

# *The challenge of a sustainable harmonisation of safety monitoring and targeting in Air Traffic Management (ATM)*

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**EUROCONTROL**

*Lille 18<sup>th</sup> Nov – ERA Safety Conference*



# Topics



What is EUROCONTROL

Background on Safety KPIs, Req. & Reg.

Type of Safety KPIs

Deployment Through European Safety Progr.

Safety Monitoring Challenges and Solution

Brussels

Headquarters  
Central Flow Management Unit  
Central Route Charges Office

Maastricht

Upper Area Control Centre

Luxembourg

Institute of Air Navigation Services

Prague

Strategic Planning & Development Unit

Budapest

Simulation Centre

Brétigny-sur-Orge

Experimental Centre



**EUROCONTROL**

Safety Regulatory Requirements and their transposition into EU legislation

ESARR 1 (2004) (1315/2007/EC regulation)

*SAFETY OVERSIGHT IN ATM*



ESARR 2 (1999/2000) (EC Directives 56/94 & 42/2003)

*REPORTING AND ASSESSMENT OF SAFETY OCCURRENCES IN ATM*

ESARR 3 (2000) (CR 2096/2005 /EC Regulation)

*USE OF SAFETY MANAGEMENT SYSTEMS BY ATM SERVICE PROVIDERS*

ESARR 4 (2001) (CR 2096/2005 EC Regulation)

*RISK ASSESSMENT AND MITIGATION IN ATM*

ESARR 5 (2002)  
(23/2006/EC Directive &  
2096/2005/EC Reg.)

*ATM SERVICES' PERSONNEL*

ESARR 6 (2003)  
(EC/482/2008 Reg)

*SOFTWARE IN  
ATM SYSTEMS*

Air Traffic Management (ATM)

ESP the successor of SSAP  
Despite Regulatory Framework  
Fatal accidents in Europe with ATM contribution



Linate, 8 October 2001



Überlingen, 1 July 2002

# European Safety Programme for ATM – deploy Safety Improv.

**AF5**

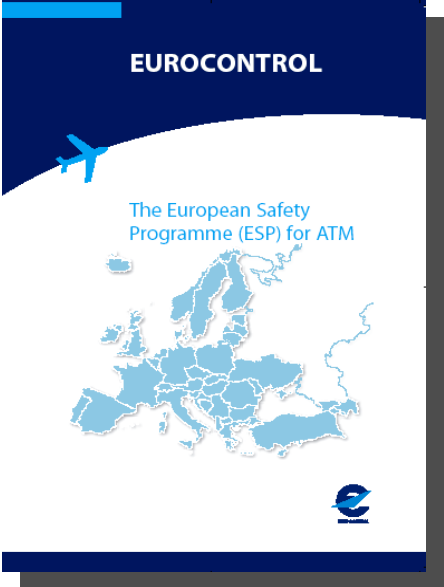
**Safety Management  
Enhancement**

**AF1**

**Implementation & Support to  
European Safety  
Legislation/Regulation**

**AF4**

**System Safety  
Defences**



**AF2**

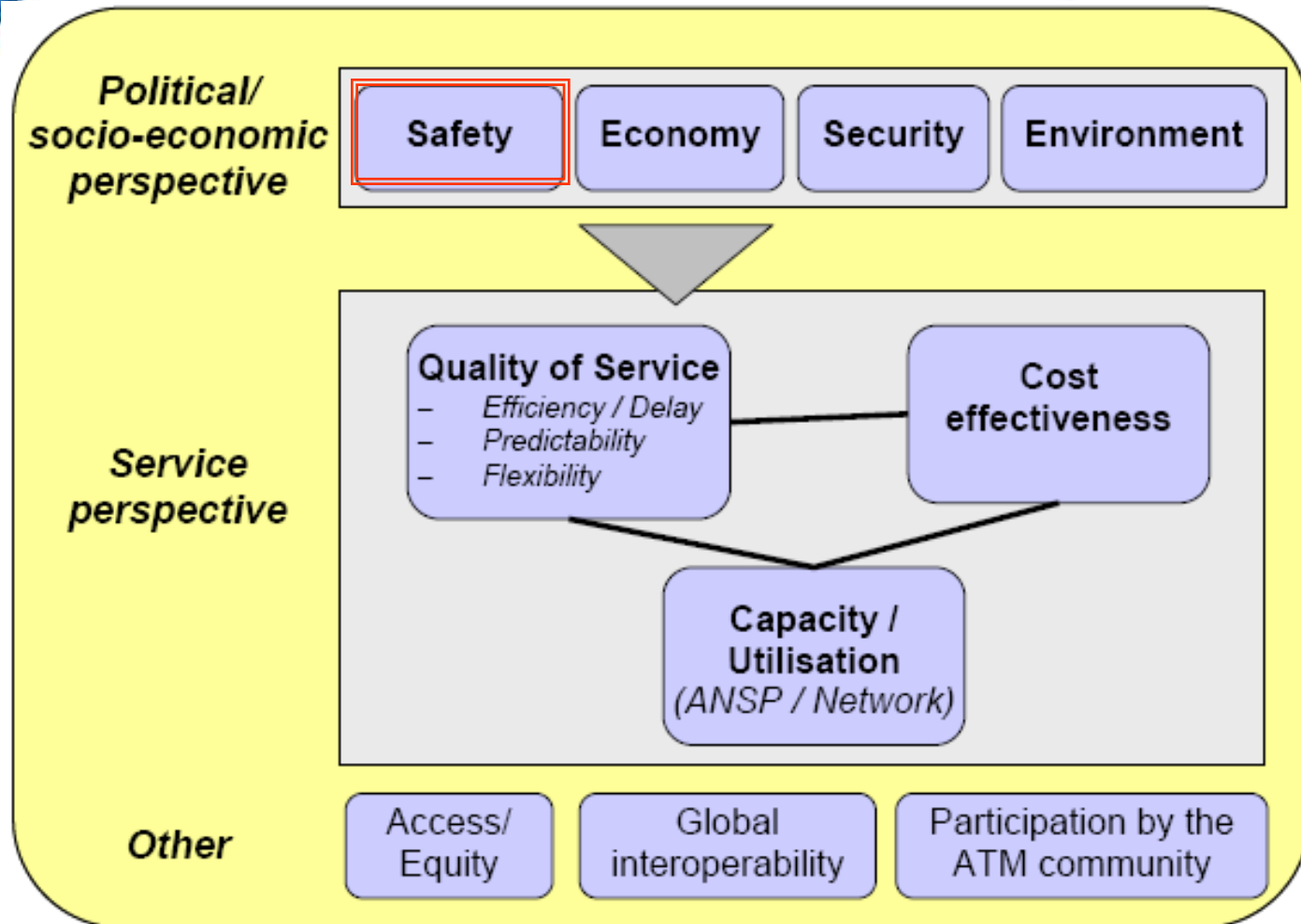
**Incident Reporting and  
Data Sharing**

