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GREENER SHIPPING SUMMIT
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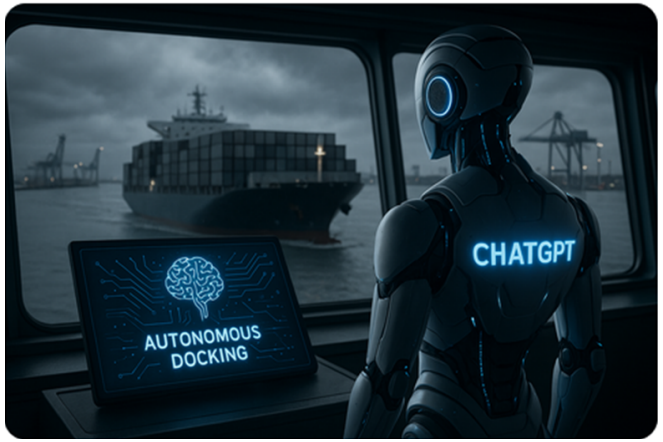
BUREAU VERITAS
Smart Ships, Smarter Decisions:
Leveraging AI and Predictive Analytics for Efficient Fleet Management


The case for AI

AI bridges the gap
Between ship & shore

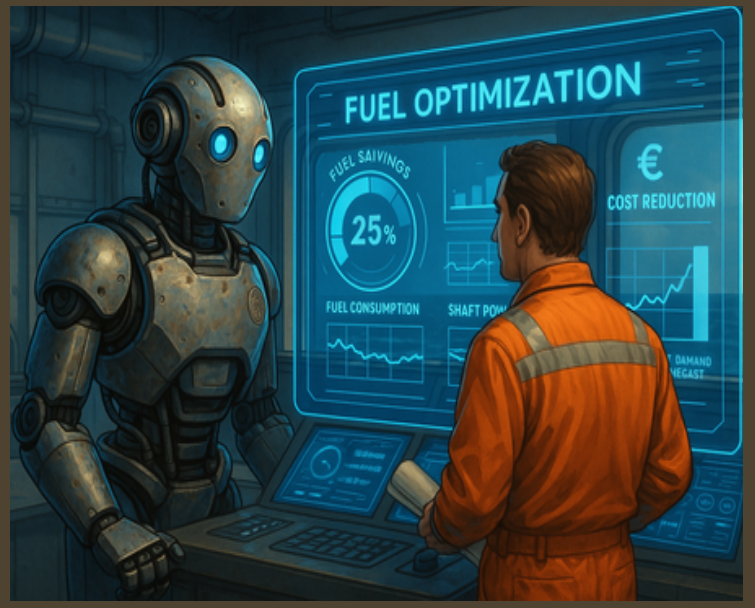
Shipping
A globally fragmented Industry
moving slowly

- The main value of AI in vessel operations
- Analysis of real-time data improves efficiency
- External data (on weather, currents, congestion or fuel prices) optimize routes
- Proprietary data (hull, engine and fuel performance) optimize ship performance.



What do these scenarios have in common?

All made possible by AI



AI as a co-operator, not a replacemen

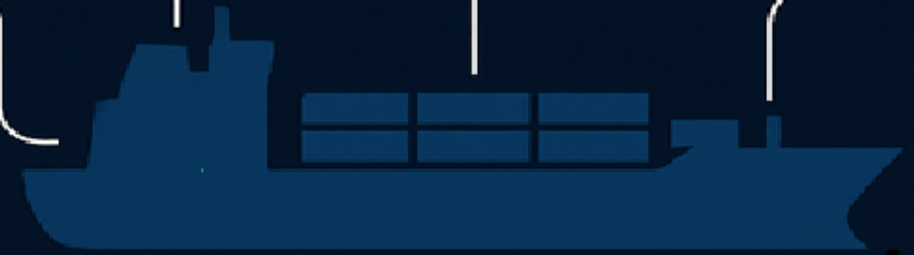
Predicting Propulsion Failures Weeks in Advance

The Augmented Crew: Humans and AI Working as One

AI bridges ship and shore into one intelligent ecosystem.

