ACOUSTICS2008/3511
Performance modelling and tradeoffs studies for hybrid sensing networks

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The transformation of naval forces in support of expeditionary operations requires substantial endurance enhancement of their existing undersea reconnaissance and surveillance functions. Concepts of operations for distributed sensor fields - to be deployed in littoral waters - are now being proposed, encouraged by the favourable outlook for network technologies. The renewed attention for multistatic sonar is one example of this trend.
Predicting the performance of distributed sensor fields for ASW applications, with sensors involving the use of acoustics and non-acoustics is complex. Though it is a great chance for optimizing the use of assets, the impact of sensor platforms' mobility (AUVs or gliders) adds yet another level of space-time complexity. Prior to any large scale test or development, system and operational studies must be able to determine optimal architectures and node placement as function of mission requirements. A major constraint is that of the limitations imposed on autonomous and covert data exchange in the maritime and underwater domains. This speeks for the design of hybrid sensor network architectures, as they appear to be well suited in dealing with substantial sensor data and command control data (e.g. backseat-driver paradigm) communication requirements.