

ROV Mid-water Station Keeping



An affordable and functional solution for Mid-water Station Keeping (MWSK) has been on the wish list of most ROV operators and manufacturers for some time now; the huge benefits in terms of operational efficiency and the future potential for pre-planned automated missions has made it a case of when, not if.

Against this backdrop and at the request of C-Innovation, CDL and Schilling Robotics engineers started work on a collaborative solution over twelve months ago, the results of that effort were demonstrated in March in the Gulf of Mexico following an extensive period of Factory Acceptance Tests.

Traditional ROV station keeping functions rely on a Doppler Velocity Log (DVL) system on the ROV which can only maintain bottom lock within a limited distance of the seafloor (typically 30m) with the added disadvantage of only providing relative position. USBL positioning systems, while providing absolute position are unable to support MWSK functionality due to inaccuracy (especially in deep water) and slow update rates, while inertial systems suffer from drift when unaided.

The solution centres around fusing these readily available positioning technologies (INS, USBL and DVL) and the integration of those technologies with Schilling's next generation closed loop control system. At the heart of the solution is the CDL MiniPOS3 INS (Inertial Navigation System) platform which uses the USBL position (and DVL when available) to produce a highly stable INS aided solution feeding precise position, acceleration and rotation information directly to the control system on the ROV at update rates of up to 50Hz.

During the trials carried out in March 2011 on the Chouest Holiday, a C-Innovation performed an extensive set of test procedures with a UHD ROV system to demonstrate the world's first practical ROV MWSK system utilizing inertial technology aided by a surface based USBL positioning system. MiniPOS3 is hardware independent and can work with any USBL or LBL system and a variety of topside software packages. The first software package to fully support the functionality is WinFrog by Fugro Pelagos which was used during testing.

The performance of the MiniPOS3 and the Schilling control system can be seen in the screenshot opposite and the results are remarkable. The absolute positioning accuracy of the ROV (without DVL) was noted at a standard deviation of less than 40cm during MWSK. With DVL lock this improved to approximately 3cm.