

# EXAIL LBL POSITIONING

## PRECISION AND RELIABILITY FOR COMPLEX UNDERWATER OPERATIONS



Canopus transponders being deployed during a positioning operation off the coast of Africa.

Underwater positioning plays a crucial role in a wide range of subsea operations, from large-scale infrastructure projects to long-term monitoring of underwater assets.

Exail Long Baseline (LBL) positioning system, featuring the Canopus acoustic transponder and Ramses acoustic transceiver, is renowned for its unmatched accuracy, robustness, and long-term reliability.

This advanced technology has been deployed in numerous high-precision applications, including offshore oil and gas operations, deep-water pipeline monitoring, subsea infrastructure installation and scientific research.

### THE PRINCIPLES OF LBL POSITIONING

LBL positioning is an established and highly effective technique for underwater navigation, particularly in water depths where USBL does not yield the expected accuracies. The system operates by deploying multiple seabed-mounted transponders as fixed reference points.

A mobile transceiver, typically mounted on an ROV or AUV, interrogates these transponders, which then respond with acoustic signals. By measuring the travel time of these signals and compensating for the sound velocity profile and ray bending, the system calculates the position of the mobile unit with high accuracy.

Exail LBL solutions feature Canopus transponders and Ramses transceivers,

which provide exceptional stability and precise positioning. In addition, Exail inertial navigation systems (INS) offer reliable positioning even in challenging environments where acoustic signals may be temporarily blocked. This combination of technologies ensures continuous, reliable, and highly accurate subsea positioning across a range of operations.

### MINIMISING OPERATIONAL DOWNTIME IN OFFSHORE OIL AND GAS

Exail LBL systems have proven essential for offshore oil and gas operations that require high precision and minimal operational downtime. In a West African project aimed at expanding an existing oil field, Canopus transponders were integrated into an already established LBL network to facilitate the accurate installation of new subsea flowlines.

After carefully calibrating the new Canopus beacons with the existing array, the system enabled the precise positioning of subsea vehicles during pipe deployment.

This ensured the installation process proceeded smoothly, without delays or interruptions to ongoing operations. The system's key benefits included high accuracy, robust performance in harsh subsea conditions, and efficiency with fewer transponders, making it an ideal solution for complex tasks.



Exail LBL solutions were deployed to provide precise positioning during a crucial oil and gas operation off the African coast.



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At the core of a successful positioning operation off the French coast, Canopus transponders delivered unparalleled accuracy.

### AUTONOMOUS, REAL-TIME MONITORING FOR PIPELINE INTEGRITY

Exail LBL solutions were also deployed to monitor the position and integrity of gas pipelines, which are essential for transporting gas across vast underwater distances.

These pipelines, resting on concrete structures, are susceptible to shifts caused by environmental changes, seabed

movement, and fluctuations in gas pressure. To monitor these critical subsea assets, Canopus transponders were strategically deployed on expansion loops.

These transponders provided continuous, real-time tracking of the pipeline's position, ensuring that any movements or displacements were detected early. The autonomous, long-term monitoring system offered engineers invaluable insights into

the pipeline's behavior, allowing them to make informed decisions about maintenance and ensuring the pipeline's long-term safety and stability.

### LONG-TERM MONITORING OF TECTONICAL PLATE MOVEMENT

Exail LBL systems have proven indispensable for environmental and scientific monitoring, particularly in tracking earth plate movements. Canopus

transponders were strategically deployed off the southern coast of France and Sicily, around fault lines, to monitor tectonic plate movements and earthquake faults, with a deployment period of four years.

These transponders provided continuous, highly accurate ranging data, enabling researchers to detect even the smallest shifts in the plates.

With their long battery life and reliable autonomy, Canopus transponders are ideal for long-term monitoring in remote and challenging environments.

The collected data has yielded valuable insights into seismic behavior and the dynamics of fault movements, contributing to a deeper understanding of global geological processes.

### IMPROVED EFFICIENCY IN ROCK PLACEMENT AND SUBSEA INFRASTRUCTURE INSTALLATION.

Exail LBL systems are extensively utilized in rock placement operations, where rocks are placed on the seabed to stabilize or protect subsea infrastructure such as pipelines. In a rock placement project in Turkey, Exail Ramses transceiver and INS were deployed to guide a fall pipe remotely operated vehicle (FPROV) in accurately positioning rocks on the seabed.

The system's ability to operate with fewer transponders while maintaining decametric accuracy, despite the high noise environment, significantly improved operational efficiency and reduced complexity. This high-precision navigation not only ensured the proper placement of

rocks but also supported the installation of other subsea infrastructure, including offshore wind farm foundations and subsea cables, where accuracy and reliability are equally critical.

### CONCLUSION

Exail is pushing the boundaries of subsea positioning technology with its innovative LBL systems. Combining Canopus transponders, Ramses transceivers, and inertial navigation systems, Exail delivers unparalleled accuracy and reliability across a wide range of complex underwater operations.

Whether monitoring pipelines, constructing underwater tunnels, or installing subsea infrastructure, Exail's solutions ensure long-term, autonomous operation, seamless integration with existing systems, and exceptional performance in the most challenging environments.