Predictive Analytics in Action

AI Predictive Maintenance Across All Critical Ship Equipment & Voyage Impact



Main Engine
fault prediction

Propulsion

Boilers &
Steam Systems
leak detection

Navigation
& Safety
Electronics

HVAC &
Refrigeration

Ballast Water
Treatment
Boost reliability

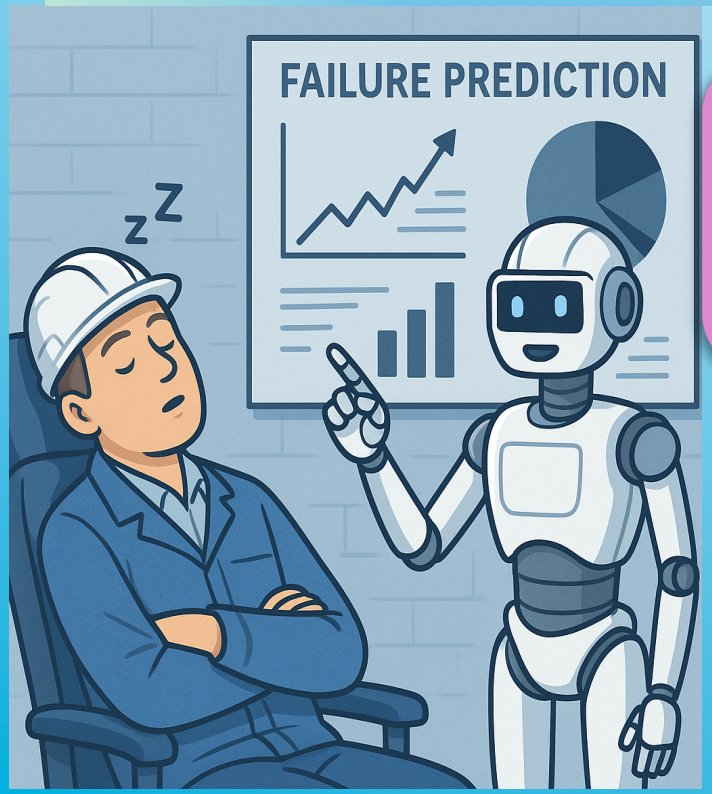
Zero
detencions

Voyage Impact

- Reduce off-hire time
- Reduce fuel consumption
- Reduce emissions
- Increase reliability

Quantified Benefits of Maritime Predictive Analytics

- Downtime reduction ⟹ 50% ↓ (unscheduled downtime)
- Fuel Consumption ⟹ 5-10% (early detection inefficiencies)
- CO2 Emissions ⟹ 8% ↓ (average reduction)
- On-time arrival ⟹ 25%↑ (reduced unscheduled repairs)



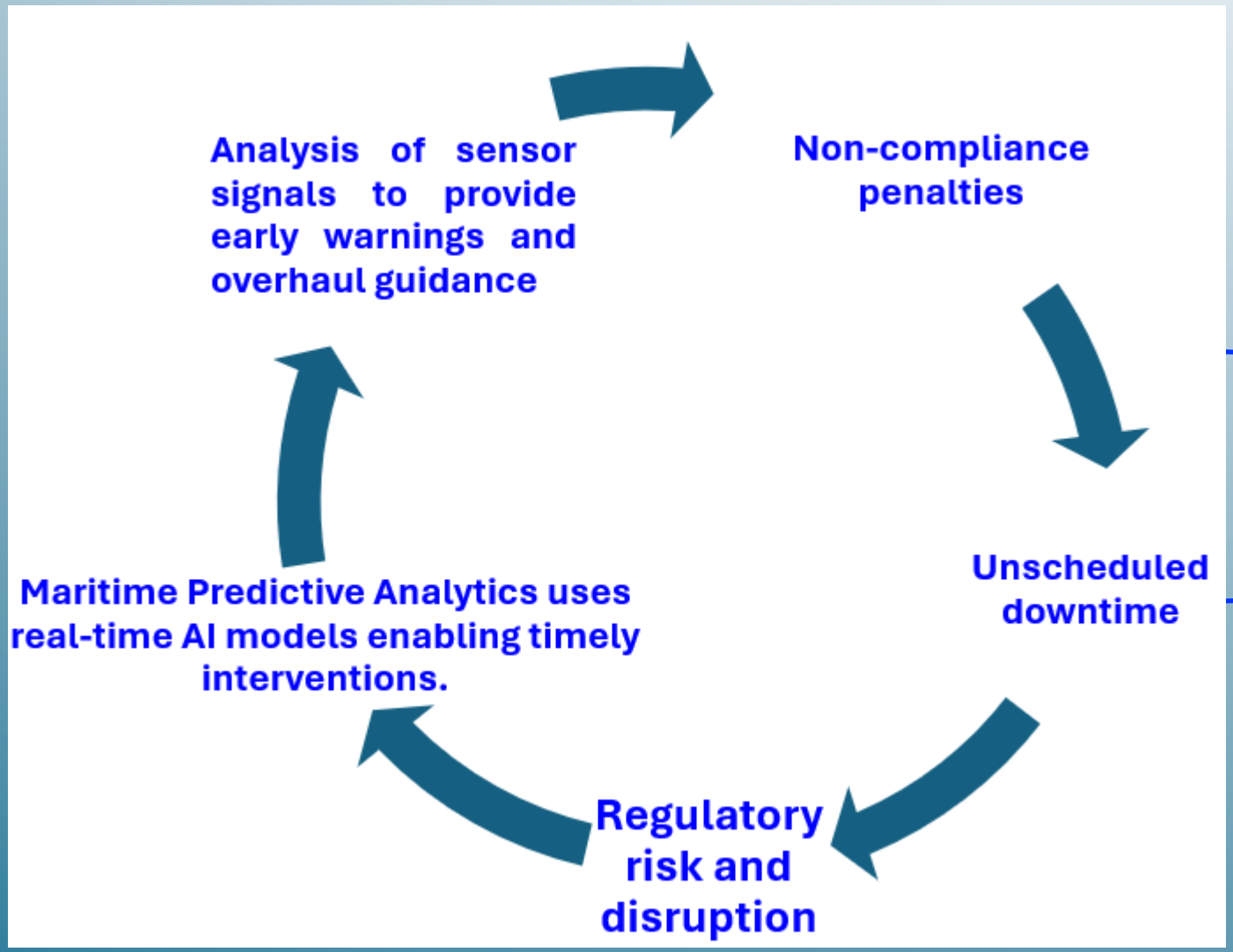
AI delivers:

