
Forum
TERATEC
20 - 21 OCTOBRE 2026
PARIS · PALAIS DES CONGRÈS

Simulation process: scientific computing and verification and validation in naval defence

Damien LAVAL – Scientific manager Naval Group

EXPERTISE IN NAVAL DEFENCE

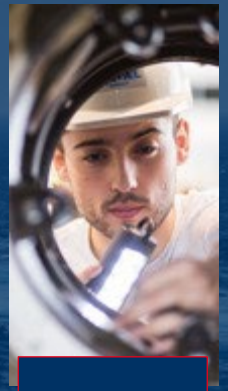
Prime Contractor and System designer-integrator

- Whole warship
- Systems
- Combat Management System (CMS) and Integrated Platform Management System (IPMS)

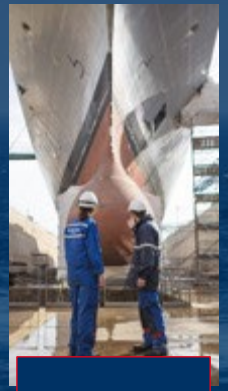
Involved throughout the life cycle



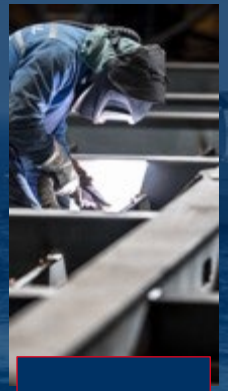
DESIGN AND PREPARE



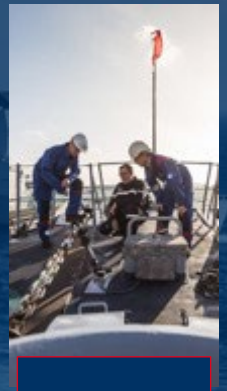
PRODUCE AND INTEGRATE



TRAIN AND /SUPPORT



MAINTAIN, SERVICE, MODERNISE



DISMANTLE AND DECONSTRUCT

Corporate Sensitivity
PUBLIC

© Property of Naval Group SA 2022
All rights reserved

TECHNOLOGICAL INNOVATION CONTINUES

- **ANTICIPATING** the operational needs of tomorrow
- **PREPARING** the integration of new technologies in line with naval defence specificities
- **DEVELOPING** open innovation and international markets

