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Risk management policy based on the defence-in-depth concept

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&

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RATP in figures ...

4 interconnected networks

- **Metro : 16 lines, 211 km, 3000 coaches**
- **RER : 2 lines, 115 km, 1000 coaches**
- **Tramway : 2 lines, 20 km, 100 coaches**
- **Bus : 260 lines, 2700 km, 4370 vehicles**

2,6 billions passengers a year

44 000 persons

Multiple functions :

- ✓ **Networks operator**
- ✓ **Contracting authority for systems, subsystems and transport system equipment**
- ✓ **Prime contractor for its systems (global engineering, civil engineering)**
- ✓ **Maintenance of system (characteristics and timelessness)**
- ✓ **Safety guarantor for the organizing authority**
- ✓ **National and international urban transport reference**

Numerous trades

Context (1)

Fundamentals

- There is still accidents
- Everything is not expectable
- Safety is never acquired definitively
- Man will always play a major role

Technical Constraints

- Evolution of systems are faster
- Performance requirements are higher…
- New technologies increases distance between system and actors
- Lifespan of equipment is variable

Human Constraints

- The undergone risk is less and less accepted
- Mentalities and methods of work change
- Behaviors change,

Context (2)

Organization Constraints

- Internal mobility and retirement departures are numerous
- Increasing complexity of the organization decreases the "visibility" of the actions and their effects
- All risks are not treated in an coherent way

Regulation Constraints

- Safety level requirements are higher
- Requirement of proof
- New risks merge

Safety does not have a price but it has a cost

Answer ?

Need for reinforcing our vigilance, for putting under control the most important risks for passengers, company and environment.

Imposes:

- to define and implement a strong risk control policy in the aim of increasing the visibility of risk

Such policy is supported by a risk management system based on Defence in Depth concept

It means:

- the control of all references
- the guarantee of effectiveness of prevention and protection devices (defence in-depth: barriers),
- control of the evolutions of the systems and their adaptation to the environment

Answer ?

Clear representation

- a cartography of the risks
- a formalized reference frame

Processes - Rules

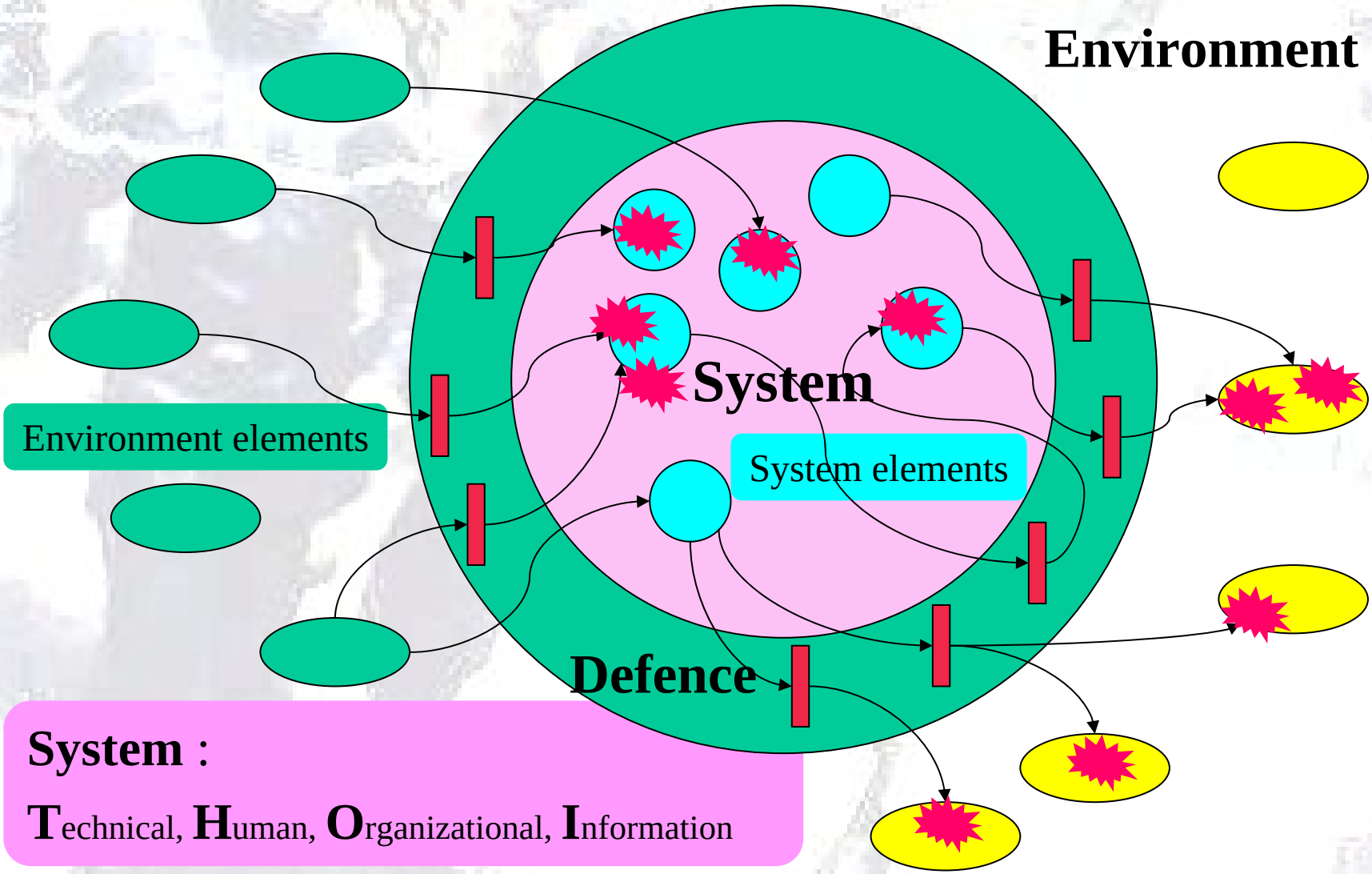
- steering process by objectives and indicators
- formalized and traced processes such as:
  - feedback of experience, incident survey and analysis, evolution control, monitoring and maintenance of barriers
  - Awareness, training, capitalization of knowledge and competences
- rules to be applied

