

**Title:** Acoustic Integration – The Options, Challenges and Benefits

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### **Abstract**

In recent years, inertial navigation systems (INS) have become increasingly used in the offshore industry, both for subsea applications and for Dynamic Positioning. The pedigree of the systems generally is unquestioned, with decades of use in the aeronautical industry proving their reliability.

As standalone sensors for DP applications, their use appears to be limited, providing only relative positions and movements with a high degree of inaccuracy over time. However when combined with other types of sensors, such as GNSS or acoustic positioning systems, INS can provide a valuable benefit to both quality and reliability of positioning.

One of the main attractions to combining sensor types is when complementary characteristics are present, allowing the weaknesses of each sensor to be compensated by the strengths of the other.

From a positioning perspective, the characteristics of acoustics are potentially accurate but imprecise positioning, with little change to this over time other than variations caused by environmental change.

In contrast, INS offers excellent short term stability and extremely high update rate, with the limitation being that the sensors are subject to drift which means low accuracy in the longer term.

Combining the two systems should allow the high precision INS to be coupled with the long term accuracy of acoustics, as well as reducing the impact that environmental effects, have on positioning quality.

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