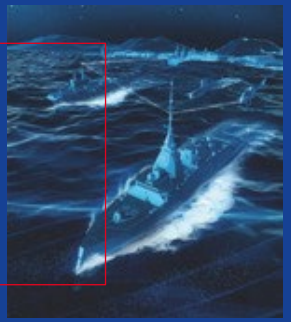
Sustainability

Staying at sea in complete safety



Commitment superiority

Cybersecurity, stealth and robustness





Information superiority

Knowing better and before others

Corporate Sensitivity
PUBLIC

© Property of Naval Group SA 2022
All rights reserved

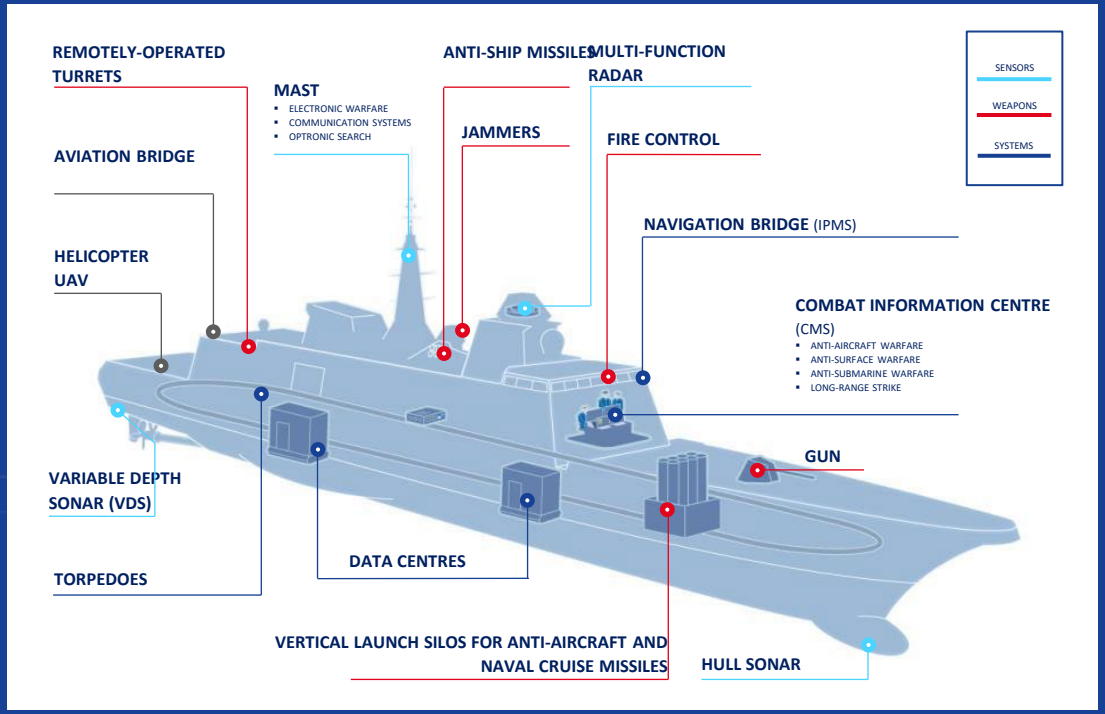
SYSTEMS OFFERING:
INTEGRATED SYSTEM MANAGEMENT

Control of overall performance

Optimisation of whole warship

Platform and systems co-engineering





Corporate Sensitivity
PUBLIC

© Property of Naval Group SA 2022
All rights reserved

SYSTEMS OFFERING: TIME MANAGEMENT

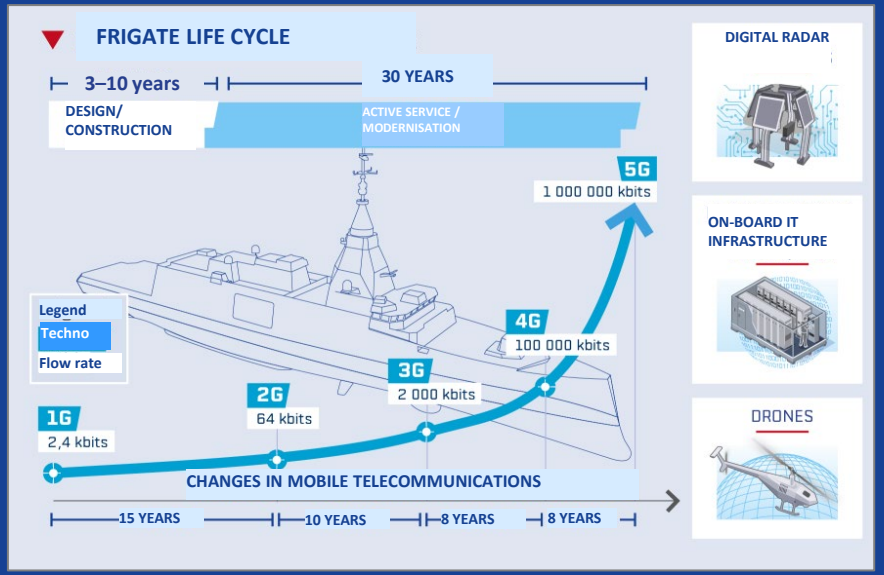
TIME MANAGEMENT IN OPERATIONS

Continuously and durably guaranteeing real-time system response



CONTROL OF TECHNOLOGICAL TIME

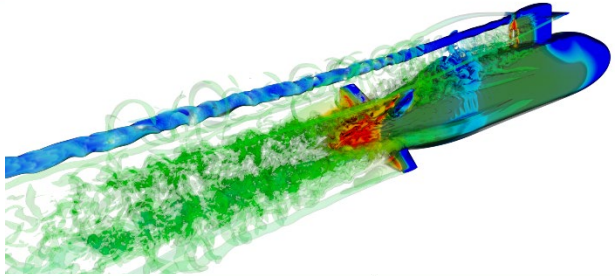
Adapt to short technological cycles:
Innovation, digitisation, automation