Structure - Responsibility

- clear responsibilities
- a control of risks organization ensuring the coordination and the follow-up of actions sustained by an internal network,

To develop and to maintain a control of the risks culture

The System and Defence-in-Depth



System :

Technical, **H**uman, **O**rganizational, **I**nformation

Type of Barriers & Principle of Actions

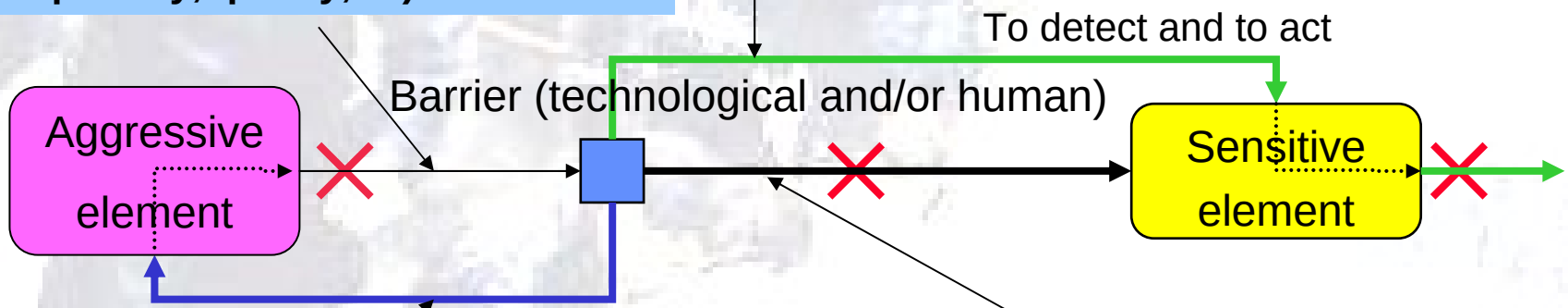
Aggressive flow :

physical, data, order, psychological, …

(appearance, disappearance, level, quantity, quality, …)

(3) Dynamic barrier

To move out of danger or to inhibit the sensitive element …



(2) Dynamic or passive barrier :

