xSight CCL service saved rig time and reduced risks during casing-exit operation

To perform a sidetracking operation, a whipstock is typically oriented and set at a predetermined depth with a window mill attached. The window mill is then detached from the whipstock and pushed to mill a window in the casing.

Casing-exit operations are critical because they provide the only entrance into the sidetrack for all future operations, thus it is important that a high-quality window be created at the optimal depth and at the desired orientation. As well depth and complexity escalate, it becomes increasingly challenging to reliably and efficiently create the window in one trip. In a high-operating cost environment, such as deepwater and remote areas, the impact of unproductive trips is amplified. One of the challenges is milling the window through casing collars, which usually results in low rates of penetration (ROP) and excessive damage to the window mill, and can sometimes cause tool failure.

A major operator in the North Sea wanted to perform a sidetracking operation on 13¾-in. casing and was concerned about the risks associated with milling through casing collars. Their confidence in the accuracy of the available casing tally was low. Baker Hughes, a GE company (BHGE), recommended the xSight™ smart intervention casing collar locator (CCL) service, which identifies casing collars so operators can avoid milling through them.

The xSight CCL service is a component of xSight smart intervention services, which provide downhole mechanics and dynamics.
measurements to optimize a wide range of wellbore intervention operations. The CCL service involves acquiring magnetometer or density measurements along with measured depth, and transmits the data to surface through mud pulse telemetry. The data is then processed with a proprietary algorithm to detect and visualize the location of the casing collars in real time.

As a key enabler and an integral part of the service, the BHGE bi-directional power and communication module was used to provide power to the downhole performance sub and to transmit data from downhole to the surface and from the surface to the bottomhole assembly (BHA).

Using the xSight CCL capability, the operations team successfully performed the whipstock casing-exit run in one trip. The BHA was run to 10,876 ft (3,315 m) and the mud flow rate was increased to 803 gpm (3,040 lpm) to activate the measurement-while-drilling system.

The BHA was sliding downward with a consistent speed of 131 ft/hr (40 m/hr) to log the casing to a depth of 9,957 ft (3,035 m). The xSight CCL service clearly identified two casing collars at 10,886 ft (3,318 m) and 10,952 ft (3,330 m)—each approximately 1.6 ft (0.5 m) deeper than the casing tally had suggested. The whipstock was then oriented and set between the identified casing collars, and the casing window was successfully milled without hitting them.

The performance and accuracy of the xSight CCL service reduced operating expenses by detecting and visualizing casing collars in real time, saving a dedicated wireline run, and reducing operational risks by avoiding milling through casing collars.

![Real-time xSight CCL log from the 13 1/2-in. whipstock casing-exit run](image-url)