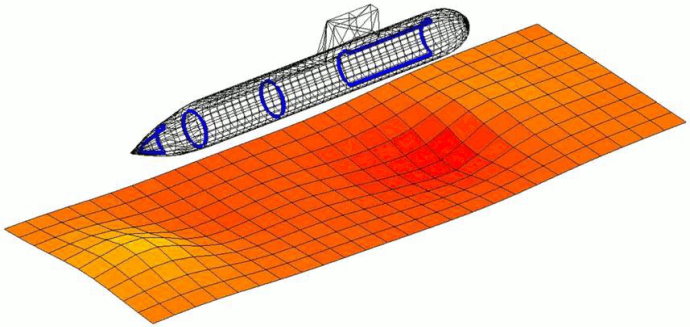


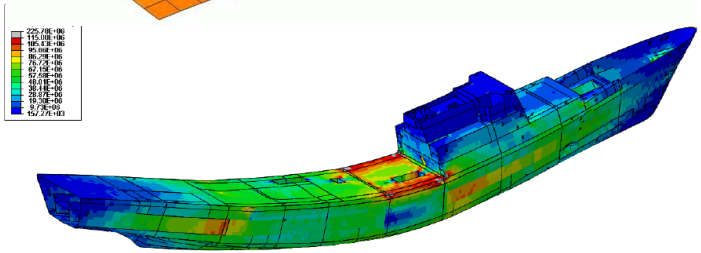
Corporate Sensitivity
PUBLIC

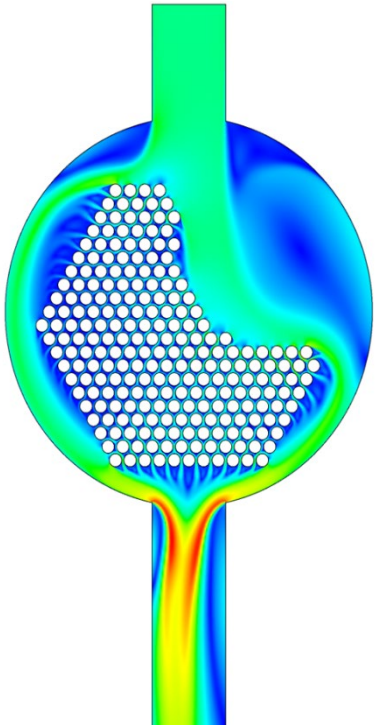
© Property of Naval Group SA 2022
All rights reserved