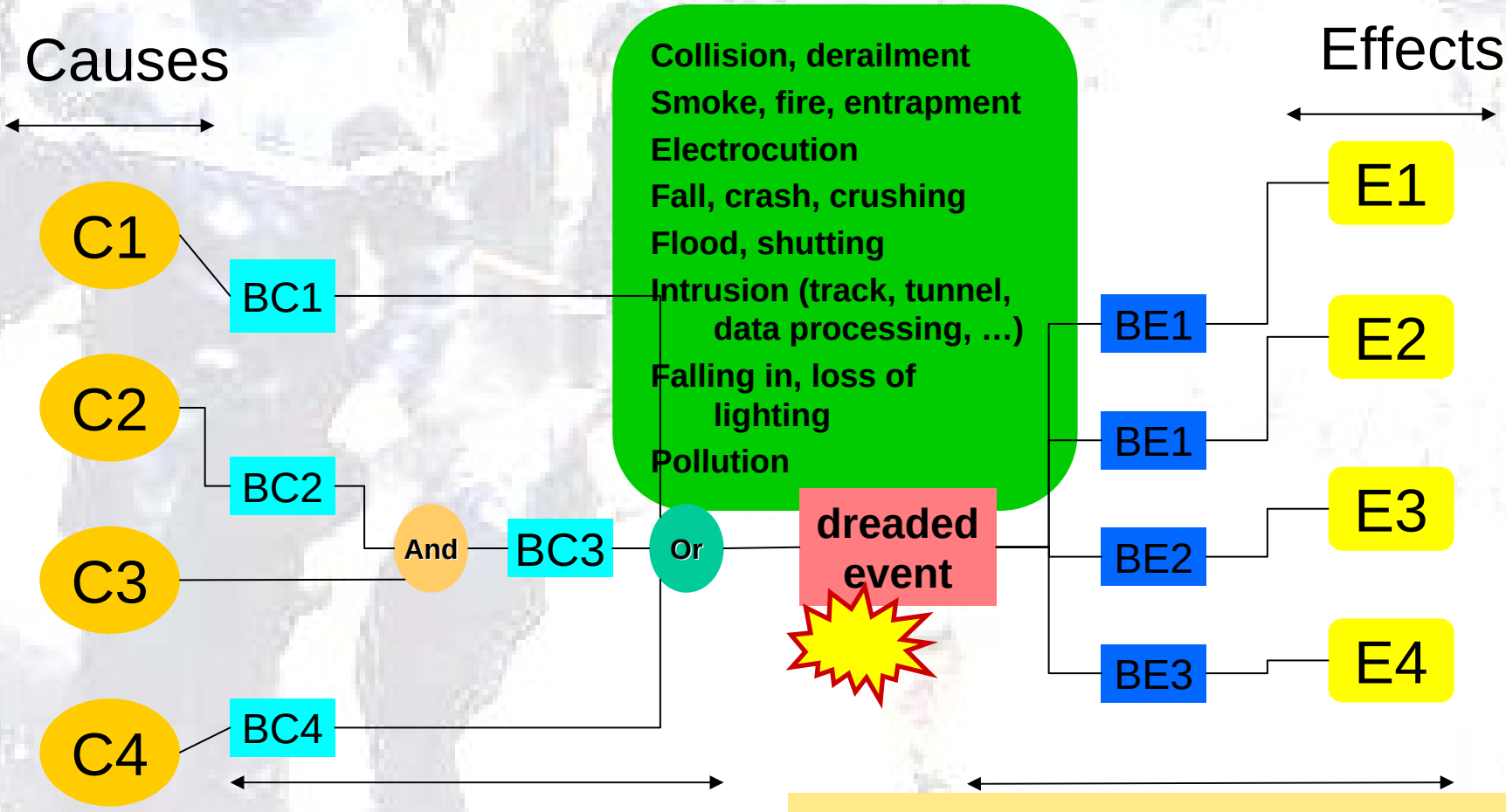
To stop, to devert, to modify, to decrease, to change, to store the flow …

