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MEASURING SAFETY IN AVIATION - DEVELOPING METRICS FOR SAFETY MANAGEMENT SYSTEMS

SMICG
Rome, May 27th 2016
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CREATING TOMORROW

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AUAS IS THE BIGGEST INSITUTE OF TERTIARY EDUCATION IN THE NETHERLANDS

- Amsterdam University of Applied Sciences
  - 43,000 students
  - 80 bachelor and master programmes
  - seven schools
- Aviation Academy is part of the School of Technology.
  - 4 year BSc program
  - 425 new students each year
  - A total of 1300 students
  - MSc in development
  - Several PhD candidates

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AVIATION ACADEMY - MISSION

- The Aviation Academy was created to serve the European aviation industry. Our mission is to provide the current and next generation of professionals with the skills they need to meet the international aviation challenges of the next 10 to 15 years.

- Goal is to become one of the top Aviation institutions in Europe at the level of Universities of Applied Sciences

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2014: WINNER OF THE DUTCH EXCELLENCE IN AVIATION EDUCATION AWARD

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AVIATION ACADEMY: MAIN THEMES ARE ON OPERATIONAL READINESS

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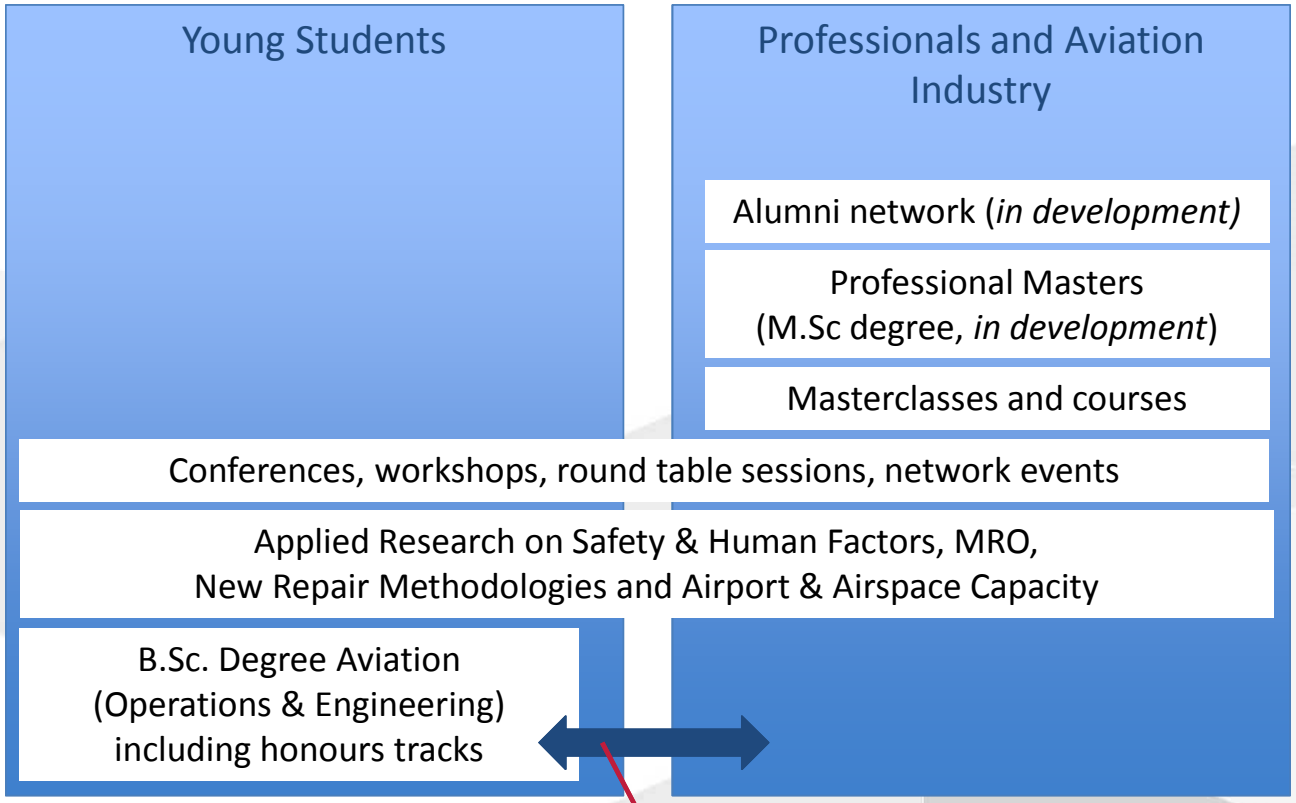
AVIATION ACADEMY: ACTIVITIES



