OPERATIONAL SAFETY INDICATORS AND TARGETS

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ITALIAN COMPANY FOR AIR NAVIGATION SERVICES

European ATM Safety Conference

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Concepts

level of safety is the degree of safety of a system. It is an emerging property of the system, which represents the quality of the system, safety-wise. It is expressed through safety indicators;

safety indicators are the parameters that characterize and/or typify the level of safety of a system;

safety targets are the concrete objectives of the level of safety;

acceptable level of safety is the minimum degree of safety that must be assured by a system in actual practice;

(ICAO DOC 9859 – SMM)

Effort

ACCEPTABLE LEVEL OF SAFETY

Setting Targets

- Quantitative safety targets (if possible);
- Qualitative safety targets, expressed in industry-recognised ways (e.g. ALARP);
- Applicable national or international standards for performance of the ATM system or its elements;

"The defined baseline can be a mixture of some or all of the above".

(SRC POL DOC 3)

Setting Targets – industry overview

$n \times 10^{-m}$

OCCURENCIES (accidents, incidents of a given severity, specific occurrences)

×

- flight hours
- sector/unit operative/working hours
- "missions" (i.e. average flight, 1.5 hours)
- movements
- specific operations (takeoff, landing)

Setting Targets – ESARR 4

(ECAC region) Maximum tolerable probability of ATM direct contribution to:

ACCIDENT

- 1.55×10^{-8} per Flight/Hour

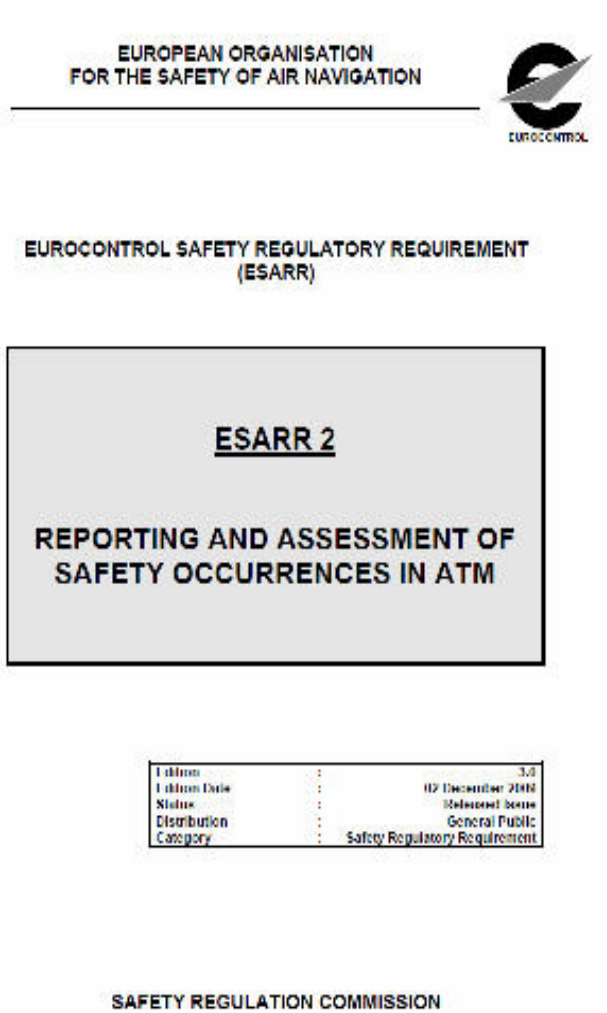
INCIDENT

- future revision of ESARR 4
- should be determined at ECAC / national level

Choosing Indicators

Typical ESARR2 Indicators

- Accidents
- Incidents
  - Near collision
  - Potential for collision or near collision
  - ATM-specific occurrences (ability to provide safe ATM services)



EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

EUROCONTROL SAFETY REGULATORY REQUIREMENT
(ESARR)

ESARR 2

REPORTING AND ASSESSMENT OF SAFETY OCCURRENCES IN ATM

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SAFETY REGULATION COMMISSION

