

# "SMS implementation issues related to a Part 145 organisation"

**EASA Workshop  
on  
Safety Management System**

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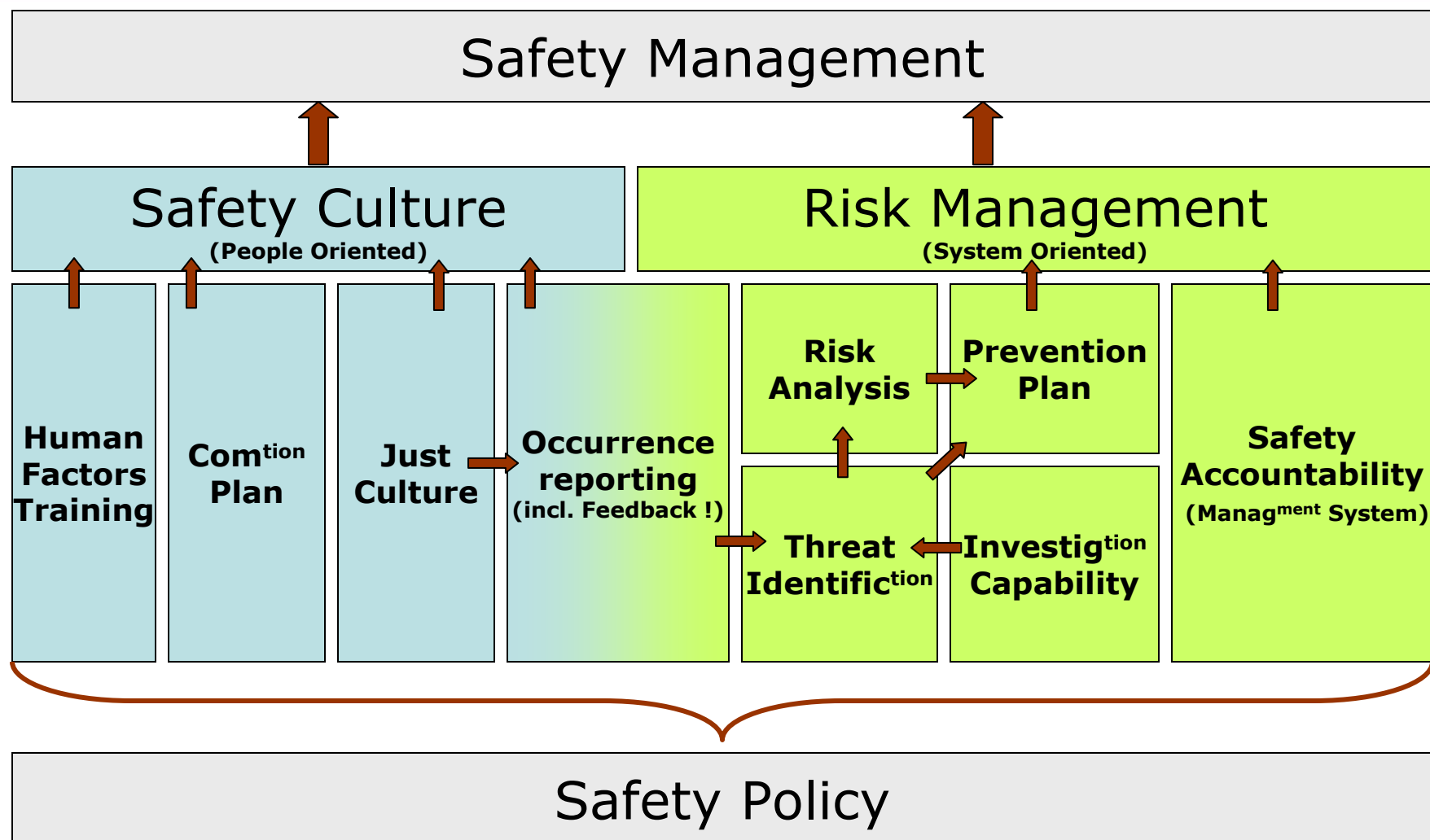
# Air France approach to Maintenance SMS