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BACKGROUND & OBJECTIVE OF THE PROJECT

www.international.hva.nl

SAFETY MANAGEMENT
INTERNATIONAL COLLABORATION GROUP

Measuring Safety Performance Guidelines for Service Providers

Executive Summary

The objective of this paper is to provide guidelines for the definition and implementation of a set of safety performance indicators as part of your safety management system.

This document proposes an approach to safety performance measurement aiming at increasing your company's potential for effective safety management that considers systemic and operational issues. Effective safety performance measurement will be decisive in driving your safety management system towards excellence.

Throughout this document:

- any reference to the term 'service provider' is intended to cover providers of aviation products and services;
- any reference to 'operations' is intended to mean your core activities being regulated through aviation safety regulations; and
- any reference to 'regulator' is used in the broad sense, to cover all State functions and responsibilities as relevant for the management of aviation safety.

Terms and definitions used throughout this document consider definitions contained in International Civil Aviation Organization (ICAO) Annex 19 Edition 1 and the Safety Management International Collaboration Group (SM ICG) Safety Management Terminology paper.

SAFETY MANAGEMENT INTERNATIONAL COLLABORATION GROUP
SM ICG

July 16, 2013

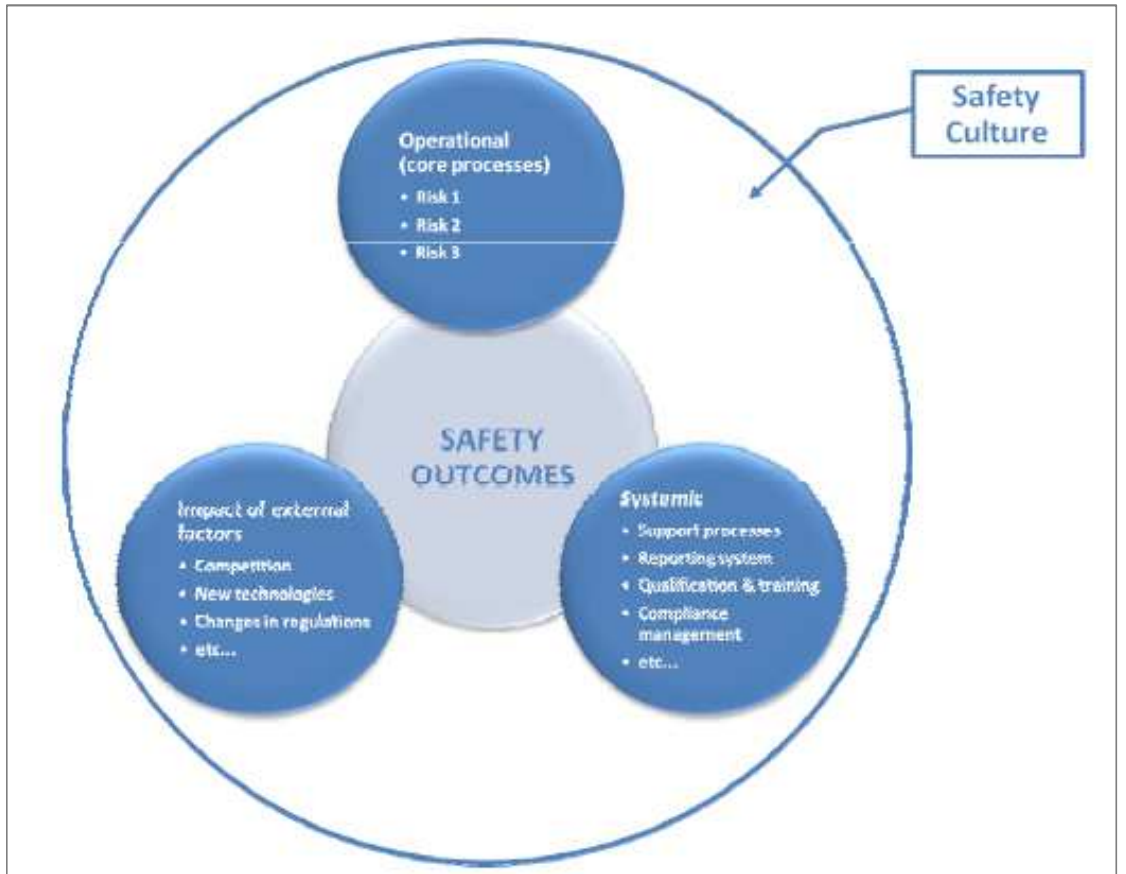

Figure 1: Components of safety performance

WE HAVE CLUSTERED ALL SAFETY METRICS INTO TWO CATEGORIES