Choosing Indicators

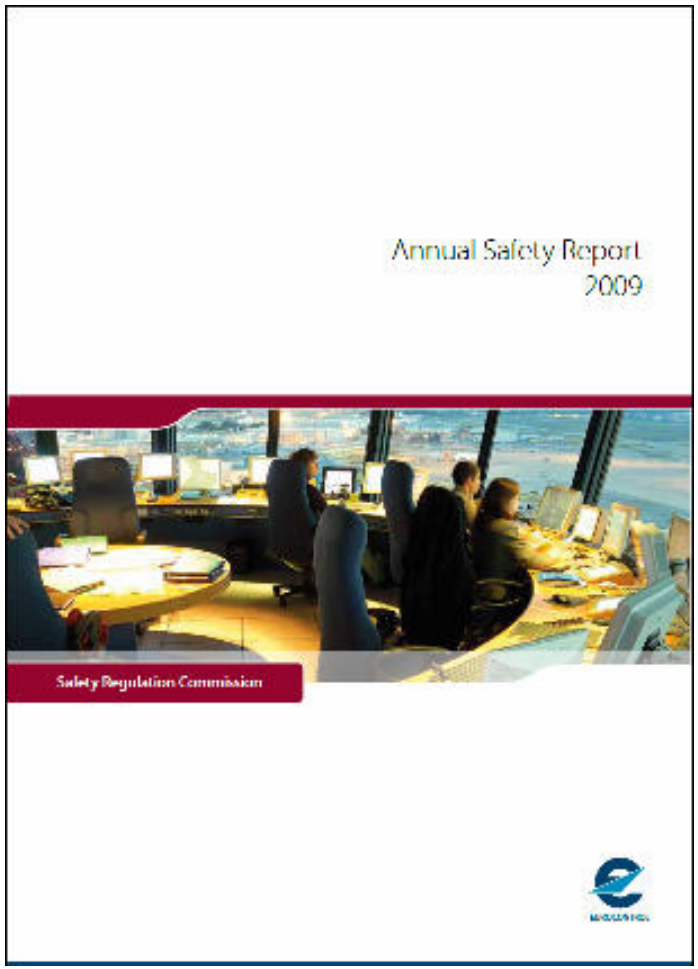
Eurocontrol – SAFER

Key Safety Indicators

- Separation Minima Infringement
- Runway Incursion

Other Key Safety Issues

- Unauthorised Penetration of Airspace
- Aircraft Deviation from ATC Clearance
- Level Bust
- Near CFIT



Choosing Indicators

FAA examples:

- % of flights complying with existing separation rules
- in case of separation loss, % of actual compliance with applicable separation

ENAV Safety Plan 2010

Targets

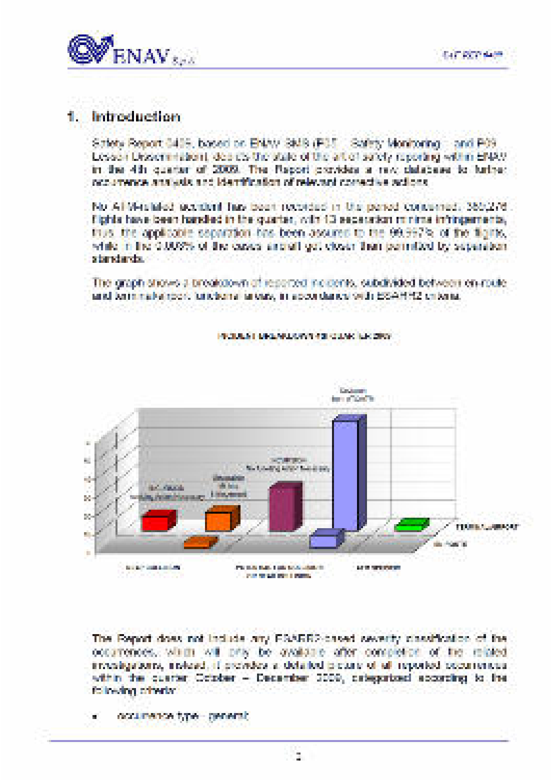
- no ATM accidents or total inability to provide service
- 0.4 ATM related class A incidents x 100,000 flights ($4x10^{-6}$)

