

# AMETHYSTE

Digital Software  
For Asset Integrity &  
Risk Based Management

A large, abstract network graph composed of numerous small, semi-transparent purple dots connected by thin white lines, forming a complex web-like structure that spans the entire background.

AVEVA

REGISTERED  
Technology  
Partner

# Risk Management, Améthyste's DNA and the backbone of your industrial performance



Risk is inherent to all human activities. Measuring the balance between risk versus opportunity allows you to increase your performance.

Identifying all the threats that may affect the company's strategic objectives in terms of production, efficiency and safety, allowing you to put in place relevant barriers to strengthen your resilience capabilities with a detailed plan in case of failure.

Knowing and managing your risks will help you to operate with peace of mind and will give you a step ahead on your competitors by being ready to recover faster in the face of adversity.

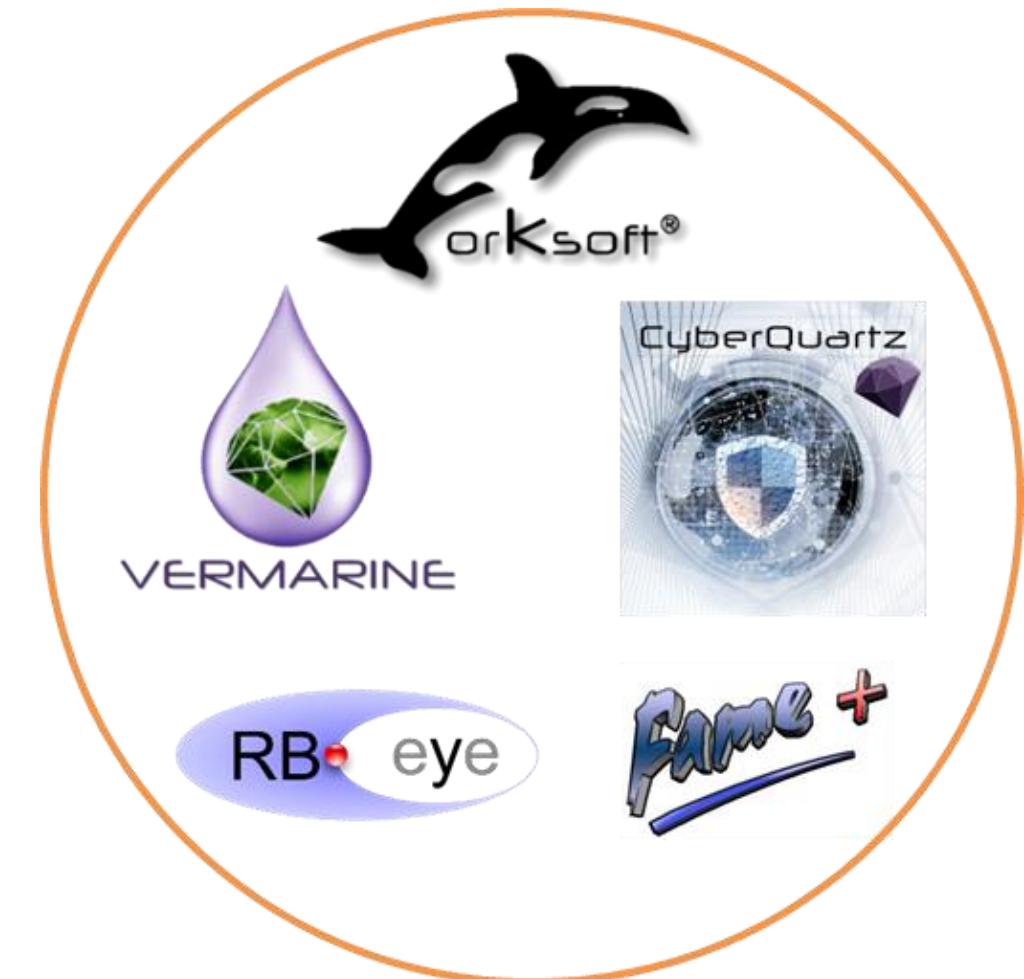
# Expert

## Agile Software Factory

- + 30 years
- Collaborative development mode
- 1 release each month
- 100% in-house development
- A core business team, pillar of the company
- Flexibility and responsiveness on ambitious projects

Recognized Expertise by a global network of partners

- Complex industries
- Risk Based inspection,
- Integrity Management
- Corrosion management
- Cyber Risk Management