Safety Process Metrics	Safety Outcome Metrics
Leading indicators	Lagging indicators
Upstream indicators	Downstream indicators
Predictive indicators	Historical indicators
Heading indicators	Trailing indicators
Positive indicators	Negative indicators
Active indicators	Reactive indicators
Predictive indicators	Retrospective indicators
Input indicators	Output indicators
Driving/monitoring indicators	Lagging indicators
Proactive indicators	Reactive indicators

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RESEARCH RATIONALE AND BACKGROUND

- What is the relation between safety process metrics and safety outcomes?
  - None
  - Necessary but not sufficient
  - Necessary & sufficient

Performance based oversight assumes that process metrics are necessary but not sufficient

- SMEs lack the benefit of large amount of safety-related data for monitoring safety indicators
- Large companies: Availability of safety-related data, but there is a need for more valid leading indicators

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RESEARCH OBJECTIVE

- To generate new and better ‘leading’ indicators for safety, based on
  - State-of-the-art safety theories
  - Robust empirical data

  that support the further improvement of safety metrics for:
  - SMEs by countering the lack of data
  - Large companies by generating valid leading indicators
  - Regulatory oversight by generating valid performance-based metrics

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METHODOLOGY

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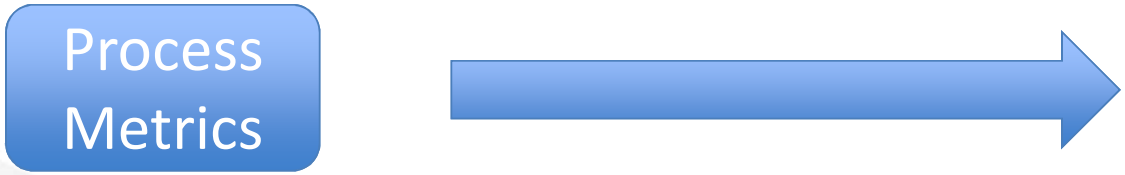
RESEARCH FRAMEWORK (1)