**AF3**

**Risk Assessment and Mitigation  
in Day to Day Operations**



# EC Mandate on Performance Measurement



## European Safety KPIs principles of development

- (1) International Civil Aviation Organisation (ICAO) Consistency
- (2) Roles and Responsibilities
- (3) Safety Improvement
- (4) Systemic approach
- (5) Practical Interface
- (6) Trust
- (7) Confidentiality
- (8) Consensus
- (9) Planning the details
- (10) Transparency and progress reporting to decision makers

# Stakeholder Requirements

## Key Principles

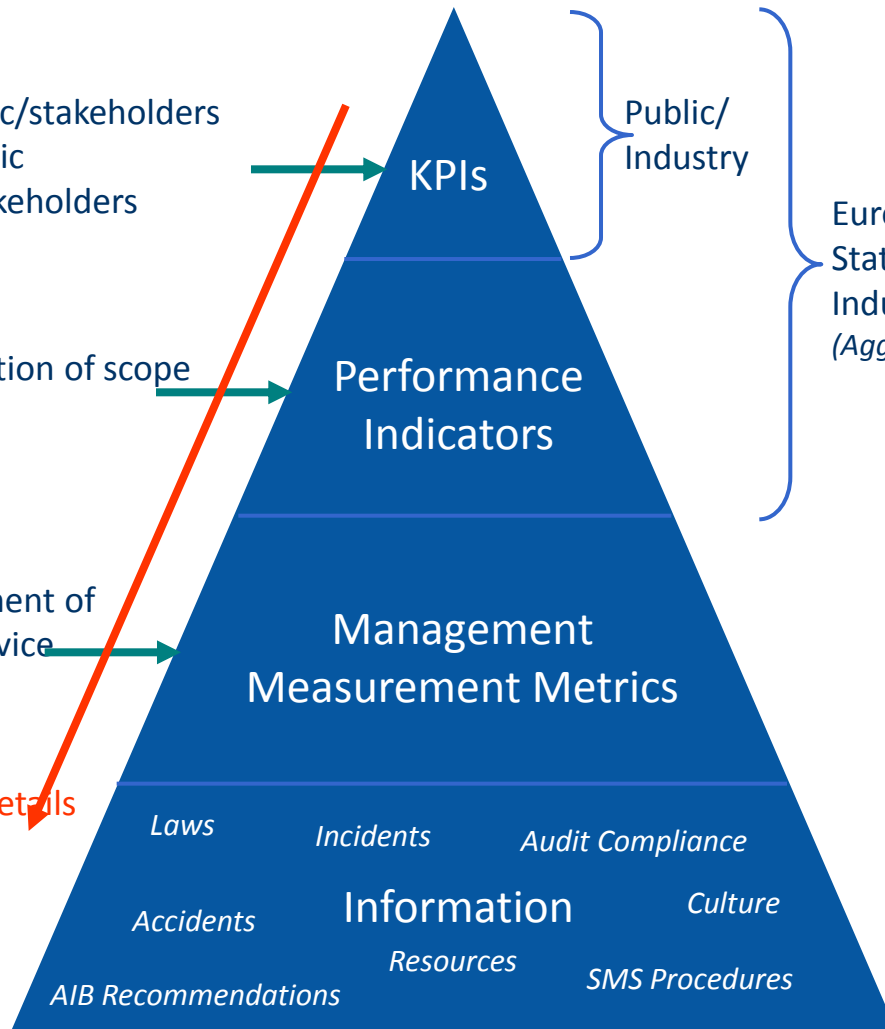
## Interested Parties

- Information to public/stakeholders
- Reassurance to public
- Call to action by stakeholders