Indicators

- Reporting levels
- ESARR 2 (Key S.I: Runway incursions and SMIs)
- “Fuori Norma” preliminary evaluation (separation actually assured and expressed as a percentage of that applicable, in a combination of the applicable separation and the rate of closure)

+ “exploring” APF

Quarterly Safety Report



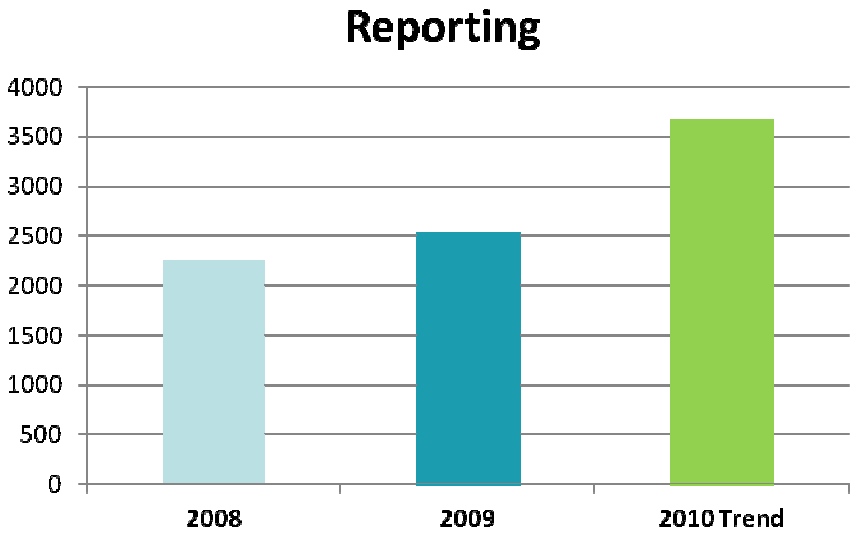
- adherent to ESARR 2 principles and international methodologies;
- Disseminated to IATA and EUROCONTROL EVAIR;
- aimed to provide up-to-date safety monitoring and wide information.