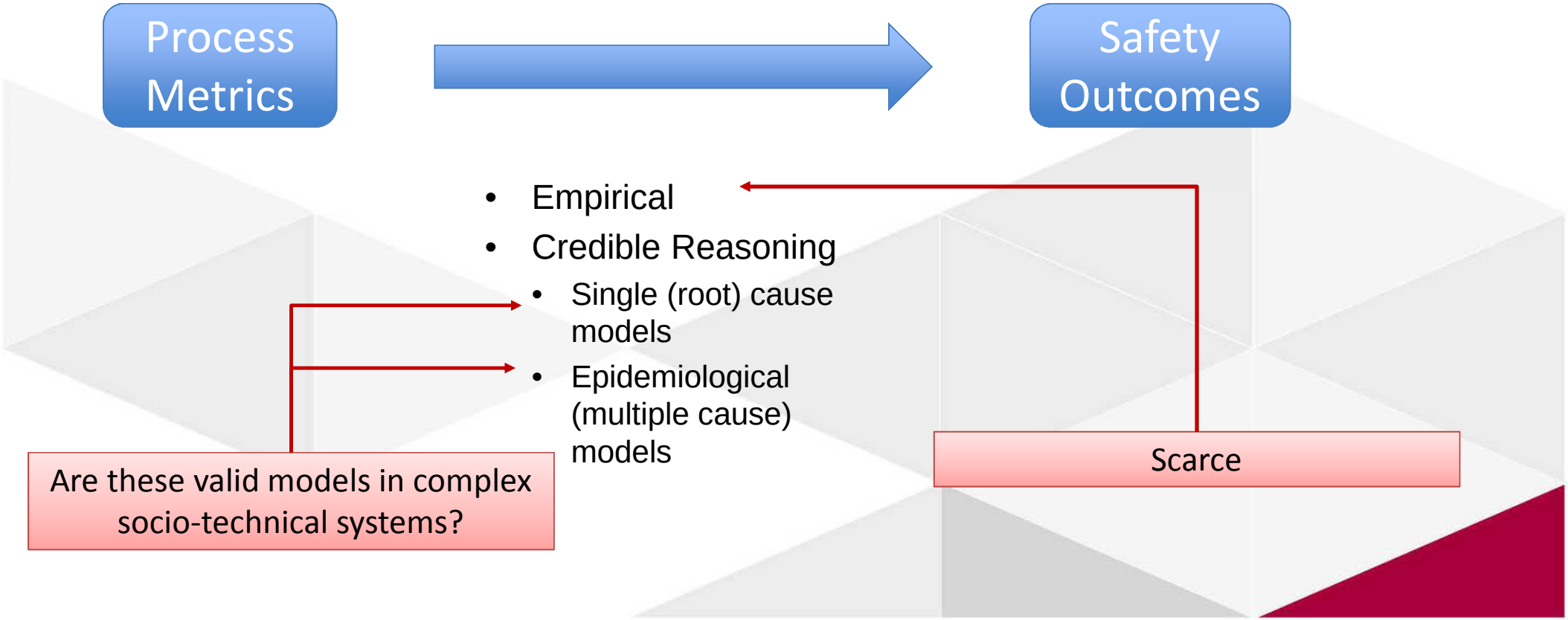
- Operational
- Processes
- Organizational
- Safety culture?

- Accidents
- (Severe) Incidents
- Occurrences
- Safety culture?

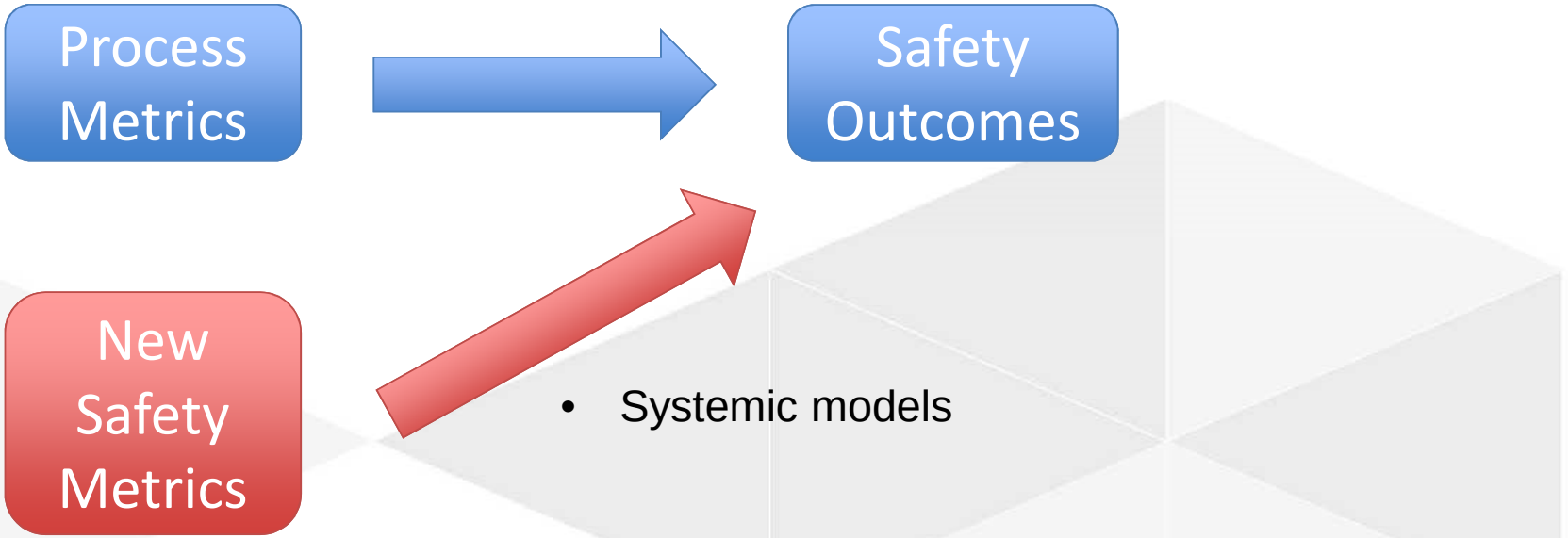
Literature not aligned:
- a result of safety management (outcome indicator), or
- a reflection and indication of how well safety management is performed (process indicator)