V&V in numerical simulation

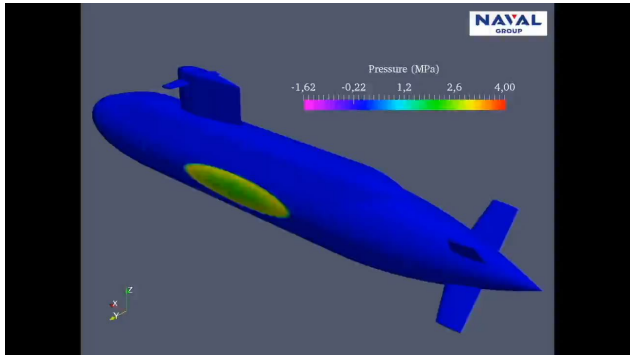












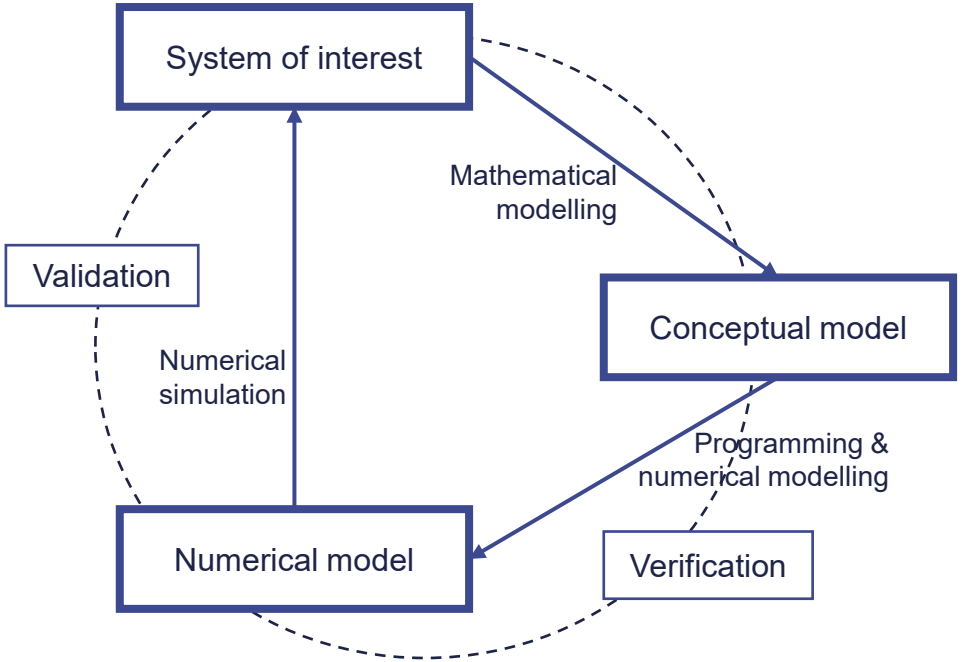
V&V in numerical simulation

- Physical fields : structural mechanics, rapid dynamics, vibration mechanics, hydrodynamics, reactive fluid mechanics, acoustics (from very low frequency to ultra-high frequency), electromagnetism (from field analysis to high-frequency diffraction), infrared, visual, materials, …

- Military peformances : the need for technical expertise in simulation models to ensure the accuracy and robustness of the results.