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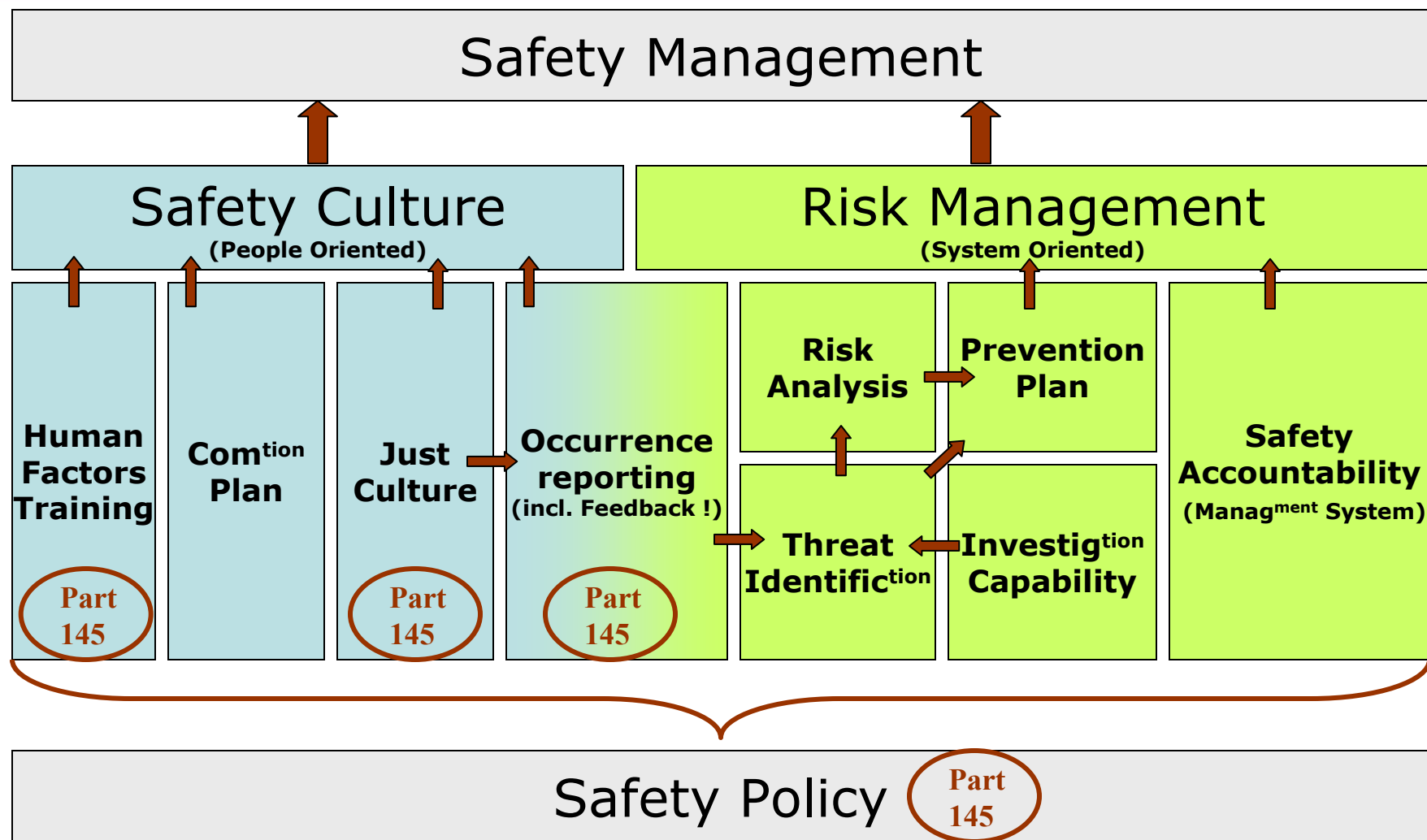
The purpose of this presentation is twofold:

- Sharing with you Air France experience in building a Maintenance SMS as an integral part of an Operator's SMS
- Highlighting potential SMS implementation issues related to flight safety risk management in a maintenance environment.

