



# Design and Development of Underwater Acoustic Modem for Shallow Waters and Short Range Communication

*Vinay Divakar*

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## **Design and Development of Underwater Acoustic Modem for Shallow Waters and Short Range Communication** Vinay Divakar

Master's Thesis from the year 2014 in the subject Engineering - Naval Engineering, Ocean Engineering, , course: Electronics Systems Design, language: English, abstract: The existing underwater acoustic modems are designed for deep oceans and long range communication leading to immense consumption of power and high cost. These long range underwater acoustic modems are not suitable choice for deployment in underwater sensor networks, Hence the problem was chosen to design and develop a underwater acoustic modems that operates in shallow waters of depth below 100m and for a short range of below 100 m. Underwater wireless sensor network is contemporary technology that can be applied in the fields of security, surveillance, military, commercial, industrial and environmental. The major drawback is that the traditional underwater acoustic modems cannot be deployed for underwater sensor networks. This work focusses on the research and development of the underwater acoustic modem for shallow waters and short range communication. The relevant background theory required understand acoustics and for modelling the unique characteristics of the underwater channel is described in detail. Different concepts to model and implement the functionalities of the transmitter and receiver were explored, while converging to the most suitable choice of concepts. The modelled system is simulated for different channel conditions such as depth, range and induced ambient noise. The results were analysed in order to conclude the performance outcome of the system. The modelled system can efficiently operate for a depth of 30m, 50m and 70m for a range up to 50m. The hardware was developed using minimum number of components as a proof of concept for efficient data transmission and reception using acoustic signals. The hardware was tested to operate efficiently in air, however hardware tests for underwater is suggested for future work, which will provide much better performance since acoustics is mor

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