis Management Team
Dedicated Social Media Team
1st/ Immediate Response
OPS / Tech / Commercial / ExB Response
Business Continuity

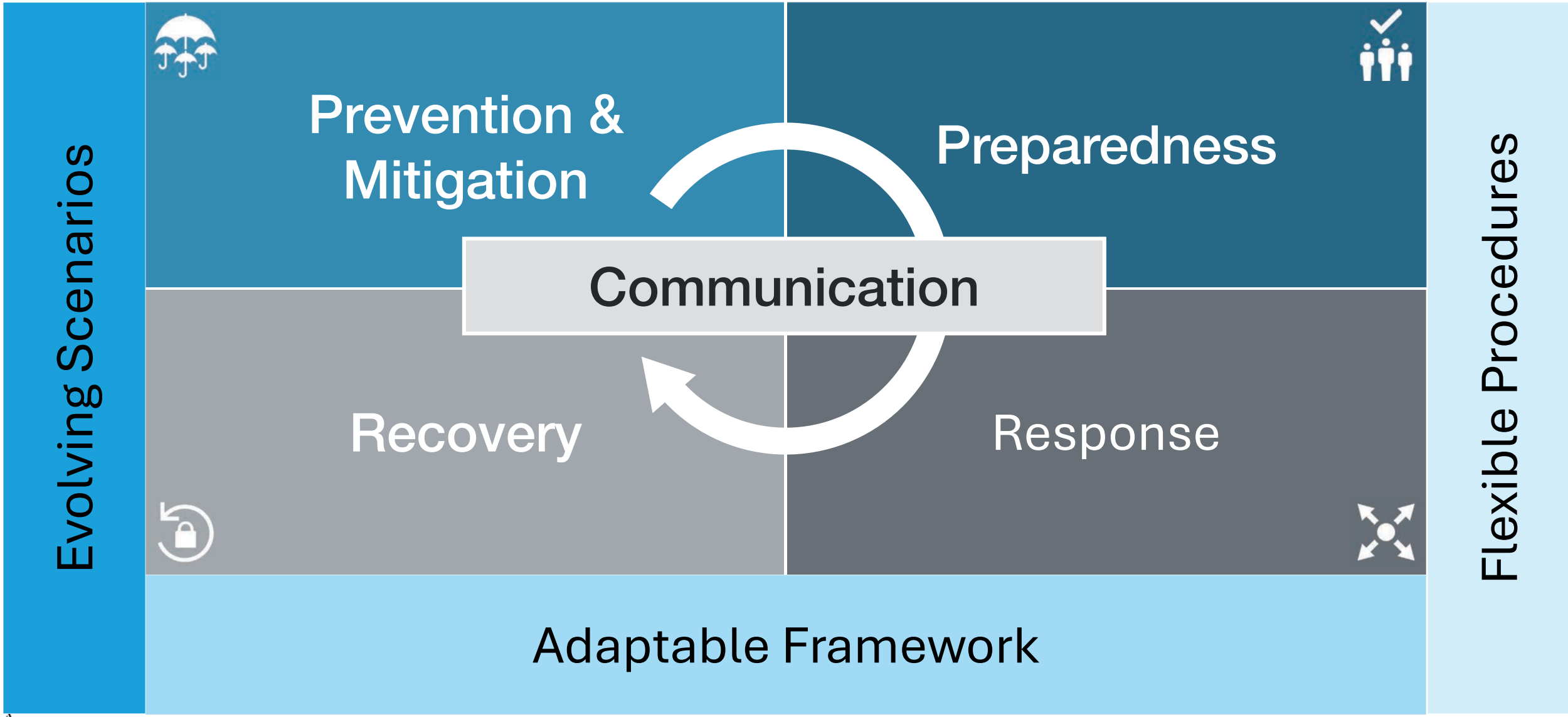
CRISIS MANAGEMENT ELEMENTS+



CRISIS MANAGEMENT ELEMENTS+ (ADAPTABLE)