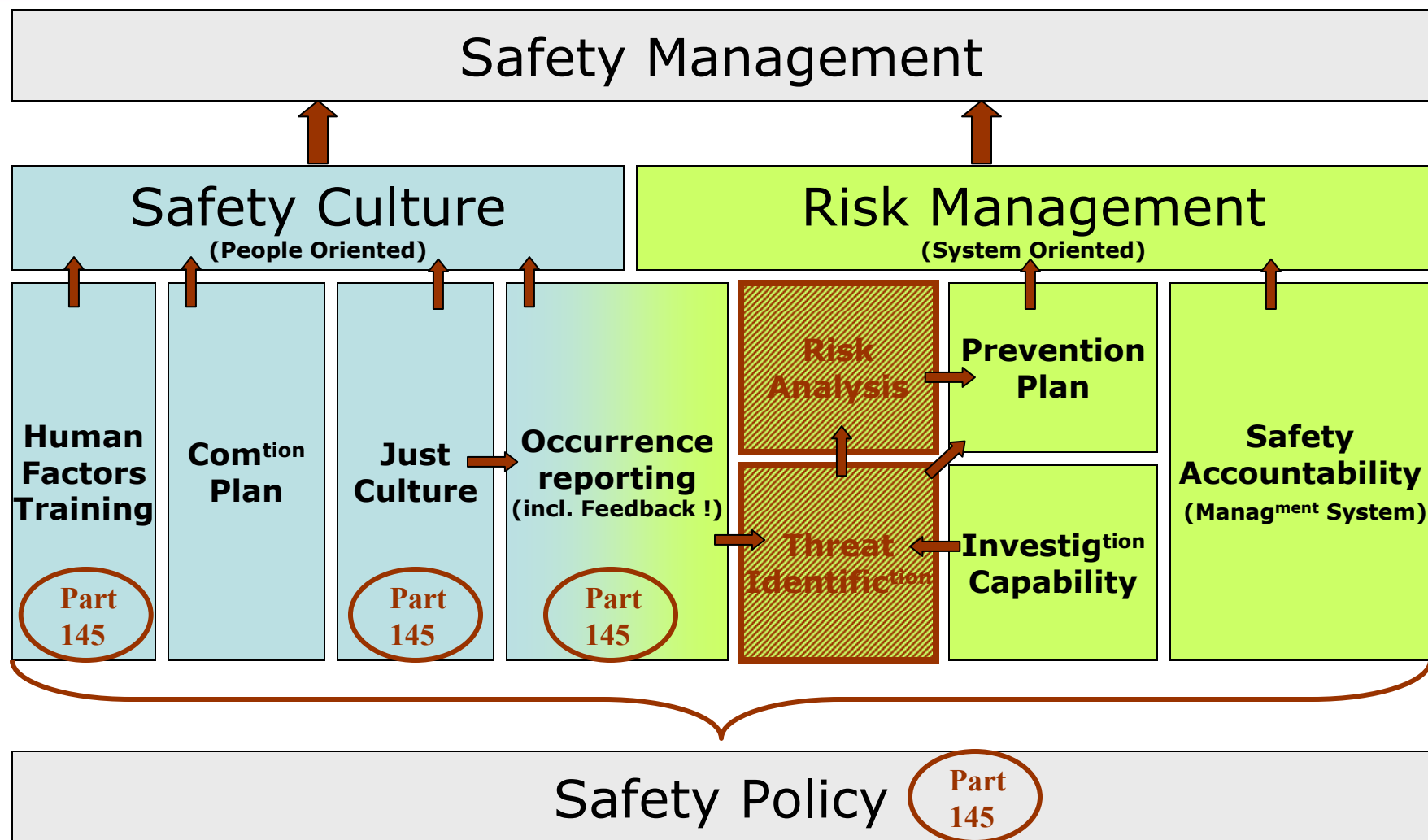
# SMS: two pillars..., and several bricks



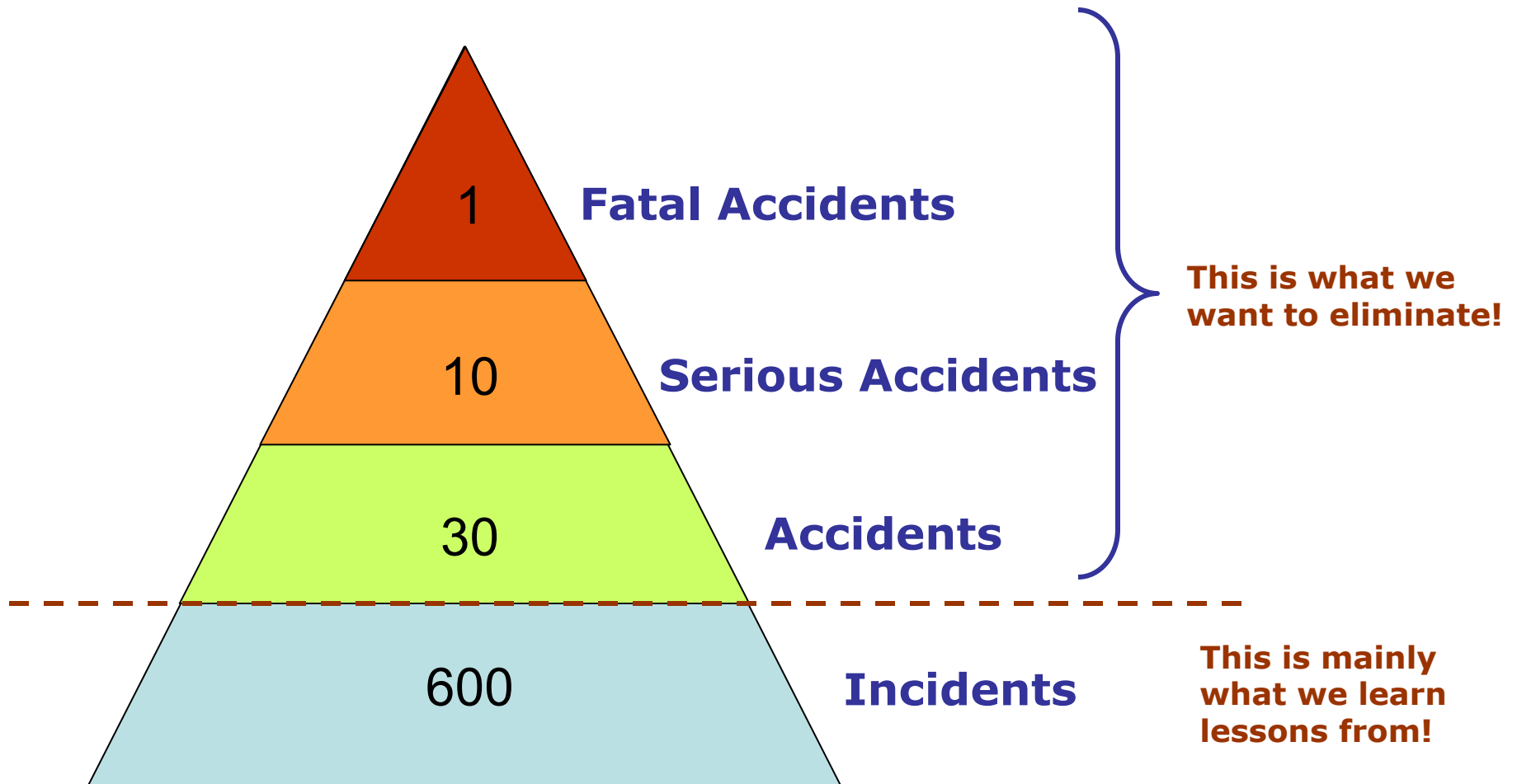
# SMS elements from Part 145 & AMC's : what is the gap?



