



EUROPEAN AVIATION SAFETY AGENCY
AGENCE EUROPÉENNE DE LA SÉCURITÉ AÉRIENNE
EUROPÄISCHE AGENTUR FÜR FLUGSICHERHEIT

3rd European Aviation Safety Plan (EASp) implementation and review summit

Measuring Safety Performance
update on SM-ICG work
Régine Hamelijnck - 18 June 2013

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SM-ICG Metrics work group



Almost finalised:

- SPMA – concept paper
- SPM guidelines for service providers
- How to communicate safety performance

To be initiated:

- SPMA – process (application of SPMA concept for State Safety Management)
- First review of SPMA concept

Final products will be published on Skybrary:

- [http://www.skybrary.aero/index.php/Safety_Management_International_Collaboration_Group_\(SM_ICG\)#SM_ICG_Products](http://www.skybrary.aero/index.php/Safety_Management_International_Collaboration_Group_(SM_ICG)#SM_ICG_Products)

SPMA = Safety Performance Measurement Approach



Contents

- SPMA Concept
 - for 'Regulators' (CAAs)
- Safety Performance Measurement
 - Guidelines for service providers



Contents

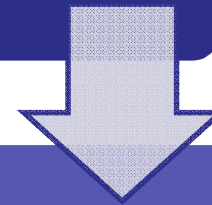
- SPMA Concept
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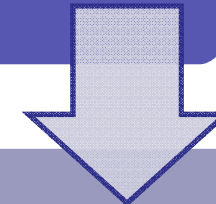
SPMA - Introduction

The obvious:

"You can't manage what you can't measure" or "What gets measured gets managed" - BUT...



If you measure the wrong things, you'll manage the wrong things.



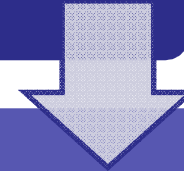
Careful measurement is essential in safety decision making!



Safety: Operational definition

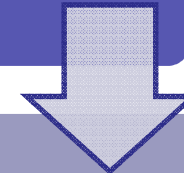
What do we mean?

- Observable behaviors representing the construct "Safety"



Safety

'absence of something'



How well risk is managed:

- how little harm (lowest severity)
- how little probability (lowest likelihood)



Capability to manage risk:

Identification of
hazards

Development &
implementation
of risk controls

Assurance of
effectiveness of
risk controls

Assurance of
competency

Communication
of essential
information



Operational definition: Summary

- **Safety**: how well **risk** is **managed** (state of being)



- **Safety performance**: **capability** to **manage** risk (system/process)



- **Measurement of safety management capability** in terms of **Safety Management processes** (What)

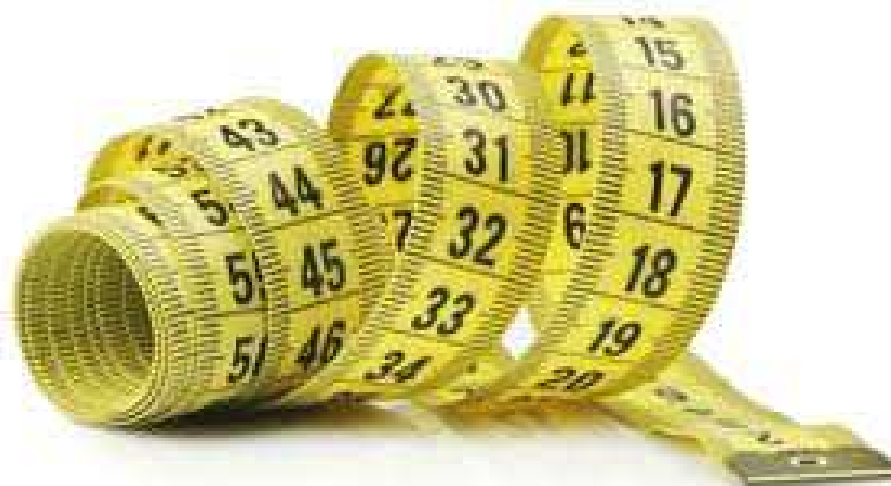


- **Process measurement** (How – measurement strategy)
 - **Process**: through leading/lagging indicators
 - **Outcome**: Ultimate benefits, results (lagging indicators)