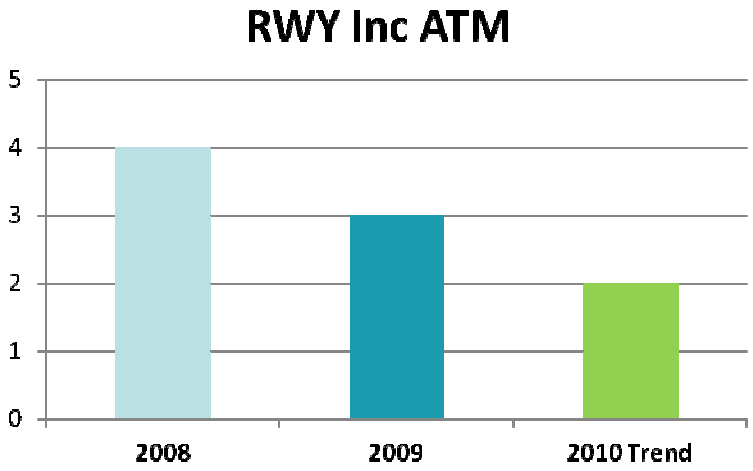
Annual Safety Report

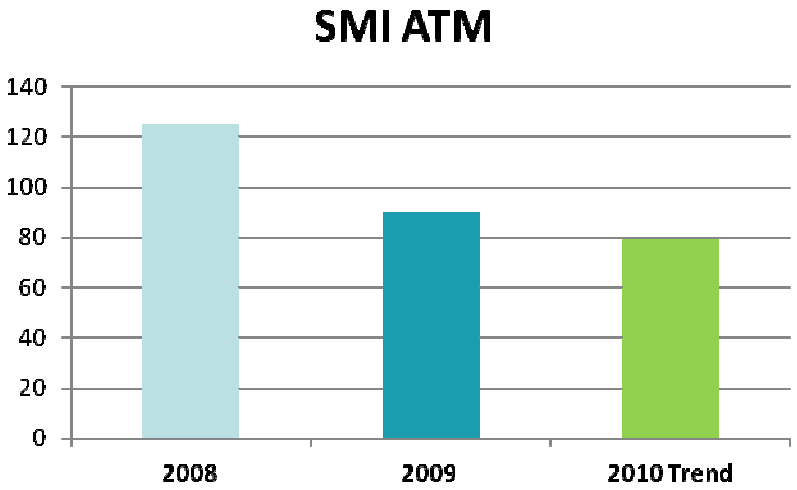
- adherent to ESARR 2 principles and international methodologies;
- aimed to provide up-to-date safety monitoring and wide information;
- depicting safety performance trends and target hitting

ENAV Ops. Safety Indicators

A look at main ENAV indicators







FN - Fuori Norma (*"out of the rule"*)

preliminary evaluation of separation loss

Not a collision risk assessment, but just an aid in:

