Digitalisation and Subsea Robotics

Underwater Vehicles Conference 2017, Aberdeen

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WHAT IS DIGITALISATION?

Shell context

Focus
- How Digital technologies can help address current business challenges
- Technologies that can have a substantial impact on our industry

Subsea context

Enabling
- Production optimisation
- Reduced life of field costs
- Competitive future projects

Definition
“Refers to the use of digital technologies to create more value and/or create entirely new business models”

Is not
- New
- Only in the Future

Refers to the use of digital technologies to create more value and/or create entirely new business models.”
ROBOTICS
For years has enabled diverless operations, investment continues now with robotic manifolds, all electric ROVs and AUVs.

DATA, ANALYTICS & MODELLING
Oil and Gas developments produce petabytes of data how can this evolve to reduce lifting costs further?

* The percentages in the bars are the proportion of Oil and Gas companies surveyed.
Source: Accenture, The 2016 Upstream Oil and Gas Digital Trends Survey
Where does the technology fit?

- **Goal:** Focus on technologies which quickly evolve one part of the data cycle.
- **Where do Subsea vehicles fit in the data cycle?**
  - Retrieving data?
  - Reducing the cost of acquisition?
- **Leveraging advanced analytics to improve vessel productivity**
**MARINE ROBOTICS**
WHERE ARE WE NOW

**PRESENT**

Subsea Facility and Pipeline Inspection
Detailed inspection: ROV; General Survey: AUV & FROV

From Data to Decisions
Engineering Analysis
Workflow driven – decision making

Visualisation Layer
Graphics, Work Process Tools

Computational Layer
Applications and Models

Data Layer
Structured & Unstructured

Asset Performance Information
Sensors/Equipment

Trends/Reports
Automation Driven

Process Control Function
Asset
MARINE ROBOTICS
EVOLVING DATA ACQUISITION

NEAR FUTURE
(NOW – 2025)

Subsea Facility and Pipeline Inspection
Detailed inspection: AUV and Fast ROV; Integrated AUV/WROV ops
Asset Based AUVs

SENSORS
- Bridge the ROV – AUV capability gap
- Higher acquisition rates

POWER AND COMMS
- Battery technology
- Subsea communications

ENABLERS
- Smaller AUVs
- “Platform friendly” LARS
- Integrated AUV/WROV inspection/intervention campaigns

DEPLOYMENT
WAYS OF WORKING
MARINE ROBOTICS
EVOLVING DATA ACQUISITION

FUTURE
(2025 AND BEYOND)

Subsea Facility and Pipeline Inspection
Integrated UAV, ASV and AUV Operations, SWÅRM AUV-ROV Operations

EXTERNAL FORCES

SOLAR, WIND, SHALE, NON-TRADITIONAL ENERGY COMPANIES
Subsea faces competition on all fronts for investment
Drive to use robotics to reduce the cost of accessing subsea facilities

CLOUD, AI, ROBOTICS AND DRONES
Enabling “Desk to Subsea” access
Integrated AUV, UAV and ASV operations

MOORE’S LAW
Reducing build cost
Cheaper robotics, enabling the realisation of “swarm” robotics

PRIMARY DISTRUPTORS

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From Data to Decisions

**ENGINEERING ANALYSIS**
Workflow driven – decision making

**VISUALISATION LAYER**
Graphics, Work Process Tools

**COMPUTATIONAL LAYER**
Applications and Models

**DATA LAYER**
Structured & Unstructured

**PRESENT**

**Personnel Offshore and Onshore**
Live data processing offshore, detailed reporting onshore

**NEAR FUTURE**
**(NOW – 2025)**

**Automated Target Detection**
More focussed “live” offshore data review
Quicker report turnaround onshore
Improve productivity

**FUTURE**
**(2025 AND BEYOND)**

**Automated Data Processing**
Trained “Neural Networks” delivering reports and anomaly reporting

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“The future of work will involve a partnership between humans and cognitive systems technology”, IBM Market Development and Insights 2017

- **Humans will excel at:** Common Sense, Morals, Imagination, Compassion, Abstraction, Creativity, Generalisation, Judgement….

- **Cognitive Systems will excel at:** Locating knowledge, Pattern Identification, Natural Language, Machine Learning, Eliminating Bias/Emotion and Endless Capacity
LINKING GRAND IDEAS TO FIRST STEPS

“Stop talking, Start doing”, IBM

Challenge:
- Delivering a step plan to 2025
- Agile, quicker, faster, cheaper, useful
- Understand where the technology adds value
- Evolution is easier than revolution
Thank you for listening