

**Title:** Sensing Autonomy

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### **Abstract**

A certain level of autonomy is already present in a DP and DP requirements have been a driving force in the development of a diversity of high reliability reference systems. Today there is a strong drive for autonomous concepts and solutions in several market niches (e.g. short sea shipping and ocean-based aquaculture). At the same time, the market downturn in traditional oil and gas leads to a reduced implementation of new reference system solutions.

A development towards higher levels of autonomy in novel operations drives the development from traditional reference systems towards solutions capable of proximity awareness and connectivity. The existing reference system technologies comprise a good platform in this development, but new technology elements like sensor fusion, machine learning, artificial intelligence and extended connectivity are considered.

The paper presents ongoing developments within microwave, laser, GNSS and inertial based reference systems and discusses likely future developments. Connectivity will be a native feature of future reference systems, and is also discussed.

Current development is running at a much higher pace than legislation and regulation can adapt. Some input to regulation challenges and trade-offs are outlined.