Beyond visualisations: realising the full value of subsea data

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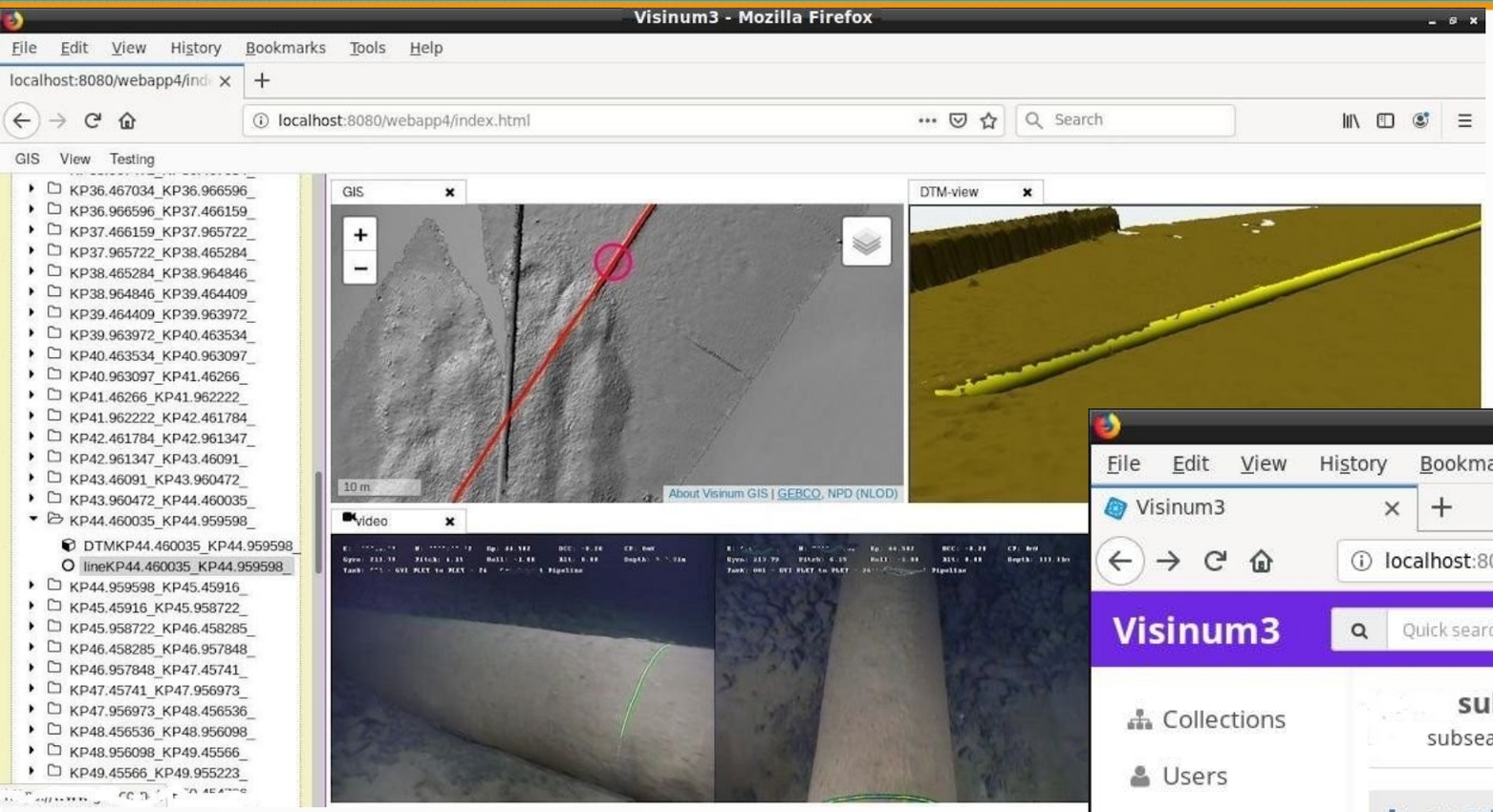
The future subsea digital toolbox
2019-10-31 Aberdeen

