Sub-sea Global Fixing in Deep Water

Currently, the precision of sub-sea global positioning (of UUV and ROV) in deep water is considered to be lagging behind the precision and functionality of GPS-based surface positioning offshore. This is particularly apparent in the operationally favourable combination of high precision and concurrent geographical flexibility.

For oil and gas-related offshore construction activities, the technical requirements (including positioning) of seabed documentation are today - in theory - irrespective of water depth, i.e. what is presently required (and achievable) in 300m will also be wanted in 3,000m water depth. But achieving this at 3,000m will still encounter technological, operational and resource related, problems. This is due to the adverse effect of increasing water depth upon the maintenance of precision of global positioning. Additionally, due to the inherent deteriorating level of resolution from surface-based seabed surveying in deeper waters, there is an increasing requirement for a significantly larger amount of supplementary and more detailed surveying by the use of submerged sensor platforms. A further improvement in the precision and flexibility of positioning in deeper water would thus significantly improve both data quality as well as the cost efficiency of seabed surveying activities.

Seabed-based auxiliary equipment (e.g. LBL network) is considered to have its optimal performance within geographically limited areas, i.e. in the concluding and area-specific phase of the extensive total mapping activity for construction projects.

The present development of untethered vehicles (UUV and AUV) for seabed surveying in deep water has included an accelerated application of inertial technology (INS), integrated with acoustic seabed tracking sensors (DVL), which is extremely advantageous for vehicle positioning, but will not constitute a standalone solution to the global subsea positioning problem.

Precise and site-independent global positioning of submerged survey vehicles requires an integrated solution. It should include the following three main elements: surface GPS positioning, relative positioning between the surface vessel and submerged vehicle, as well as input from vehicle-based sensors. This relative positioning is the one element which is affected directly and most strongly by the adverse influence of increasing water depth and which thereby in particular should be subject to further improvements of precision and functionality.

Without any such improvements the value of the decimetre precision of surface GPS-positioning, which is understood to be imminently available offshore, will not reach its optimal level of essential utilisation (except for the separate importance of the improved global height referencing capability!).

One of the possible reasons for the indicated present â€˜gapâ€™ of precision in global positioning at sea surface versus deep water, could be that the relevant communication from the potential end user to the professional suppliers has been insufficient and/or too late in adequately clarifying what is necessary as well as what is additionally desirable regarding precision, flexibility and cost-efficiency.