(1) Dynamic barrier

To move or to inhibit the aggressive element …

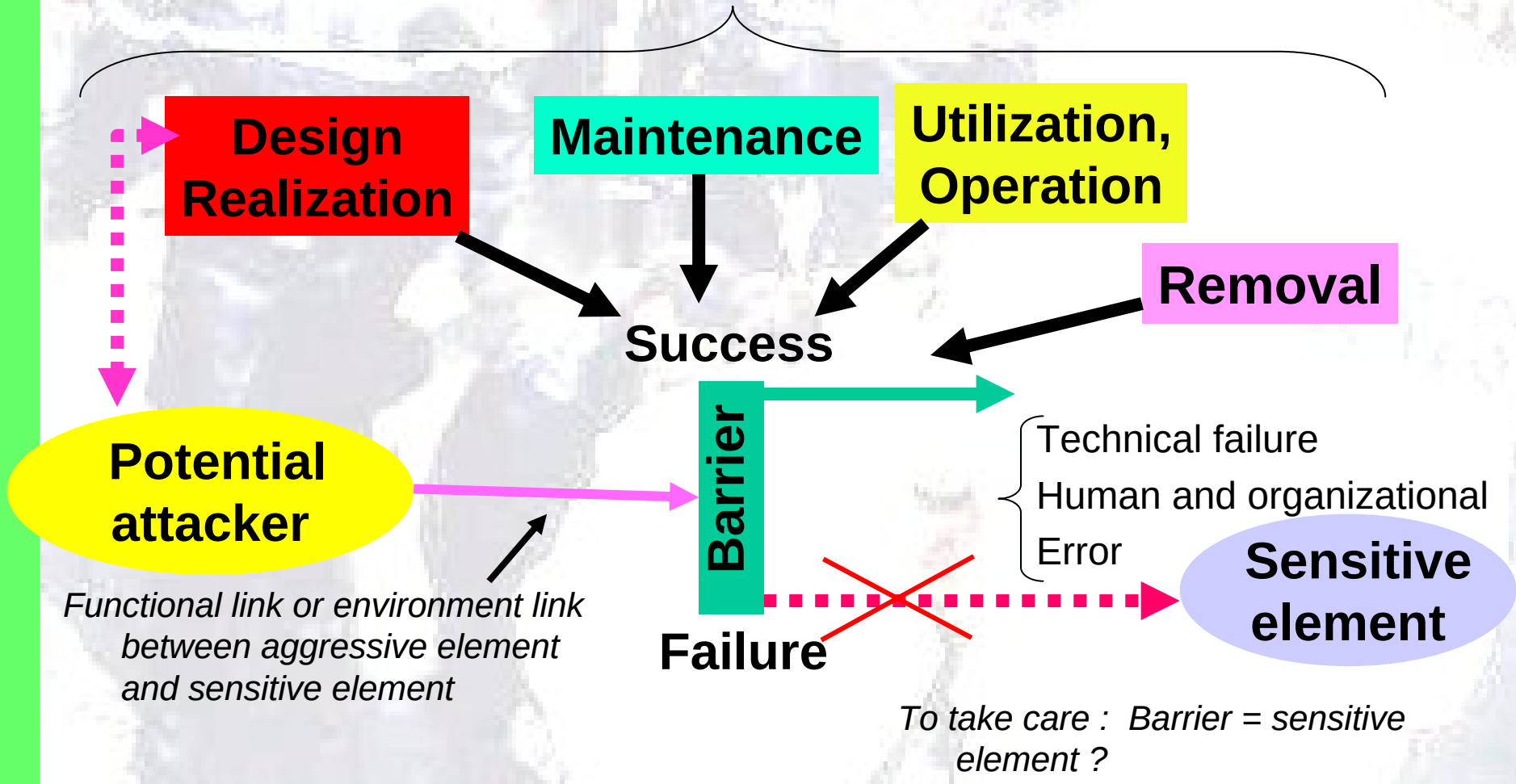
Prevention and Protection Measures

« bow tie » diagram (causes - effects)