Introduction

- Subsea / pipelines engineer
- 20+ year’s experience, Aberdeen and Norway
- Pipelines/risers design, offshore project engineer, pipelines design coordinator
- Startup company Qwilka
  - Visinum data management & analytics platform
  - Unstructured engineering data
  - Manage, extract value from video, images, MBES, lidar etc.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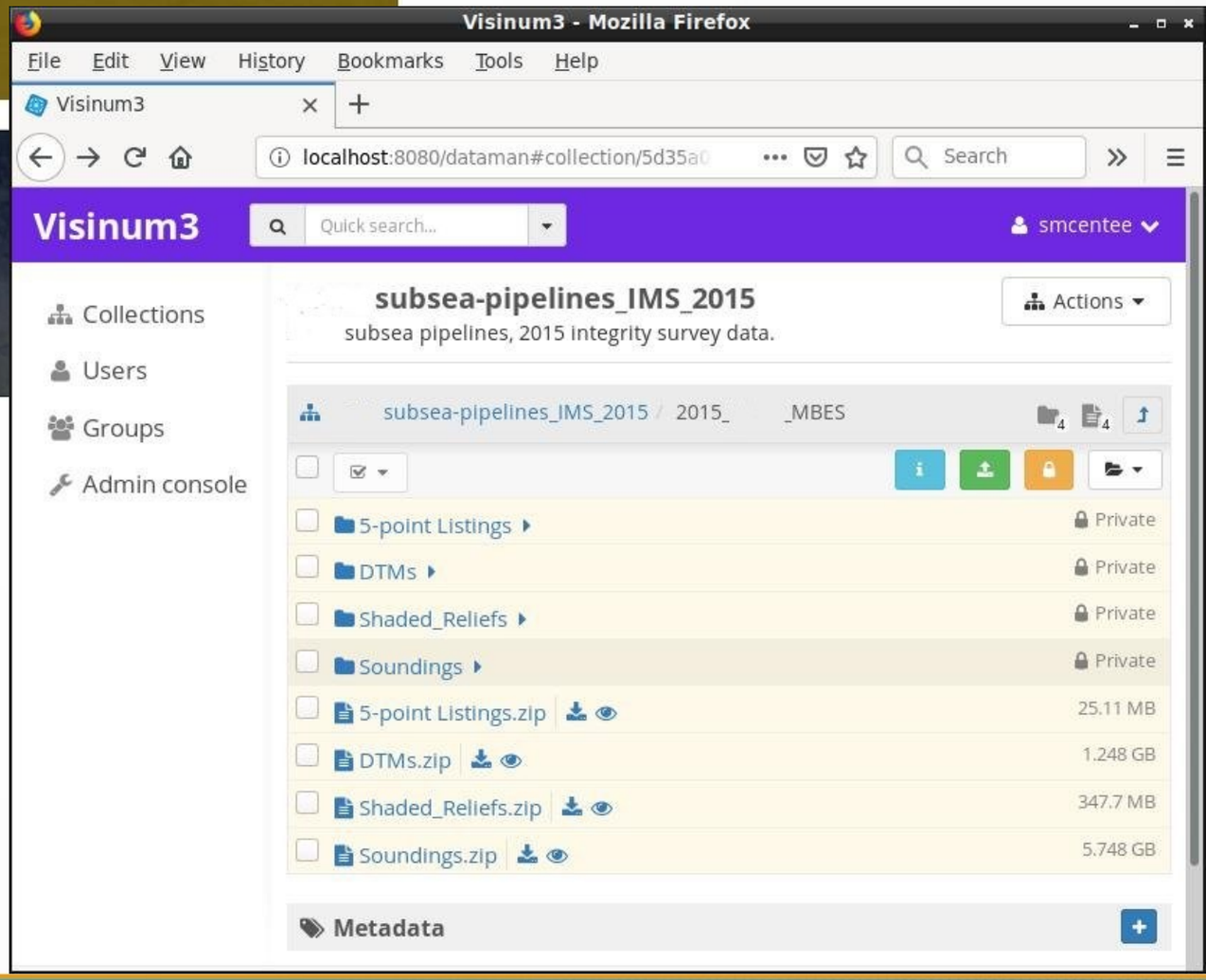
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Metadata

Objectives

- To review recent developments in the digitalisation of subsea / pipeline engineering
  - Examine the historical context
  - Present ideas on how to obtain more value from data and new technologies
  - Discuss possible future developments
- Present the subsea engineering viewpoint