# Deployed Globally



+170  
Oil & Gas  
Projects

**EXPORT**

+85%  
Licenses

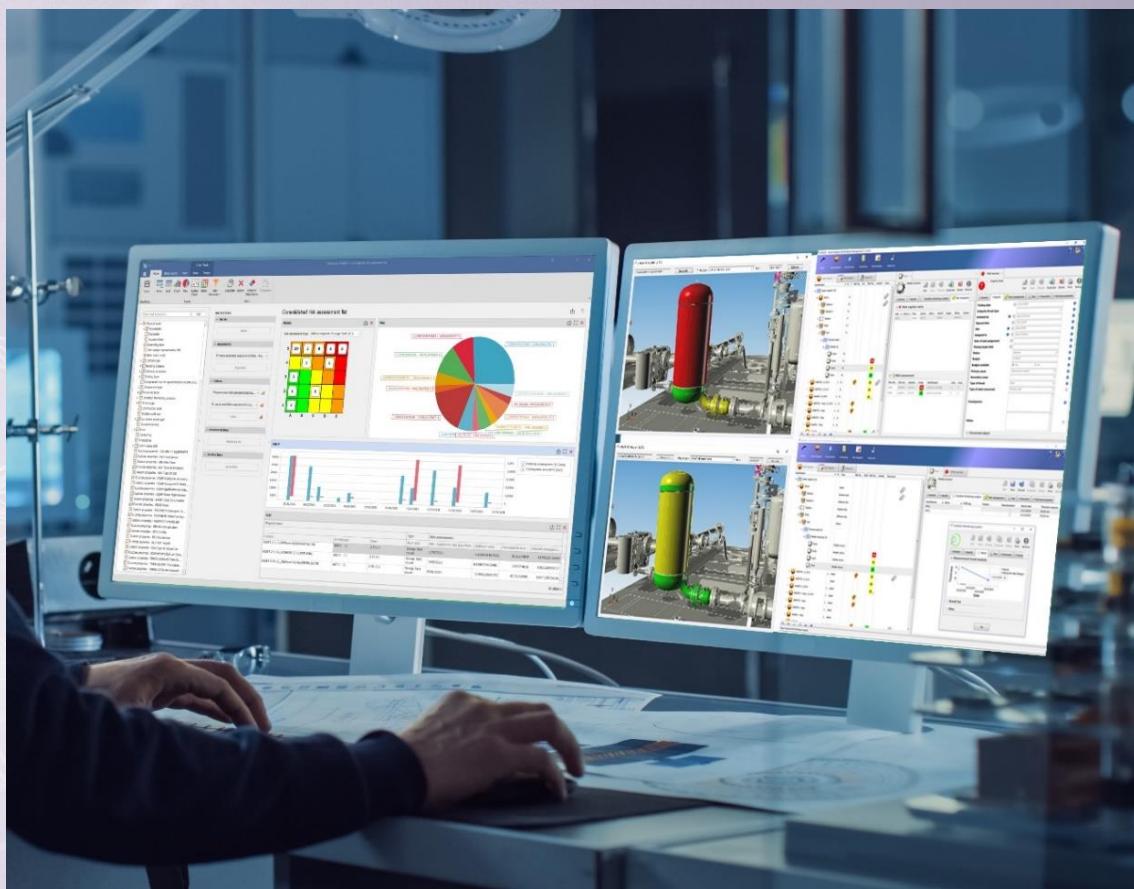


+40  
Countries



# Value Proposition

A sophisticated 360° digital platform  
that helps make informed decisions  
to prioritize investment



Holistic view of risk exposure



Early identification of major threats



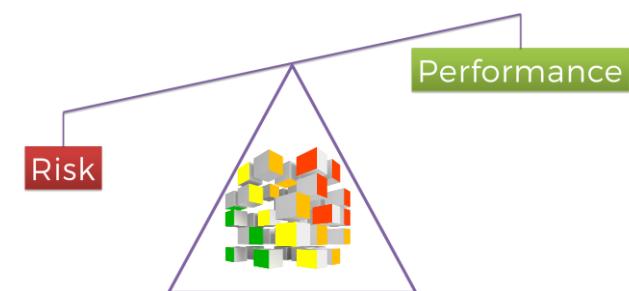
Prioritization to reduce inspection and maintenance costs



Optimized Inspection & Maintenance Strategies for asset's availability and life extension



Optimized investments on barriers against Cyber attacks



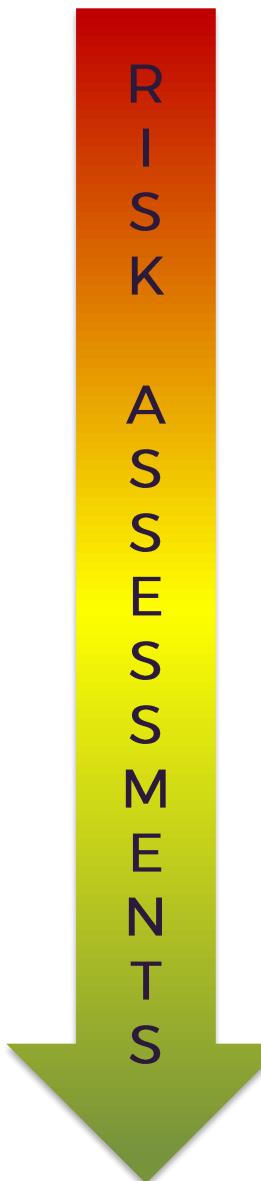
# Maximize the asset's value during the whole lifecycle

## Project Management

- Engineering
- Procurement
- Construction
- Commissioning

## Performance Management

- Operation
- Revamping
- Transition
- Decommissioning



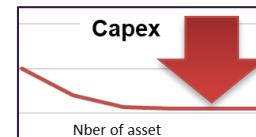
### Safety first

- Holistic view of risk exposure



### Design / Revamping

- Design validation
- Accelerate Certification
- Capitalize on know-how
- QA/QC & standard compliance