- Facilitates identification of scope of action required

- Facilitates management of improvement of service

- Increasing level of details



Public/  
Industry

European/  
States/  
Industry  
*(Aggregation of ANSP/States)*

Organisational  
Level  
*(Service Providers)*

Principles  
why  
what

Roles &  
Resp.  
Who  
why

*The whole process needs to be a continuous improvement activity*

## Types of Safety Indicators

- Systematically evaluate, as a matter of routine, achieved safety performance in all safety-related operational activities;
- Analyse trends and detect unwanted degradation of safety levels, supporting the development of effective improvement plans;
- Assess the extent to which political, strategic, regulatory and industry safety targets are being met;
- A measurement system that can incorporate error tolerance, reaction and recovery level will be explored.

# Lagging indicators

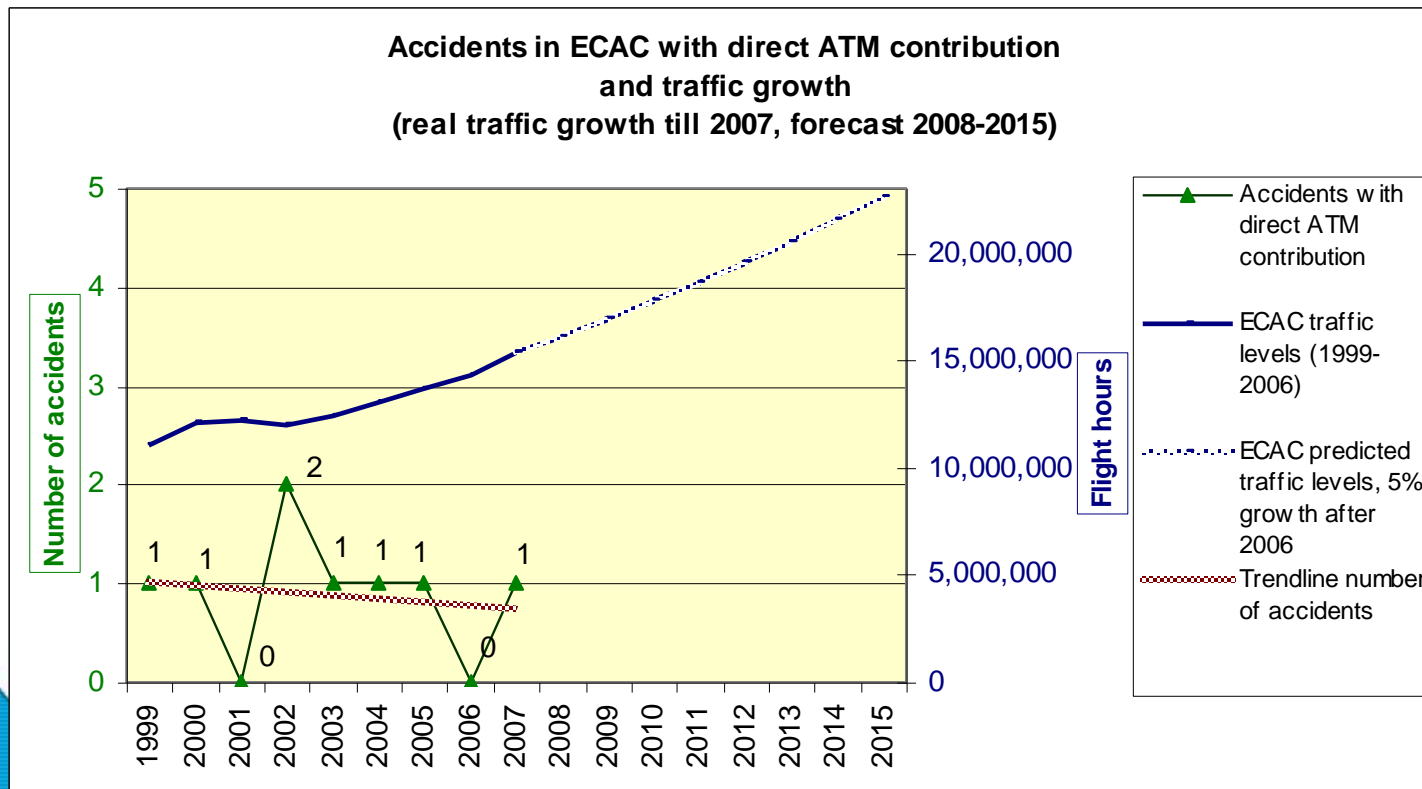
Indicators which

- measure events (e.g. safety occurrences, such as accidents, incidents, system outages etc.) that have happened;
- measure whether safety improvement activities have been effective in mitigating identified risk;
- measure the outcome of the service delivery;
- represent the consequences of actions previously taken;
- frequently focus on results at the end a time period and characterize historical performance (e.g. the end of the supply chain i.e. ATM service provision).