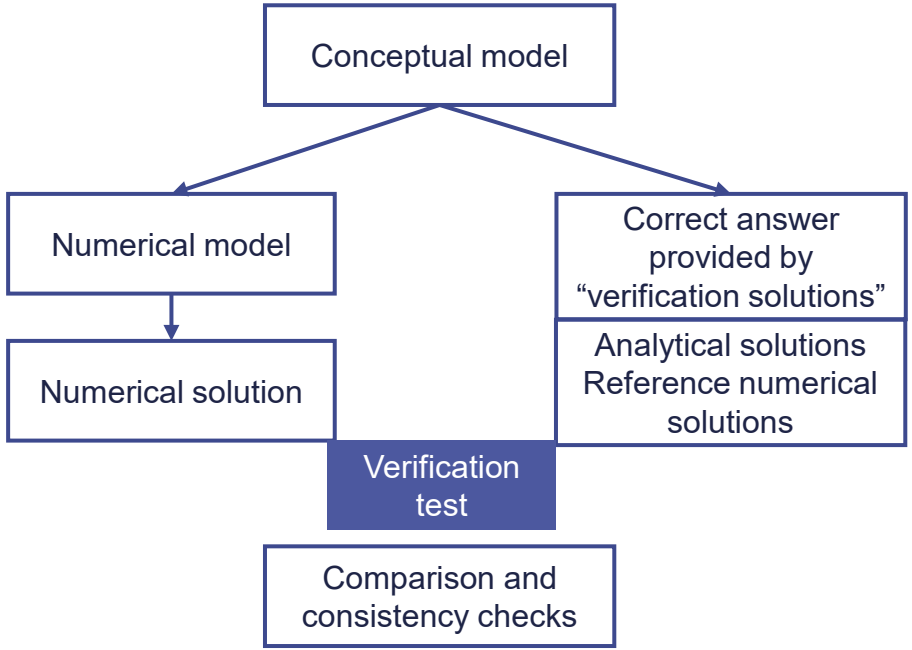
V&V in numerical simulation

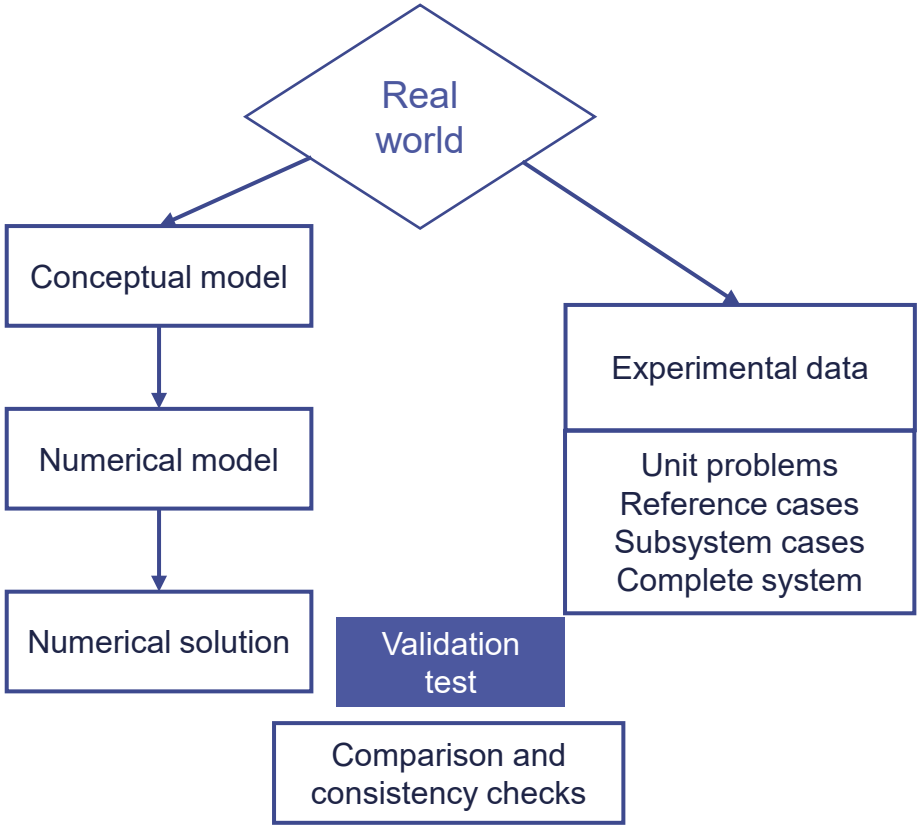
A reliable verification and validation process to ensure the accuracy and robustness of the numerical simulation processes required for the development of complex systems



V&V in numerical simulation

Forum TERATEC
20 - 21 OCTOBRE 2026
PARIS · PALAIS DES CONGRÈS





The need for speed

- In order to optimise systems, the use of **fast** and accurate models is essential!

Is Artificial Intelligence a solution?

- The use of AI for model reduction and metamodelling is a ‘traditional’ practice that is now well-established through the application of the V&V process.

- For the use of AI instead of numerical simulation, the V&V process does not apply.

V&V in artificial intelligence

AI Risks, Trustworthiness and its Attributes

The development and adoption of AI are accompanied by an urgent need: to ensure reliability and trustworthiness in these systems. This chapter is dedicated to the imperative of a trustworthy AI, highlighting the risks associated with “untrustworthy” AI and the potential serious consequences. It explores the challenges and risks related to the adoption of AI, examines the concept of trust in AI, and explores user perspectives regarding interaction with these systems.