### Operation

- Inspection optimization
- Targeted Maintenance
- Downtime reduction
- QA/QC & Audit Conformity

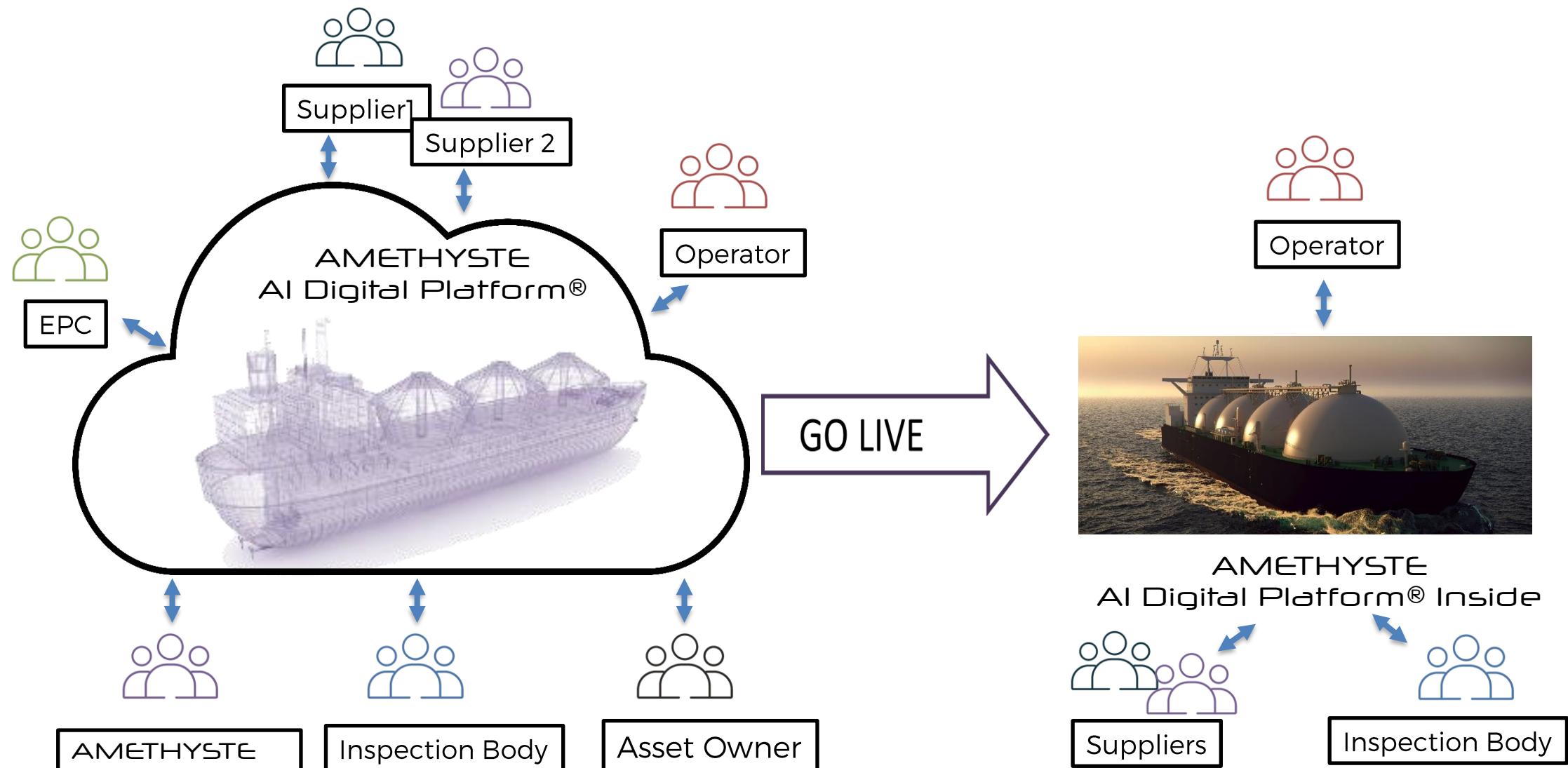


### Valuation

- Objectivate asset condition
- Investment prioritization
- Extend asset lifetime