SM-ICG SPMA matrix

	A: Indicator usage	B: Outcome indicators	C: Process indicators
Tier 1 INTEGRATED CIVIL AVIATION SYSTEM	Public information/ long term trending, identification of significant	(1) Accident rates, Incident rates, Fatalities (etc.)	Σ Safety Management capability (effectiveness of): • Identifying common cause threats • Effectiveness of regulatory controls
Tier 2 SERVICE PROVIDER PERFORMANCE	Risk management and regulatory issues		Performance: • Compliance with regulatory specifications • Ability to identify unique threats • Effectiveness of risk control measures
Tier 3 REGULATOR PERFORMANCE (ACTIVITIES)	Safety risk management by regulator (SSP)	Provider behaviors and aggregate outcomes) • effectiveness of risk control application (Oversight system performance – Design Assurance and Performance Assurance)	Risk management / : • to identify common cause threats • Ability to develop risk controls Resource allocation





Guidance provided for each Tier

Attachment 1 –Safety Performance Measurement Guidance

The following tables provide further guidance on the three tiers within the safety performance measurement matrix, including examples of indicators.

also provides
examples

Tier 1		
A	Civil Aviation System outcomes	These measure high level, outcomes of the aviation system, as opposed to lower level direct outputs of individual elements of the system.
B	Safety performance indicators	High-severity occurrence data monitoring at sector level. Useful to standardise definitions where comparison with other states or regions would be beneficial.
C	Indicator usage	- Public opinion, - Long-term trending - Setting objectives for further analysis (e.g. research) and action, - Measuring progress on a particular issue (e.g. specific segment of the aviation system /aircraft types) - Monitoring of performance at the level of different states or regions / aviation segments (e.g. operators, manufacturers).Identify hazards in the Civil Aviation System or major system segments through analysis of accident scenarios (e.g. identify failure modes and effects analysis) - Results in mandatory actions such as regulations - Information regarding inadequacy of service provider and regulator SRM - Information regarding ineffective risk controls of service provider and/or regulator The low frequency of high-severity occurrences means that aggregation at a regional level may produce more meaningful analyses.
D	Relationship	There is relationship between tier 1 and tier 2, but this relationship can only be validated over a long period of time, due to the low frequency and variability of tier 1 outcomes. There is no direct link between tier 1 and tier 3, because the regulator can only take action on the service provider.
E	Resource requirements	- Access to/ implementation of systems and personnel to collect, interpret and analyse relevant data - Communication (media)



Correlation and SPI validity

What is measurement 'validity'?

- Measures represent constructs (modelling of safety)
- Correlation between measure and construct

Tier 2 to Tier 1

Tier 3 to Tier 2

Tier 3 to Tier 1 via influence on Tier 2



Challenges: Immediate and future

- How to effectively measure processes
- Measurement validity in decreasing accident rates
- Risk-based resource targeting
- Safety Management process measurement and assessment methods
- System description/analysis techniques
- Integration of safety culture assessment