Confiance.AI

Forum TERATEC
20 - 21 OCTOBRE 2026
PARIS · PALAIS DES CONGRÈS

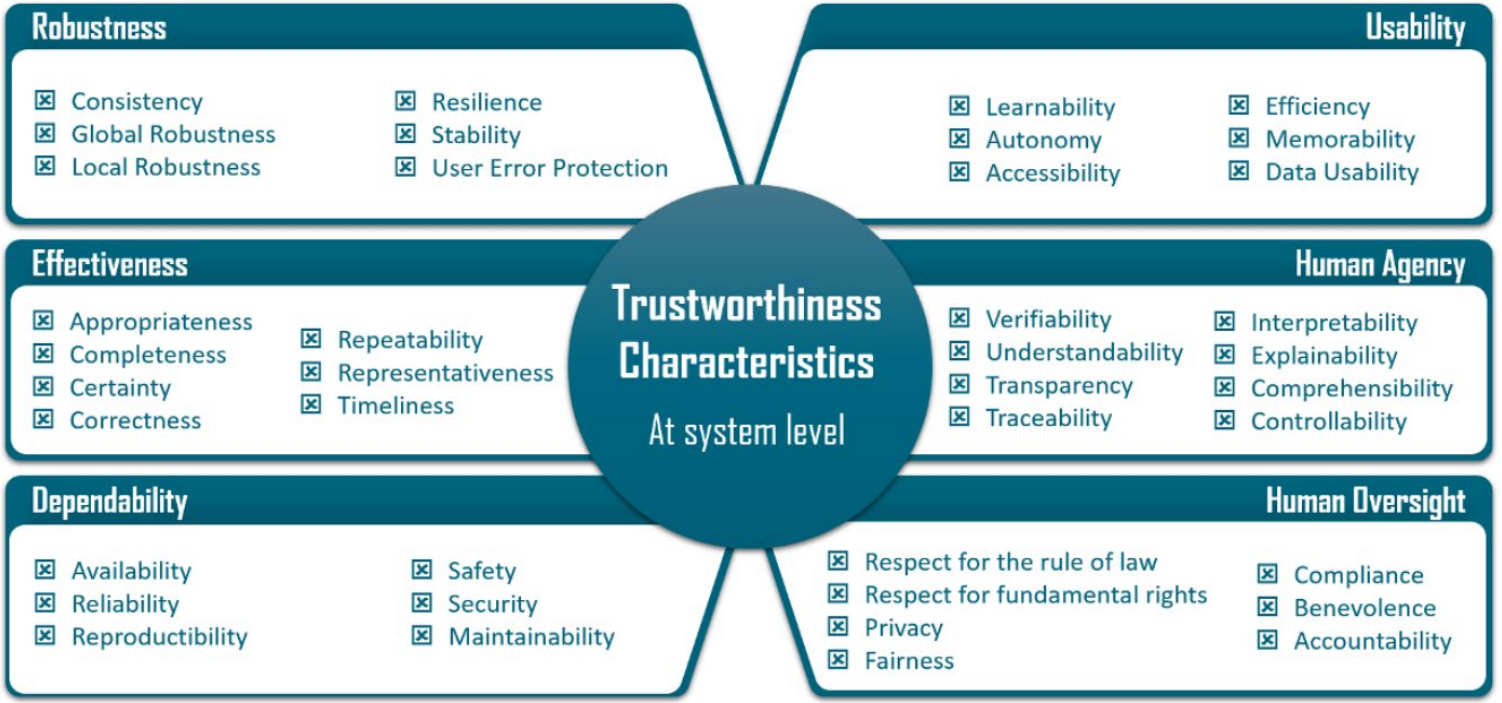
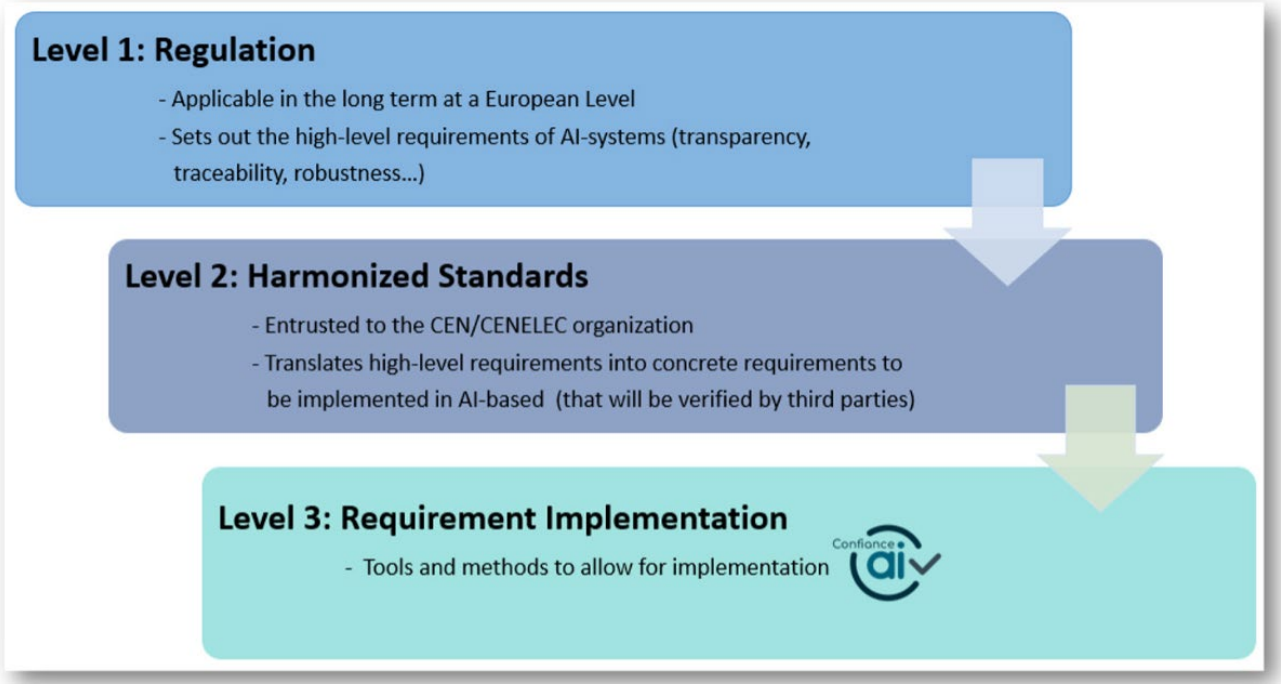