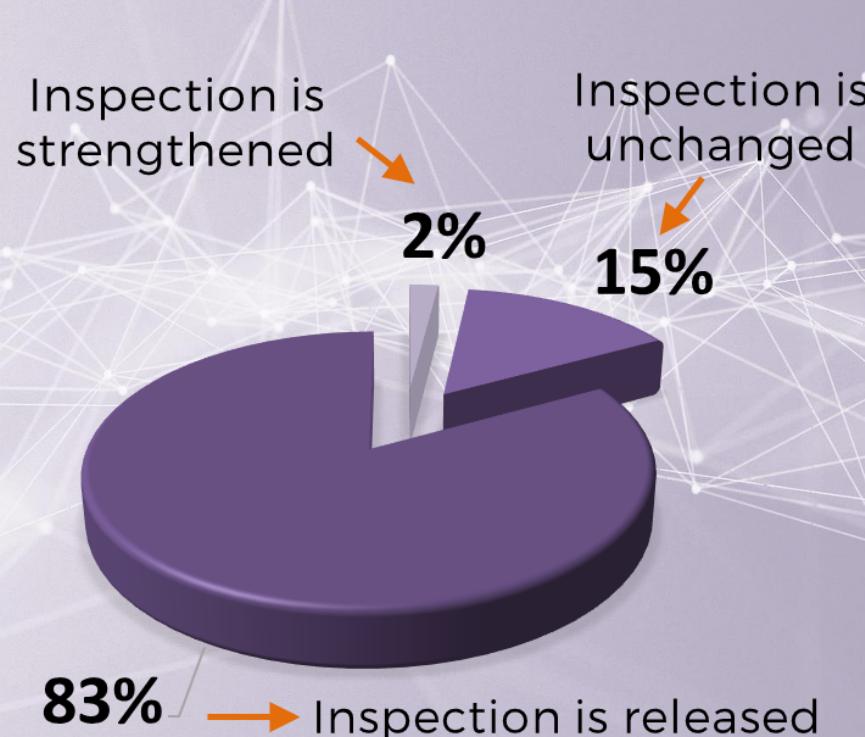


# 360° holistic Co-Construction platform



# Example of ROI that can be expected

Reduced production loss & better risk management

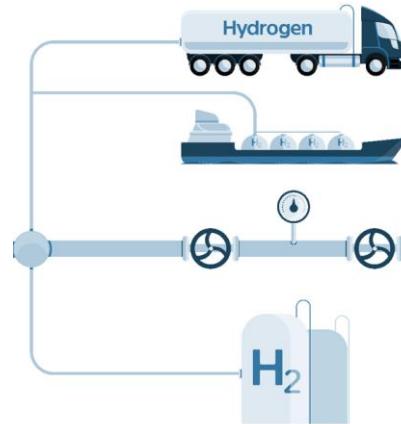


Several M\$ savings over a turnaround period

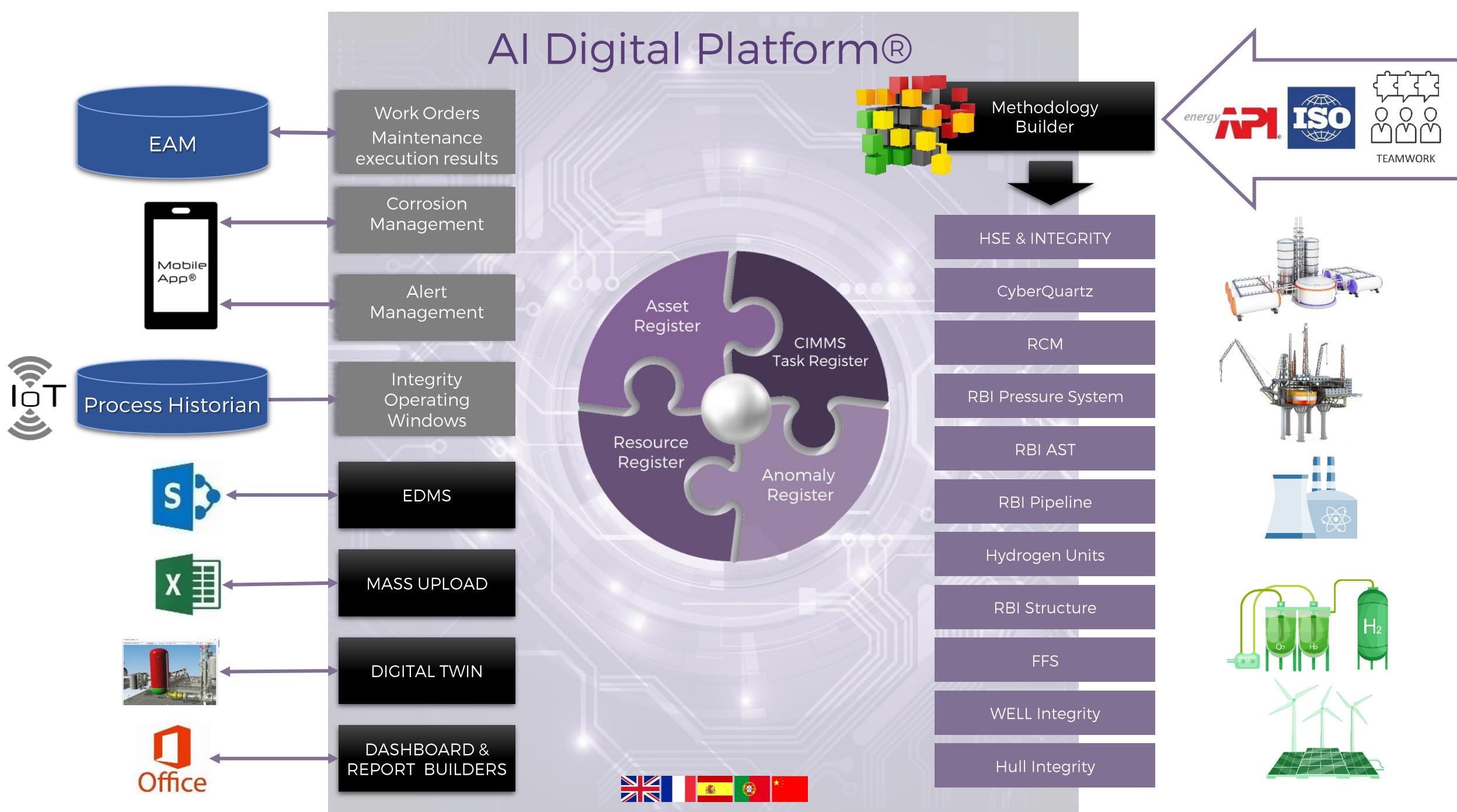
- Inspection intervals of pressure vessels significantly increased with reduced number and extent of shutdowns
  - Total plant shutdowns reduced to a few GPL PV (5y to 10y)
  - Gaz Plant shutdowns deferred (6y to 9y)
  - Limited number of topsides shutdowns on a FPSO
- Estimated total savings at 30 M\$ over 5 years for an Oil & Gas major's subsidiary
- A large number of very low risk vessels removed from inspection programs (e.g. 200 on 2 connected platforms)