- Prioritizing investigations
- Assigning proper resources

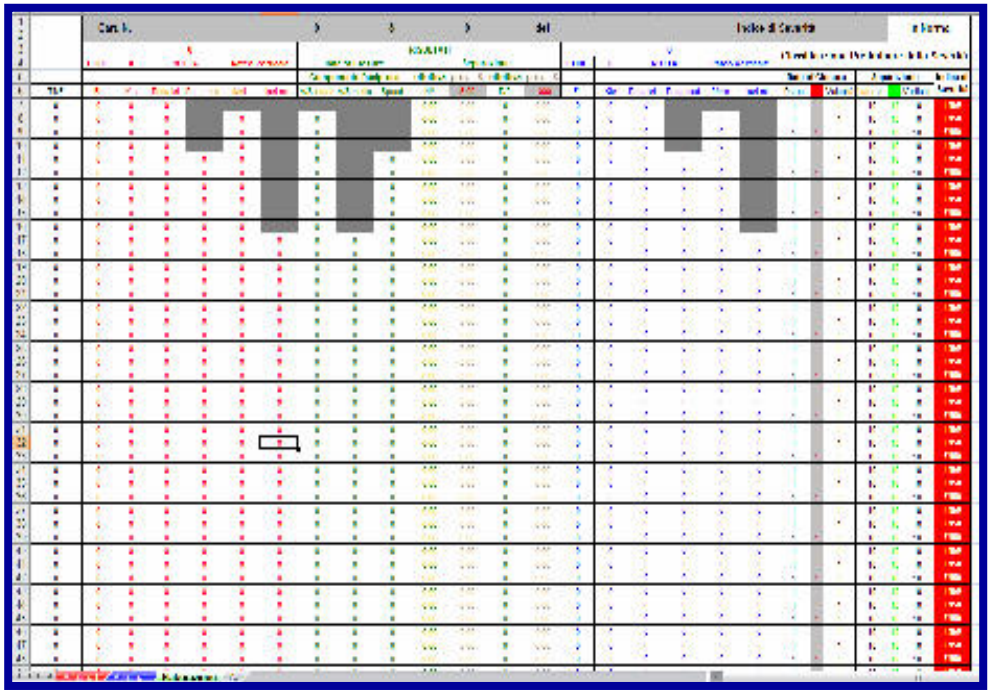
ENAV Ops. Safety Indicators

FN

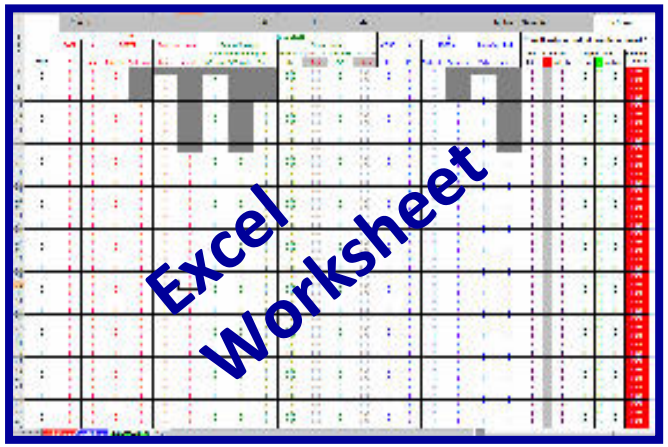
Fast and simple method for a "pre-evaluation":

TXT radar data

Excel worksheet



ENAV Ops. Safety Indicators



FN – How does it work?

Evaluates RoC and Separation

SEPARATION			RATE OF CLOSURE			
			≤60 kt ≤1000ft/min	>60kt&≤250kt >1000ft/min&≤ 2000ft/min	>250kt&≤600kt >2000ft/min&≤ 4000ft/min	>600kt >4000ft/min
				3	4	5
	>75%	1		4	5	6
	>50% ≤75%	3	4	6	7	8
	>25% ≤50%	8	8	10	11	12
	≤25%	10	11	13	14	15

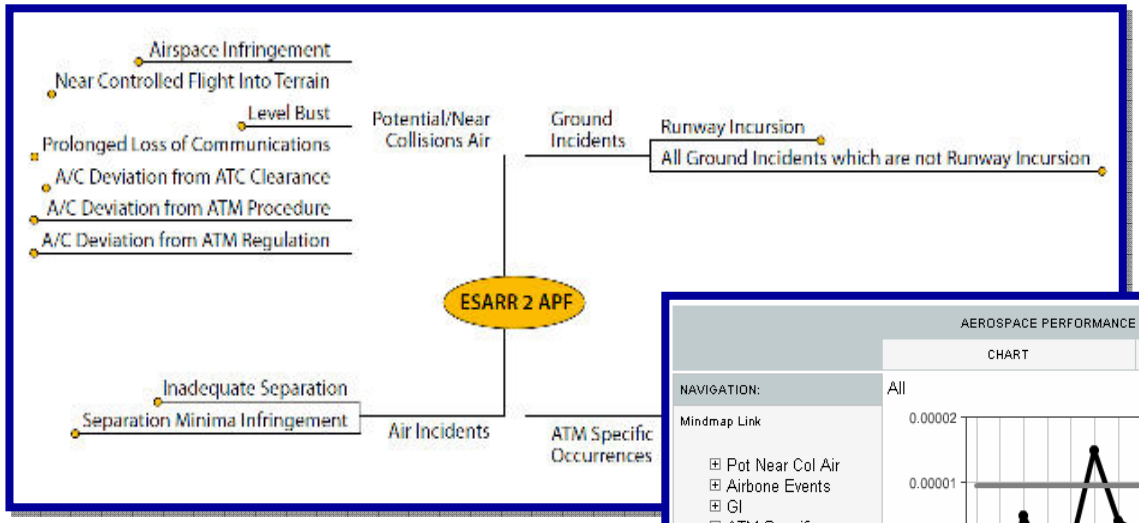
In norma
Fuori Norma
Fuori Norma 75
Fuori Norma 50

Aerospace Perfomance Factor

Aggregates multiple operational safety risks into **ONE** graphical performance representation over time, based on historical indicators

