



Measuring Safety in Aviation

Wednesday, 24-5-2017 | 9:15 – 10:15

PRESENTED BY:

Dr. Nektarios Karanikas

Aviation Academy, Amsterdam University of Applied Sciences

EBACE
22-24 MAY 2017 | GENEVA

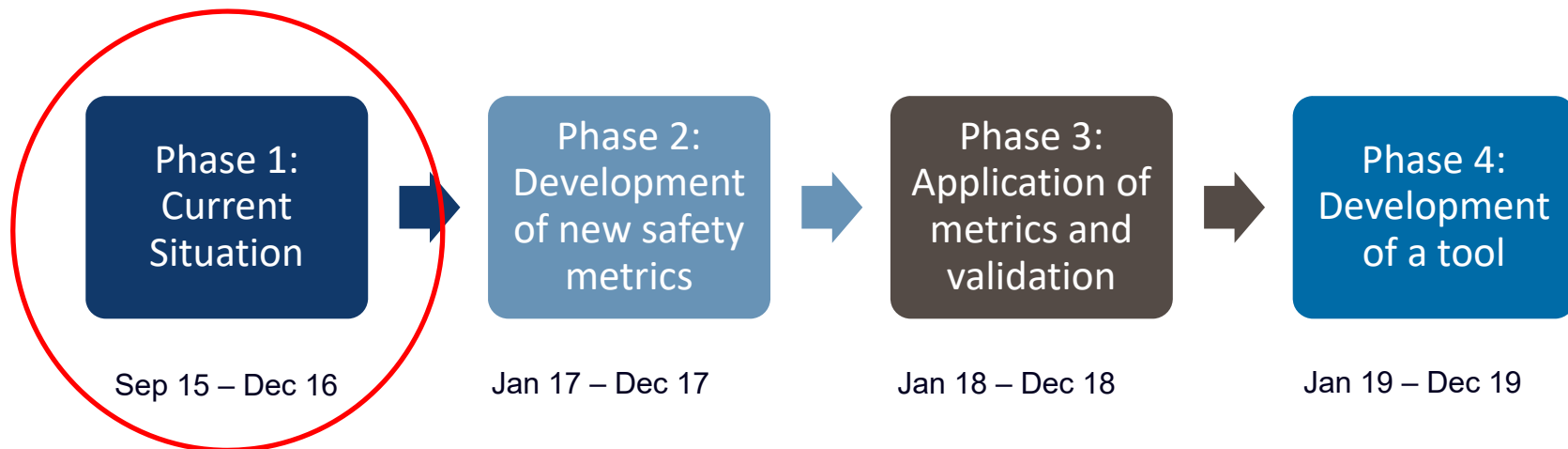
Current Challenges

(Results from roundtable with companies)

- **Small – Medium Enterprises:** lack of adequate safety/operational data to monitor day-to-day safety.
- **Large companies:** operational/safety data available, but they need metrics of better quality.
- **Transition** from compliance-based to performance-based performance monitoring.
- **Need for valid and practical safety metrics** that do not require a lot of operational/safety data.

The journey

Completed phase



Overall Situation

(Results from review of literature, standards and reports)

- **Accidents** are mainly used in safety performance measurement.
- **The ambiguity in the thresholds** of (serious) incidents does not allow their use in safety performance measurement.
- **Safety metrics can be split into two groups:** safety process and safety outcome metrics.
- **There is no proven relation** between safety processes and outcomes.
- **Current safety metrics lack validity** because they lie mainly on the safety viewpoint adopted.
- **No quality criteria** for developing safety metrics are referred in the standards.

Current Practice

(Results from surveys to aviation companies)

- **A compliance-based approach** is followed for SMS assessment.
- **Companies do not use predefined quality criteria** for the design of their safety metrics.
- **Most of the companies follow linear safety approaches**, due to the confidence and trust to industry practice and accumulated experience.
- **Safety culture** is seen as important part of safety management, but not assessed consistently.