# Designed for:

- ✓ Oil & Gas
- ✓ Hydrogen
- ✓ Wind Energy
- ✓ Nuclear
- ✓ Petrochemical
- ✓ Mining
- ✓ Water
- ✓ Waste
- ✓ Port
- ✓ Marine and Fluvial
- ✓ Complex buildings



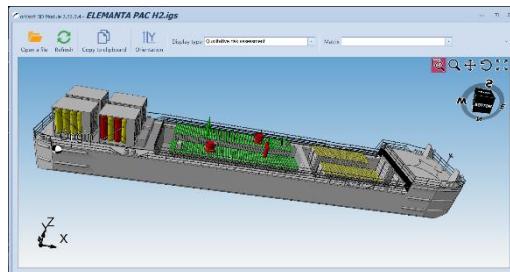
# AI Digital Platform®



# The complete scope targeted

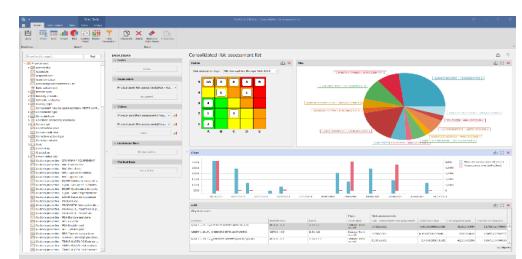
## Cartography

- Assets,
- Design,
- Processes,
- Environments,
- Human resources,
- Organizational resources,
- IT Network



## Dashboards & Reports

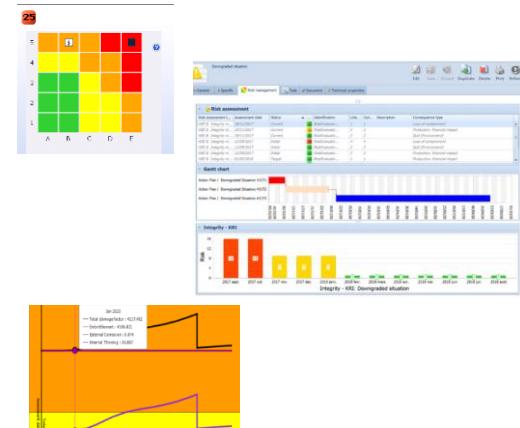
- User-friendly report and dashboard capability in natural language for non-IT end users



## Risk Assessments

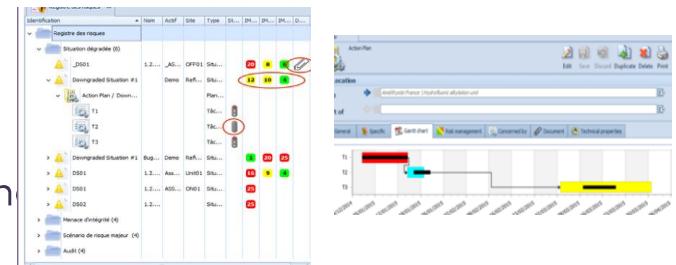
- Identification of damages & failures
- Audit findings
- Definition of acceptable level of risk
- Assessment of Probability and Consequence of failure
- Definition of Insp & Maint strategies

Based on Regulations,  
Best Practices & expert's knowledge



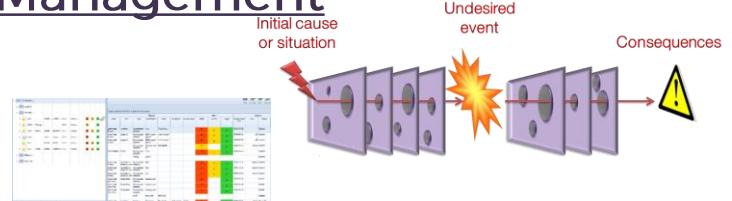
## Action Plans

- Task Management
- Resources Management
- Inspection, Maintenance and Recovery plans