Recent developments

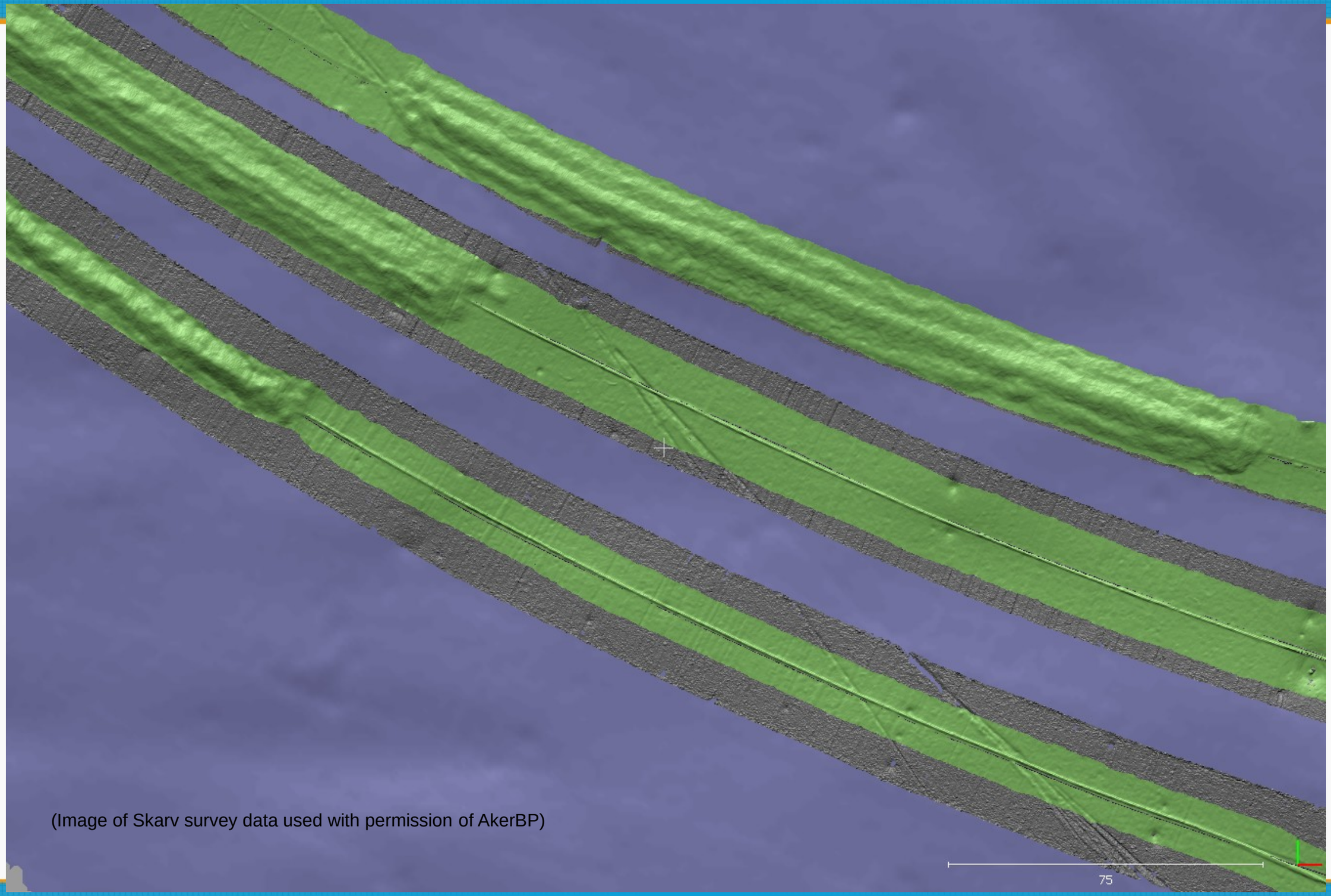
- “Lower for longer” oil price is leading to transformation in oil & gas
- Technology is a major part of the transformation
- New developments in subsea
  - AUVs, USVs, faster surveys
  - machine learning, computer vision
- Improvements in visualizations and data access
- Significant cost reductions in integrity management

New Challenges

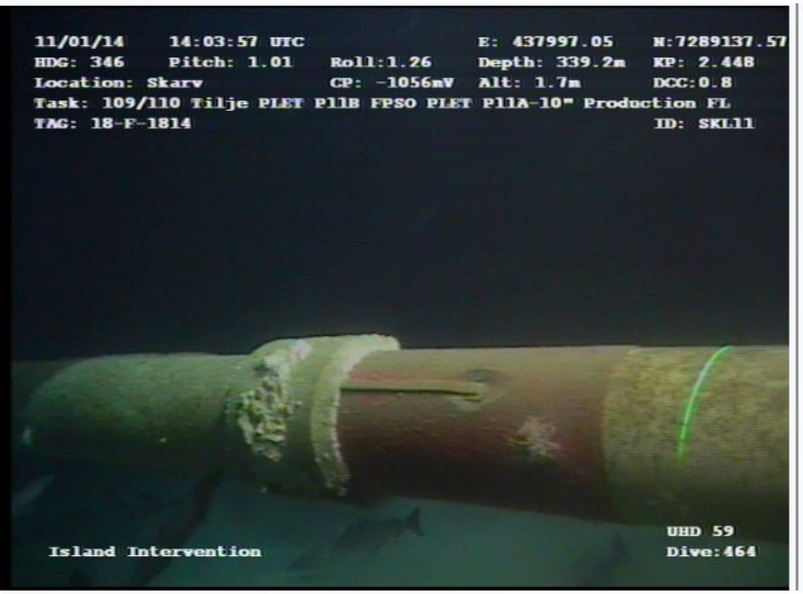
- New technologies offering new kinds of data
  - better data resolutions (better outcomes)
  - huge volumes of data (data management issues)
- Challenge integrating data into engineering
  - goal is to maximise value from data
- If pipelines are ALARP, why do more?
- Data has the potential to offer more than integrity:
  - realistic risk evaluation -> lower opex
  - better understanding of infrastructure -> lower capex