# The big step towards Safety Management



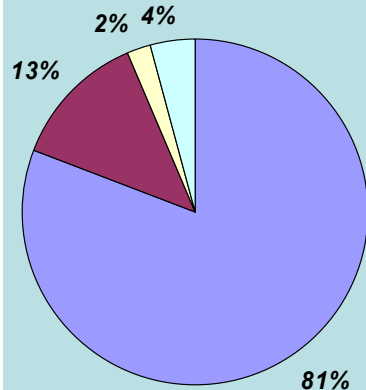
# Accidents vs Incidents: the need for a proactive approach



Source : ICAO SMM Doc 9859

# Accidents vs Incidents : the need for a proactive approach

## Single IFSD → Incident



Source : Air France 2003-2006

Most frequent causes:

- Reliability
- Maintenance Error
- Operational Error
- FOD

## Dual IFSD → Accident

Most probable causes:

**Fuel exhaustion**  
**Dual Maintenance Error**  
**Fuel contamination**  
**Dual F.O.D.**

**Correlated engine failures → Improbable**

**Reliability**

**Uncorrelated engine failures → Extremely improbable**

The probability of a second engine failure decreases considerably if the reasons for shutdown are independent.

**The most frequent cause of a single IFSD is the least probable cause of a dual IFSD!**

→ In order to prevent accidents, we must work on accident scenarios!  
(top-down, proactive approach)