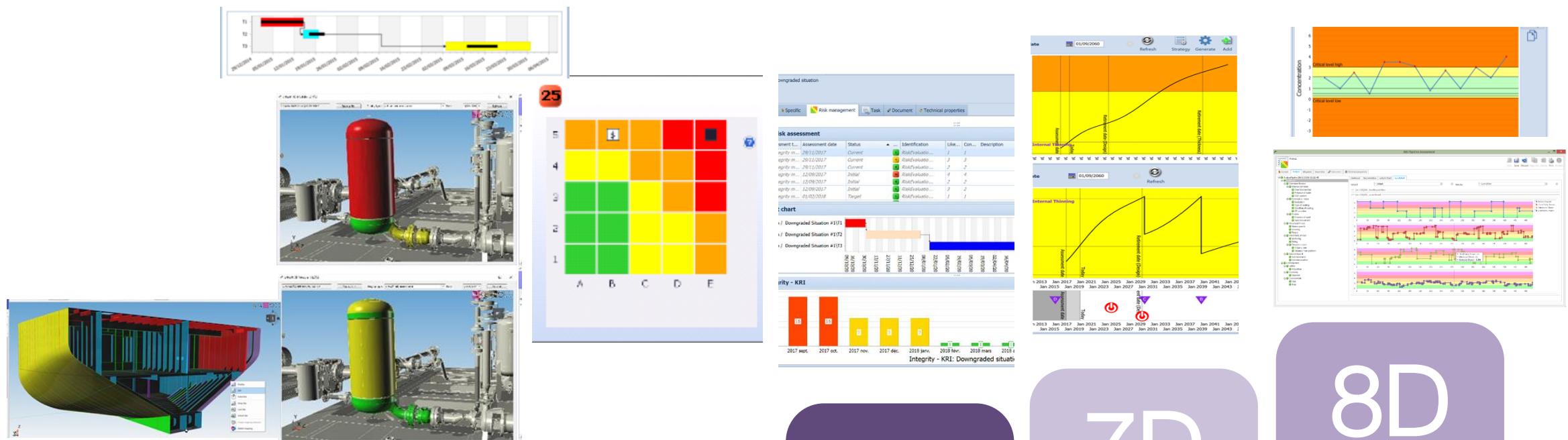


## Audit & Major risk Management

- Audit
- Degraded situation
- Threats identification
- Major risk scenario



# 8 dimensions to manage your assets



**3D**  
Visualization

**4D**  
Time  
Schedule Long  
term strategies

**5D**  
Risk  
Failures  
identification  
POF & COF

**6D**  
Safety  
Audits,  
Emergency and  
recovery plan

**7D**  
Cost  
Priorization of  
allocated  
ressources &  
Budget  
optimization

**8D**  
Operation  
Real time data  
Facilities  
management

# Our development targets for 2021 - 2024



## Offshore Wind

VERMARINE

- ✓ Turbines
- ✓ Tower
- ✓ Foundations
- ✓ Cables
- ✓ Substations

## Hydrogen

VERMARINE

- ✓ Production
- ✓ Transformation
- ✓ Storage
- ✓ Transportation
- ✓ Distribution
- ✓ Large industrial consumers

## Port Integrity

VERMARINE

- ✓ Integrity of Port facilities
- ✓ Integrity of fluvial and marine infrastructures

## Cyber Risk



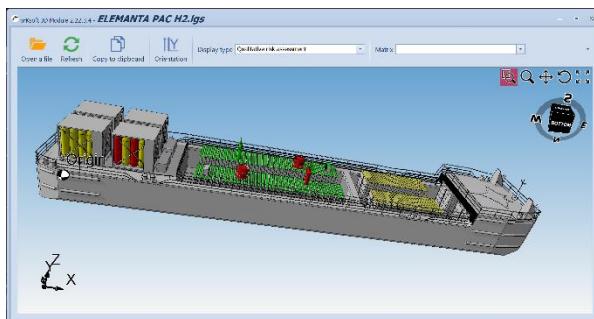
CyberQuartz®

- ✓ ISO 27001
- ✓ Ebios
- ✓ Good practice for Cybersecurity in the Marine Sector - ENISA
- ✓ Cybersecurity guidelines for Ports and Port Facilities – IAPH



# Hydrogen application cases

## H2 to power & Bunkering Integrity Management



### ELEMANTA

SOFRESID concept of modular barge

- to produce power from hydrogen fuel cell and
- offshore bunkering of H2 powered vessels

The screenshot shows a news article from 'OFFSHORE ENERGY' magazine. At the top, there's a photo of a boat on a lake with French flags flying. Below the photo, the article title is displayed in bold: 'France to get first high-powered hydrogen barge for electrification of ships at berth'. The article is dated July 4, 2022, and is attributed to Naida Hakirevic Prevljak. The text discusses the collaboration between Amethyste, ArianeGroup, Cetim, HDF Energy, Rubis Terminal, and Sofresid engineering to develop the ELEMANTA H2 barge.