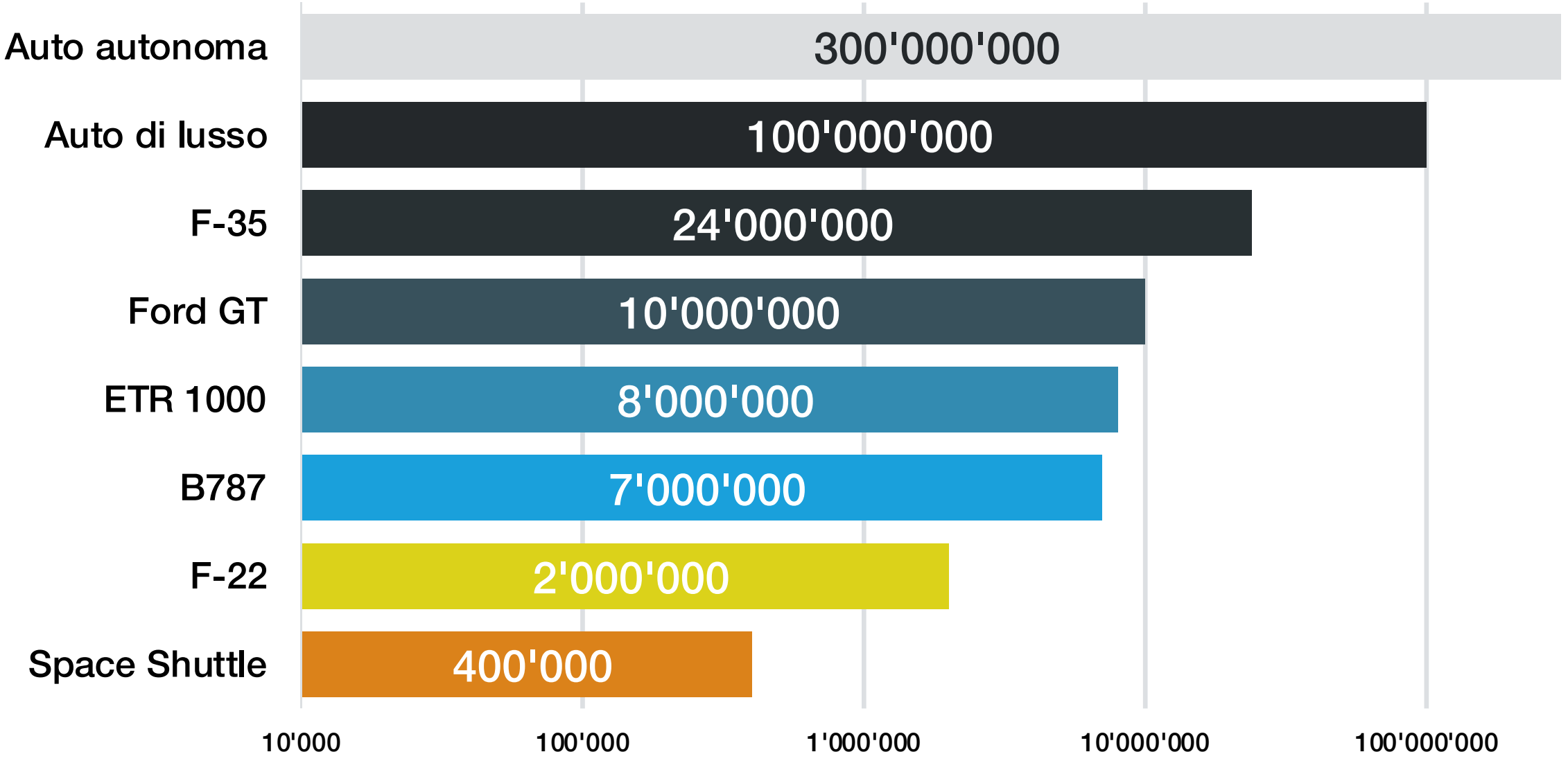
SAFETY AND AI



System complexity

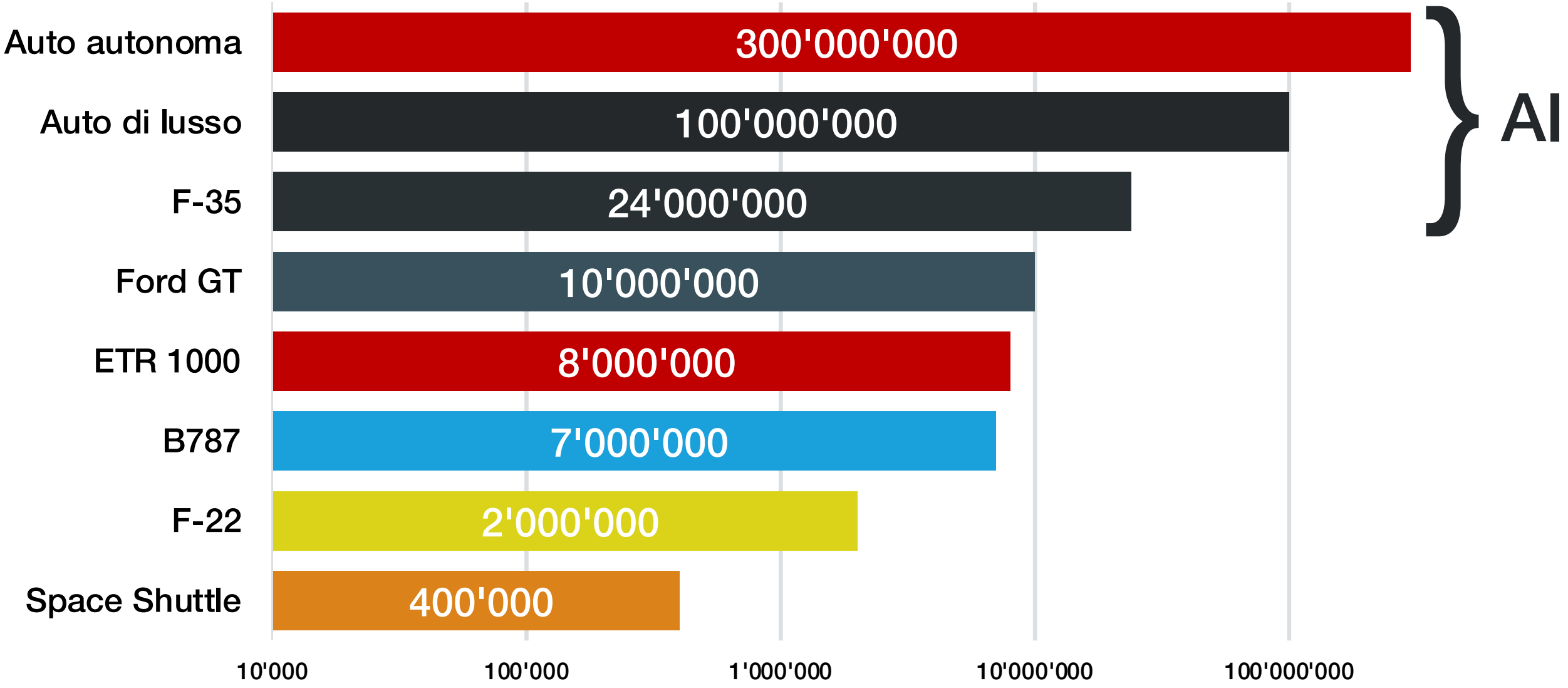
Coding of transportation systems / vehicles

Code lines comparison

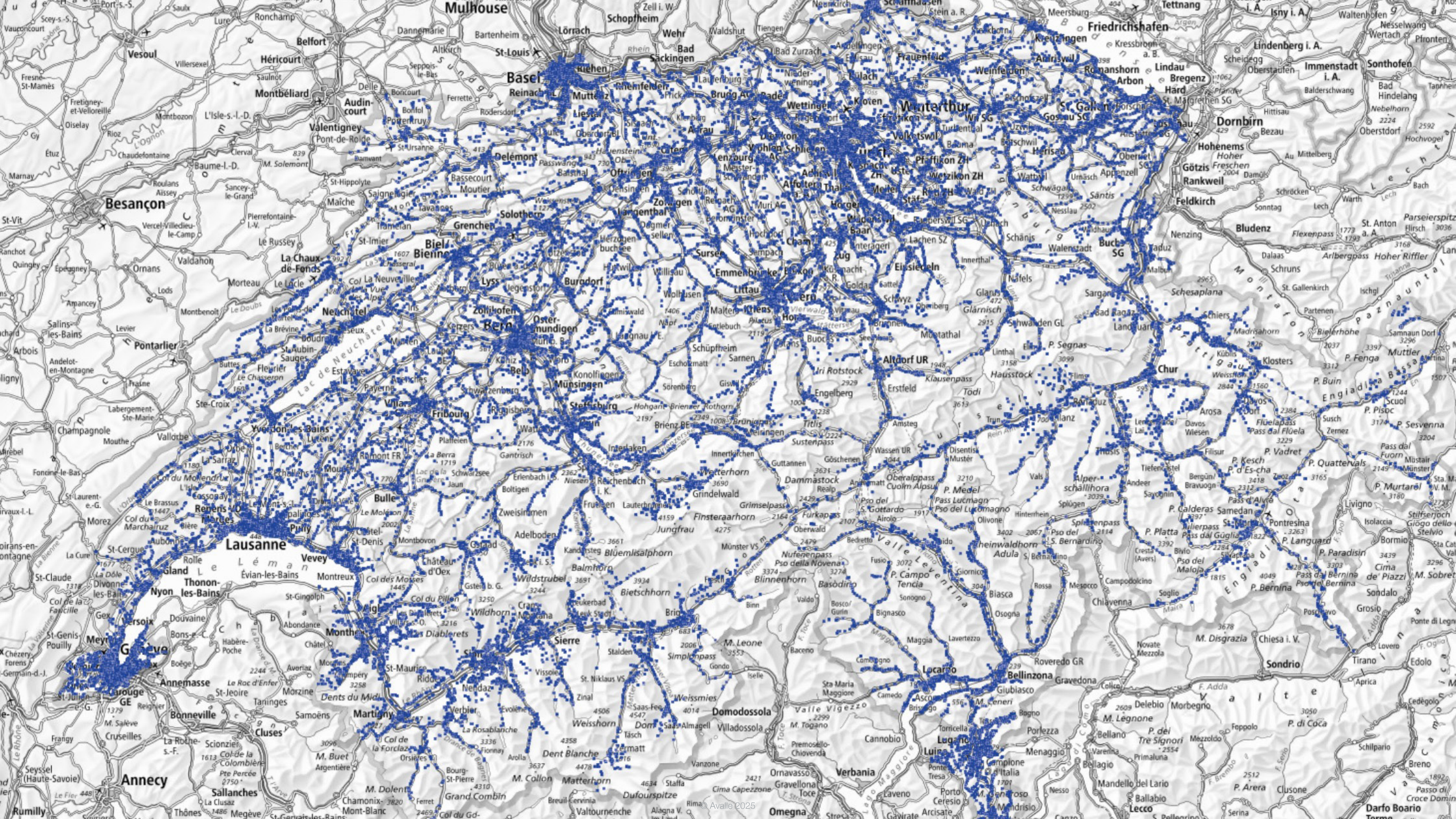


Coding of transportation systems / vehicles

Code lines comparison



Short quiz about the Swiss public transportation system



Mulhouse
Basel
Besançon
Belfort
Vesoul
Montbéliard
Delémont
Winterthur
Zürich
Friedrichshafen
St. Gallen
Dornbirn
Feldkirch
Bludenz
Vaduz
Solothurn
Grenchen
Biel/Bienne
La Chaux-de-Fonds
Neuchâtel
Bern
Luzern
Zug
Einsiedeln
Altdorf UR
Chur
Davos
Klosters
Arosa
Fribourg
Yverdon-les-Bains
Pontarlier
Lausanne
Vevey
Montreux
Genève
Annecy
Annemasse
Thonon-les-Bains
Évian-les-Bains
Sion
Sierre
Brig
Martigny
Monthey
Domodossola
Locarno
Bellinzona
Lugano
Sondrio
Tirano
Interlaken
Thun
Grindelwald
Zermatt
Matterhorn
Lac Léman
Lac de Neuchâtel
Avalle 2025

Data, more data, a huge amount of data!

How advanced is artificial intelligence today?

Let's look at this simple examples to prepare for this presentation.

