Asset optimisation: the win-win answer for Proserv

Stuart Harvey and Preston Clarke of Proserv explain how data analytics and innovative technology can bring operators substantial environmental and financial results.





Two Proserv technicians inspecting a monitoring solution for remote onshore and offshore wells.

arly this year, Proserv won its first renewable energy-related subsea cable condition monitoring contract from DEME Offshore, a contractor on the Equinor/SSE-operated Dogger Bank Wind Farm. Proserv will be supplying its trademarked ECG solution, which can holistically monitor the condition and integrity of the export and inter-array cables on an asset.

Going further than traditional cable monitoring systems, ECG not only employs distributed temperature and distributed acoustic sensing but uniquely engages distributed electromechanical sensing allowing it to collate a wide range of relevant information and so, via data analytics modelling, predict the possibility of failure. The concept is rather like echo cardiograms – analysing data and other metrics to gain visibility of the health of the human heart. "It is like a doctor wiring up a patient," Proserv's subsea technology manager, Preston Clarke told OEUK.

"A temperature curve moving a few degrees higher, along with a bit of vibration, could be the first warning sign of a problem developing. We can stop things from deteriorating by harnessing the monitoring and predictive capabilities of ECG over the system," he said.

Engaging the power of data analytics to underpin condition monitoring is a major strategy for the company right across the energy spectrum. This can have direct benefits for carbon footprint and emissions reduction. As boardrooms of companies operating in many sectors are focusing on environmental, social and governance (ESG) strategies, this is highly relevant.

Proserv's digital innovation director Stuart Harvey said that there are three key indicators which, if detected, can prevent damage to the environment as well as enhance company performance. These are discerning poor equipment performance, potential equipment failures or potential human errors in processes. He explained: "If a company has the technical capabilities to deliver these three core elements across their assets, with a consistent disciplined approach, they are on the road to success.

"However, like any technology, its growth and return on investment requires alignment with culture, and digital technology is no exception! I believe that all too often this is forgotten and that getting these factors aligned is arguably one of the biggest challenges the energy industry faces today, if we are serious about delivering on our digital and energy transition ambitions."



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Putting the 'E' into ESG...

Prosery's objective and philosophy is to deliver a competitive advantage to asset owners and operators through digital solutions, enabling them to outperform their competition.

Stuart cited multiple examples particularly around chemical injection and the management and understanding of dosing. "We have come across cases where chemical injection rates have fluctuated considerably and, in some situations, have steadily increased over a number of years up to significant levels. In such instances, it is typical this information is known by the offshore team. But their focus tends to be short-term and therefore this data is not usually visualised to the onshore reliability team in a way that enables them to easily trend multiple factors which, for example, may impact performance or corrosion.

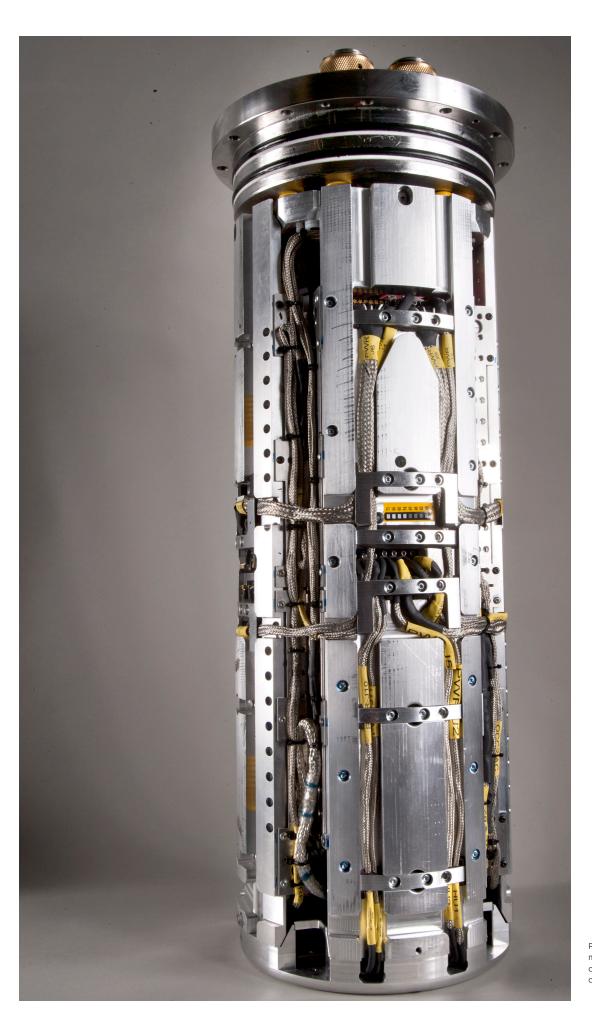
"We're changing that by working collaboratively with clients to reimagine how these feedback loops can not only be analysed but, more importantly, visualised in a way that challenges the status quo of control room alarm and trip design philosophies.

"As well as the financial and local environmental costs, there is also the carbon footprint of getting chemicals to an asset, not to mention the CO_2 footprint of producing the chemical in the first place," he added. "It is through the use of data analytics and new visualisation techniques that we can positively identify and bring these events to light."

...and the 'S'

For Stuart, data-visualisation is a key focus. He suggested that making an interface intuitive to the users is where Proserv is helping onshore reliability and maintenance teams improve their own human performance.