# Lagging indicators - samples Annual Summary Reporting Achieved Level of ATM Safety in ECAC

MTOW above 2250 restriction

accidents involving Commercial Aircraft with Direct ATM Contribution

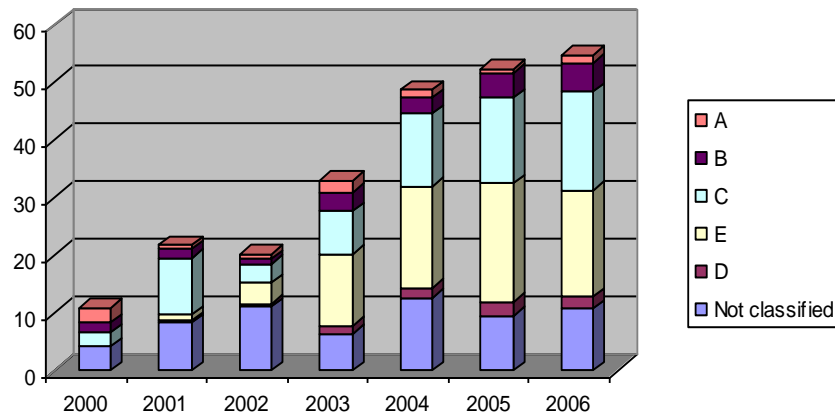


# Lagging indicators – samples

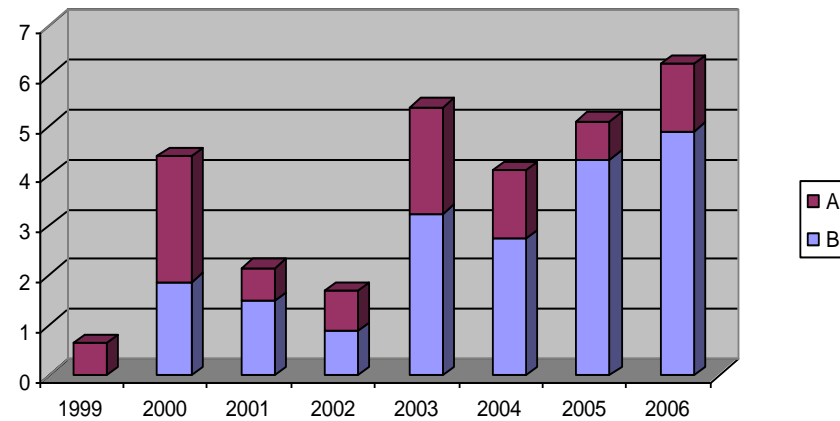
## Incidents

### Runway Incursions

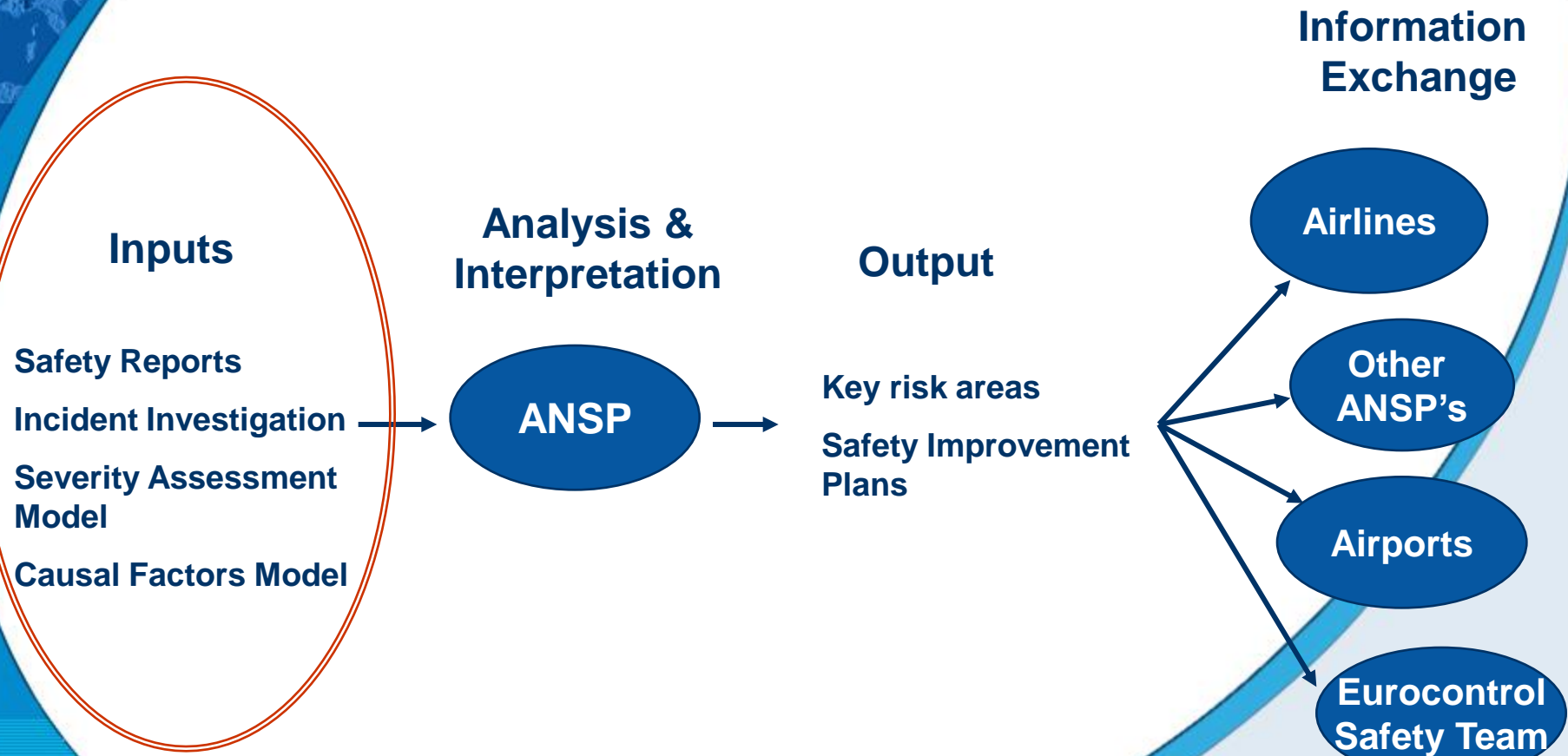
Runway Incursions  
(occurrence per million flight hours and severity)