1. A collage image blending road, rail, air transport with digital code overlay. All the vehicles must be real and from known Swiss operators (SWISS, SBB, VBZ, as example). Make it like an innovative and modern but minimalist style transportation hub. Make the aspect ratio 16:9.
2. Remove the old VBZ tram by the new VBZ Flexity, remove the SWISS aircraft and replace it by the new SWISS A350 and add the Microlino car on the road. One bus can be an Hess Electric bus and keep the other as PostAuto. The Microlino car is not shown! Please add it.
3. The Microlino car is not shown! please add it. the rest is great!
4. Add the overhead electric lines for the train and the tram.
5. The picture must be in 4K, details such as names of destinations on the bus and Tram must be readable, car details must show no "glitches". When I zoom to the vehicles, the details must be realistic. on the previous pictures you might reconginze that AI is at work.

How advanced is artificial intelligence today?

Let's look at this simple examples to prepare for this presentation.

6. Perform the following changes on the last picture: (1) - The VBZ Bus on the left bottom corner must be turned by 180 degrees to drive toward the right upper corner (like the cars). (2) The back of the Microlinos are not correct.
7. Put the Post Autobus (in yellow) in the previous spot and do not change anything on this bus. The bus on the right (in blue) must show the back of the vehicle.
8. Remove the 2nd car on the right and keep the 4k resolution.
9. The details and the resolution ist not great. make it better so that it looks like a real image.
10. Remove the digital overlay.

Made with Google AI, Gemini 3 Pro, Nano Banana Pro | 1st iteration

1

3

Made with Google AI, Gemini 3 Pro, Nano Banana Pro | 3rd iteration

4

Made with Google AI, Gemini 3 Pro, Nano Banana Pro | 4th iteration

Made with Google AI, Gemini 3 Pro, Nano Banana Pro | 6th iteration

6

Made with Google AI, Gemini 3 Pro, Nano Banana Pro | 9th iteration

9

Made with Google AI, Gemini 3 Pro, Nano Banana Pro | 10th iteration

10

AI with or without emotions?

From the movie “Lucy” di Luc Besson, 2014

What is an AI Agent?

It is a decision-support system

An AI agent is not a model and not a dashboard

The Shift Has Started

Safety, maintenance and operations are no longer static

The world of safety is shifting faster than our frameworks.

Risk Models Under Pressure

When reality outpaces structure

AI changes the way we see risk, the speed at which we detect it, and the way people make decisions.

Why We’re Here

Adapting models, not just tools

Today is not a technical deep dive.
It’s a strategic conversation
about responsibility.

From Static to Dynamic

Risk is no longer a snapshot

Risk models were once snapshots.
Today they are streams.

Every Second Matters

Time compression changes safety

Sensors, IoT, and predictive models compress detection time from hours to seconds.

Patterns Before Problems

Weak signals become visible

**AI doesn’t wait for incidents;
it detects anomalies.**

Probability Rewritten

Live risk means live decisions

When models self-adjust,
your risk map changes live.

Shifts Roles

Humans move from control to supervision

Operators become supervisors of automation, not controllers.

When AI Gets It Wrong

Failure changes shape

Every system fails.
AI simply fails differently.

Accountability Moves

Responsibility does not disappear

When systems influence decisions, accountability shifts between human and machine.

Transparency Becomes Critical

Black boxes create blind spots

Opaque AI creates blind spots.

Bias Is a Risk

Data reflects history, not truth

Every AI model carries the bias of its data.

Standards Lag Behind

Regulation follows reality

Regulatory frameworks are running behind the curve.

AI Missed It

When silence becomes danger

A predictive maintenance model failed to detect a rare anomaly.

AI Triggered It

When protection disrupts reality

The system overreacted and shut down a subsystem without contextual understanding.

Your Decisions Now

Leadership/experts reflection

What needs to stay human?

Strengthen Human Oversight

Judgment over procedure

Ensure humans can intervene and know when to intervene.

Design for Failure

Assume misprediction

Assume AI will miss predict at some point.

Build Responsible Governance

5 | 1 2 3 | 4 6 7

Structure beats intention

Clear accountability lines and transparent data pipelines are essential.

The Responsibility Is Ours

AI amplifies consequences

**AI doesn’t remove responsibility;
it amplifies it.**

SRM Tools Under Pressure

Tools shape decisions

SRM tools influence how we perceive risk.

SRM Toolkit Overview

Still valid, now stressed

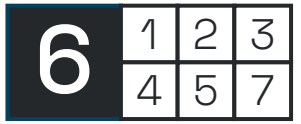
Which tool remain relevant?

SRM Tools

Some ideas and more…

Risk matrices, Bow-Ties, and ARMS and many other remain relevant.

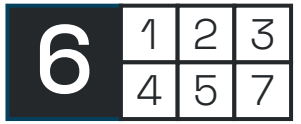
Risk Matrix: Static vs Dynamic



Color loses meaning

Risk matrices assume fixed probability and severity.

Risk Matrix Failure Modes (decision support aid)



False comfort

A green box can still represent serious risk.

Bow-Tie: Why It Still Works (as example)

Logic over statistics

Bow-Tie models causal relationships explicitly.

AI Barriers (with Bow-Tie)

AI as a barrier, not an owner

AI can act as a preventive or mitigative barrier.

Failure Mode (Bow-Tie)

Barrier illusion

AI barriers may appear present while silently degrading.

Data-Driven Risk

Patterns at scale

Data-Driven models identify trends across many events.

AI Limitations

What is not reported does not exist

Data-Driven models depend on reporting quality.

Where Risk Really Lives

Between tools

Most accidents emerge between tools, not inside them.

Leadership Implications

Tools evolve, leaders decide

Leadership defines how tools are used and trusted.

Tools Evolve. Responsibility Remains.

Human-led, AI-supported safety

**Technology changes,
responsibility does not.**

Main building blocks of an AI agent

Simplyfied AI Agent elements

AI Agents do not replace responsibilities nor accountabilities

Main building blocks of an AI agent

Environment

The operational reality the agent observes.

- Flight operations
- Maintenance
- Air traffic management
- Airport ground operations

The agent does not see “risk”.
It sees signals.

Data Inputs (Sensing layer)

This is the most underestimated part.

Typical inputs:

- Occurrence reports (ADREP/ECCAIRS)
- FDM / FOQA exceedances
- Maintenance findings (MPD tasks, deferred defects)
- Delays, diversions, cancellations
- Weather, NOTAMs, runway conditions
- Audit and SMS findings
- Others…

Key point: Sh!t in equals, confident sh!t out!

Main building blocks of an AI agent

Knowledge & Models (Reasoning)

This is where “intelligence” or the algorithm starts with his magic:

Note: Used together, not separately

- Taxonomies (ADREP, HFACS)
- Risk models (Bow-Tie, ARMS)
- Statistical learning (patterns, trends, drift)
- Rules (regulatory thresholds, company policy)

Example

- Bow-Tie defines the structure
- AI detects barrier degradation trends over time

AI does not invent causality.
It surfaces weak signals humans miss.

Inference & Pattern Detection

Here the agent answers questions humans cannot at scale.

Examples

- Which precursor combinations precede runway excursions?
- Which maintenance deferrals correlate with in-flight turnbacks?
- Where does risk migrate when operations are under pressure?
- This is probabilistic, not deterministic.

No “yes or no”.
Only risk trajectories.

Main building blocks of an AI agent

Decision Support Output (Action layer)

The agent never decides alone.

Typical outputs

- Dynamic risk indicators
- Early-warning alerts
- Degraded barrier flags
- Scenario simulations (“if traffic +15% then…”)

Example

- “This route-aircraft-crew combination shows a rising unstable approach probability under tailwind conditions.”

Human decides. AI informs.

Feedback & Learning Loop

Without this, there is no agent.

Feedback sources

- Investigation outcomes
- Mitigation effectiveness
- Operational changes
- False positives / false negatives

This is where models **degrade or improve**

No learning loop = static tool

Main building blocks of an AI agent

Governance & Responsibility

(non-negotiable)

Mandatory elements

- Named accountable owner
- Human override at all times
- Traceability of recommendations
- Auditability for authorities
- Explicit limits of use

AI scales responsibility. It does not dilute it.