What constitutes the bottom threshold of an occurrence?

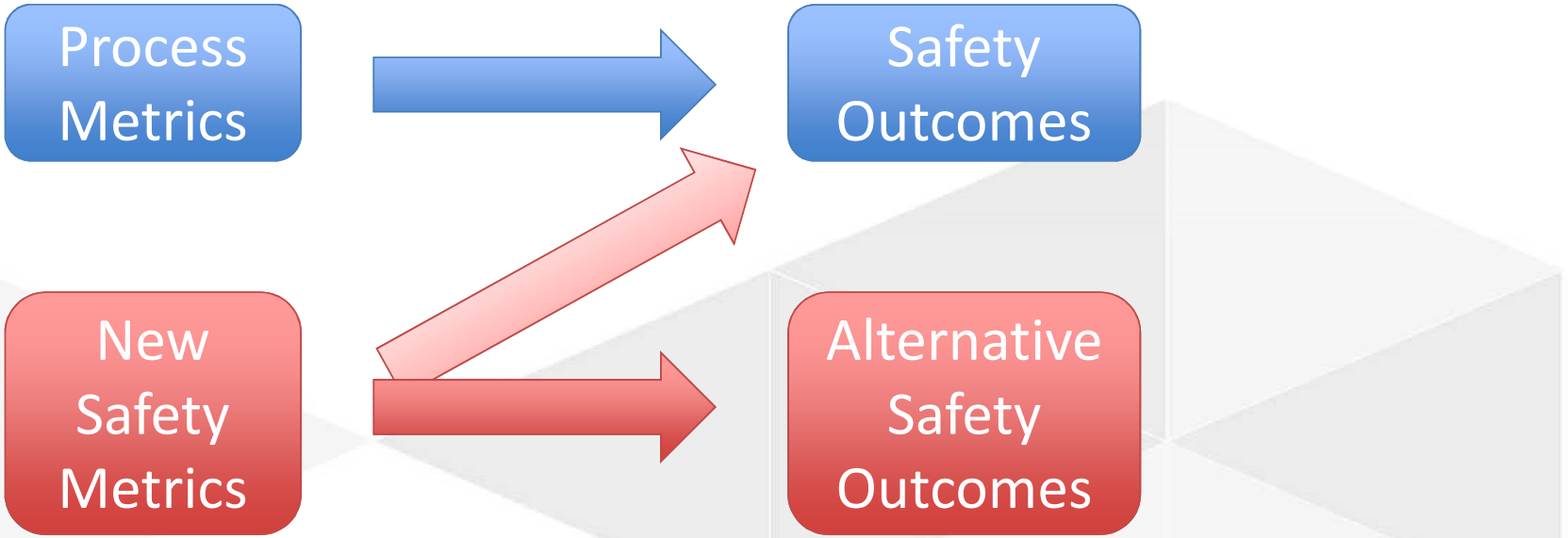
RESEARCH FRAMEWORK (2)



RESEARCH FRAMEWORK (3)



RESEARCH FRAMEWORK (4)