Figure 1: The AI Trustworthiness characteristics and sub characteristic (Mattioli, 2023)

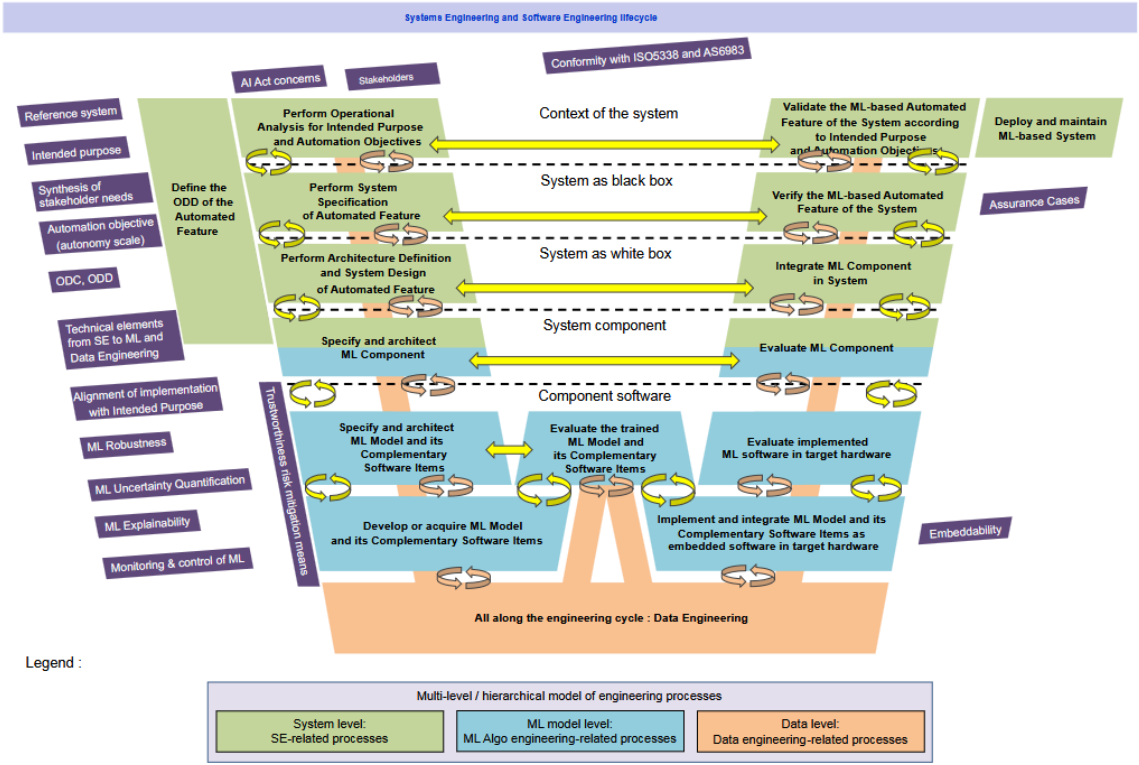
Confiance.AI

- **Explainability** deals with the capability to provide the human with understandable and relevant information on how an AI application is coming to its result;
- **Interpretability** relates to the capability of an element representation (an object, a relation, a property, etc.) to be associated with the mental model of a human being. It is a basic requirement for an explanation;
- **Comprehensibility** refers to the capability of an element representation (an object, a relation, a property, etc.) to be understood by a person according to its level of expertise or background knowledge.

Confiance.AI



Confiance.AI



Legend :

Confiance.AI