FMEA

Failure Mode and Effects Analysis

PRO

- Structured and easy to understand
- Excellent for component-level and subsystem analysis
- Supports prioritisation via severity, occurrence, detection
- Widely accepted by regulators and engineers

CONS

- eak on human and organisational factors
- Linear thinking, poor at capturing interactions
- Becomes bureaucratic if over-detailed

APPLICABILITY

- Aircraft systems
- Rolling stock components
- Maintenance tasks
- Design and modification phases

BEST USE WHEN/FOR

You analyse what can fail at component or task level.

FMEA

Failure Mode and Effects Analysis

Design Lead _____

Core Team _____

Potential
Failure Mode and Effects Analysis
(Machine FMEA)

FMEA Number _____

FMEA Date _____

Page _____ of _____

Equipment Information												Actions		Action Results					
System	Assembly	Component	Function	Potential Failure Mode(s)	Potential Effect(s) of Failure	Sev	Potential Cause(s)/ Mechanism(s) of Failure	Occur	CRT	Current Design Controls	Det	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	New Sev	New Occ	New Det	New CRT	New RPN

Write down each failure mode and effects of the failure

Severity – On a scale of 1-10, rate the Severity of each failure (10 = most severe). See Severity table

Occurrence – Write down the potential causes, and on a scale of 1-10, rate the Occurrence of each failure (10 = most likely). See Occurrence table

Detection – Examine the current design, then, on a scale of 1-10, rate the Detectability of each failure (10 = least detectable). See Detection table

Risk Priority Number – The combined weighting of Severity, Occurrence, and Detection. **RPN** = Sev x Occur x Det

Response Plans and Tracking

Bow-Tie Model & Analysis

▶•◀

PRO

- Excellent visual clarity
- Strong barrier thinking (preventive and mitigative)
- Bridges engineering, operations, and management
- Works well with assurance and audits

CONS

- Depends heavily on correct hazard definition
- Can give false confidence if barriers are weak or symbolic
- Needs discipline to stay alive

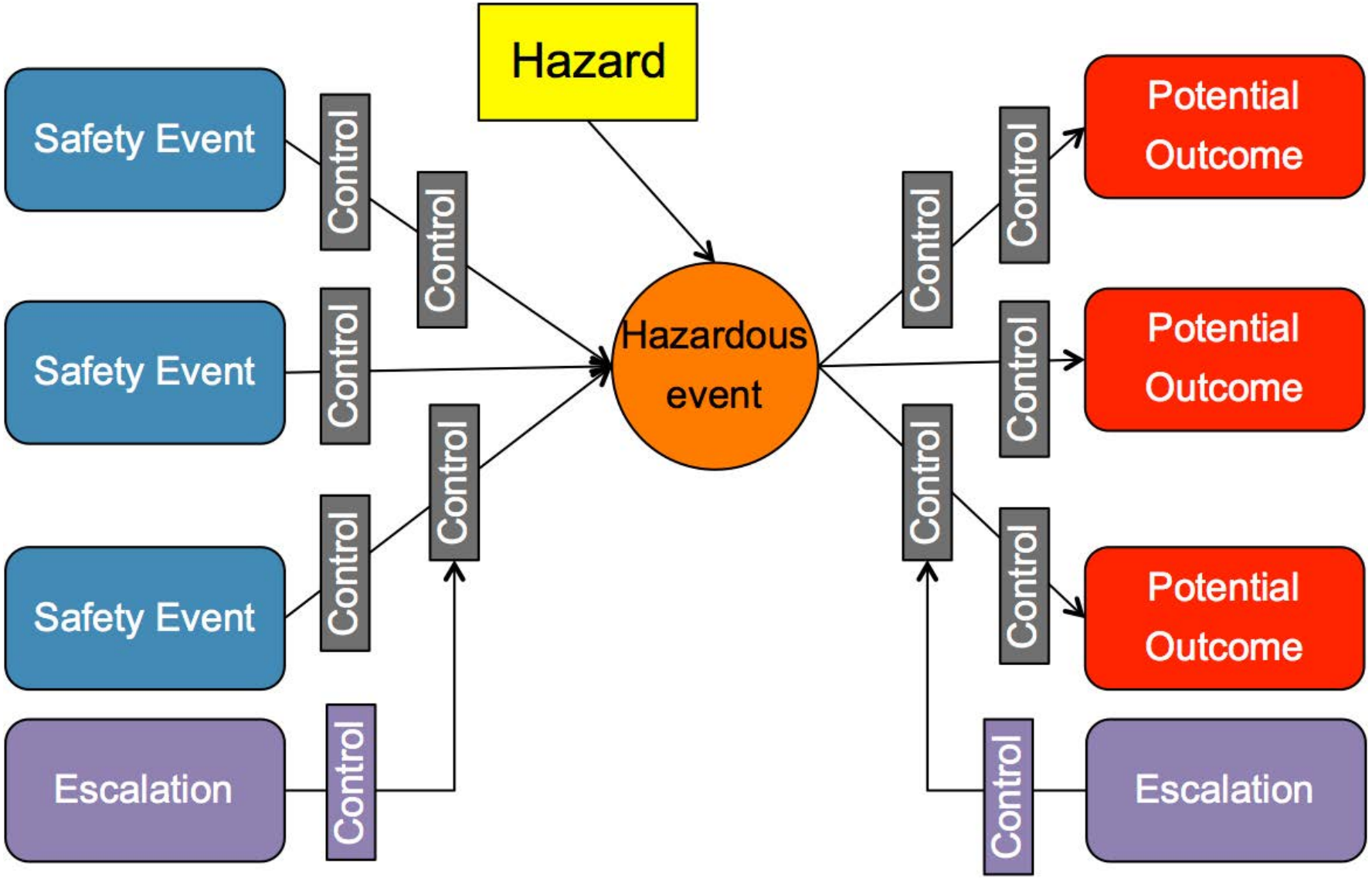
APPLICABILITY

- Operational risks
- Maintenance hazards
- Infrastructure and asset management
- AI-supported systems (with barrier monitoring)

BEST USE WHEN/FOR

You want to manage risk ownership and control effectiveness.

Bow-Tie Model & Analysis



Reason’s Model

Swiss Cheese Model

PRO

- Excellent conceptual model
- Strong organisational and cultural insight
- Easy to explain to leadership

CONS

- Not an analysis tool by itself
- No quantification
- Overused and oversimplified

APPLICABILITY

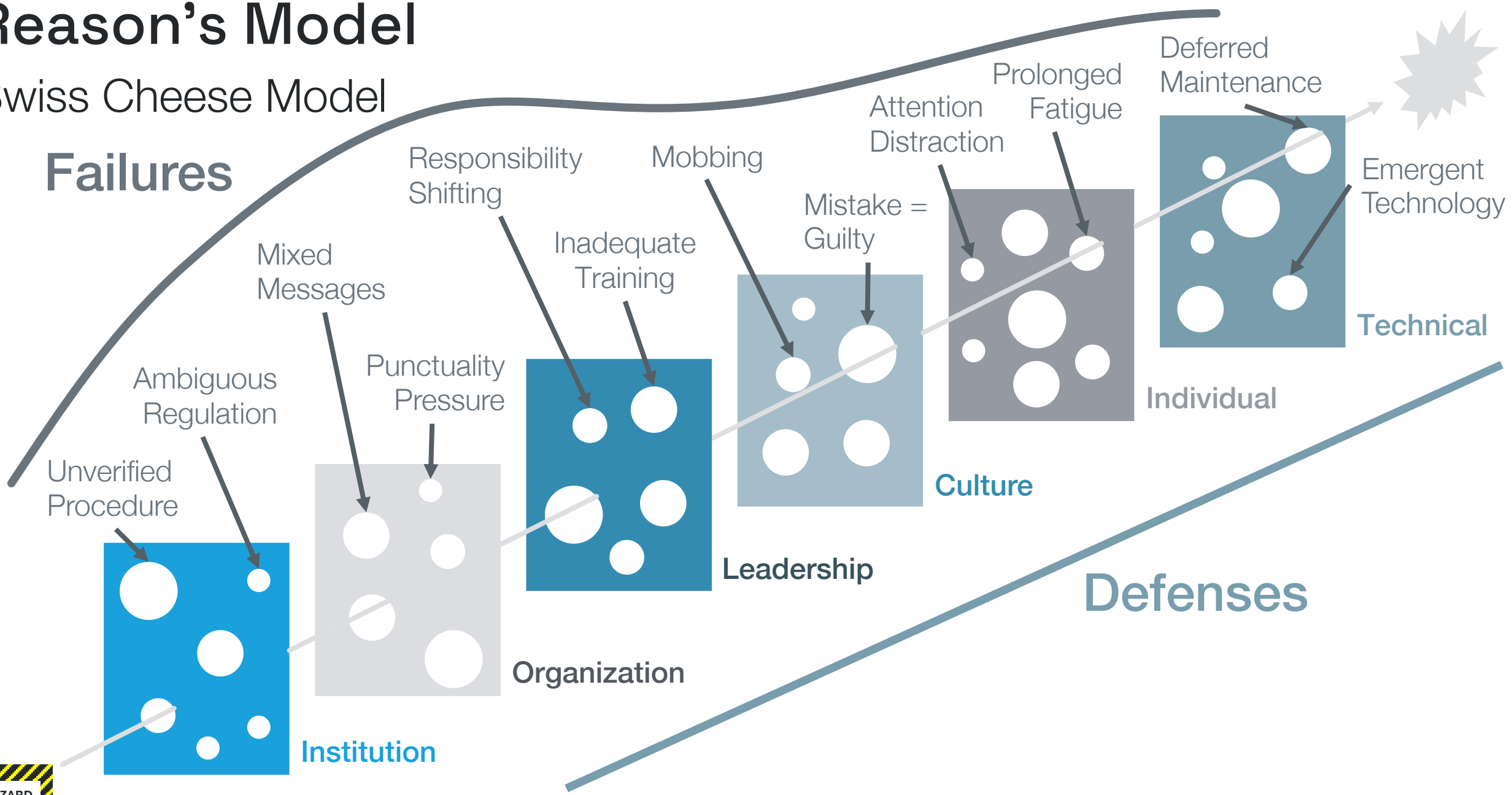
- Safety culture
- Accident analysis
- Management and governance discussions

