Artificial Intelligence (AI) and Safety

IRF Conference
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Who are we?

The Norwegian Ocean Industry Authority (Havtil)

- A directorate and supervisory authority subordinate to the Ministry of Energy (ED)

Areas of responsibility

- Petroleum operations offshore and at land plants
- Renewable energy production offshore (offshore wind power)
- Prospecting and extraction of seabed minerals
- CO_2 transport and storage

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Main issue 2025

In our industry, the use of AI can influence risks linked to major accidents, safety systems,
or critical infrastructure.

Can be a resource and may contribute to reduced risks, however that depends on companies understanding and actively managing risks when developing and using AI systems.

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Havtil's approach

Regulation and supervision
- HSE Regulation
- Market surveillance
- Standardization (ISO, CEN/CENETEC)

Knowledge development
- Studies and in-depth investigations
- Follow-up of industry

Collaboration and dialogue
- International Regulators Forum (IRF)
- Safety Forum and Regulators Forum
- AI research centres (for example, Norwegian Centre on AI for Decisions)

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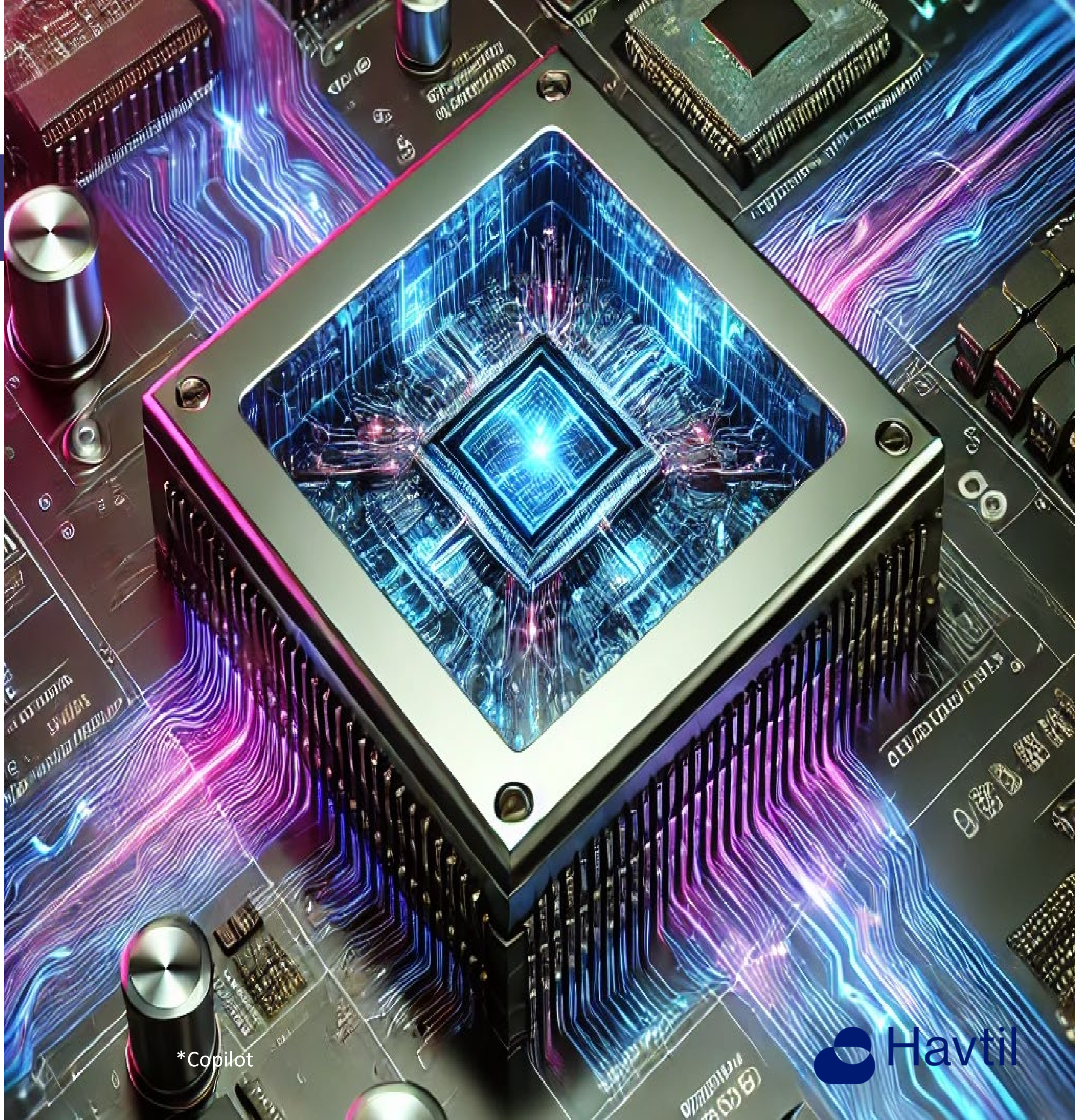
Development and trends

- Complex digital technologies
- Number of interfaces between digital technologies
- Organisational complexity



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AI solutions in use /planned for the Norwegian shelf

Some examples:

- Automated drilling operations
- Planning and maintenance
- Crane operations
- Production optimalization
- Cybersecurity threat detection

What if….