# Air France approach to Threat Identification & Risk Analysis

## Three basic fundamentals:

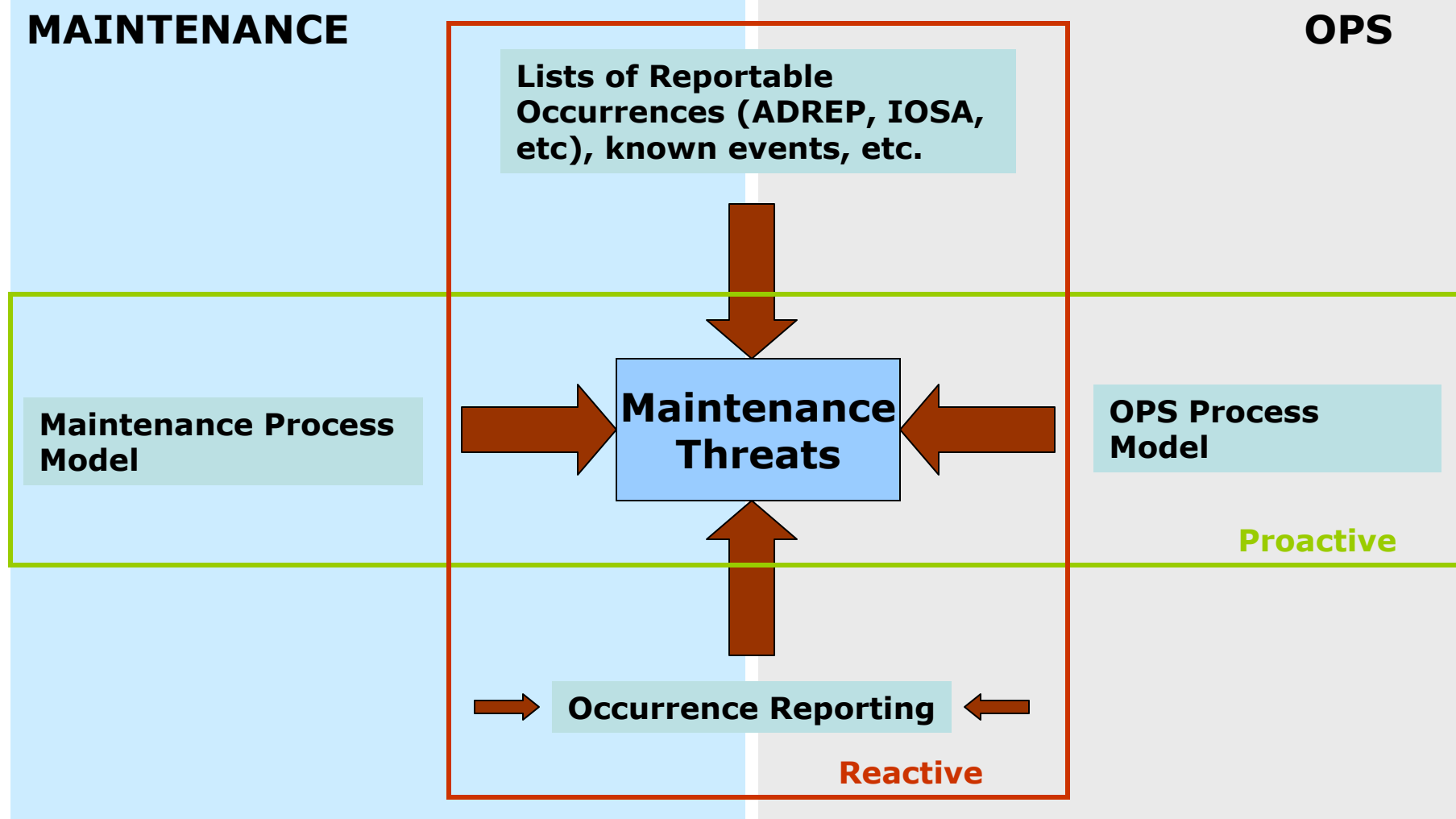
- The purpose of an SMS is to prevent the occurrence of accidents
  - ***The risk exposure to accidents is to a great extent uncorrelated with the occurrence of incidents***
- There is no « Maintenance Accident »