"Having an interface which is intuitive and powerful also helps with bringing teams along on the digital journey. This philosophy, combined with working collaboratively with the users, has become really



Proserv's subsea electronics module, the Artemis 2G, can offer coexistence capabilities.

The interviewees (L-R): Preston Clarke subsea technology manager, Proserv

Stuart Harvey, digital innovation director, Proserv.



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impactful. We deliberately avoid mimics of any visualisations that are already found in the control room and instead focus on more innovative designs and recognition techniques.

"When you take a step back and look at the bigger picture, it is clear to me why this approach is so powerful. Visualisations and human-machine interfaces (HMI) in control rooms struggle to innovate because by their very nature they are closely regulated. Any changes or updates are highly controlled and rightly so. That environment is performing the critical control function of an asset.



"That is why Proserv's strategy is to deliver new innovative analytics and visualisation techniques with agility, outside of this environment. In doing so, we are demonstrating the value of challenging that status quo, but without the risk. I am confident it is only a matter of time before some of these new techniques will find their way into the control room."

Stuart said this approach is also having wider positive impacts for clients, "First, because of the environment our analytics and visualisations are being deployed in, the onshore reliability and maintenance teams have been able to intercept events that would have become alarms or trips in the control room before they occurred. This reduces the workload and stress for the offshore team actually in the control room environment. Second, this approach is fostering a cultural shift by bringing teams closer together and having open conversations around root causes of events and continuous improvement, thanks to the visualisation that is now available."

Coexist and thrive

Proserv's evolving digital service offering reflects a growing industry need for better real-time monitoring as operators seek to extend the life of equipment, maximise performance - and optimise assets.

But the team has built its long-standing reputation for technology around its controls capabilities. Here too, via unique innovation, it offers significant capabilities to improve reliability and prolong life.

Over time, operators experience obsolescence problems with subsea controls equipment that was supplied by an original equipment manufacturer (OEM) perhaps only five or ten years earlier. Preston explained: "The electronics become unsupported, or obsolete, as the OEM has moved on to a new version or model. If it is left unattended, this equipment would become more and more unreliable. So, we have developed a methodology to overcome obsolete controls and regenerate them. This ultimately improves both the economic and the environmental gains for its operators.

"The operator can keep everything running while we upgrade modules as required over time, spreading out costs, avoiding the intensive impacts of the replacement and extending the life of the equipment."

"The solution and approach that we have come up with is known as augmented controls technology (ACT) – which adds our subsea electronics technology to the existing OEM infrastructure. This prolongs the life of an asset and so maximises its potential value. Second, it upgrades the infrastructure by increasing functionality and capability; and third, it enables operators to avoid the cost, and environmental drawbacks, of full system replacements.

"Our communications capabilities can 'coexist' on the same umbilical line as the existing equipment. This avoids replacing everything and keeps the field alive, combining augmented Proserv technology with the legacy infrastructure that is already there."

Proserv takes failing control modules into its facility and completely refurbishes them. Preston stressed that, given the current thinking about waste reduction and streamlined operations expenditure, the team's capabilities in this area are particularly relevant, always seeing "replacement as the last resort".

The ability to be OEM-agnostic also opens up possibilities for customers:

"If an operator has all of its subsea control modules from one particular OEM vendor but wants to add a well or extension, we can offer it a control module that can coexist, or talk, to all of those existing modules. This avoids the problem you can have with competing mobile phone operating platforms, for example, that cannot communicate with each other.

"Alternatively, if subsea control modules installed a decade ago fail and the OEM no longer supports them, it is in that supplier's own interests to recommend replacing the entire system. Proserv's 'coexist' capabilities enable the operator to switch out any unreliable modules and instead deploy our electronics, bypassing the waste of a full system upgrade. This shows the benefits of being OEM-agnostic."

Environmental and economic win-win

Preston referred to a project in southeast Asia involving subsea modules that were some 20 years old. The operator wanted to tie in a new field, as an

extension. Unlike the other proposals that would have required the operator to tie directly all the way back to the platform – with a new umbilical and additional controls – by engaging its ACT capabilities, Proserv retrieved the old modules, enhanced them with its Artemis 2G subsea electronics modules and lowered them back into place. This meant a tie-in of just a few kilometres to the asset, rather than a new umbilical all the way back to the platform which was 12 km away.

From an ESG perspective, a less intrusive solution offers obvious savings but equally the bottom line is also well protected, creating "a win-win".

In an extreme case, an operator might have to upgrade the entire field, perhaps replacing 30 or 40 subsea modules on its wells if it returns to the OEM for a replacement solution. This would be very expensive, not to mention the environmental consequences of the manufacturing of the new equipment and the footprint of a large campaign offshore, involving support vessels, to replace them.

"With Proserv, the operator can keep everything running while we upgrade modules as required over time, spreading out costs, avoiding the intensive impacts of the replacement and extending the life of the equipment and the asset," said Preston.

"We can also add in new instrumentation when we carry out upgrades and increase bandwidth capability. As a case in point, an operator had an issue with a very small gas leak. We hooked up a camera to monitor the subsea wellhead to detect its source, using our coexistence abilities, as the OEM system did not have enough bandwidth to support the video camera.

"This allowed us to determine whether the leak was actually confined to inside the well, as that meant the operator could continue production. If not, there would have been environmental consequences. The alternative solution would have been to send a vessel to drop a remotely operated vehicle down, which would have been on station with dozens of people on board with all the subsequent time, costs and carbon emissions that would entail." O