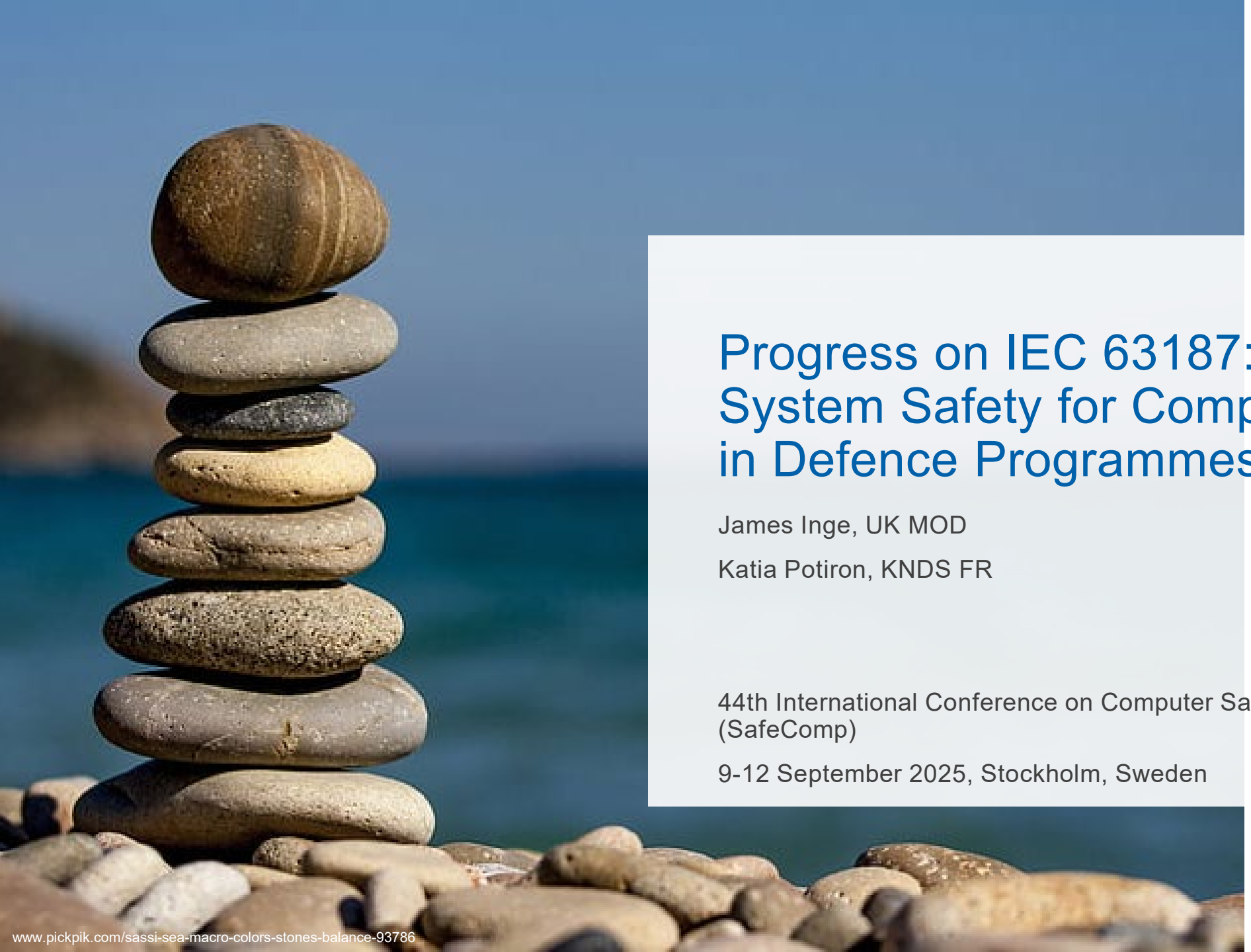


Progress on IEC 63187: System Safety for Complex Systems in Defence Programmes

James Inge, UK MOD

Katia Potiron, KNDS FR

44th International Conference on Computer Safety, Reliability and Security (SafeComp)

9-12 September 2025, Stockholm, Sweden

www.pickpik.com/sassi-sea-macro-colors-stones-balance-93786

Acknowledgements and Disclaimer

- The authors acknowledge the work of the IEC SC 65A *Systems Aspects* committee Working Group 18 *System Safety of Complex Systems in Defence Programmes*, whose work is making IEC 63187 possible.

