

Demo 2: Integrated Communications for Underwater Operations

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New forms of navigation aids for underwater vehicles are enabled through the use of acoustic communications. Both the content and form of the message may be used to estimate range, bearing, range rate, geo-location, and time. Accurate range estimates are available via a conventional 2-way method, but the transmitted signal also supports high precision bearing estimation and highly accurate range rate compensation at the receiver. A new multi-access waveform supports asynchronous and simultaneous reception and processing of multiple messages leading to translation of conventional satellite GPS to the underwater environment. High accuracy tracking of underwater vehicles is enabled through a further modification of this multi-access signal. Recent advances in DSP-based, low-power modem development provide a rich infrastructure for accomplishing these navigation functions simultaneously with a variety of communications functions. Each of these developments are supported by recent at-sea experiments and demonstrations