  - ***All accidents are « Operators Accidents »***
- The Maintenance Organisation generates « Threats » to the Operator
  - ***The potential consequence of a « Maintenance threat » can only be assessed in the context of “Air Operations”***



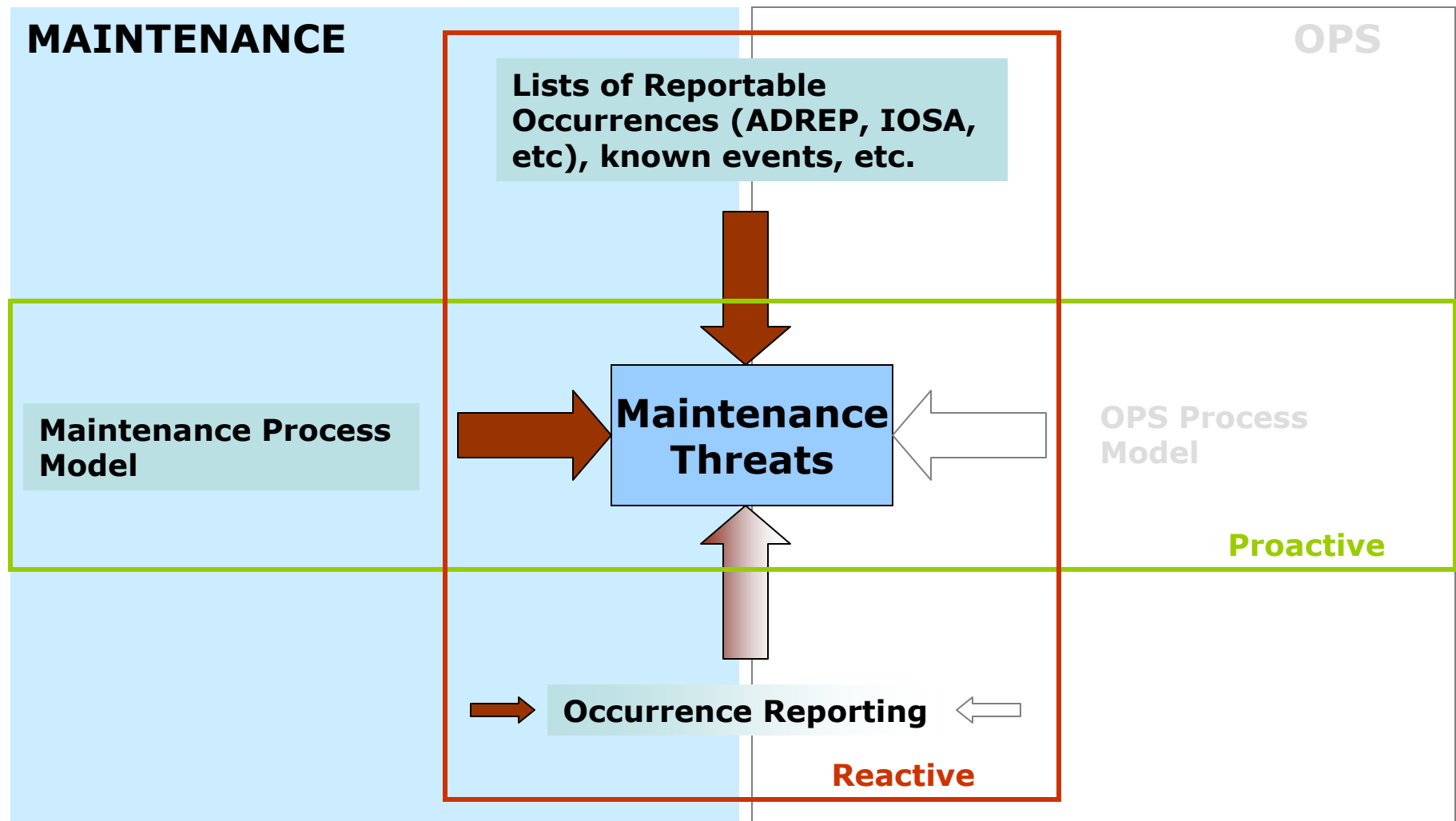
Hence the necessity of a joint OPS/Maintenance approach to Risk Management