- Safety II
- …

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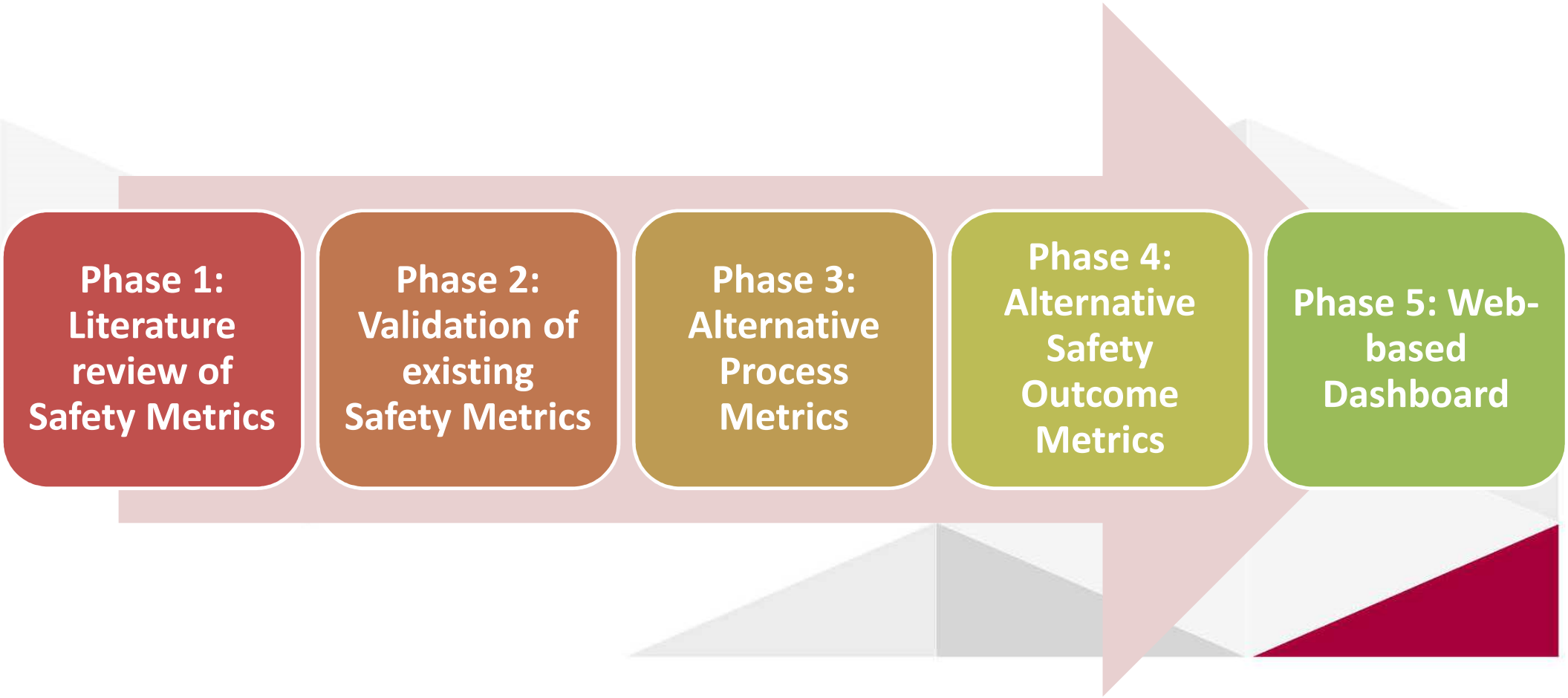
METHODOLOGY



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CURRENT PARTNERS

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EXPECTED RESULTS & APPLICATION