Processes and Outcomes

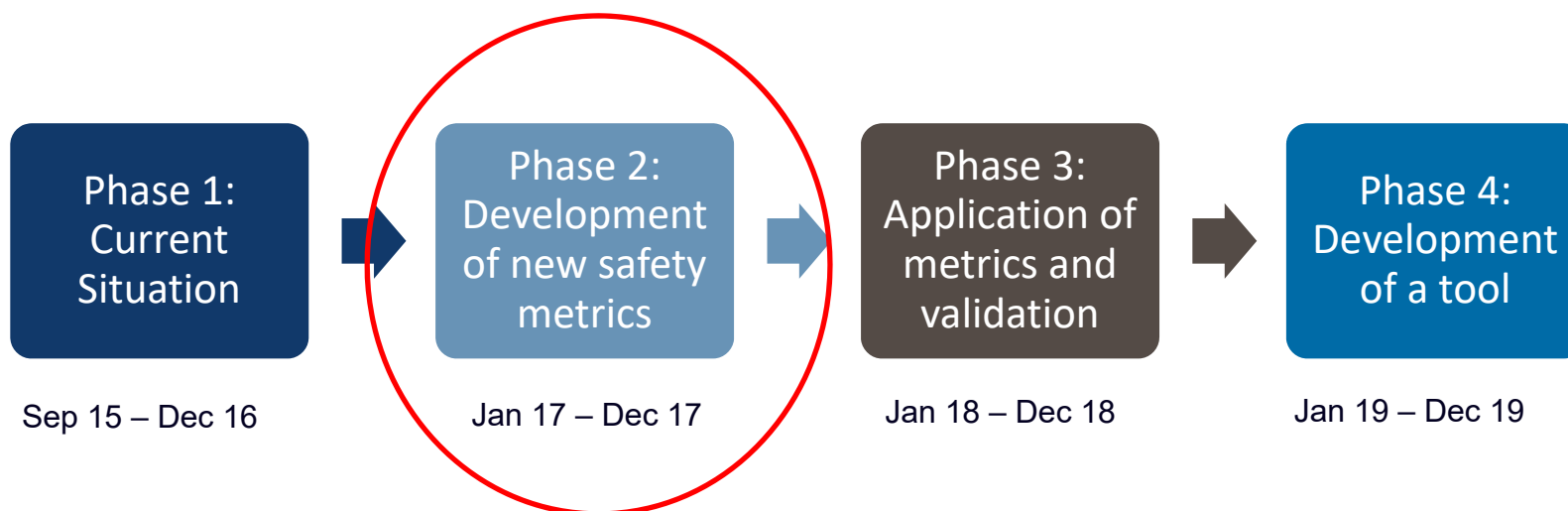
(Results from surveys to aviation companies)

- **No strong evidence for the relation** of activity, demographic and SMS process data with safety outcomes.
- **Only in a few companies** some associations exist, and occasionally, those had opposite directions at different organizations.
- Results were attributed to the **different interpretations** of thresholds of safety outcomes, **diversity in SMS implementation**, and limited value of the **linear approach to safety**.

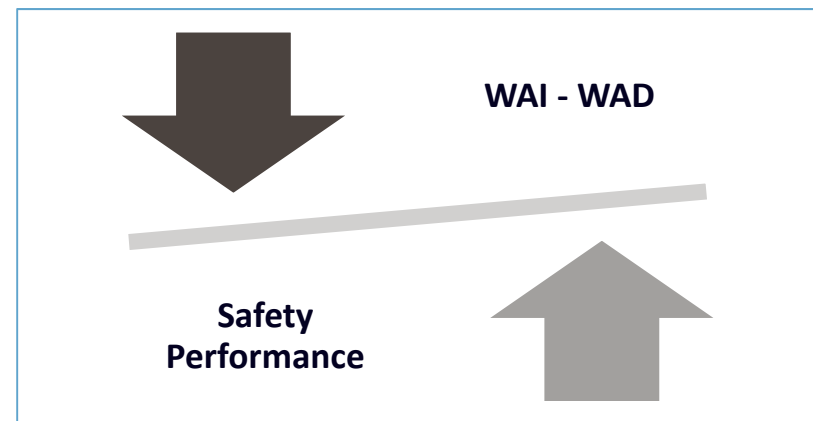
Kaspers, S., Karanikas, N., Roelen, A., Piric, S., van Aalst, R. & de Boer, R.J. (2017). Measuring Safety in Aviation: Empirical Results about the Relation between Safety Outcomes and Safety Management System Processes, Operational Activities and Demographic Data, PESARO 2017: The Seventh International Conference on Performance, Safety and Robustness in Complex Systems and Applications, IARIA, pp. 9-16