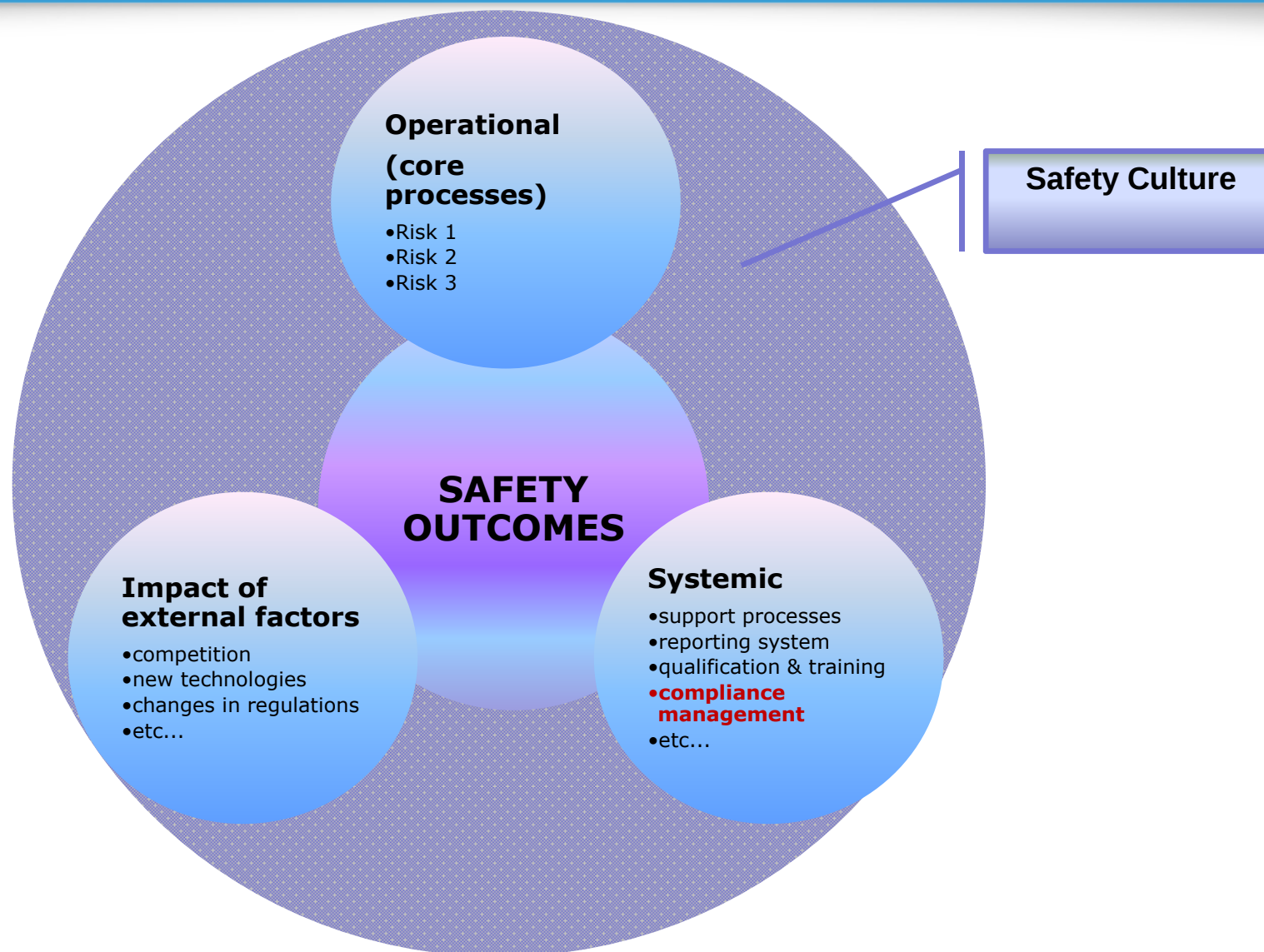


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'Components' of safety performance