### VESSELS

July 4, 2022, by Naida Hakirevic Prevljak

**Amethyste, ArianeGroup, Cetim, HDF Energy, Rubis Terminal and Sofresid engineering have teamed up to develop a multi-service power barge ELEMANTA H2, designed to supply green electricity and hydrogen to large ships, reducing their polluting emissions by more than 80% during port calls.**

The project partners have signed a memorandum of understanding (MoU) to deploy mobile solutions providing, from **green or low-carbon hydrogen, cold ironing** services complementing the electrical grid, for container ships, cruise ships or tankers.

ELEMANTA H2 will also enable **hydrogen bunkering** to meet the refueling needs of future hydrogen ships.

# Hydrogen application cases

## H2 to power Integrity Management

Fuel cell installed at **SARA refinery** where Améthyste integrity solution is already implemented



© ClearGen

© ClearGen

SARA refinery - French V



Reproduction prohibited

# H2 Pipelines network application case



## Scope

Existing and new pipelines

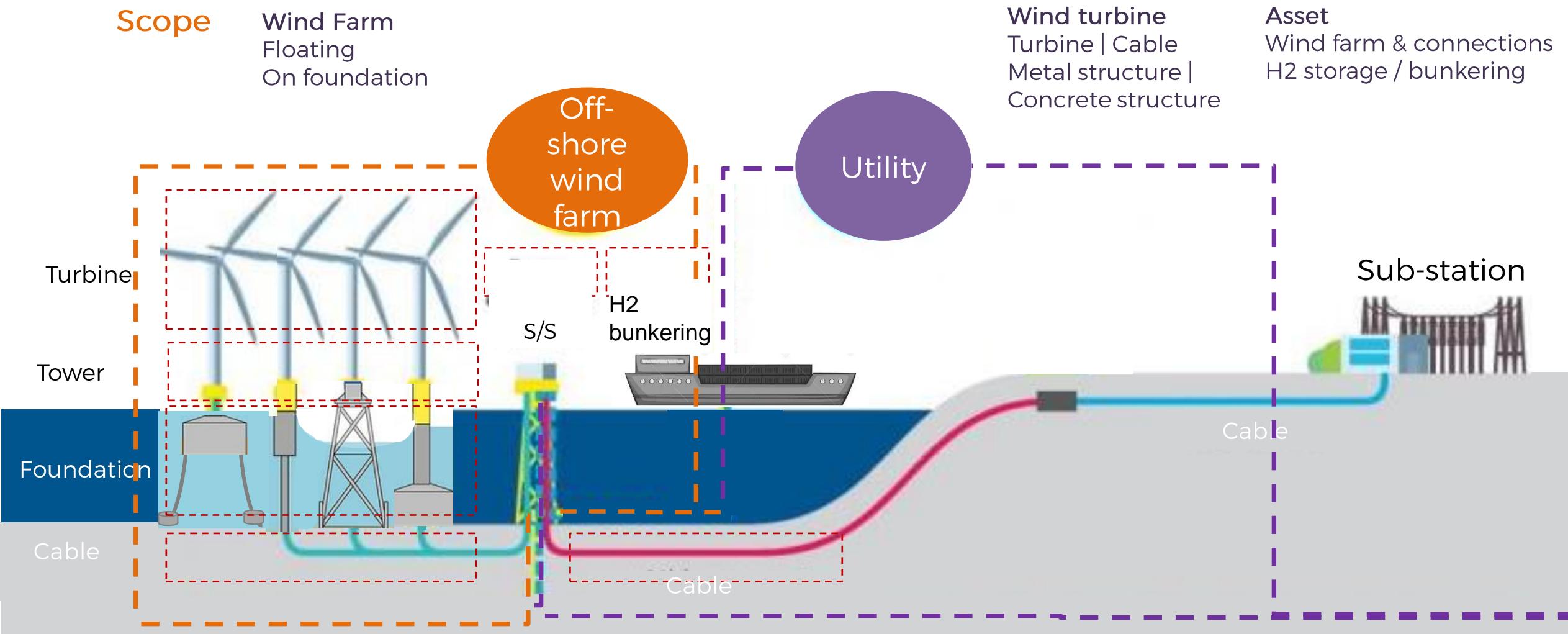
## Application cases

Fluid types Oil and Gas pipeline  
Development of a PIMS  
(Pipeline Integrity Management Software)  
based on existing calculation codes

Integration of H2 in gas pipeline  
Development of a specific PIMS  
(Pipeline Integrity Management Software)



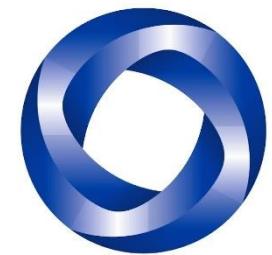
# Offshore windfarms targeted scope



# API RP 581 for Pressurized Equipment Applicability to Nuclear Plants



**API RP 581 Risk-Based Inspection Methodology –  
Documenting and Demonstrating the Thinning  
Probability of Failure Calculations,  
Third Edition (Revised)**



شركة نواة للطاقة  
Nawah Energy Company

# Port Integrity targeted scope

## A complex multidisciplinary area



# With major challenges in transformation

- Ports integrating multiple activities are privileged places for accelerating the ecological transition
- They must position themselves in the sectors of the future by attracting new activities that will constitute growth drivers such as renewable energies, industrial ecology, storage and supply of alternative fuels:
  - refueling offer (storage, distribution, etc.)
  - power supply
  - Hydrogen production for port industrial ecosystem and ships
  - ...