The journey

Current phase



The main concept



- In practice, the industry considers those gaps, **but we haven't uniformly depicted/measured those and searched** for their effects.
- We will focus on the gap; we do **not claim authenticity of either WAD or WAI.**

Depicting the gap

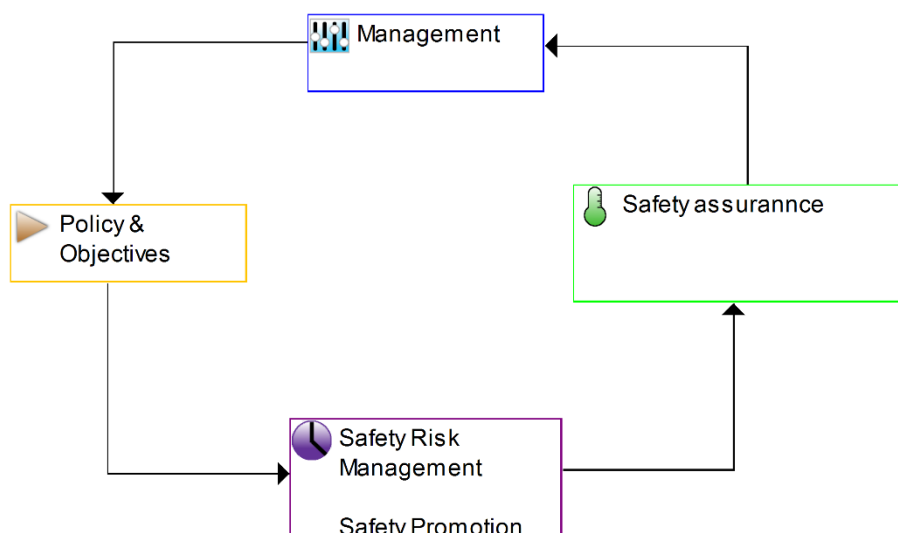
Metrics that reflect published theories and encompass various areas of safety management

- Wal-WaD at the operational process level
- Safety space & resource scarcity
- Evaluation of Safety Management Systems
- Effectiveness of risk controls
- System complexity and coupling
- Safety culture