BEST USE WHEN/FOR

You explain why accidents emerge organisationally.

Reason's Model

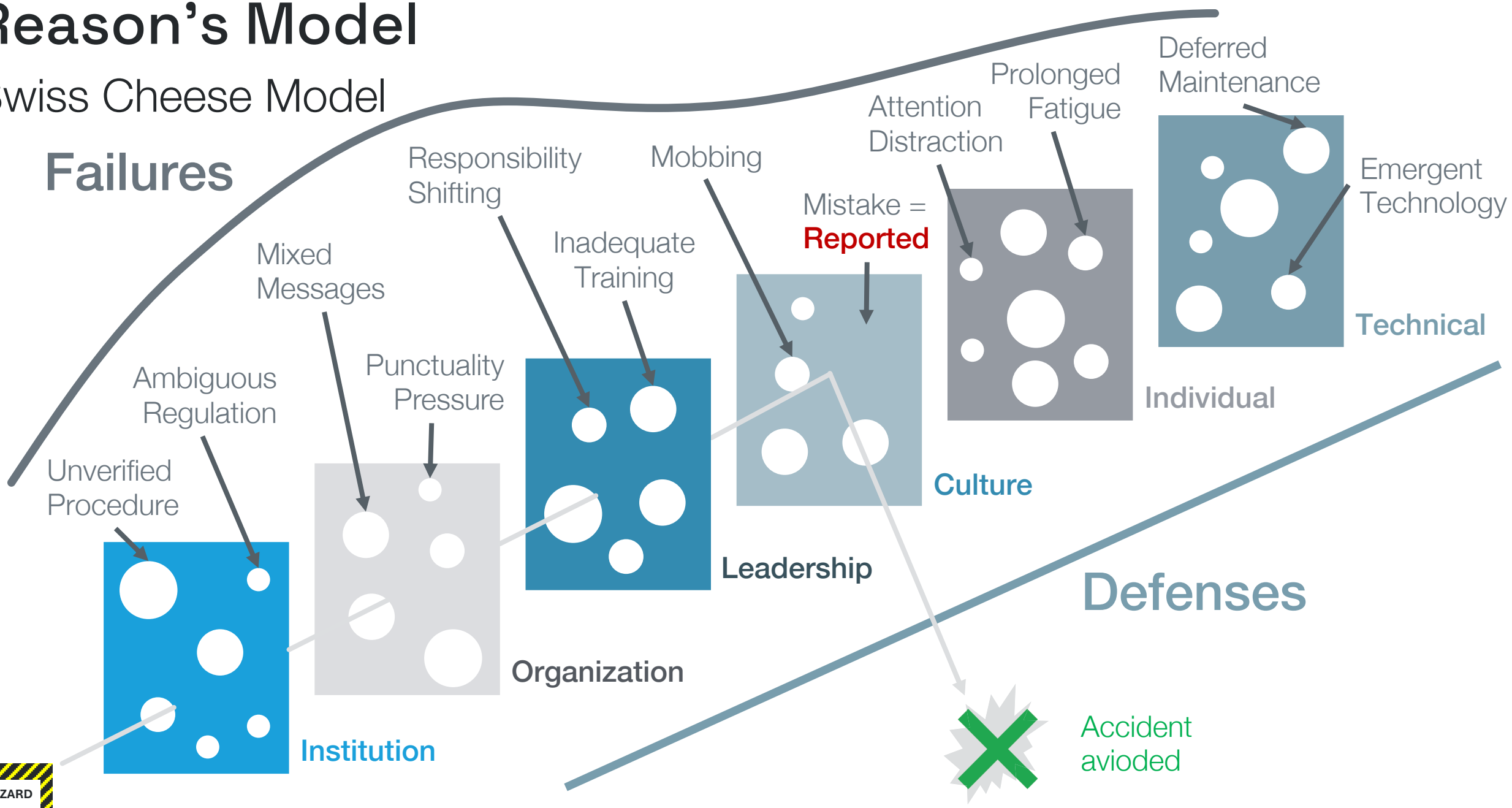
Swiss Cheese Model



HAZARD

Reason's Model

Swiss Cheese Model



ARMS

Aviation Risk Management Solutions

PRO

- Structured severity and likelihood assessment
- Industry-aligned aviation taxonomy
- Supports decision consistency
- Scalable for SMS environments

CONS

- Aviation-centric
- Requires training and discipline
- Risk of “matrix worship”

APPLICABILITY

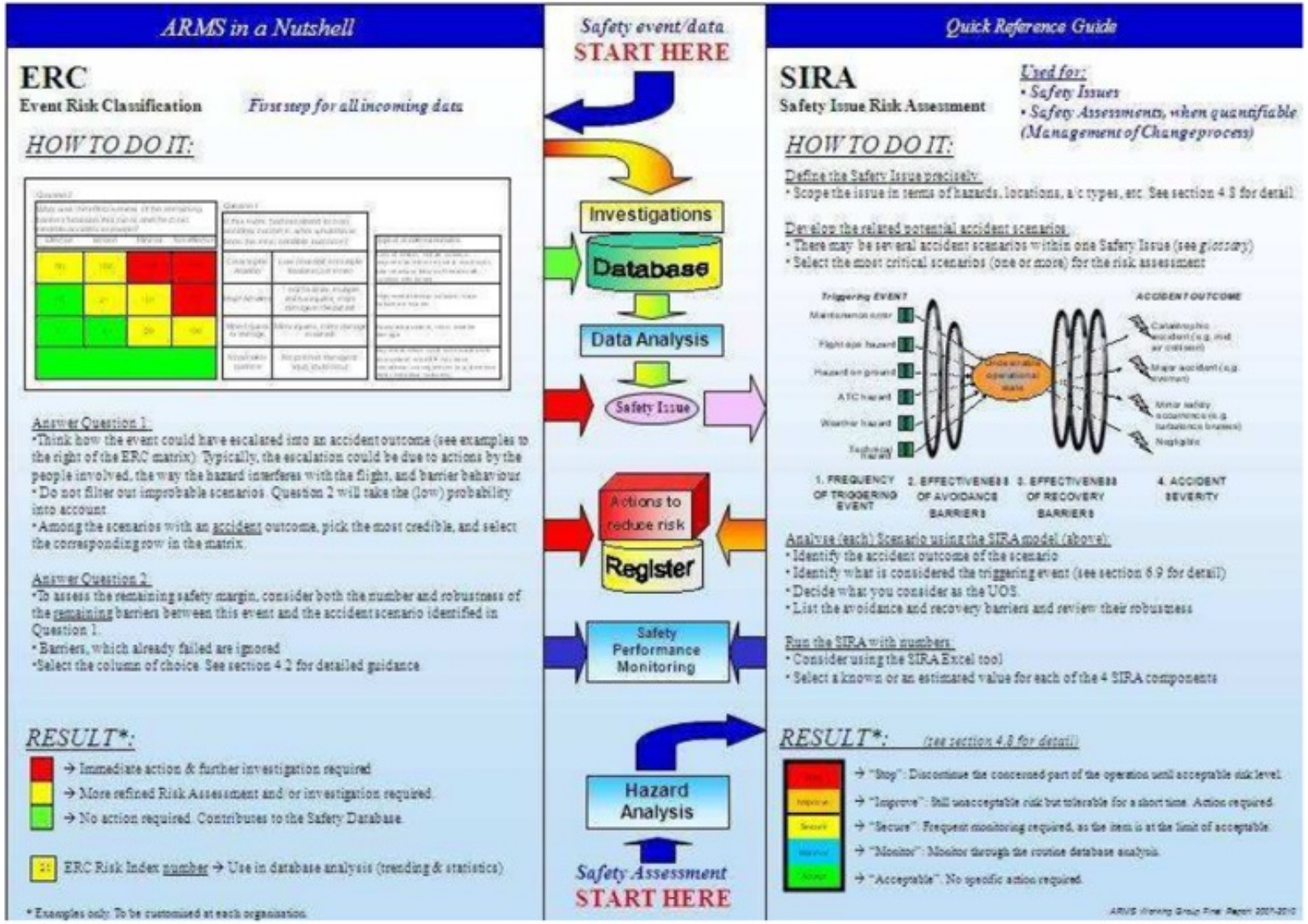
- Flight operations
- Maintenance organisations
- Airports
- Safety reporting analysis