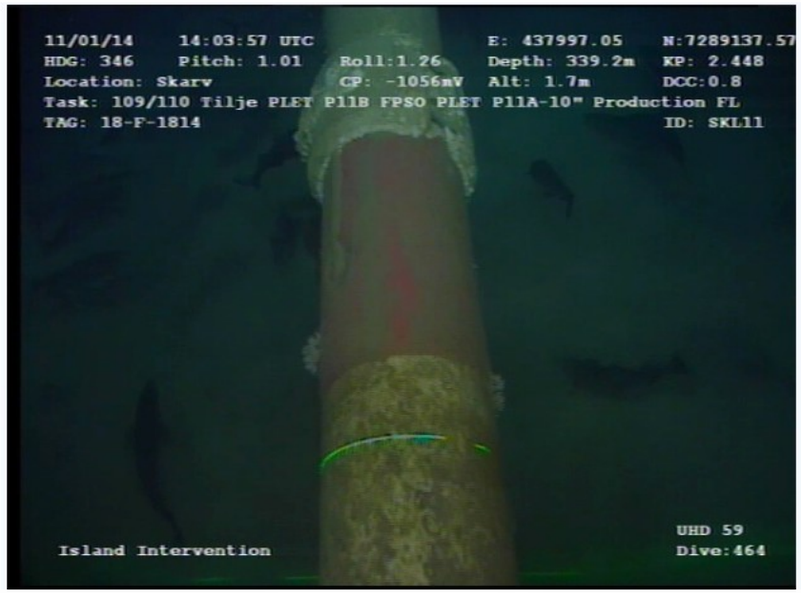
Pipeline engineering

- Pipeline engineering is primarily «design-driven»
  - Mainly based on simple engineering theory
  - Data from well testing, metocean, seabed survey is condensed into the *design basis*
  - Completely deterministic process, any uncertainties covered by “conservative” assumptions
- Robust but over-engineered infrastructure (high capex)
- Maximise production uptime
- Minimize operational risks (ALARP, lower opex)
  - Eliminate risks, if possible



(Image of Skarv survey data used with permission of AkerBP)





(Image of Skarv survey data used with permission of AkerBP)

“The design process needs to be made more efficient, less costly, and less time-consuming … it is not beyond reason to think of design being made essentially automatic, and the design being documented automatically.”

Palmer & King, Subsea Pipeline Engineering (2008)

Developments & Opportunities

- Pipeline design is being automated
  - moving from the desktop to the data centre
  - moving closer to the data
- Opportunity to transform subsea engineering
  - from «design-driven» to «data-driven» engineering
  - reality-based, utilising data and field observations
  - realistic evaluations of risks
  - better understanding of infrastructure behaviour

How to realise value from subsea data?

- "Why Data Science Fails in Oil & Gas?"
  - perception that potential is not being realised
- Couple «physics-based» models to data science
- Probabilistic evaluation of risk based on data
  - move away from deterministic, conservative approach
- Inverse methodologies
  - start with the answer (the data) and analyse back to the definition
  - reveals information about the real status of the system

What is needed?

- Data accessibility
  - most subsea data is “siloed” & confidential
  - commercial and legal barriers
  - need-to-know approach will not deliver
- Growing trend towards “open” data
  - OGA National Data Repository
  - incident reporting - safety flashes
  - AkerBP “data liberation front”

What is needed?

- Context as well as data
  - enables risk comparisons and physics-based approach
- Collaboration
  - more data and context means better outcomes
- Trust
  - need to have confidence to share data
  - “general infrastructure information normally uncontentious”

    OGA Reporting and Disclosure of Information 2019
- Subsea engineers thinking like data scientists
  - or train data scientists as pipeline engineers?

Concluding remarks

Subsea has a choice on how to proceed:

- Use new technology to achieve incremental improvements and some cost reductions
  - but basically, continue as before
- Transform subsea engineering and realise the full value in subsea data
  - reduce risks
  - maximise economic recovery

Thank you for listening!

https://qwilka.github.io/