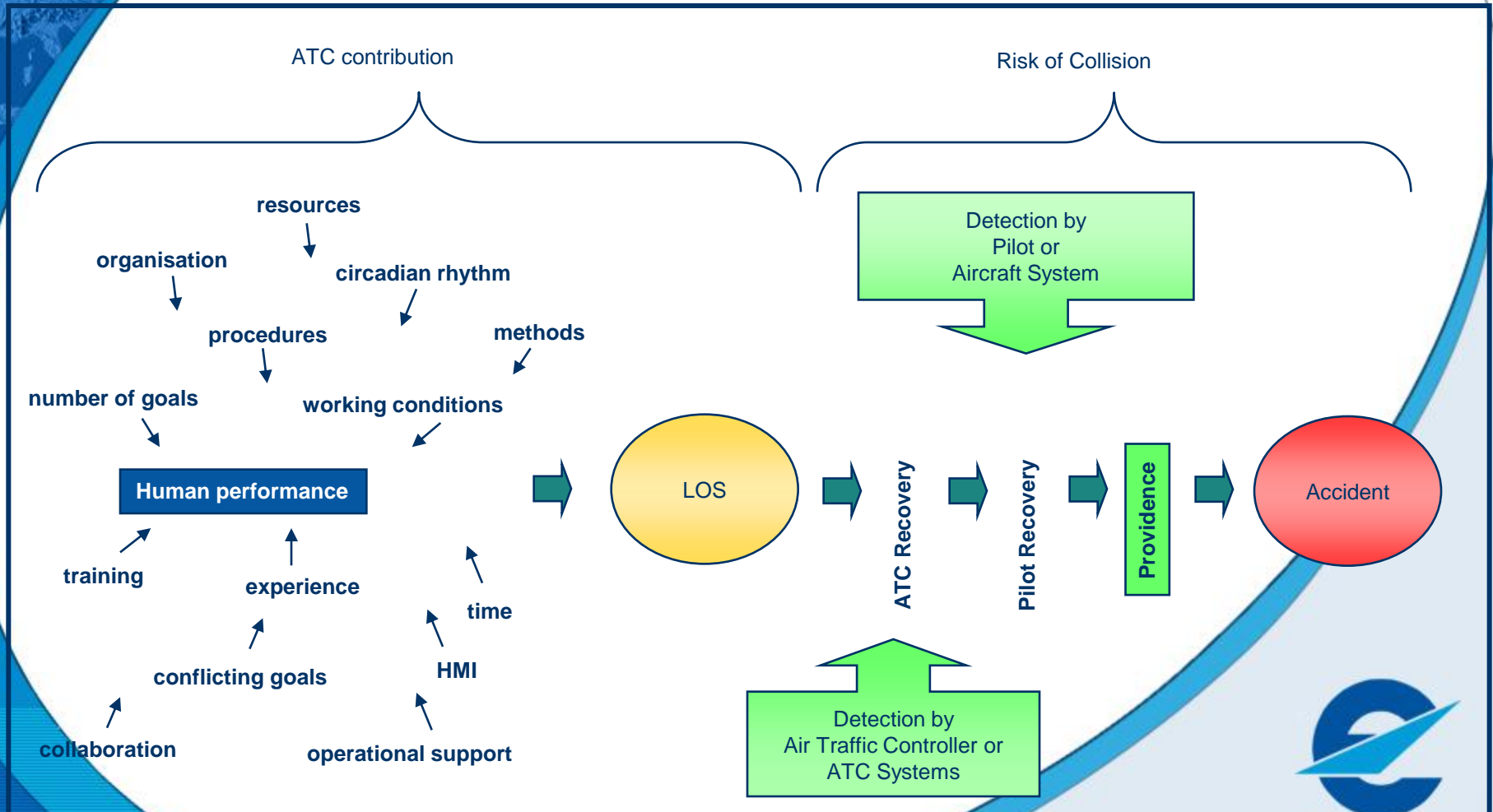
Runway Incursions  
(high risk occurrences per million flight hours and severity)