- **5–15%** fuel savings
- **35–50%** reduction in corrective maintenance
- **20–30%** reduction in downtime
- **20–40%** reduction in CO_2 intensity
- **60–90 days** faster issue detection vs. manual methods

Teach your AI System

- Audit your data (sensors, class data, logs)
- Let the AI learn a "normal" baseline (typically 2-3 weeks)
- Feed in log-book notes to improve model accuracy
- Measure KPIs like **M**ean **T**ime **B**etween **F**ailures, **M**ean **T**ime **T**o **R**epair, CII and carbon intensity reduction

Alarms warn you too late — AI warns you early

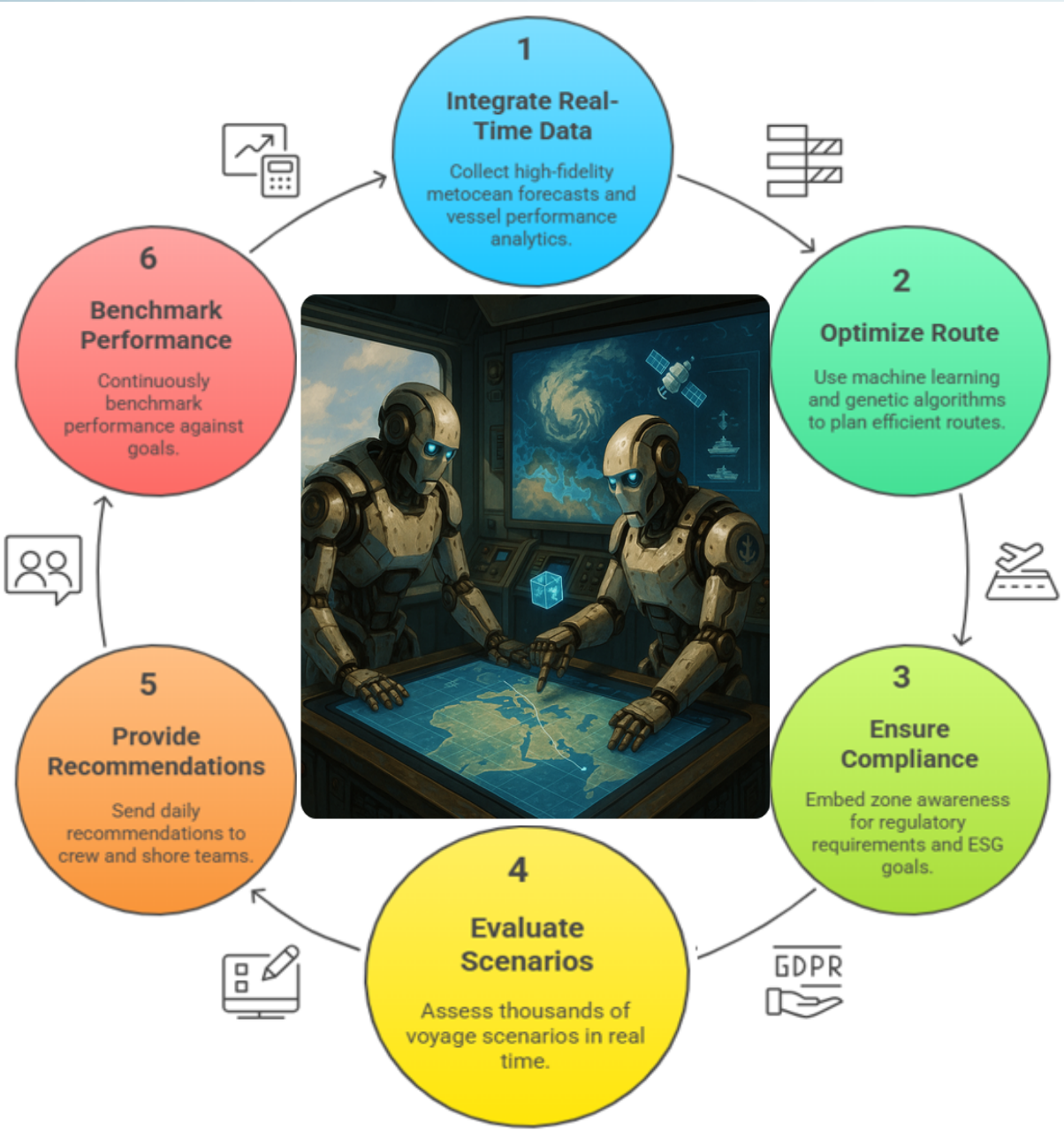


From guessing – to knowing

Traditional reactive maintenance Is no longer sufficient

Predict failures before the sound of alarm

Multi-objective voyage-planning algorithms




AI & Automation

AI and Automation: The new engines of efficiency

Digital Twins

Real-time simulation and predictive maintenance

Predictive Analytics

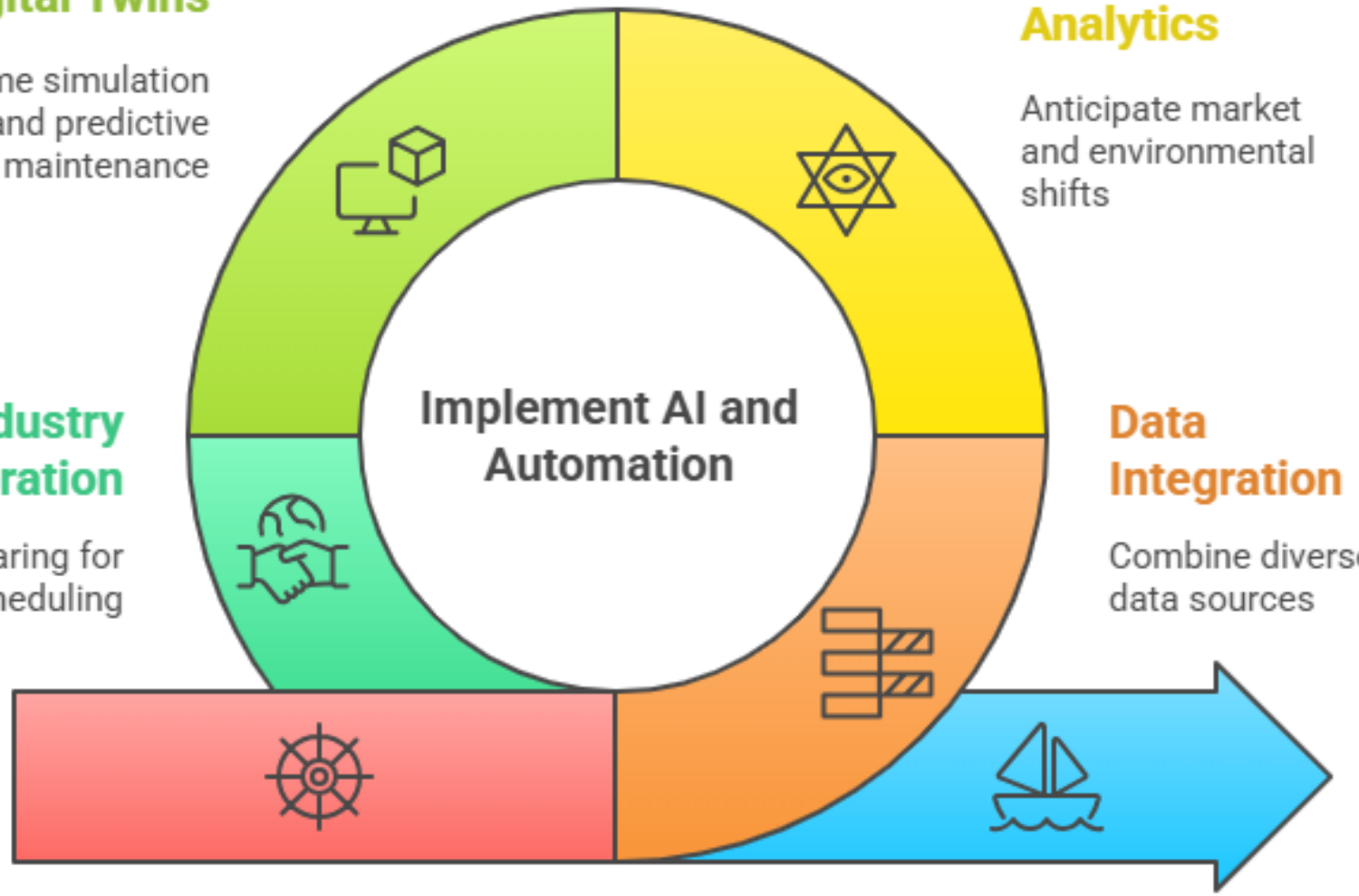
Anticipate market and environmental shifts