- Apply AI to actively control and perform a series of commands when kick is detected.
- Unreliable predictions – insufficient representative data / lack off edge-cases for training data model.
- Resulting in the system misinterpreting the situation and unable to identify the specific combination of parameters that indicate a kick.

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Risk scenarios

Serious injury in a serious crane incident

Well control incident
Blowout
Ignited blowout

Subsurface:
Pore pressure predictions indicate shallow gas
Intersecting wellbores
Faults
HPHT wells

Weather conditions:
Iceberg
Ice on board
Green water

Gas leak
Ignited gas leak
Fire

Structural incident:
ship collision
Hundred year wave / Green water (waves on deck)

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AI represent increased uncertainties

When it comes to AI, the knowledge base is limited, and uncertainty is greater.

Why is that?

- Risk and uncertainty related to AI.
- Fewer incidents reduce learning opportunities and event insight.
- No clear criteria for reporting AI-related incidents.
- No petroleum-related AI incidents investigated yet—limited understanding of triggers and causes.
- Limited knowledge base for risk-reduction across development, testing, implementation, and maintenance.

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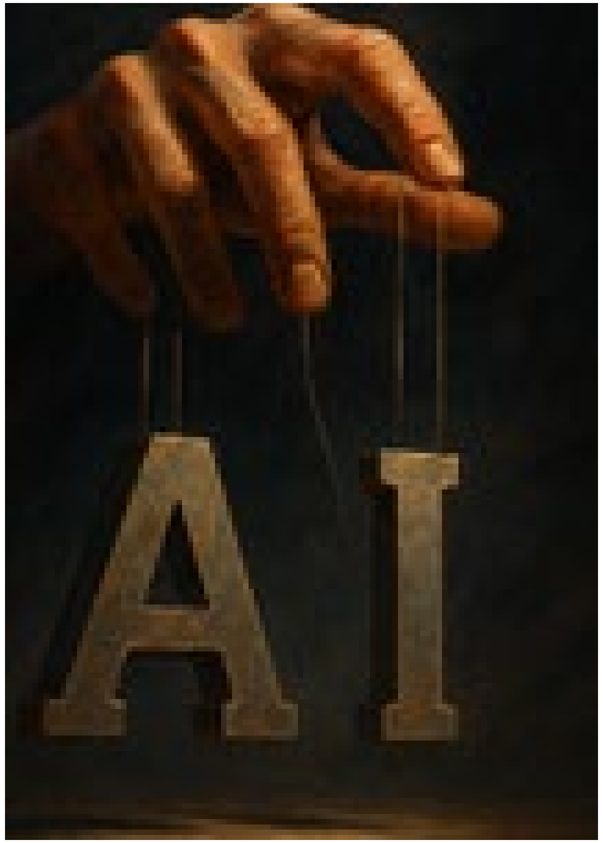
What do we observe

- Strong push toward deploying AI in operational settings.
- Many AI developers and leaders lack familiarity with major hazards and regulatory requirements.
- Technology development processes give limited attention to criteria that ensure adequate consideration of human factors.
- Limited engagement with end users and worker representatives.
- Emerging technologies are reshaping collaboration and operational models.
- Assume that humans will always intervene if AI fails.

«Human in the loop»

Copilot



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Transparency and explainability

- Understand how the system works, when it will work, and when it will not work.
  - Communicating uncertainty
- System provide timely and correct based on intended purpose.
  - Continues and real time oversight
  - Retrospective oversight and post-decision review
- System tailored to the specific needs of the user which can be different depending on the users.

*Copilot

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AI in systems of importance for safety

Risk management

- Data quality and handling
- Documentation and logging
- Accuracy
- Robustness
- Transparency / openness
- Human oversight and control
- Cyber security

Data quality and handling	Representative and high-quality data. This includes training, validation, and test data. Ensure data and model maintenance with a life cycle perspective.
Documentation and logging	Updated technical documentation, including development methodology, design choices, and user interface. A logging function for recording system events.
Accuracy	Reliable predictions and correct results. Consistent functionality throughout the entire life cycle.
Robustness	Ability to maintain performance under various circumstances. Be resilient with regarding to errors, faults, unintended changes and inconsistencies that may occur within the system or the environment in which the system operates
Transparency and openness	Provide information to understand system outputs for proper use. Highlight relevant limitations and uncertainties.
Human oversight and control	Real-time monitoring and analyze post-operations Ensure alignment between workflows and new technology. Facilitate adequate training and education.
Cyber security	A structured and holistic approach to digital security and digital infrastructure before an AI system is deployed. AI systems designed and developed to be resilient against cybersecurity threats.

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Conclusion

- AI can enhance safety and efficiency but requires cautious implementation.
- Strong governance and continuous risk management are essential throughout AI lifecycle.
- Human expertise remains vital; AI should support, not replace, decision-making.

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