MASTER OF SCIENCE
IN
ENGINEERING ACOUSTICS

LINK BUDGET ANALYSIS FOR UNDERSEA ACOUSTIC SIGNALING
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Link-budget analysis is commonly applied to satellite and wireless communications for estimating signal-to-noise ratio (SNR) at the receiver. Link-budget analysis considers transmitter power, transmitter antenna gain, channel losses, channel noise, and receiver antenna gain. For underwater signaling, the terms of the sonar equation readily translate to a formulation of the link budget. However, the strong frequency dependence of underwater acoustic propagation requires special consideration, and is represented as an intermediate result called the channel SNR. The channel SNR includes ambient-noise and transmission-loss components. Several acoustic communication and navigation problems are addressed through wideband link-budget analyses.

KEYWORDS: Underwater Acoustic Communication, Bandwidth Optimization, Link Budget

DETECTION OF BINARY PHASE-SHIFT KEYING SIGNAL IN MULTIPATH PROPAGATION
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Time-varying dispersion and multipath propagation in a shallow underwater environment causes intersymbol interference in underwater communication. This thesis investigates a mitigation procedure for communication using a Binary Phase-Shift Keying (BPSK) signal. The method employed uses the time-reversed ocean impulse response to mitigate the degradation of the bit error performance. All results were achieved by the use of computer simulation of typical shallow water environments.

KEYWORDS: Binary Phase-Shift Keying, Underwater Acoustics, Acoustic Communication, Underwater Communication, BPSK, MMPE, Parabolic Equation.