- The views expressed in this presentation are the authors' own and do not necessarily represent those of the IEC, KNDS or the Ministry of Defence.
- Details of the IEC 63187 standard are liable to change as it develops through the drafting and publication and approval process.

65A/1187/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: IEC 63187-1 ED1

DATE OF CIRCULATION: 2025-09-05

CLOSING DATE FOR VOTING: 2025-11-28

SUPERSEDES DOCUMENTS: 65A/1122/NP, 65A/1186/RVN

IEC SC 65A : SYSTEM ASPECTS

SECRETARIAT: United Kingdom

SECRETARY: Ms Stephanie Lavy

OF INTEREST TO THE FOLLOWING COMMITTEES: TC 65,ACOS

HORIZONTAL FUNCTION(S): TC 65/SC 65A Horizontal Basic Safety

ASPECTS CONCERNED: Safety

☒ SUBMITTED FOR CENELEC PARALLEL VOTING

☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes. Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE: Systems engineering – System safety – Complex systems in defence programmes Part 1 – Concepts, terminology and requirements

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

Committee Draft for Vote released 5 Sep 2025

What is IEC 63187?

TC65 Industrial-process measurement, control and automation

SC65A System aspects

WG18 System safety of complex systems in defence programmes

IEC 63187: Systems engineering – System safety – Complex systems in defence programmes

IEC 63187-1

Part 1 – Concepts, terminology and requirements

Part 0?

IEC TR 63187-2

Part 2 – Guidance on application

Who's involved?

Why are we doing it?

Market evolving towards:

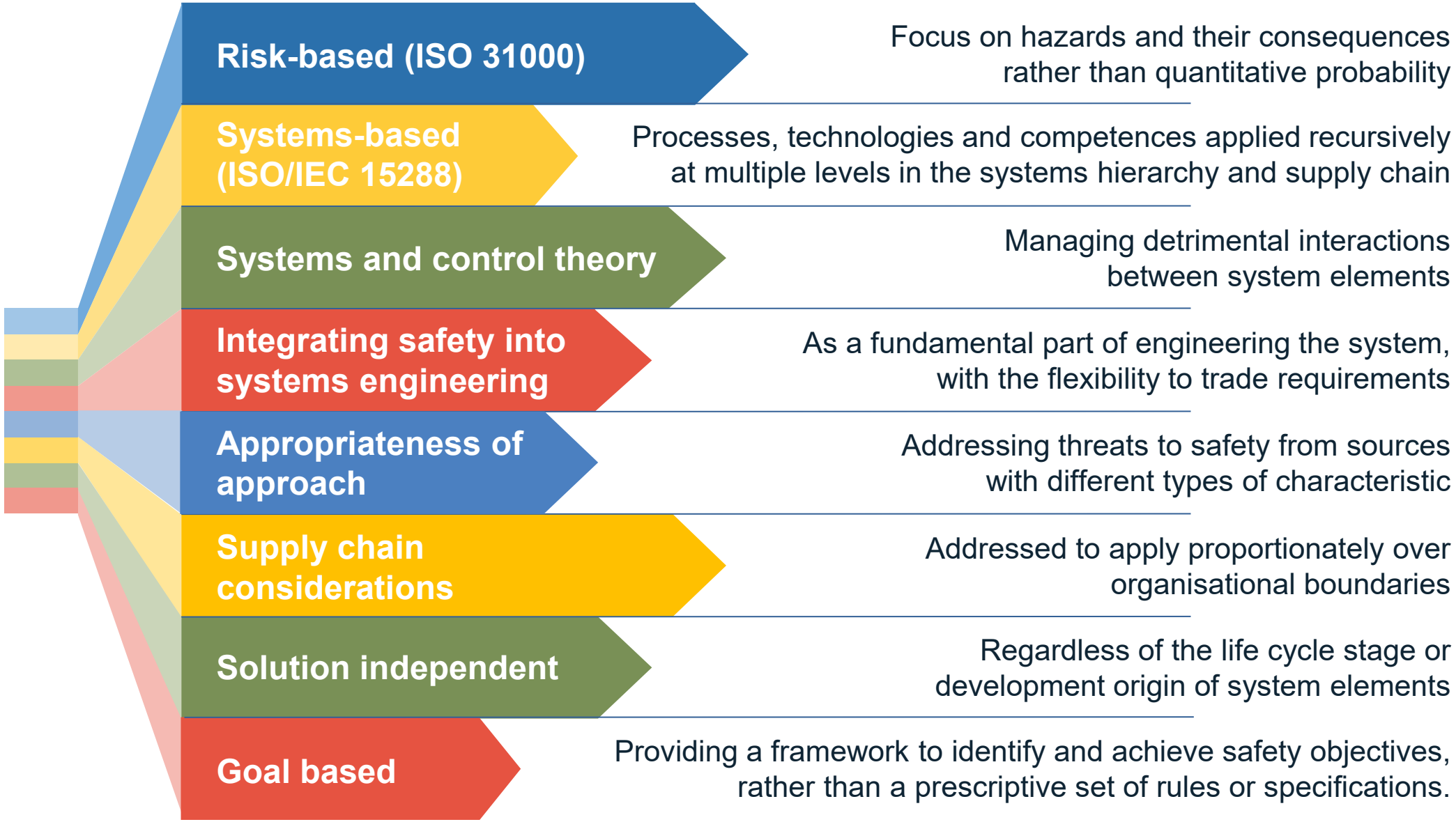
- More **complex** systems with **complex** functions and **complex** architectures
- **Fewer humans in the loop** to handle safety
- New technologies and impact of new usages of technologies
- **Dynamically evolving risks**