BEST USE WHEN/FOR

You need consistent operational risk decisions.

ARMS

Aviation Risk Management Solutions



FTA

Fault Tree Analysis

PRO

- Logical and rigorous
- Excellent for catastrophic events
- Supports quantitative analysis
- Strong certification pedigree

CONS

- Time-consuming
- Poor with human variability
- Not intuitive for non-engineers

APPLICABILITY

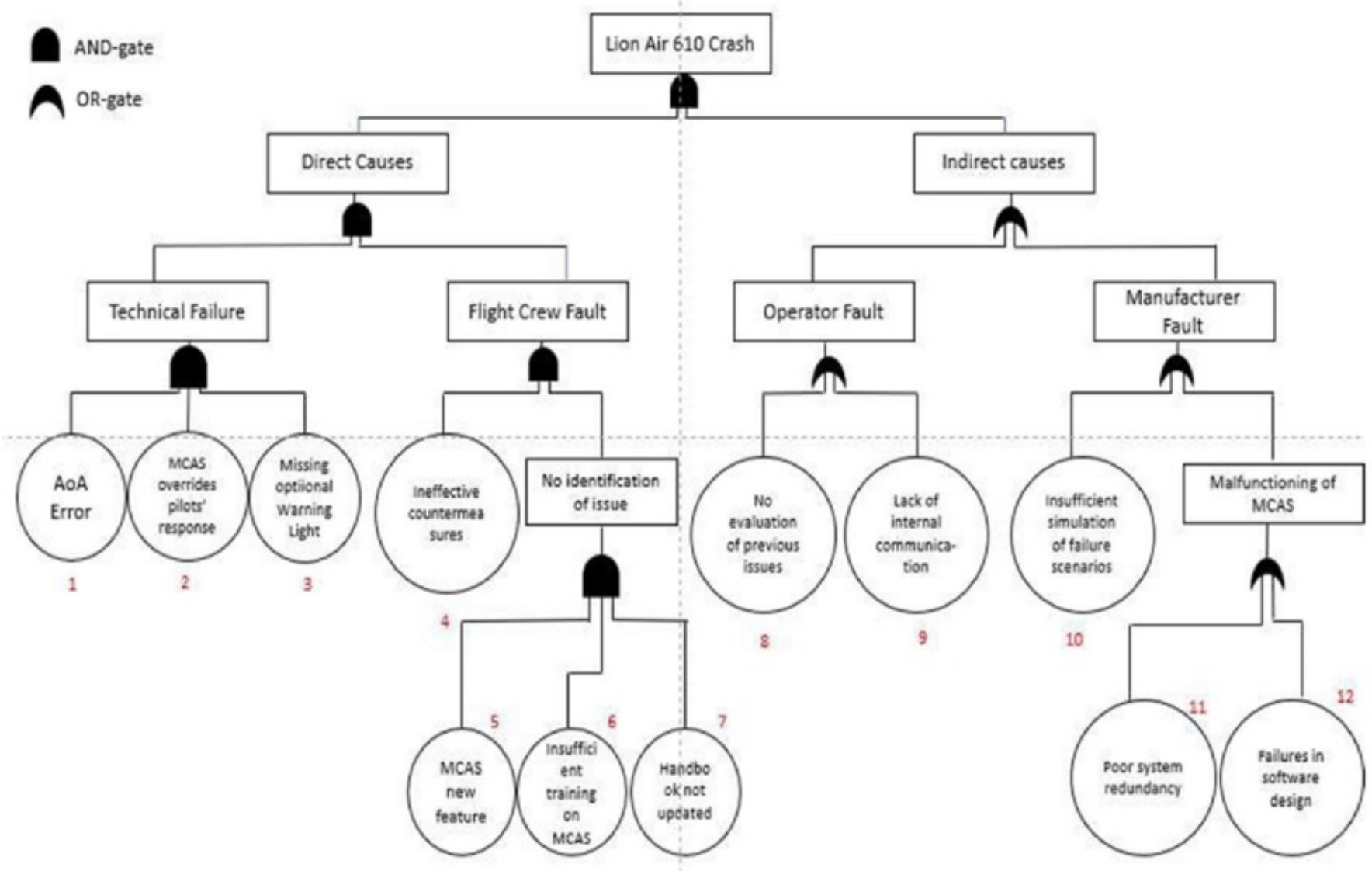
- Aircraft systems
- Signalling systems
- Control and protection systems

BEST USE WHEN/FOR

You analyse how a top event can occur.

FTA

Fault Tree Analysis



HFACS

Human Factors Analysis and Classification System

PRO

- Deep human and organisational insight
- Standardised taxonomy
- Strong accident investigation support

CONS

- Retrospective by nature
- Requires trained analysts
- Not a frontline risk tool