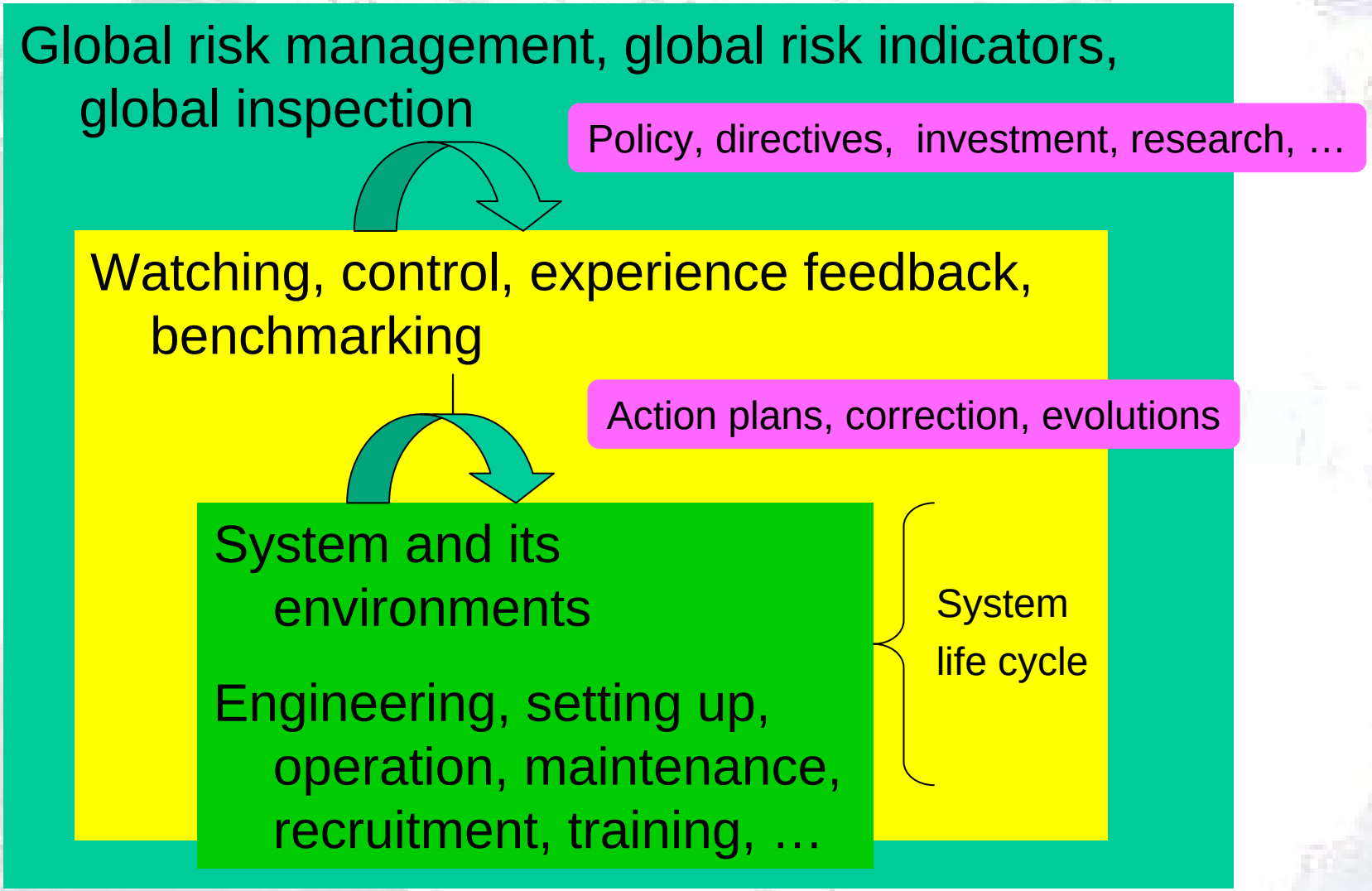
Barriers Requirements

To respect the consistent requirements on the barriers and their life cycles



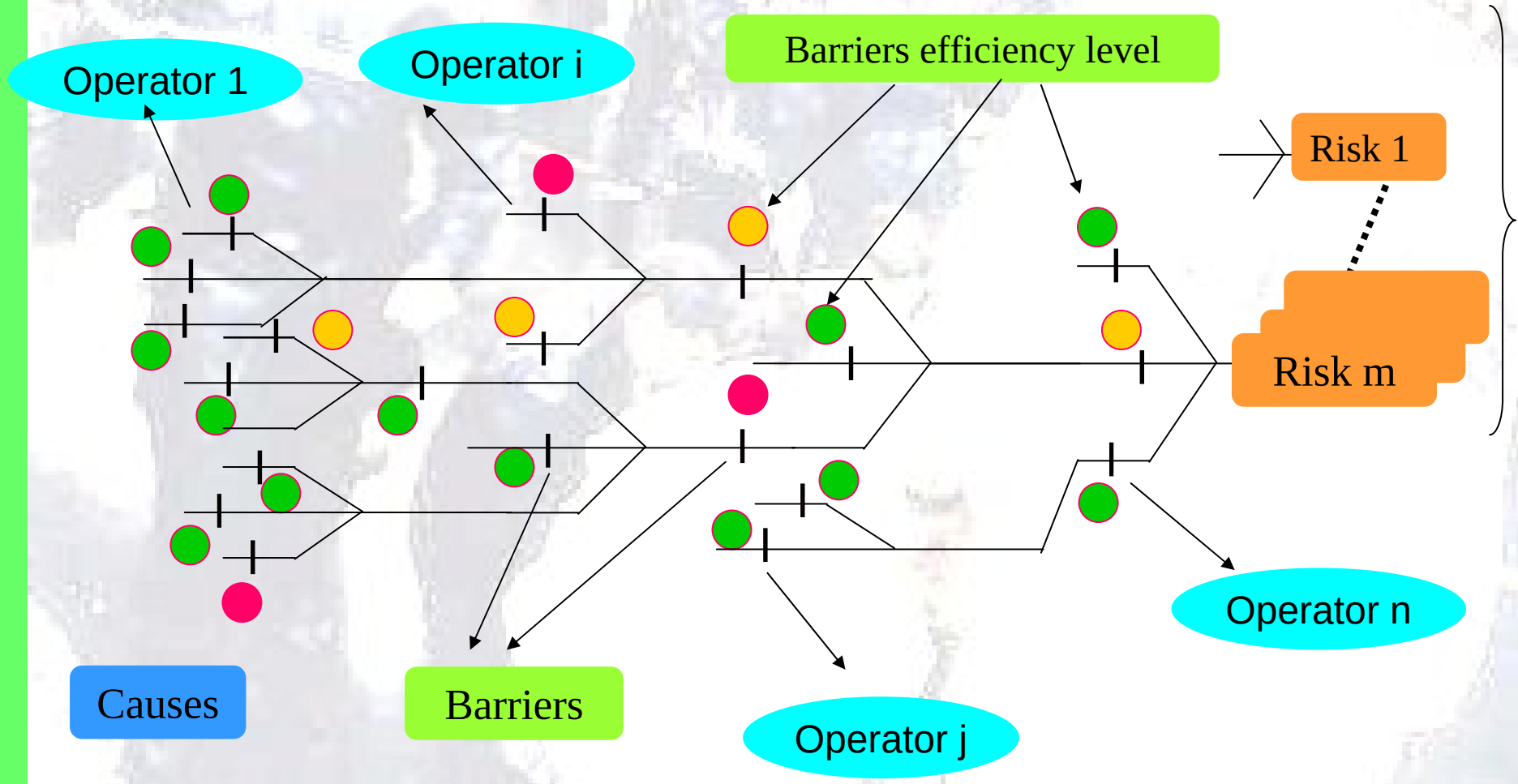
Defence-in-Depth Efficiency

The different Barrier Levels

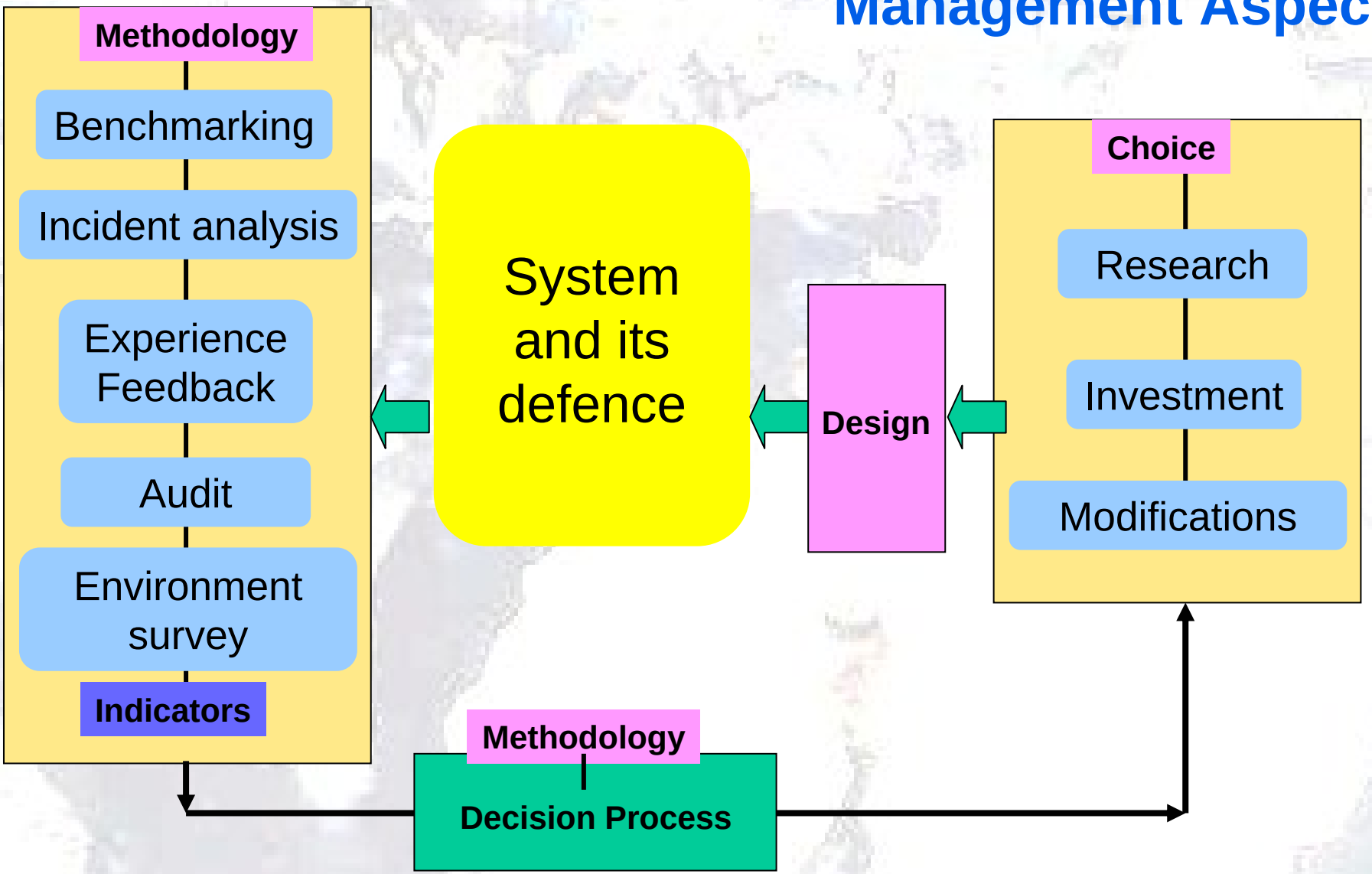


Defence Follow-up, Risks cartography, Property and Responsibility

- What efficiency ? Why ? Where ?



Defence-in-Depth Concept and Risk Management Aspect



Conclusion

- In the current context, a rigorous control of the risks is essential for the transport system companies
- The Defence-in-Depth concept presents a lot of advantages :
  - **Systemic view**
  - **Simplicity of concept and easy appropriation by the actors**
  - **Decision Makers assistance and analysis assistance (incident, evolutions impact)**
  - **Better consistency on the risk treatment (reinforcement if necessary)**
  - **Indicators and precursors follow-up key element for steering**
- Necessary conditions of success :
  - **Strong management commitment**
  - **Specific organization**

But : « we must be always vigilant and preserve a critical and astonishment mind because nothing is obtained definitely »

Thank You for Your Attention