# Key issues for Lagging indicators (1) – harmonisation of the inputs



## Key issues for Lagging indicators (2) – consistent usage of “barrier” model, methods and tool

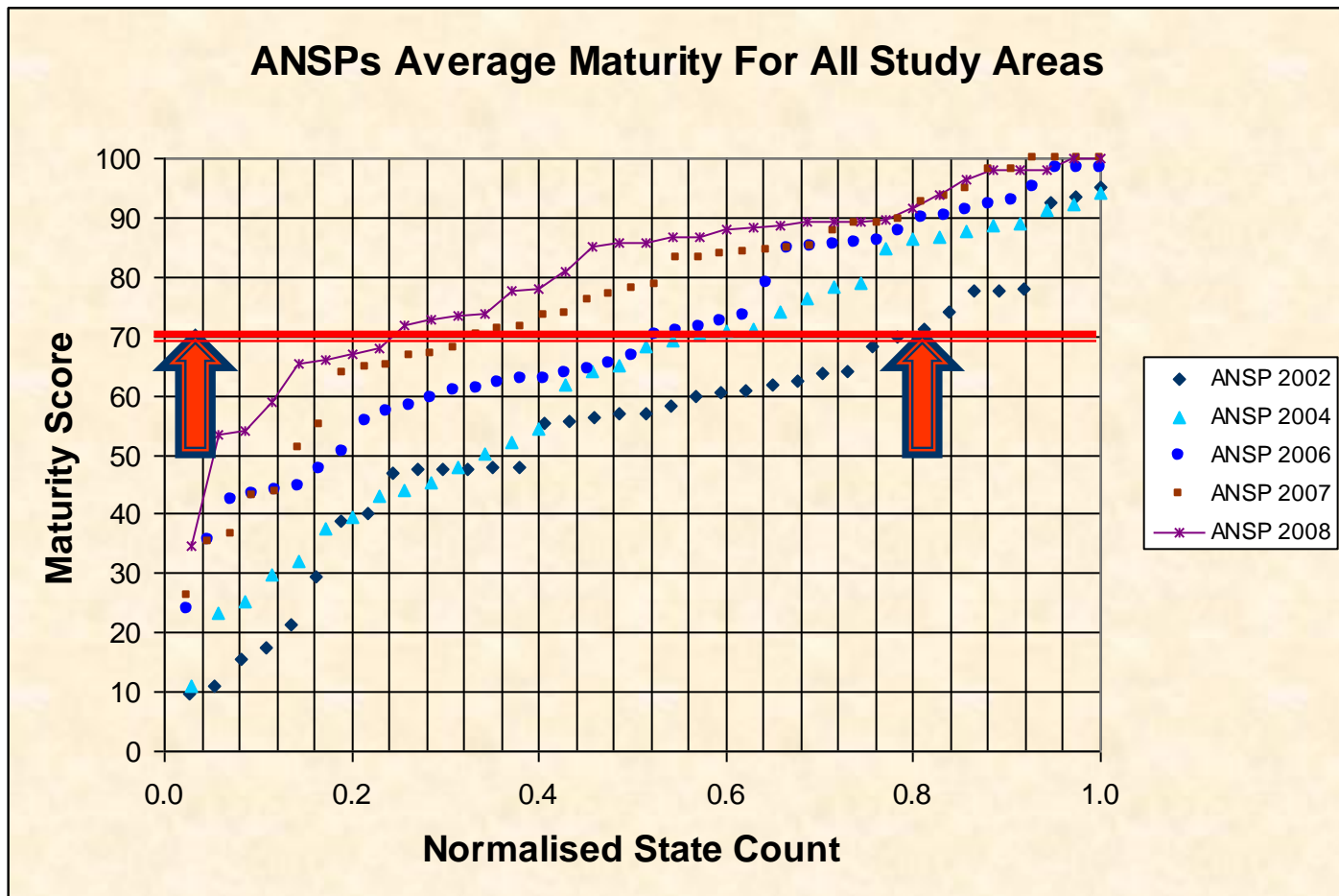


# Leading indicators

Indicators which

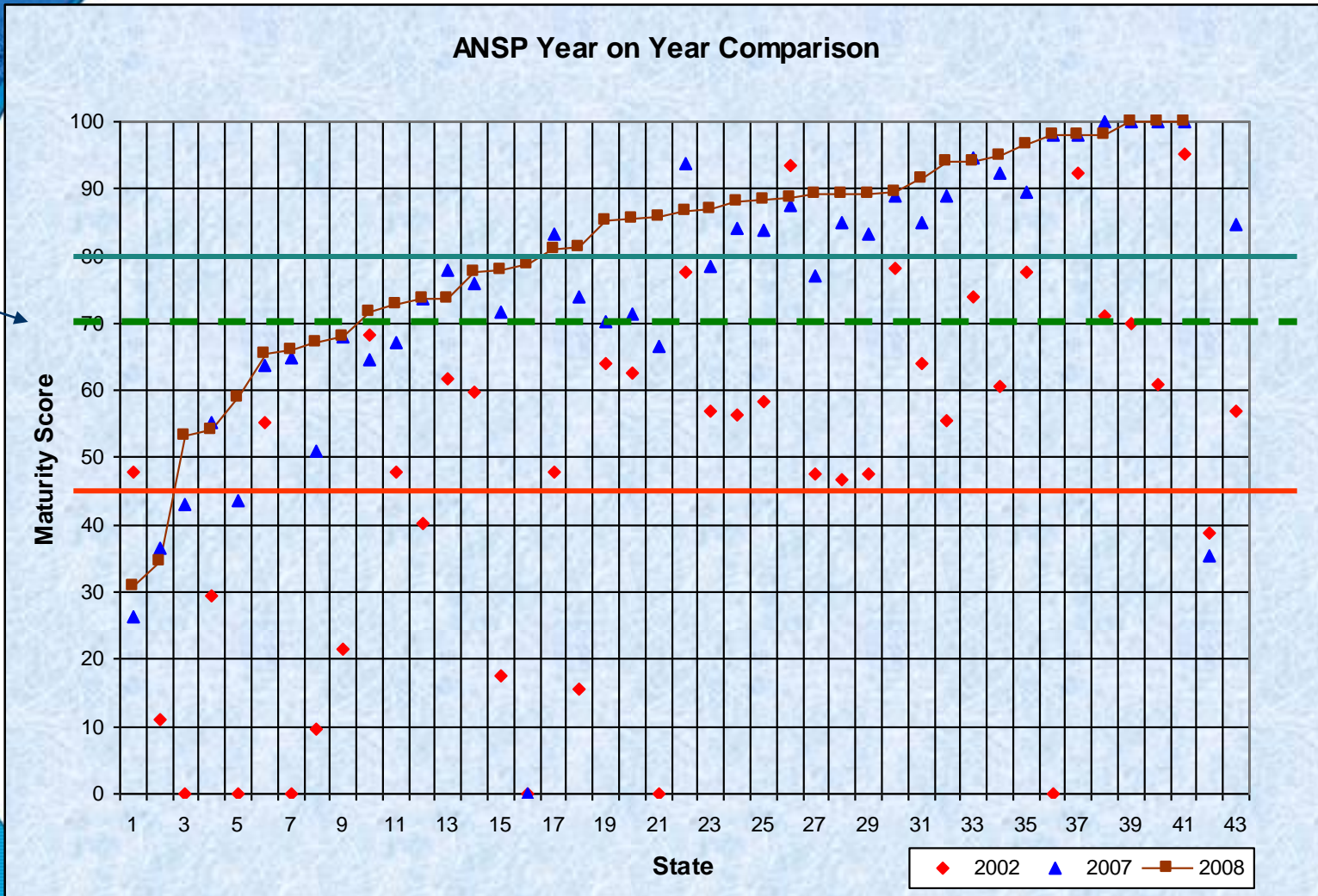
- are identified principally through the comprehensive analysis of the organisations (providers, regulators, States)
- are designed to help identify whether the providers and regulators are taking actions or have processes that are effective in lowering the risk
- are considered the "drivers" of **lagging indicators**.
- improved performance in a **leading indicator** will drive better performance in the **lagging indicator**.
- Improved rules, regulations, oversight, procedures etc will lead hopefully to fewer errors within various layers of organisation and hence to less safety occurrences

# Sample of Leading indicators Safety Maturity (e.g. Maturity of the ANSP's SMS)



# State Maturity Comparison (ANSPs)

ESP target



Continuous improvers

Active developers

Slow starters



# Definitions and Targets

Category	Maturity	Definition
Slow Starters	0 - 45%	States in this category typically suffer from a lack of resources and leadership for the implementation of safety management frameworks compatible with the EUROCONTROL philosophy.
Active Developers	46- 80%	With maturity scores between 46% and 80%, States in this category typically move constructively through the steps of the implementation of a mature safety framework and several have now reached the target minimum maturity level of 70%. Individual States suffer occasional set-backs but there is now enough local expertise and management determination within organisations to keep the process going.