Industry Collaboration

Data sharing for reliable scheduling

Data Integration

Combine diverse data sources



Inefficient Maritime Operations

Manual, reactive decision-making

Optimized Maritime Operations

Precise, proactive, and collaborative

BV's Digital Capabilities

Bureau Veritas Augmented Surveyor AGS-3D

Innovation Spirit

Encouraging new ideas and solutions

AI-Powered Technology

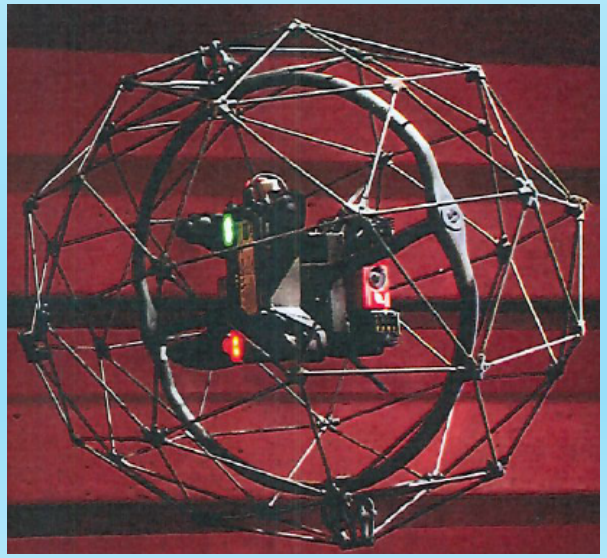
Integrating AI to improve task efficiency

Collaborative Efforts

Teamwork between TotalEnergies and Bureau Veritas

Drone Technology

Utilizing drones for anomaly detection and mapping



The benefits of AGS 3D

Predictive Maintenance

Anticipates repairs to allocate resources effectively

Automation

Optimizes inspections by automating key tasks

Drone Inspections

Uses high-tech drones for safer and more flexible inspections

Real-time Collaboration

Facilitates global stakeholder collaboration through a digital platform

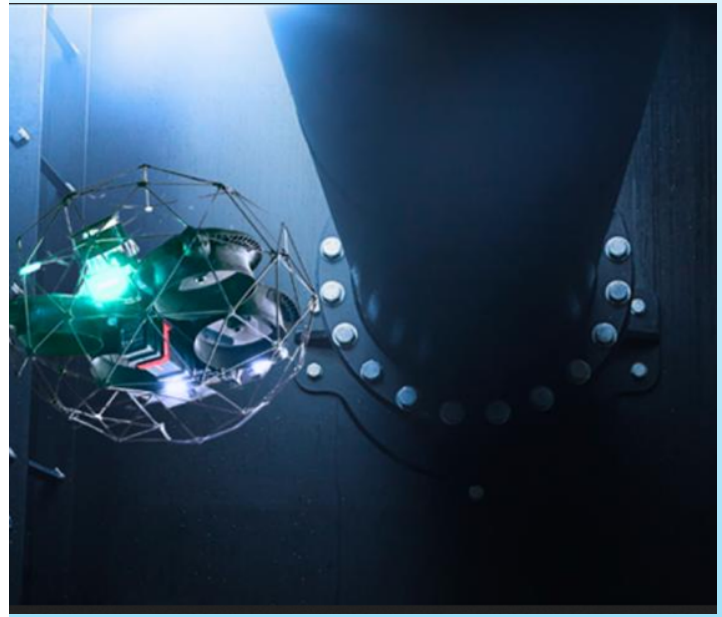
Enhancing Asset Management with Technology