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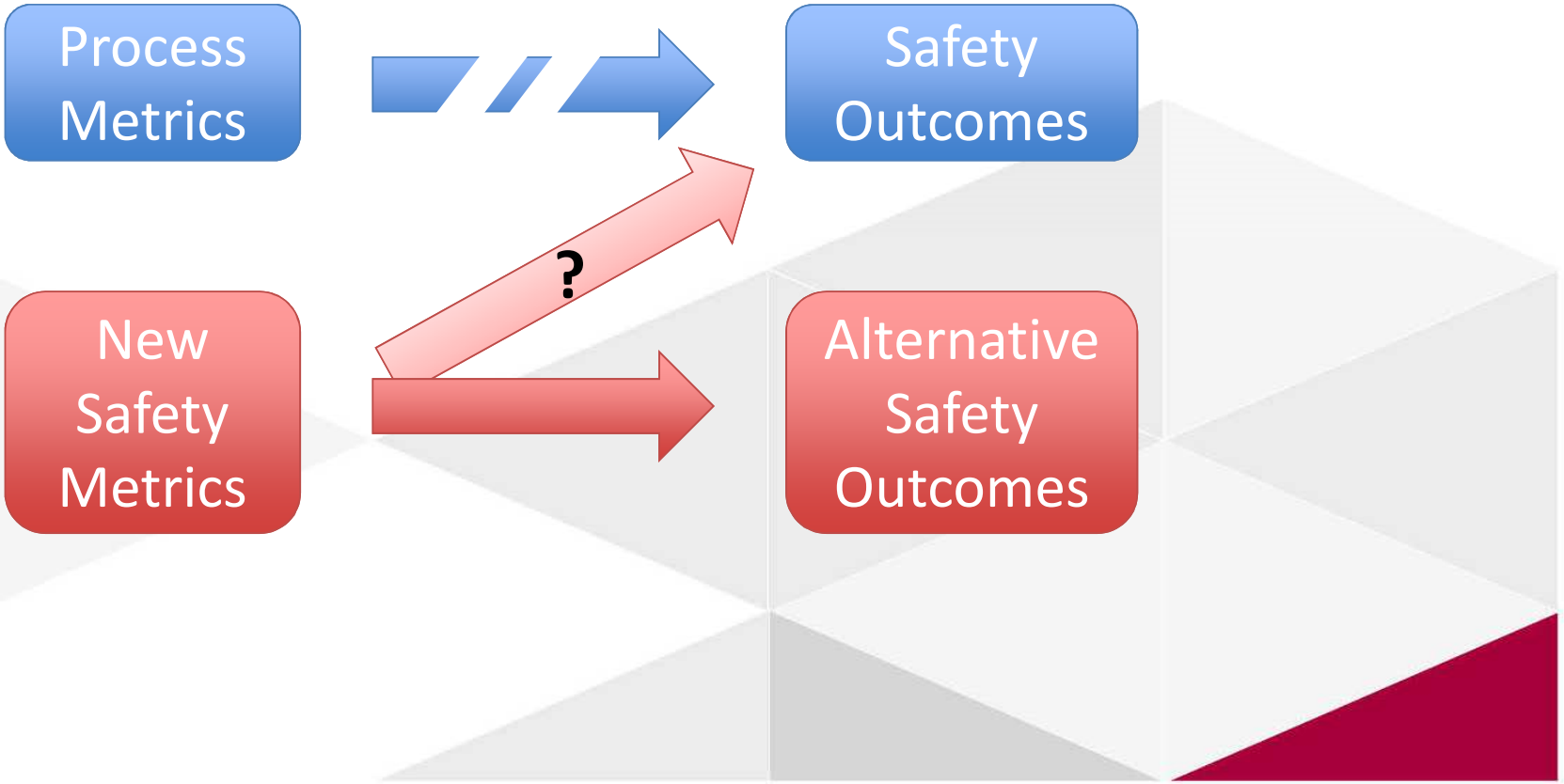
EXPECTED RESULTS: NEW SAFETY METRICS THAT BETTER SUPPORT THE IMPROVEMENT OF SAFETY



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APPLICATION

- We aim to:
  - Create a web-based dashboard to support the implementation of advanced safety metrics
  - Create guidance material for authorities, SME’s and large companies

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CALL TO ACTION

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WE WELCOME FURTHER PARTICIPANTS!

- Requirement: willingness to share safety data after signing a NDA
- Benefits:
  - direct input into project
  - first insight into deliverables
  - better understanding of results
- Contact Robert J. de Boer, professor of Aviation Engineering
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  - www.hva.nl/aviation
  - Follow me on Twitter: Robert_J_deBoer