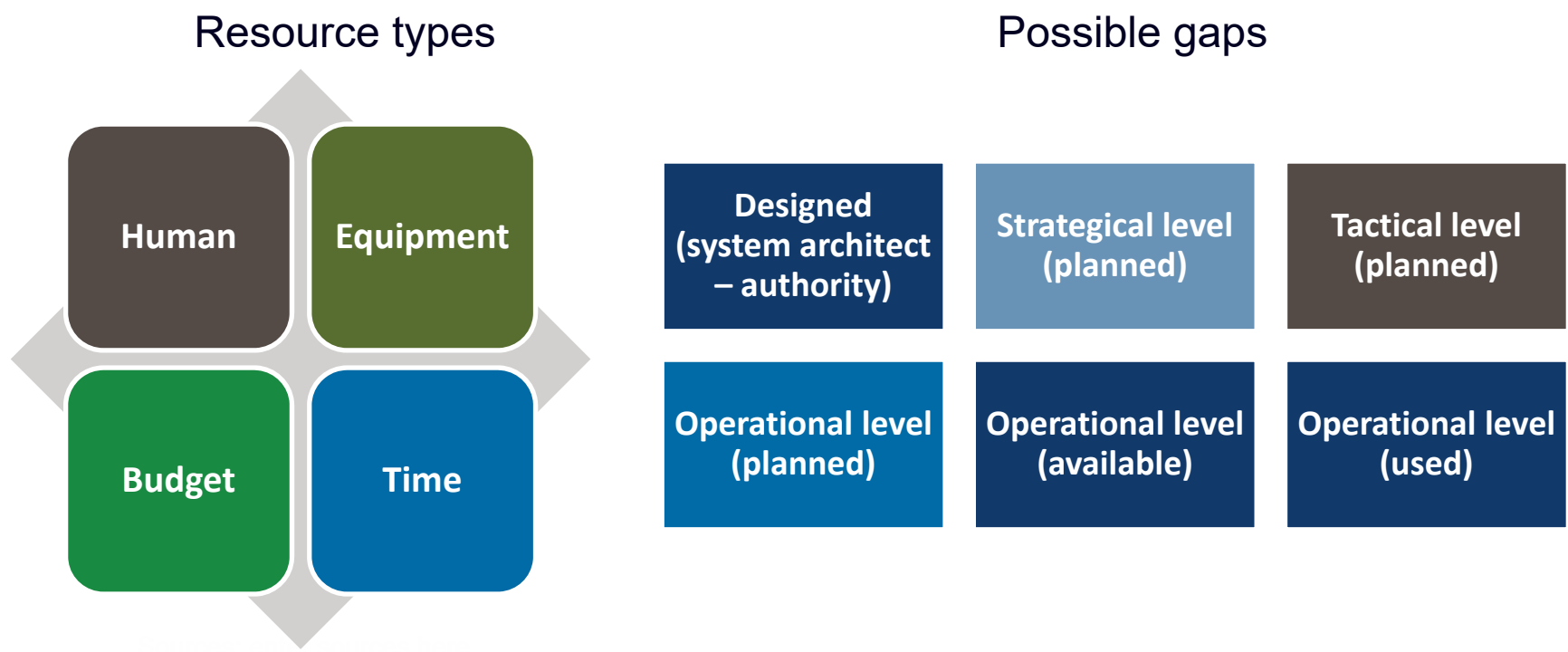
Example: Assessment of Safety Management Systems

Application of Systems-based Hazard Analysis



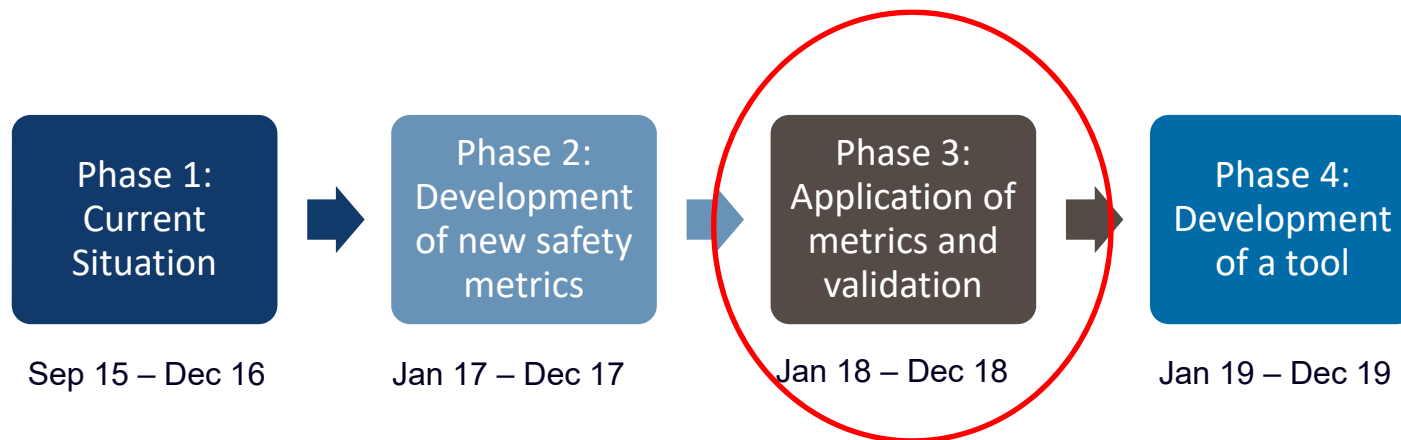
- **Evaluation step 1:** Whether SMS functions according to standards
- **Evaluation step 2:** Why SMS does not function according to standards or does not meet its objectives.
- SMS assessment tool components: **Checklist, scoring and guidance** for its use.