Defect Tracking

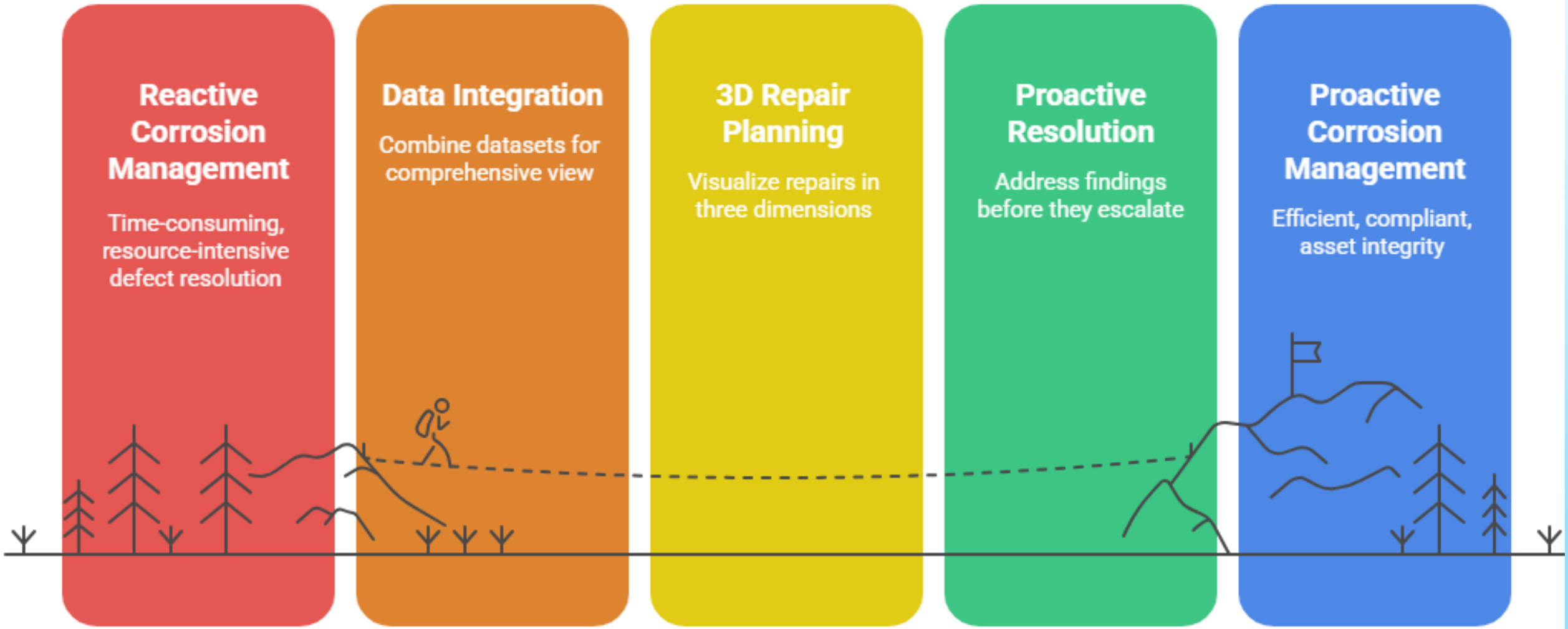
Monitors and plans repairs for asset defects

3D Modeling

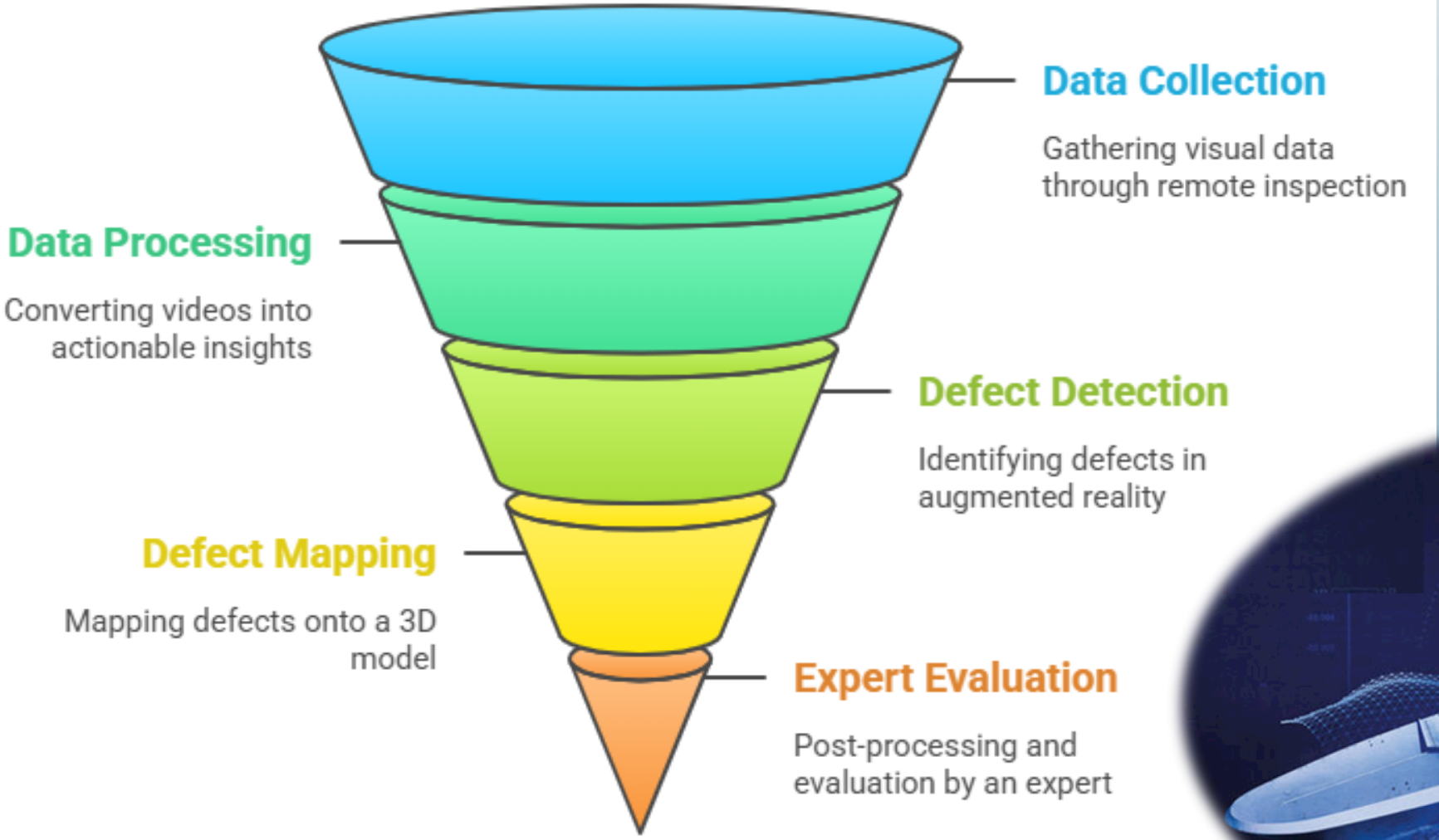
Creates 3D models from drone footage to highlight corrosion