# Air France approach to Maintenance Threat Identification

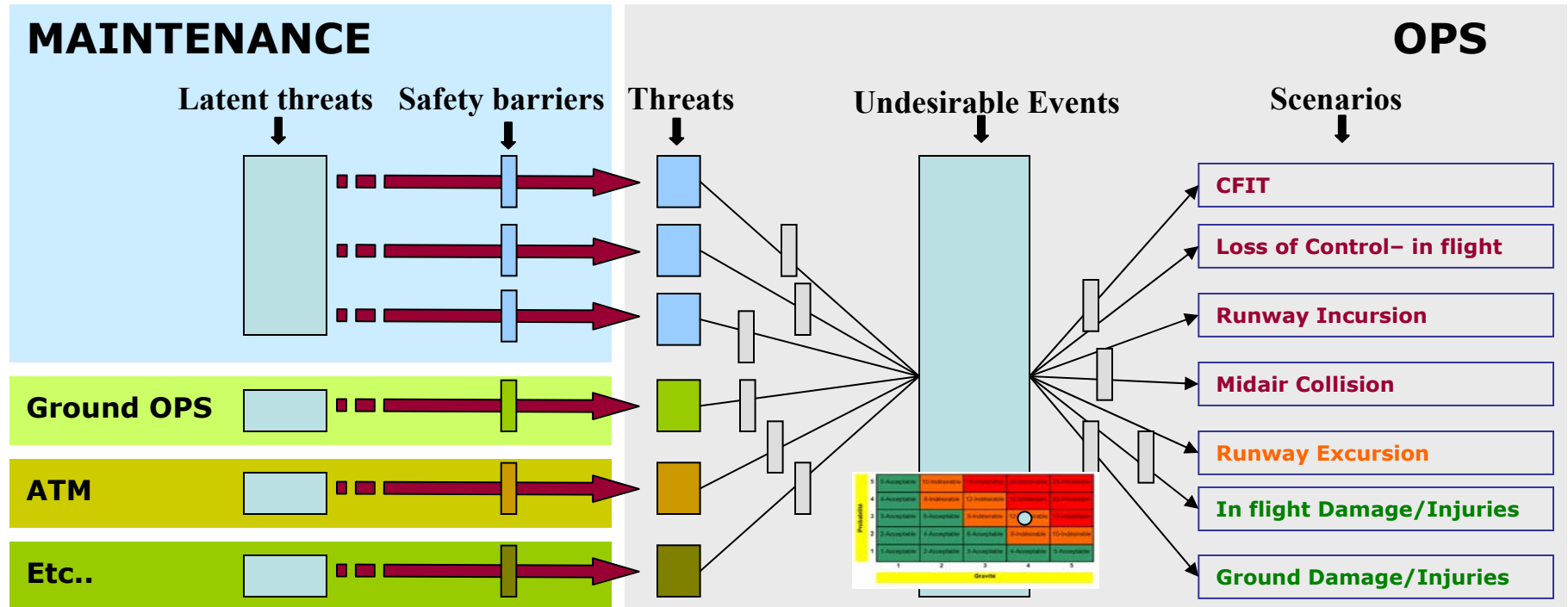


## Without a joint OPS/Maintenance approach...



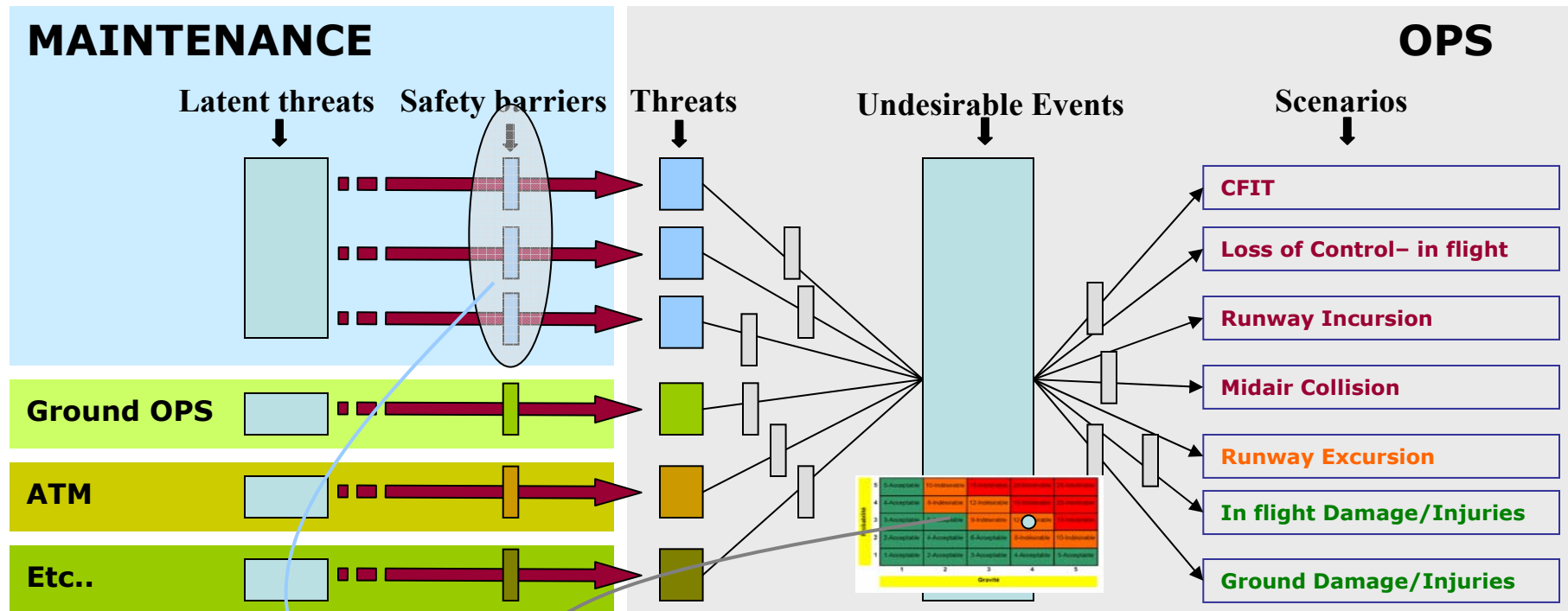
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# Air France approach to Risk Analysis



