NOV deploys **eVolve Optimization Service** in remote Kenya wildcat exploration well to identify harmful drilling dysfunction and save multiple bit trips

Innovation in action

A client drilling in Kenya needed to understand how performance limiters were impacting their operation. The eVolve team worked with the client to measure and analyze time and depth data and prevent failure mechanisms by using a combination of our products, software, and drilling dynamics recommendations.

The client showed a proactive approach to drilling exploration wells. While many operators are of the mindset that memory-only data will not be of significant value for wildcat wells, NOV was able to deliver definitive results in this application. Fast turnaround times on our data analysis and a close daily discussion with the client allowed us to, through the ADVISE tier, optimize the drilling dynamics of an operation in an extremely remote territory, where any failures and inefficiencies mean severe increases in operational costs.

- Saved a minimum of three bit trips, leading to cost savings of at least USD 450,000

- Used downhole data to provide drilling engineers with beneficial BHA change recommendations

- Improved ROP through implementation of optimized drilling parameters

Technology

NOV's innovative eVolve™ Optimization Service delivers complete, integrated drilling technologies to solve our clients' complex drilling problems. The eVolve team delivered a solution from the ADVISE tier, a data-driven optimization service incorporating our BlackBox™ memory-mode logging tools, to optimize the client's drilling operation and increase performance.

Performance

Our BlackBox vibration recorders were used in the 17½-in., 12¼-in., and 8½-in. sections of the client's well. The first 17½-in. bit showed severe signs of impact damage after pulling out of hole due to low rate of penetration (ROP). The first thing revealed by the BlackBox data was that severely harmful vibration happening in the bit and bottomhole assembly (BHA) coincided directly with a seemingly negligible input from the autodriller, with no signs for concern from surface data. The drilling crew immediately began to drill only in manual mode until the autodriller could be configured correctly. This change helped eliminate what would have been additional premature bit failures.

Results

The autodriller error, combined with the difficulty of drilling the harder, more challenging formations deeper in the hole, would have led to severe premature damage. In the 12¼-in. and 8½-in. sections, high-frequency vibration data analysis revealed moments of whirl, allowing us to provide formation-specific drilling parameters and assist the client in determining where, when, and why their drilling performance lacked and how they could address those issues. Using the BlackBox data to identify the failure mechanism and to develop a better plan of action, we enabled the client to save a minimum of three bit trips, in turn leading to cost savings of at least USD 450,000.

NOV deploys **eVolve Optimization Service** in remote Kenya wildcat exploration well to identify harmful drilling dysfunction and save multiple bit trips
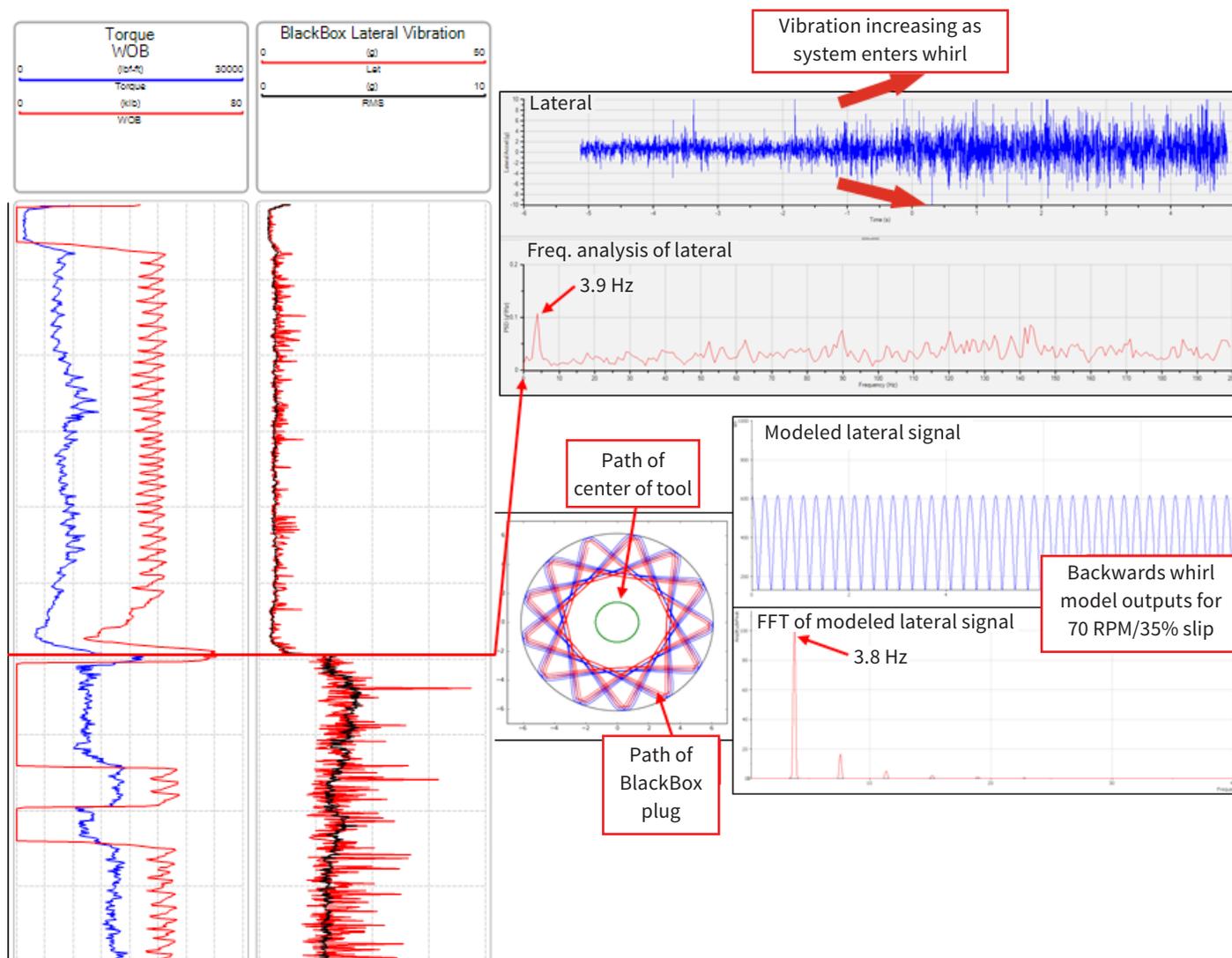

Figure 1 – This image shows the several types of data provided by the BlackBox tools. Information on torque, weight on bit, and lateral vibration enable the client to develop a more comprehensive understanding of downhole events and drilling dynamics. In this application, the BlackBox tools helped to identify a failure mechanism with the autodriller and significant lateral vibration increases as the system entered whirl once off bottom.