APPLICABILITY

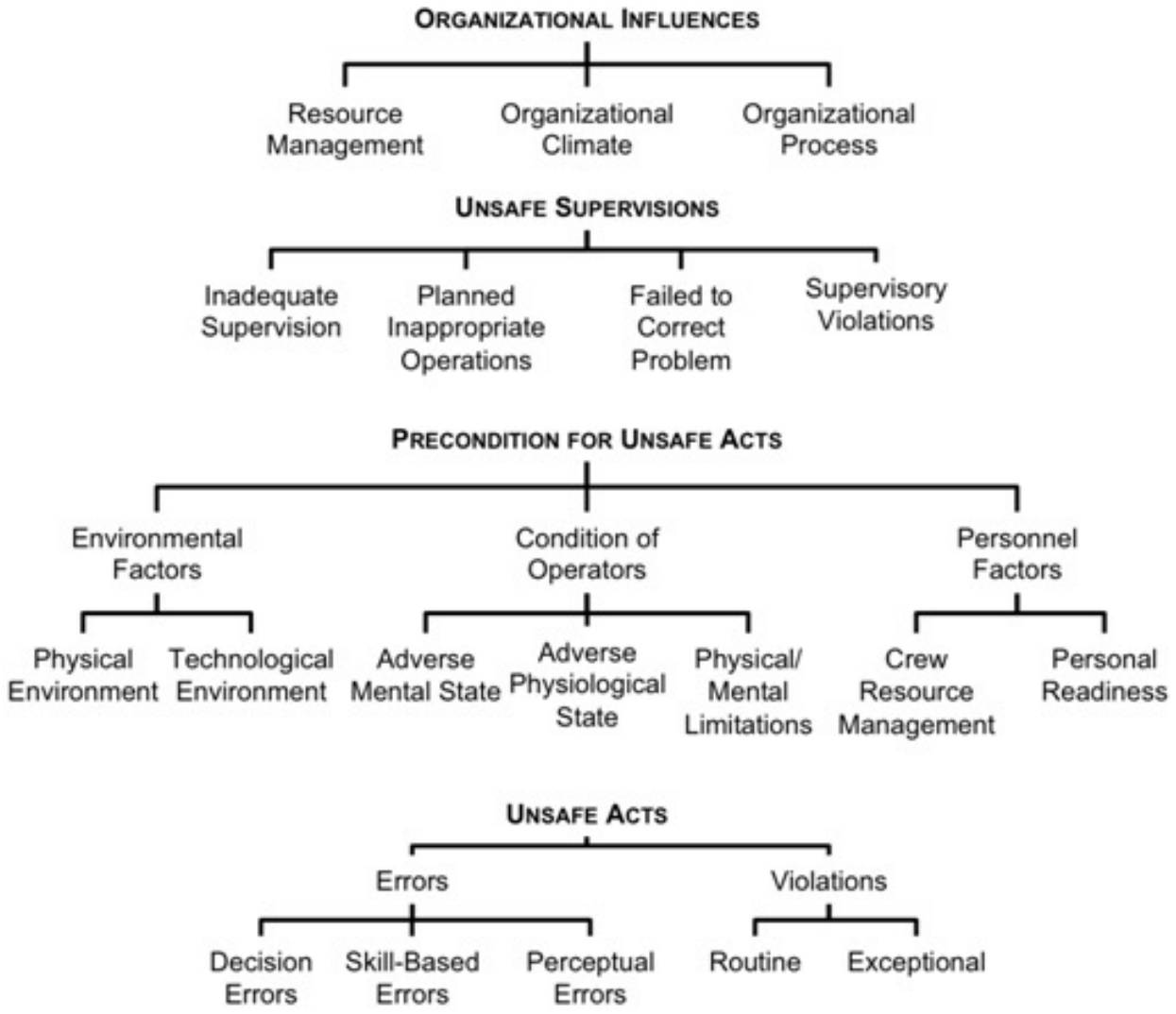
- Accident and incident analysis
- Safety trend analysis
- Training needs assessment

BEST USE WHEN/FOR

You analyse why humans and organisations failed.

HFACS

Human Factors Analysis and Classification System



HAZID

Hazard Identification

PRO

- Fast and collaborative
- Excellent early-phase tool
- Strong cross-functional alignment

CONS

- Qualitative
- Depends on participant competence
- No inherent risk ranking

APPLICABILITY

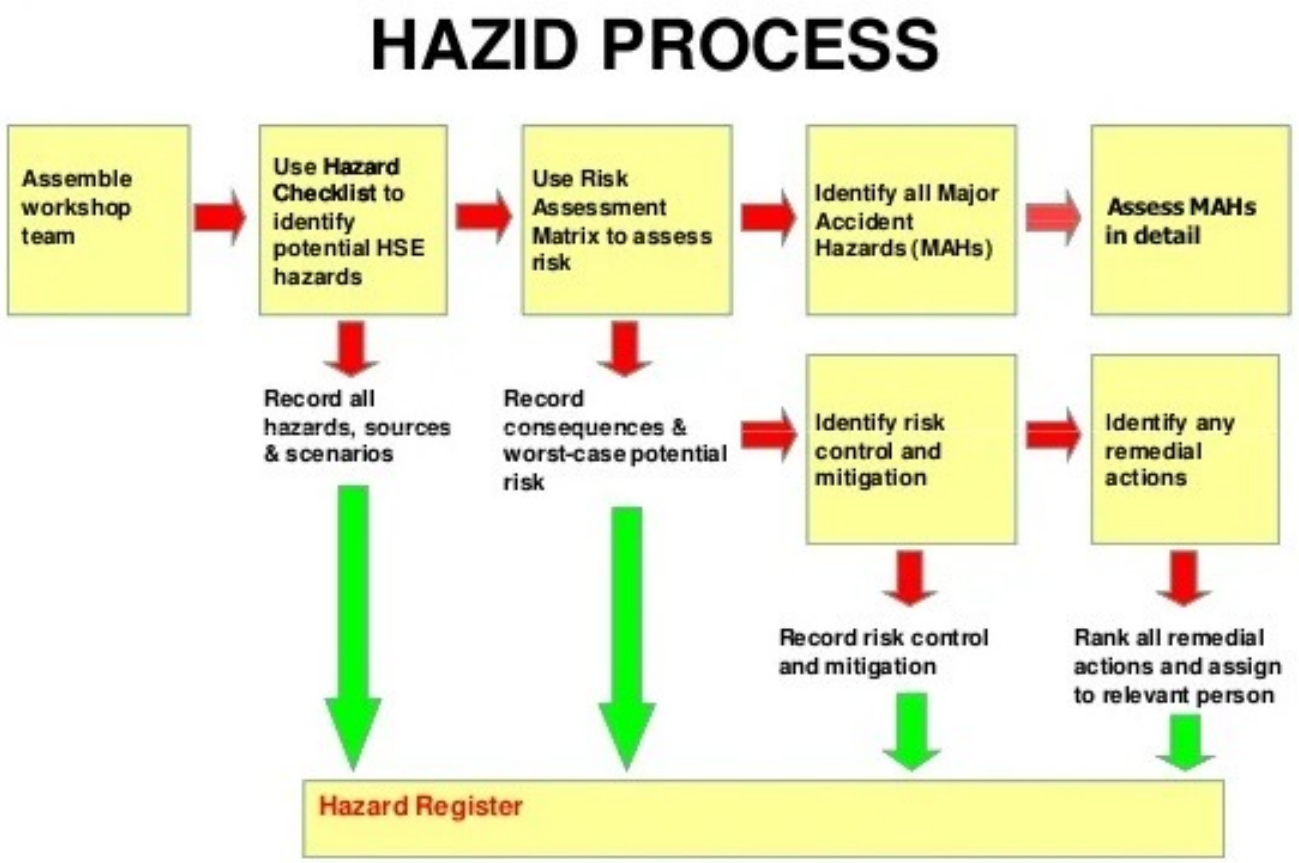
- New systems
- Infrastructure projects
- Procedure changes

BEST USE WHEN/FOR

You want to identify hazards early.

HAZID

Hazard Identification



Guideword	Considerations				
Hazardous Substances	Flammability	Toxicity	Reactivity	Corrosivity	Contamination
Process Upsets	Flow	Temperature	Pressure	Chemistry	Composition
Environment	Air	Water	Spillage	Waste	
Equipment Malfunction	Vessels	Ancillary Equipment	Valves	Control Instrumentation	Safety Devices
Integrity Failures	Process Caused	Material Caused	Structural		
Utility Failures	Air	Steam	Nitrogen	Vacuum	Ventilation
Human Factors	Task Error	Information Issues	Timing Issues	Wrong Action	Poor HMI
Sampling / Analysis	Missed Sample	No / Incorrect Test Result	Sampling Hazard	Inaccurate Test	
External Effects	Crane ops	Vehicles	Offsite Accidents	Sabotage	Fire
Natural Hazards	Wind	Flood	Heat	Cold	Earthquake
Emergency Ops	Fire	Explosion	Toxic Release	Environmental Release	Offsite