Example: Safety space & resource scarcity



The journey

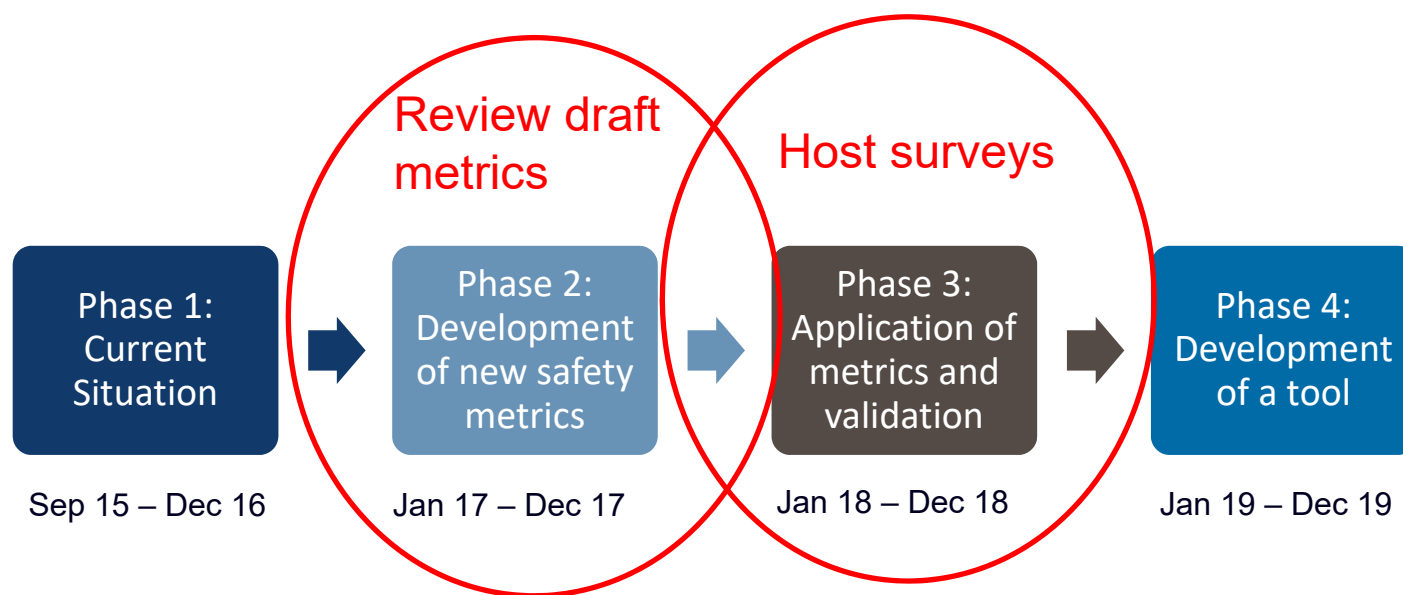
Next phase



Processes VS Outcomes

The journey

Your engagement is very important



Company benefits (1/2)

- **Contribution in research** serving the industry needs. The more the number of partners from various domains, the higher the validity, scalability and practicality of the deliverables.
- **Demonstration to authorities** of active interest in safety initiatives.
- **Acknowledgment of contribution in technical reports** and international publications and presentations (where the company contributed).
- **Reception of own results** from application of tools/metrics in the company, with tailored recommendations and benchmarking across the other partners (anonymously).

Company benefits (2/2)

- **Participation in the annual project meeting** to exchange views and jointly drive the research to the right direction (travel expenses reimbursed for non-NL European partners).
- **Upload of company logo** on the website of the research project for the duration of contribution.
- **Reduced registration fees** for the Aviation Academy events and master classes.
- **Free inhouse workshop on a selected topic** (during surveys for application of metrics).

But above all benefits...

**because improving safety
is our social responsibility!**

On behalf of the team, many thanks!





Measuring Safety in Aviation

Wednesday, 24-5-2017 | 9:15 – 10:15

PRESENTED BY:

Dr. Nektarios Karanikas

Aviation Academy, Amsterdam University of Applied Sciences

Information: n.karanikas@hva.nl

EBACE
22-24 MAY 2017 | GENEVA