**The level of risk associated to Maintenance Threats can only be measured in the context of Air Operations**

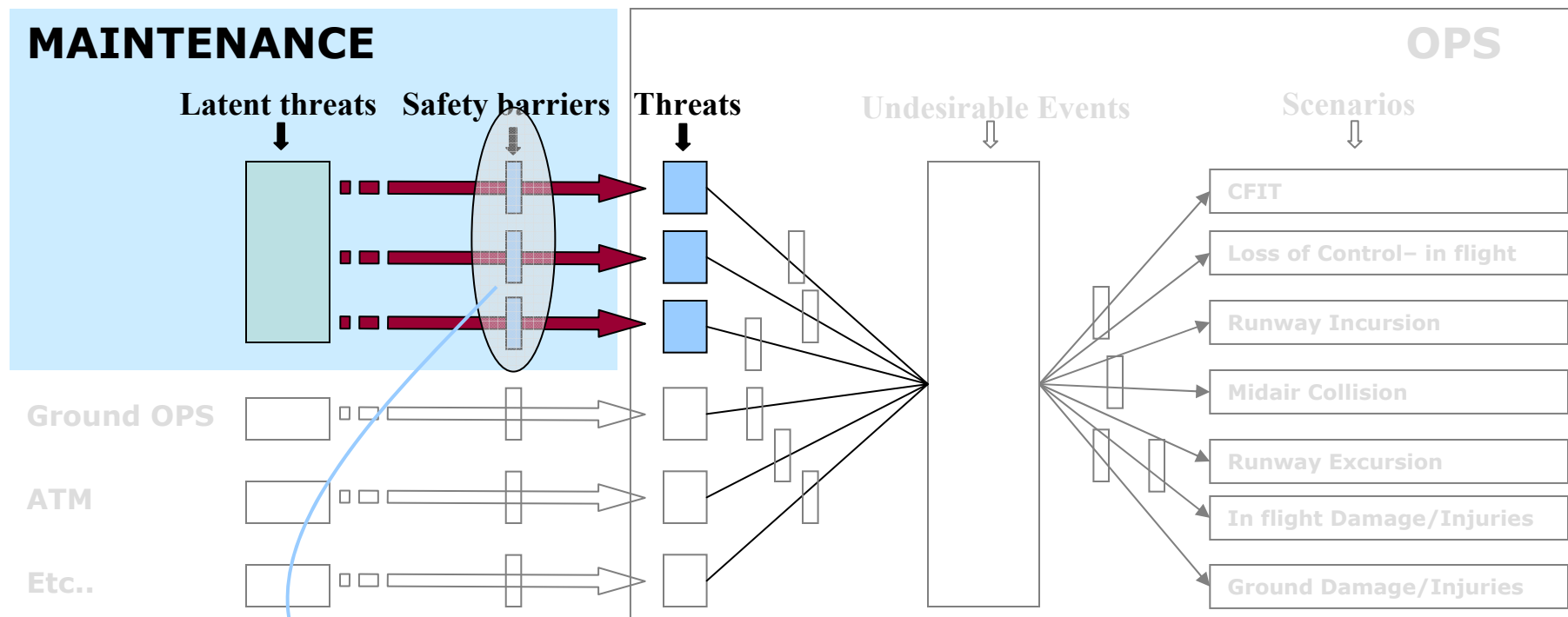
# Air France approach to Risk Analysis



Prevention plan				
Undesirable Event	Risk	Safety Barrier	Owner	Indicator
U.E. 1	Red	✓ Action 1.1	X	➔
		✓ Action 1.2	Y	➔
U.E. 2		✓ Action 2.1	Z	➔
		✓ Action 2.2	T	➔
	Orange	✓ Action 2.3	X	➔
		✓ Action 2.4	Z	➔
U.E. 3		✓ Action 3.1	X	➔
		✓ Action 3.2	Y	➔
	Yellow	✓ Action 3.3	Z	➔
U.E. 4		✓ Action 4.1	X	➔
		✓ Action 4.2	Y	➔
		✓ Action 4.3	Z	➔
U.E. 5	Green	✓ Action 5.1	X	➔
		✓ Action 5.2	Y	➔
U.E. 6	Green	✓ Action 6.1	X	➔
		✓ Action 6.2	Y	➔
		✓ Action 6.3	Z	➔
U.E. 7	Green	✓ Action 7.1	X	➔

The MO prevention plan includes a list of "Actions" built upon the « Maintenance safety barriers », and prioritised in accordance with « Operational risk analysis »

# Without a joint OPS/Maintenance approach...



Prevention plan				
Undesirable Event	Risk	Safety Barrier	Owner	Indicator
U.E.1		✓ Action 1.1	X	✓
		✓ Action 1.2	Y	✓
U.E.2		✓ Action 2.1	Z	✓
		✓ Action 2.2	T	✓
		✓ Action 2.3	X	✓
		✓ Action 2.4	Z	✓
U.E.3		✓ Action 3.1	X	✓
		✓ Action 3.2	Y	✓
		✓ Action 3.3	Z	✓
U.E.4		✓ Action 4.1	X	✓
		✓ Action 4.2	Y	✓
		✓ Action 4.3	Z	✓
U.E.5		✓ Action 5.1	X	✓
		✓ Action 5.2	Y	✓
U.E.6		✓ Action 6.1	X	✓
		✓ Action 6.2	Y	✓
		✓ Action 6.3	Z	✓
U.E.7		✓ Action 7.1	X	✓

...part of the picture is missing!

# The need for a global approach to Risk Management

- The above shows that a maintenance organisation cannot conduct “threat identification” and “risk analysis” in isolation.
    - For an integrated M.O., the Maintenance SMS being an integral part of the Operator’s SMS is a solution.
    - In other cases, solutions must be provided in order to make risk management effective:
      - ***Safety Management Cooperation with the customer Operator through contractual arrangement?***
      - ***Support from State Safety Programmes?***
      - ***Worldwide/Regional Initiatives/Cooperation Programmes on Maintenance Risk Management?***
      - ***Extensive guidance material from the regulator?***
      - ***Other?***
- In this respect, a clear strategy is needed – before attempting to transpose ICAO Annex 6 recommendations into Part 145!

Thank you for your attention