HAZOP

Hazard and Operability Study

PRO

- Very systematic
- Excellent for complex systems
- Reduces blind spots

CONS

- Heavy and slow
- Requires expert facilitation
- Not operationally friendly

APPLICABILITY

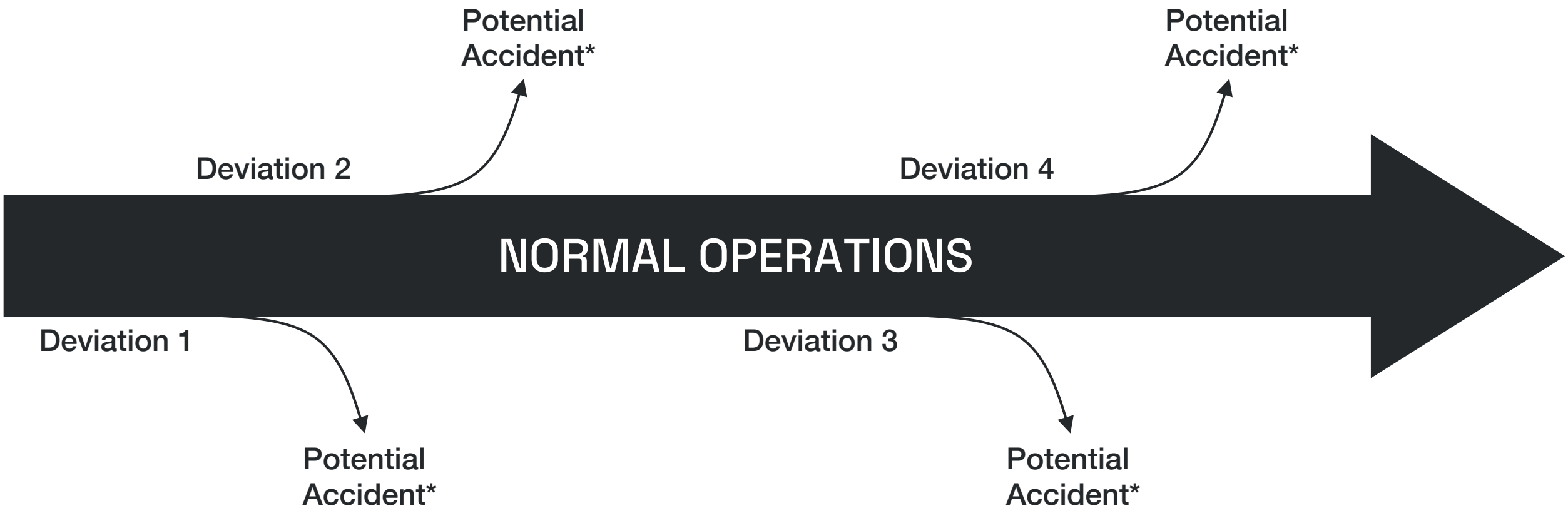
- Control systems
- Signalling
- Energy and process interfaces

BEST USE WHEN/FOR

You analyse design deviations and interactions.

HAZOP

Hazard and Operability Study



Deviation = Guide word + Process Condition

Guide words: no/none, more, less, part of, other than, reverse, …

* If safeguards fails

ETA

Event Tree Analysis

PRO

- Clear consequence modelling
- Good escalation logic
- Complements FTA well

CONS

- Less effective for complex human actions
- Can oversimplify reality

APPLICABILITY

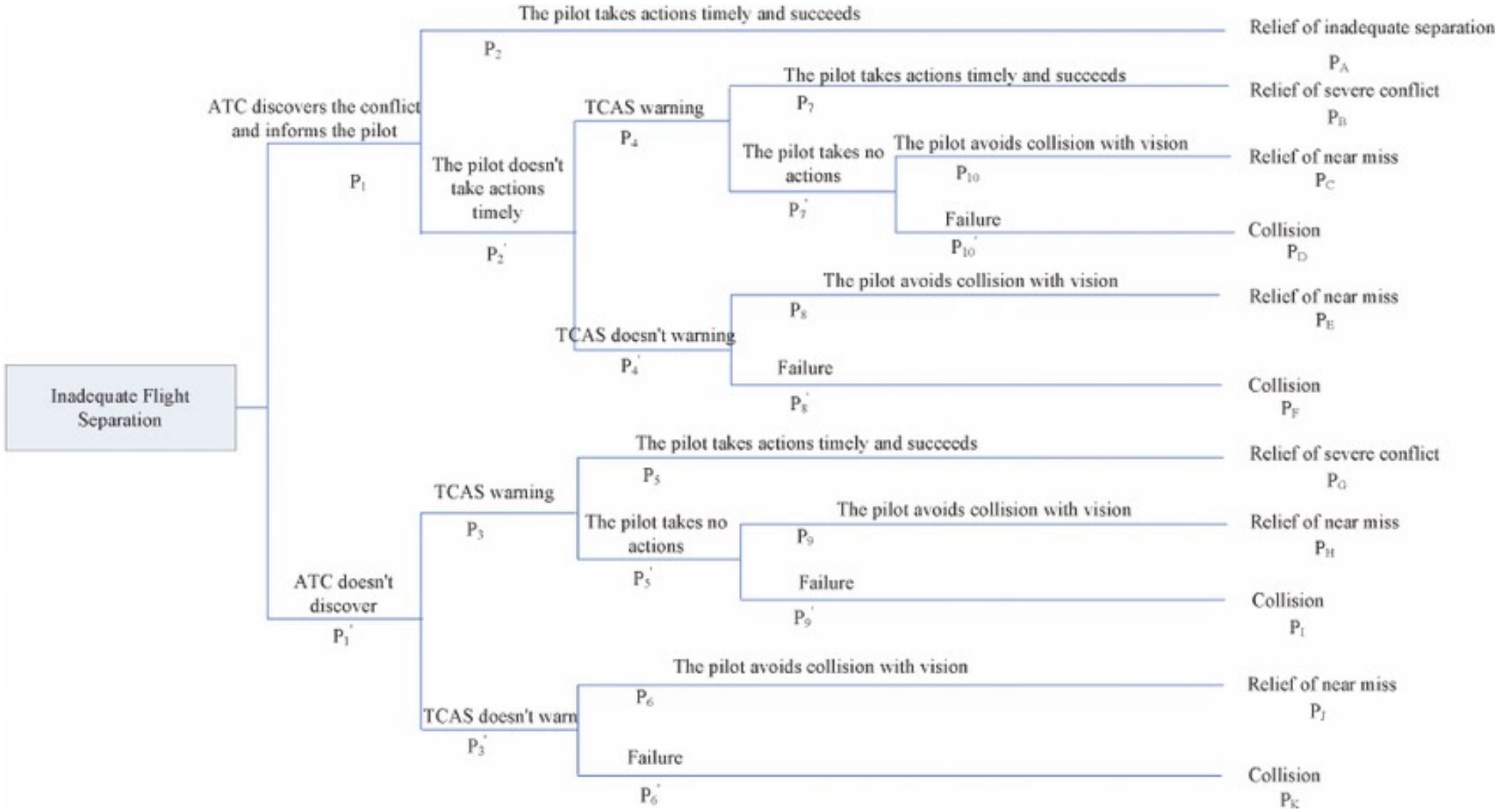
- Emergency response
- Barrier performance
- Accident escalation

BEST USE WHEN/FOR

You analyse what happens after something goes wrong.

ETA

Event Tree Analysis



STPA

System-Theoretic Process Analysis

PRO

- Excellent for automation and software
- Captures unsafe control actions
- Strong systemic perspective

CONS

- Steep learning curve
- Poor acceptance in traditional ops
- Hard to visualise

APPLICABILITY

- Highly automated aircraft
- AI-driven control systems
- Advanced rail systems

BEST USE WHEN/FOR

You analyse control and software-driven risk.

TEM

Threat and Error Management

PRO

- Operationally intuitive
- Human-centred
- Strong training integration

CONS

- Qualitative
- Needs pairing with formal SRM tools

APPLICABILITY

- Flight operations
- Maintenance
- Operations training

BEST USE WHEN/FOR

You manage frontline operational performance.

FRAM

Functional Resonance Analysis Method

PRO

- Captures complexity and variability
- Explains normal operations
- Excellent for learning

CONS

- Hard to explain to management
- No quantification
- Analyst-dependent

APPLICABILITY

- Complex operations
- Accident analysis
- System resilience studies

BEST USE WHEN/FOR

You analyse why systems usually succeed and sometimes fail.

SPI

Safety Performance Indicators

PRO

- Management visibility
- Supports assurance
- Enables trend monitoring

CONS

- Can drive wrong behaviour
- Lagging indicators dominate
- Easy to game
- Must gather all data from other systems, tools or analysis

APPLICABILITY

- SMS monitoring
- Board-level reporting

BEST USE WHEN/FOR

You **monitor safety performance over time.**

Change Risk Assessment

MOC-Based, pairable with What-If? Analysis.

PRO

- Mandatory under SMS
- Strong governance
- Forces structured thinking

CONS

- Often treated as paperwork
- Quality varies widely

APPLICABILITY

- Organisational changes
- Fleet changes
- Digitalisation projects

BEST USE WHEN/FOR

You manage risk introduced by change.

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