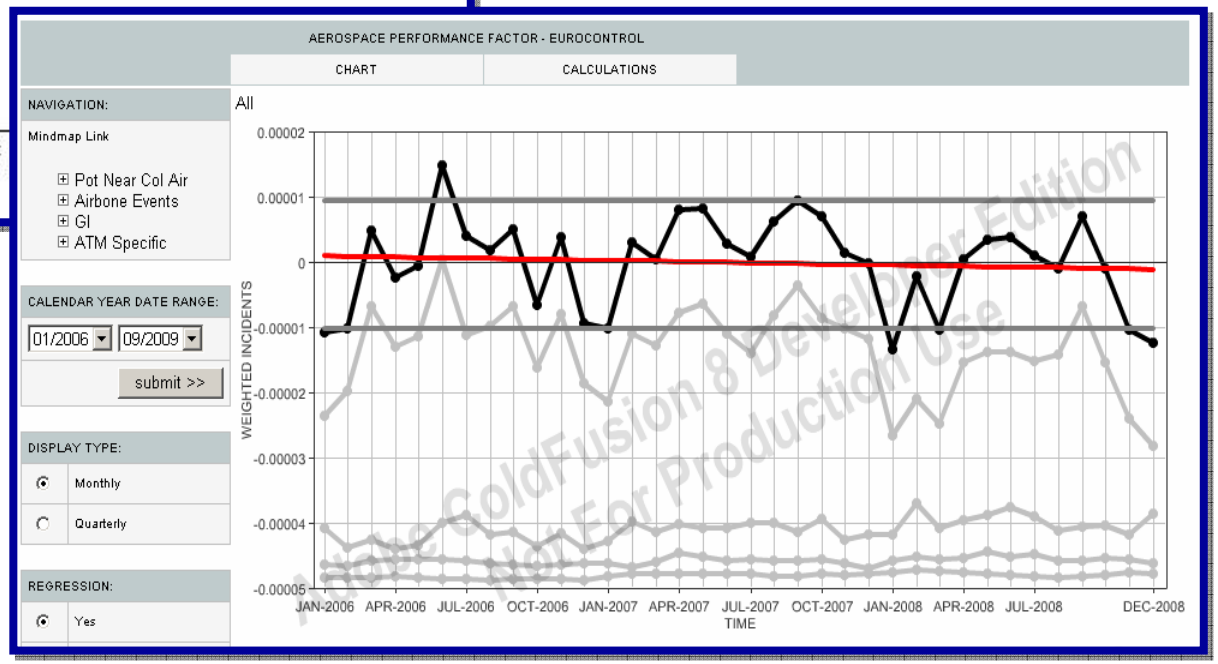
ENAV Ops. Safety Indicators

APF – An example



ESARR 2
"Mindmap"

EUROCONTROL



ENAV Ops. Safety Indicators

APF advantages:

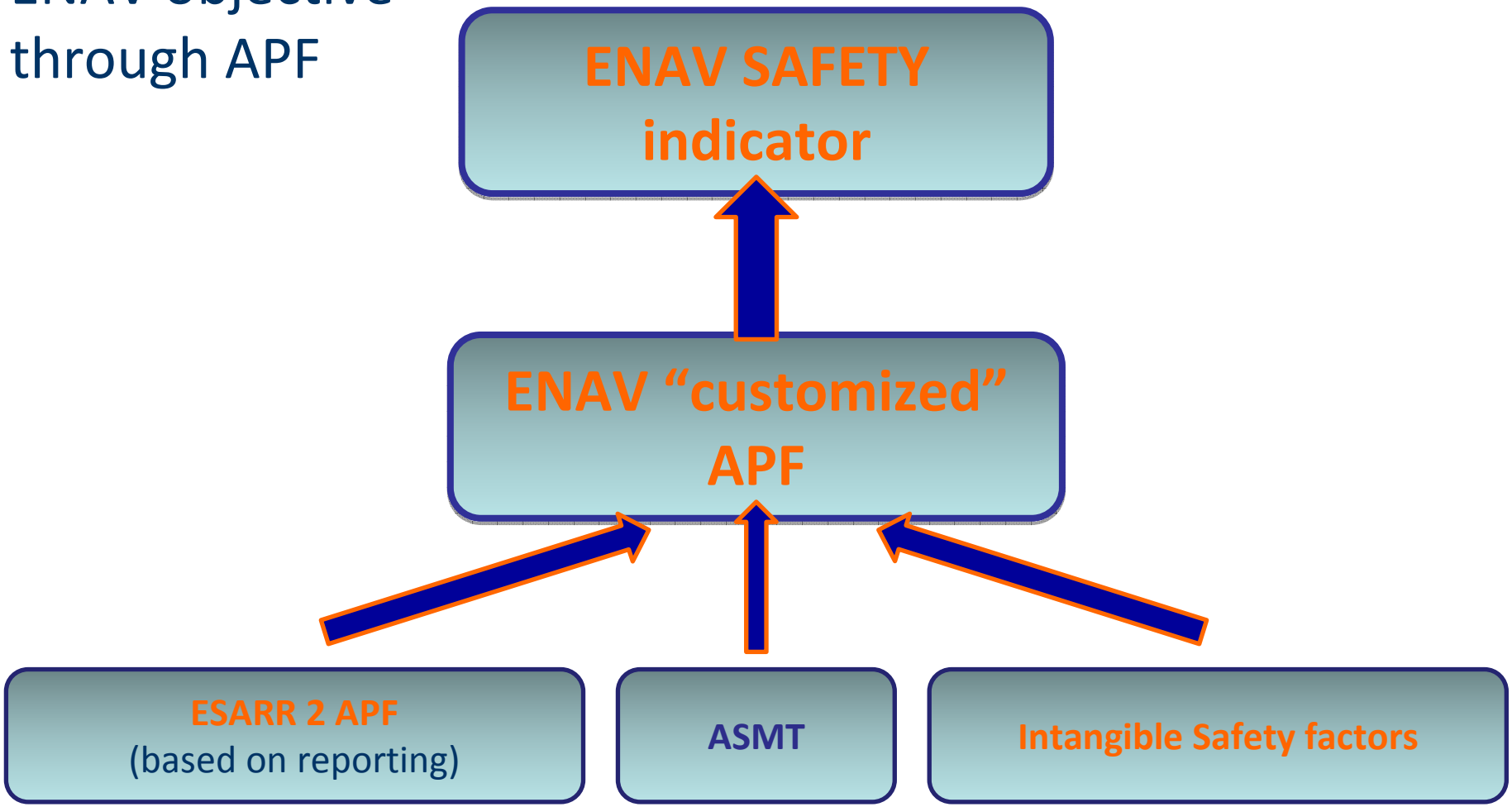
- Easy monitoring
- Organizational performance then “drill down” into causal factors
- Graphical representation of Safety levels

ENAV peculiarities:

- Integration with *ASMT*
- Integration of “intangible” factors (safety promotion, investments…)

ENAV Ops. Safety Indicators

ENAV objective through APF



Safety Culture Survey

Aiming to asses its own Safety Culture maturity, ENAV requested EUROCONTROL support for an in-depth analysis on about 2000 people.

Surveyors involved in:

- preparing the material
- conducting the survey
- analyzing the results
- elaborating the Final Report

Managing Safety KPIs

- Continuous “real time” high-level picture
- Deeper look
  - triggered by alerts
  - on scheduled periodical basis
- Action as appropriate
- Feedback

Conclusions

Not “measuring the unmeasurable”; instead:

- setting appropriate safety targets
- costantly monitoring safety performance (and taking necessary actions)
- dinamically reviewing and updating indicators towards set targets
- proactively contributing to review and update targets at national and international regulatory level

Towards the Future

SES II PERFORMANCE SCHEME (*FRAMEWORK REGULATION*)

- Community-wide performance targets on the key performance areas of safety, the environment, capacity and cost-efficiency;
- National or FAB plans, including performance targets, ensuring consistency with the Community-wide performance targets;
- periodic review, monitoring and benchmarking of the performance of ANS and network functions.

Towards the Future

PROGRESSIVE INTEGRATION OF:

- **subject**: various performance indicators and targets (safety, capacity, environment, …)
- **context**: ANSP, national, international (FAB, Single Sky, …)

HARMONIZED TARGETS

Any Questions?

Thank You!