Source: Linkedin

Existing safety standards do not:

- Align with **system engineering**
- Address **multi-layered systems** recursively
- Capture **emergent behaviours** at system level (detrimental effects without failure occurring)
- Allow full interaction with **other engineering domains**

IEC 63187-1 fundamental principles



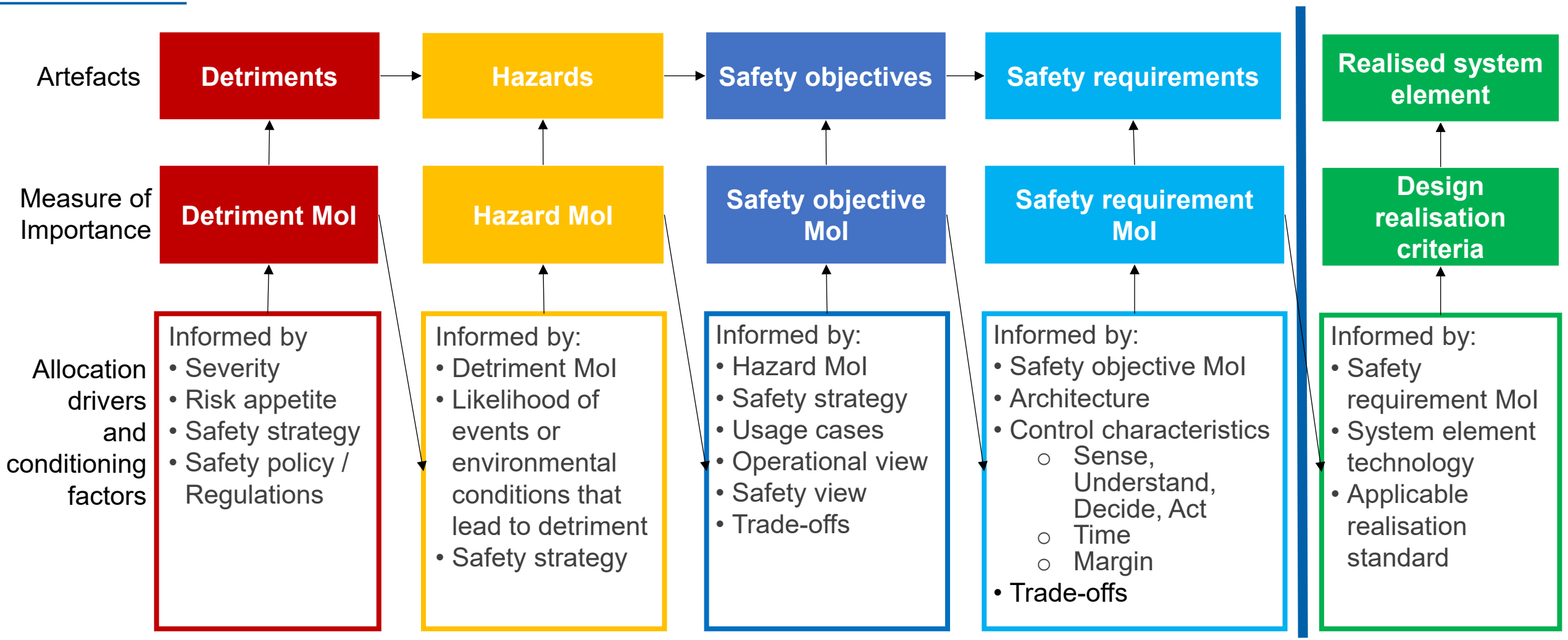
What's new since last year?