From Reactive to Proactive Corrosion Management

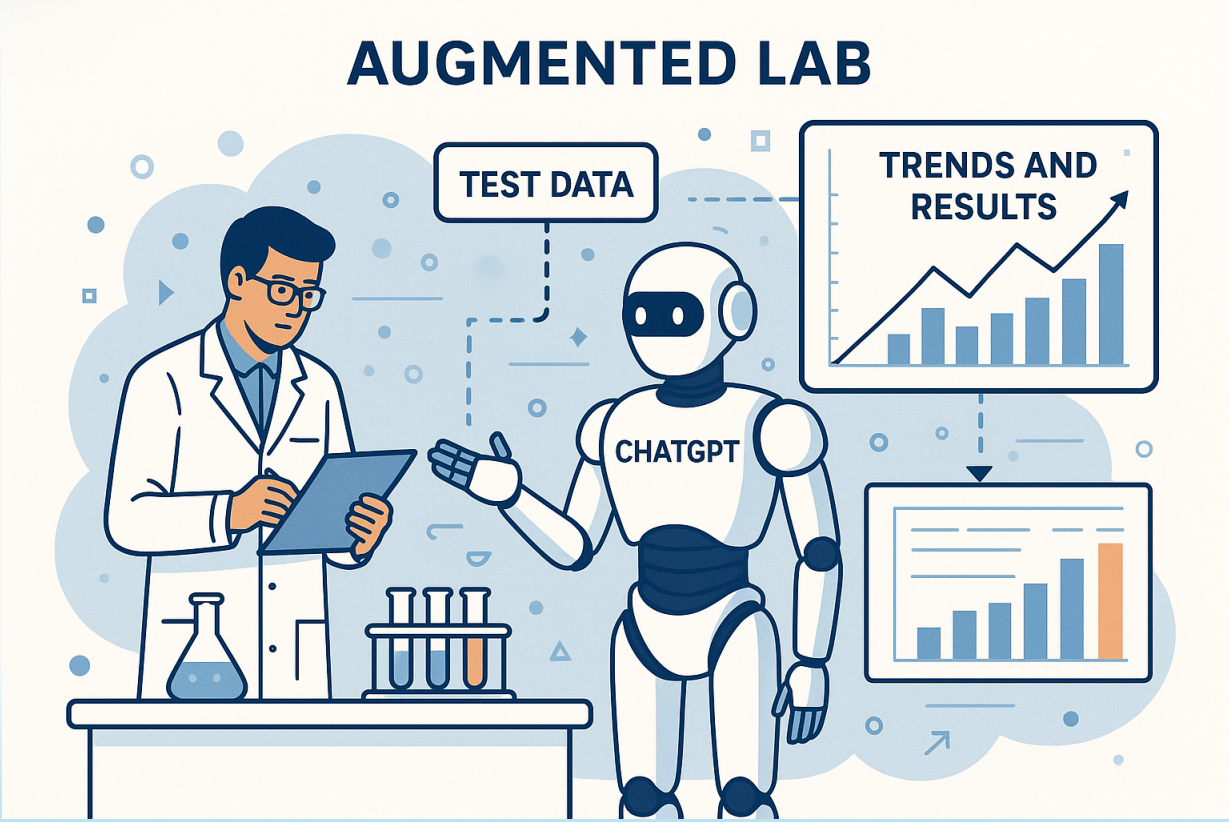


The procedure : From drone surveys to actionable insights



AI enabled Augmented Lab

- Project “Charles” initiated at the Bureau Veritas Laboratory in Atlanta (USA) for Oil Condition Monitoring in automated repetitive laboratory tasks
- It frees experts from 20% of repetitive work and allows focus on high-risk samples. It enhances predictive maintenance
- 3 million test results over 15 years were used for model training. Partnership with Microsoft Azure Cloud Significant boost in productivity and analysis accuracy
- Enable on-demand AI-based consultation services Expand client support via online analytical tools Continue integration across Bureau Veritas labs
- Establishment of a Data Lab Team Mission: Support and scale AI initiatives across BV labs Partnership with Microsoft Azure for cloud-based AI services
- Apply AI to all Bureau Veritas testing sectors Achieve efficiency, precision, and innovation in laboratory services Reinforce Bureau Veritas’s leadership in data-driven quality assurance