The risks and opportunities of this transformation make the evolution of the port as a developer essential for the local economy, towards an entrepreneur port having a regulator role of the activities on its public domain.

# Integrity management to become a Smart Port

## Digital platform for managing the integrity of Major Maritime Ports



- Management of the integrity of all the physical assets involved in the Port activities
- Cyber risk management
- Identification and monitoring of logistic risks
- Identification and monitoring of risks related to the concentration of multiple industrial activities operated by third parties within the public port domain,
- Risk management linked to flow of hazardous material,



# Cyber Risk Management Inside

Because industrial plants are more and more connected to external systems



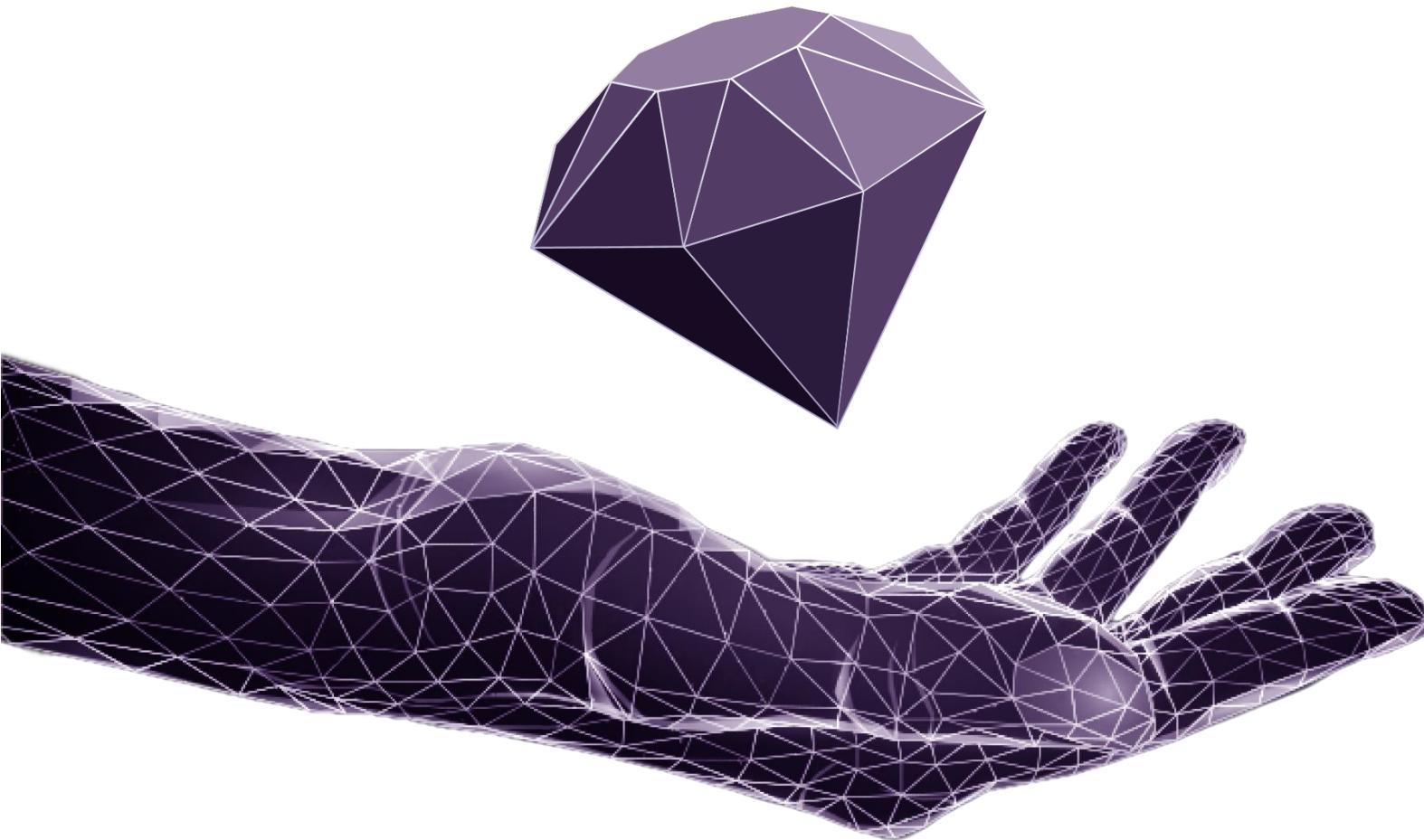
- Improve system security
- Reduce reaction times
- Accelerate recovery
- Fluidify team coordination
- Build a common referential
- Visualize risks globally and dynamically
- Accompany changes in company culture
- Simplify the ISO 27001 implementation

## DYNAMIC APPROACH

- Full Traceability
- Intrusion attempts indexing
- Responses analysis
- History conservation
- Improvement measurement

## Cyber Resilience





Designed to  
support  
Energy Transition

# AMETHYSTE

Risk based driven decision  
Digital peace of mind