Continuous Improvers	81 – 100%	States in this category report maturities over 80% and dedicate their efforts to efficiency and effectiveness of the safety frameworks they have embedded, usually over a number of years. The focus is on fostering a coherent and positive safety culture across all parts of the organisation.

The ESP target is for all States to achieve a minimum maturity of 70%

# How leading indicators take account of lagging indicators

## Quantitative Study Areas

A1	States' Safety Capability
A2	The collection and dissemination of incident data
A3	Safety Performance Measurement
A4	Promotion of best practice
A5	Organisational structures for safety
A6	Current safety rules and procedures
A7	Current Safety Culture
A8	Current achieved safety performance - deleted
A9	Current perceived safety levels
A10	Disclosure of safety information
B1	The implementation of SMS
B2	Timely compliance with international obligations

## Qualitative Topic Areas

B3	Identification of specific safety programmes within States that address national safety issues.
B4	Describe the current situation with regards to issues affecting the implementation of legislation.
B5	Identify potential weaknesses in the safety of air navigation that warrant special or immediate attention.
B6	Identify the current safety concerns of the airspace users representative bodies.
B7	Identify current safety concerns of the Air Traffic Controller's representative bodies.
B8	Establish the position regarding whether or not the State's ATM safety indicators should be published annually to demonstrate that agreed targets are achieved?