Compliance and Safety Risk Management

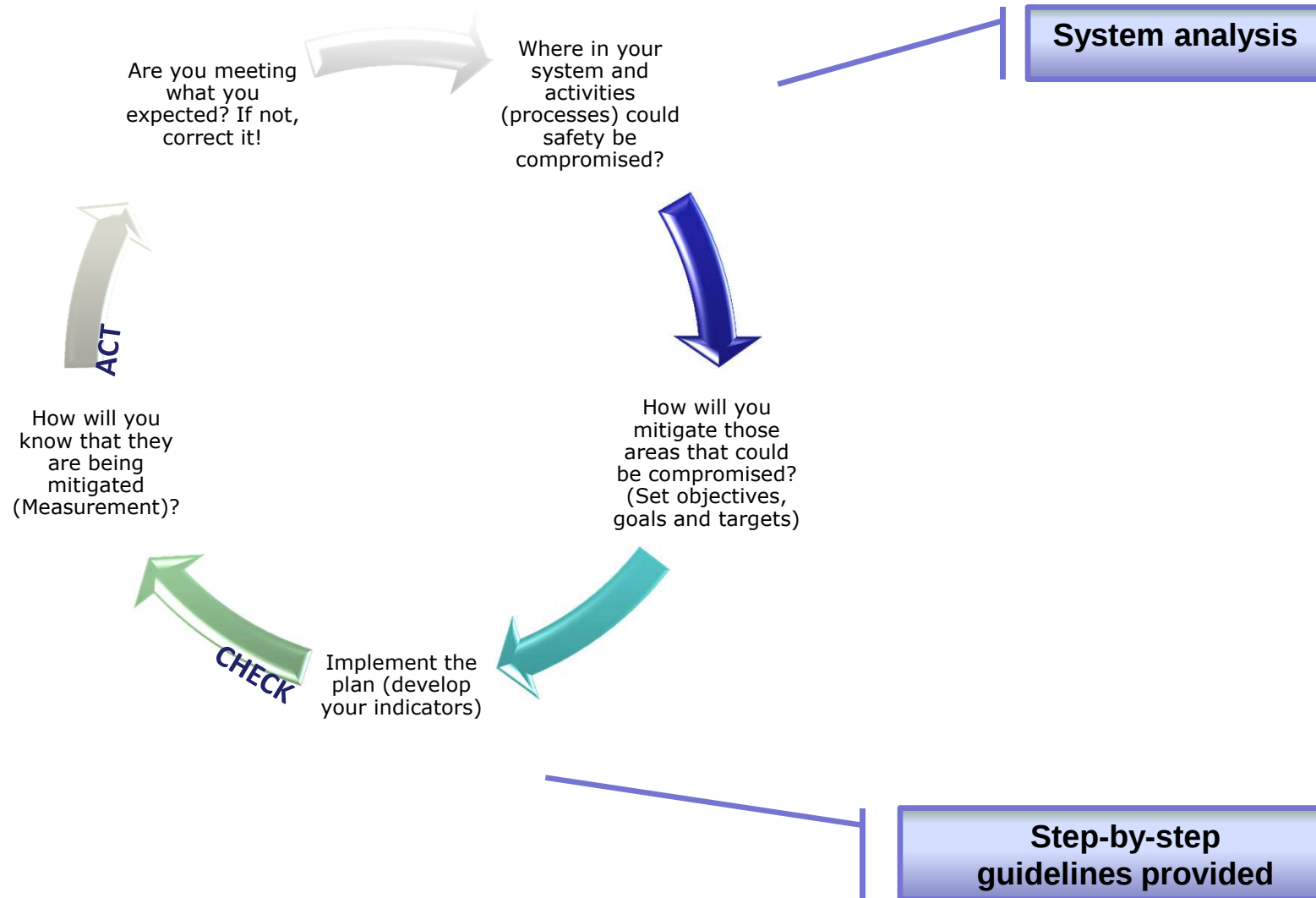
Most rules refer to risk in technical/operational processes

- Design standards
- Operating limitations
- Training standards
- Maintenance requirements, etc.

Rules are made for “common cause” hazards - affect all of a “class”



Plan-Do-Check-Act





Risks and challenges:

- Finding the right balance:
 - process measures ./ outcome measures
 - indicators to monitor ./ indicators to drive performance
- Being able to deliver the bigger picture
 - challenge results
 - assess indicators in combination
- Effectively integrating SPIs with Safety Risk Management
- Indicator 'seduction' (overreliance on positive results / complacency)
and:
 - Management commitment