- Comments from previous Part 1 drafts addressed
- Explanation of the concepts improved in informative annexes
- Better alignment with ISO/IEC/IEEE 15288:2023
- Improved treatment of requirements for
  - Human factors
  - Enabling and interfacing systems
  - Performance measurement
  - Routes to realisation
- Part 1 Committee Draft for Vote produced
- Part 2 guidance substantially improved
- Discussions on a potential Part 0 to give an overview of the IEC 63187 concepts (not currently a formal proposal)

How do I demonstrate the system is safe?

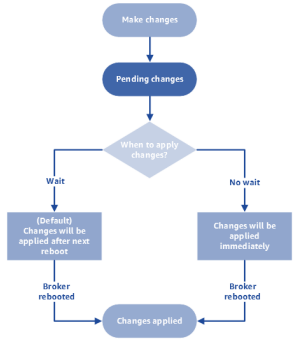
- Identify relevant hazards for the system (throughout its life cycle)
- Ensure the requirements on the system, its operation and its life cycle address its contribution to hazards at the root cause level and also at control structure level
- Decompose and allocate the requirements, while maintaining their effectiveness
- Identify and treat emergent emerging properties and behaviours of the system that contribute to detriments and hazards
- Ensure satisfaction of the safety requirements that address the system's contribution to hazards
- Gain assurance and confidence in the above, proportionate to the system's contribution to risk and maintain that confidence throughout the system life cycle

Measures of Importance



Recursive instantiation of IEC 63187-1 across organisations

Organisation A Lifecycle



Instantiation of the standard in Organisation A

Input 1 · Input 2 · Process A · Process B · Process C · Output 1 · Output 2

Process interactions within Lifecycle A

Level N

Process interactions between organisations and tiers

Instantiation of the standard in Organisation B

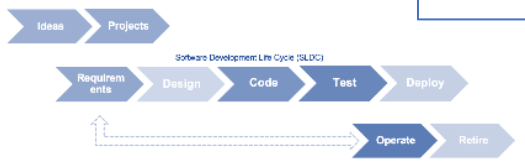
Input 1 · Input 2 · Process A · Process B · Process C · Output 1 · Output 2

Level N+1

Instantiation of the standard in Organisation C

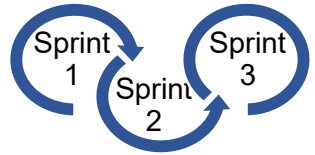
Input 1 · Input 2 · Process A · Process B · Process C · Output 1 · Output 2

Level N+1



Organisation B Lifecycle

Organisation C Lifecycle



Agile approach

When can I get it?

- 2017
  - New Work Item Proposal
- 2018
  - Proposal accepted
  - IEC 63187 drafting work starts
- 2019
  - Decision to create IEC TR 63187-2 guidance document
- 2022
  - Committee Draft (CD1) circulated
  - 178 reviewer comments received
- 2024
  - Project cancelled due to 5-year rule
  - CD2 circulated
  - SC65A votes to restart project
- 2025
  - Comment resolution and refinement
  - Committee Draft for Vote (CDV)
- 2026
  - Final Draft International Standard (FDIS)
  - Publication of IEC 63187-1 and IEC TR 63187-2

Future dates subject to committee approval!

SafeComp 2024 Position Paper

Motivation, goals, principles and approach

https://www.safecomp2024.unifi.it/upload/sub/other/position%20papers/SAFECOMP2024_paper_101.pdf

SafeComp 2025 Position Paper

Update on current progress

https://hal.science/hal-05240620

SafeComp 2025 Poster

Key points in more detail

https://safety.inge.org.uk/20250904-SafeComp_IEC63187_Poster-O.pdf

IEC Project Dashboard

Track progress towards publication

https://www.iec.ch/dyn/www/f?p=103:38:411633489072730::::FSP_ORG_ID,FSP_APEX_PAGE,FSP_PROJECT_ID:1369,23,126413

Thank you