## Safety Targets

- Safety targets are derived to meet either political, strategic, regulatory, industry safety objectives or management performance-driven improvements.
- A cautious approach in setting targets is recommended.
- If targets are set too early in the process, or if they are unduly correlated with other performance indicators (such as efficiency or pay), the whole process may be threatened.
- The starting point for setting targets should be **leading indicators** and subsequently with improved maturity of the system the targets for **lagging indicators**

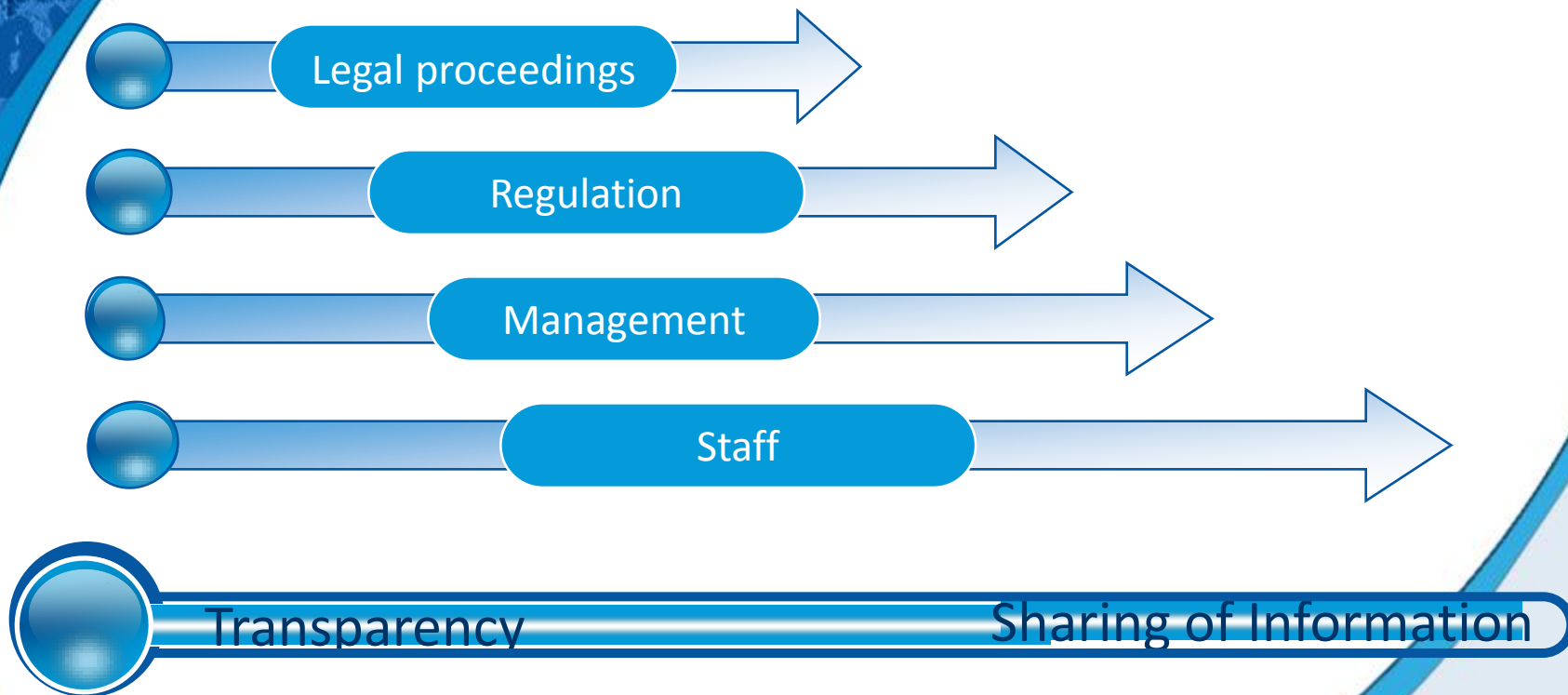
# Tools, Methods & Enablers

- TAXONOMY (HEIDI/ADREP)
- TOKAI ( TOol Kit for ATM Occurrence Reporting)
- Severity and risk of recurrence principles (EAM2-GUI5) and its related TOKAI tool
- SOAM – Systemic Occurrence Analysis Methodology – Causal Factors & Safety recommendations (EAM2-GUI8)
- Safety metrics, statistical tool & analysis of safety trends – TOKAI tools
- ASMT/InCAS
- Safety Maturity Questionnaire – What If tool – RADAR diagram analysis\*
- Safety Surveys Technique (EUROCONTROL/ ICAO/Transport Canada)
- Overall SMS principles and metrics in EGSMM\*
- Voluntary & Mandatory reporting at European scale
- Just Culture Principles
- Repository of safety knowledge ([www.skybrary.aero](http://www.skybrary.aero))

# Just Culture – Drawing/Defining the Borders of “acceptable/non-acceptable behaviours”



# Just Culture Prerequisites – Regulatory and Management part



# Just Culture Prerequisites – Reporting principles

Ease of Reporting

Trust

Independence

Motivation & Promotion

Feedback

Acknowledgment

# *Questions ?*

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