Next steps

soon to be published on Skybrary



- Measuring Safety Performance - Guidelines for service providers

I. Concept & definitions

II. Process for developing SPIs

***III. SPI examples: for systemic
issues and operational (per
type of service provider)***



A Systems Approach to Measuring Safety Performance

- The Regulator Perspective -

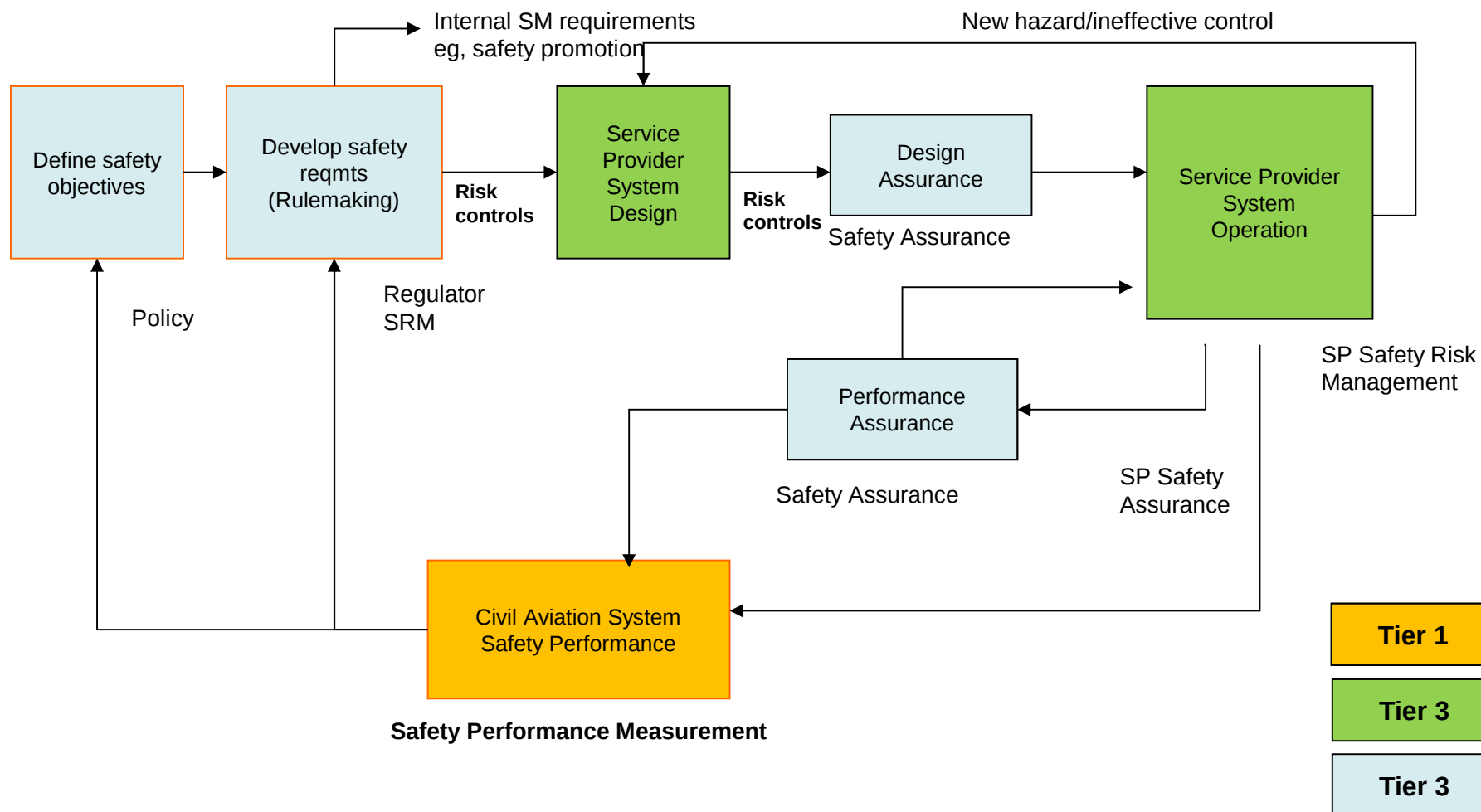
***I. Aviation system
characteristics***

***II. The safety measurement
system***

***Attachment: Tier1/2/3
Guidance & examples***



Outlook: SPMA - process





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Thank you for your attention!

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