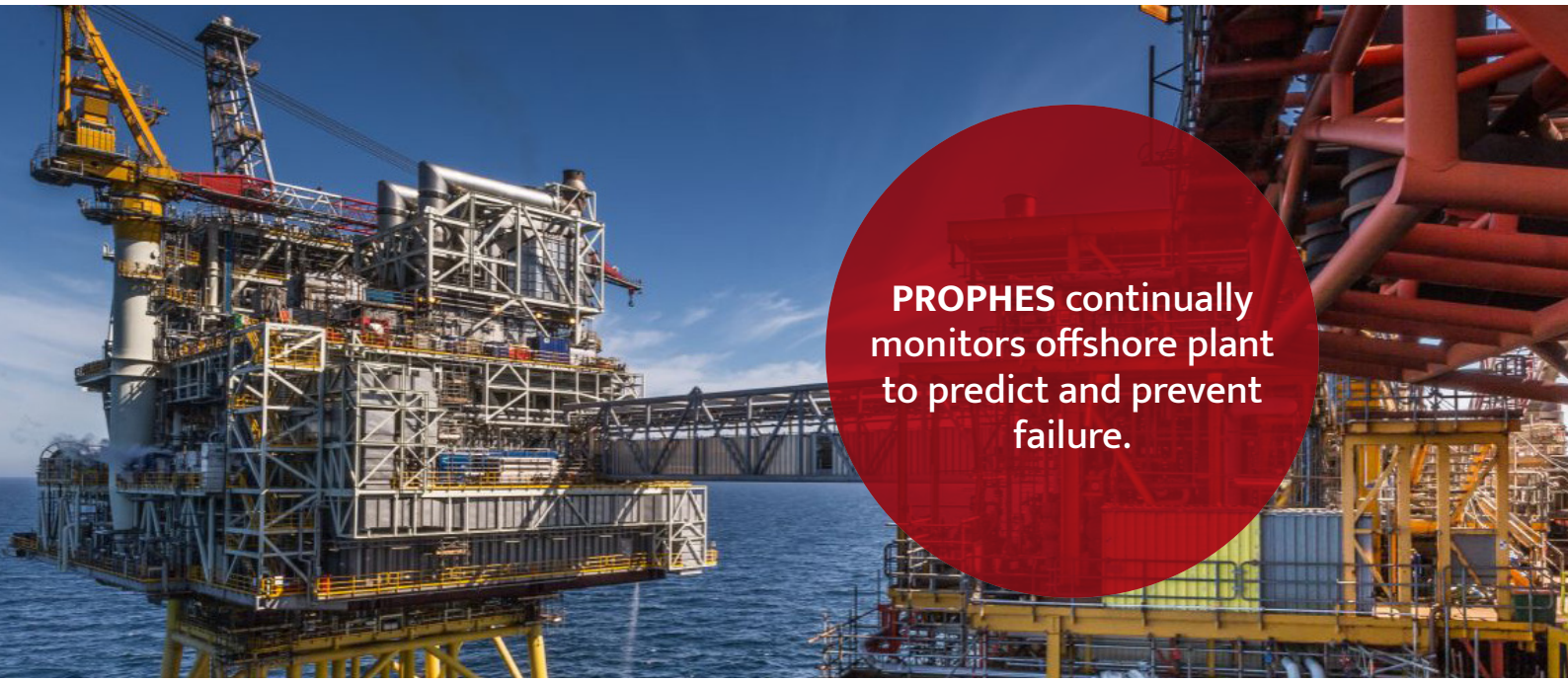
Spartan Digital Operations



**PROPHES** continually monitors offshore plant to predict and prevent failure.

The Oil & Gas Technology Centre

University of Strathclyde Glasgow

REPSOL SINOPEC Resources UK

*"PROPHES allows you to visualise real-time field data from numerous sources, compare issues with previous problems and label problems for future analysis. This capability gives you a significant reduction in the time to mitigate faults."*

Lee Broadley, Reliability Manager, Repsol Sinopec

## KEY BENEFITS

- *Increased production recovery*
- *Real-time surveillance of critical plant and equipment*
- *Unnecessary paperwork removed*
- *Reduce manual error and delay*
- *Increased onshore and offshore productivity*

## THE CLIENT

Repsol Sinopec Resources UK is an oil and gas exploration and production company operating in the North Sea. Based in Aberdeen, Scotland, they have interests in 48 fields, 38 of which they operate on the UK Continental Shelf along with 11 offshore installations and two onshore terminals.

## THE PROBLEM

In 2018, over $6Bn of Oil and Gas reserves were unrecovered from the United Kingdom Continental Shelf (UKCS). Over 60% of this production loss was caused by unplanned downtime resulting from mission-critical plant and equipment failure.

The Oil & Gas Authority reported that upstream plant and equipment reliability decreased by 14% in one year, indicating a worrying trend that could substantially increase annual unrecovered production in the UKCS. At the same time, Operations and Maintenance costs are increasing at 3% on average per annum.

And it is not just the North Sea plant and equipment that is ageing, decades-old IT systems and maintenance processes no longer deliver enough value.

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## THE SPARTAN SOLUTION

Spartan worked in collaboration with Repsol Sinopec Resources UK, the Oil and Gas Technology Centre (OGTC) and Strathclyde University to design, build and trial a cloud-based Predictive Maintenance solution called **PROPHES**.

PROPHES continually monitors real-time telematics data from offshore plant and equipment and uses a range of Artificial Intelligence algorithms that recognise emerging fault modes and predict failure. When failure is predicted, onshore and offshore equipment experts will use the web based PROPHES analytics tools to compare current behaviour against historical trends to identify the root cause and agree on an action plan to prevent failure and minimise unplanned downtime.

PROPHES works alongside **PHALANX**, Spartan's mobile workforce management platform, to provide a comprehensive Asset Performance Management solution. PHALANX has a range of offshore mobile apps to automate investigations, work order execution and follow-up, as well as the capture of stranded data on equipment with no telemetry (e.g. Operator Rounds).

**Spartan's digital APM solution will increase your organisational efficiency and give you control of your assets.**

**Start a conversation with our team today.**

## THE RESULTS

The trial focused on Gas Compression System (GCS) failures on Repsol Sinopec's Piper platform. A supervised machine learning algorithm was developed and validated against a historical digital twin of the GCS trains that was uploaded to PROPHES. The digital twin also included events from the Computerised Maintenance Management System (CMMS) and the Production Loss Management System (PLMS). The algorithm had an 81% accuracy in identifying GCS faults, especially dry gas seal failures.

When Repsol Sinopec rotating equipment experts reviewed the historical predictions for Train 1 of the Piper GCS, they quickly noticed repeated failures of the dry gas seal. The experts used the tool to add additional sensors (e.g. DE Primary Seal Leakage Flow, Scrubber Level) and confirmed a repeating pattern was present.

A Spartan software engineer joined the Piper offshore maintenance and operations team to trial the use of specialist PHALANX Oil & Gas mobile apps. The investigation, work order management and operator rounds apps allowed offshore engineers to execute everyday tasks with no need for paper or manual processing.

PHALANX saved between 45 and 60 minutes per maintenance work order. And because PHALANX was integrated in real-time to the Repsol Sinopec CMMS system, there was no need for engineers to queue for access to a PC to update work order results and create follow-on work requests.

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