Classification societies embrace AI

Analyze inspection footage, flag potential non-conformities and prioritize review by human surveyors

In the future, classification societies may move toward AI-powered continuous assurancy models in which vessels are monitored in real time

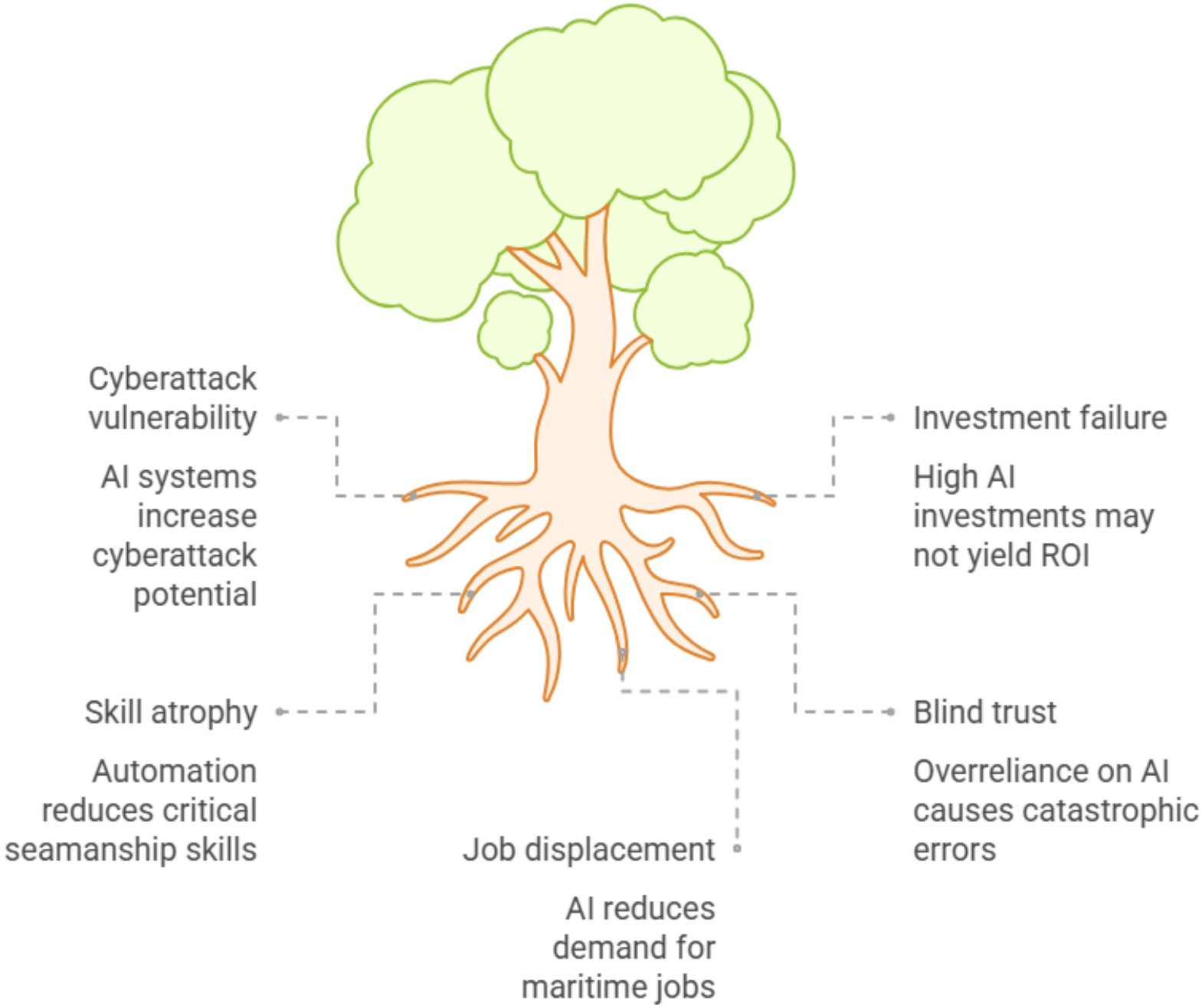
It must recognize that this is more than reducing inspection times

Our focus is on increasing the accuracy and objectivity of our work, on protecting our surveyors and on freeing our people to deal with more challenging tasks

Technology is not replacing people: our experts' experience will always be a critical part of the equation


The Future Fleet

Human-Centric AI - Not uncontrolled adoption

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Thank you for your Attention!