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Underwater Wireless Communication System

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Abstract: *This paper presents a comprehensive study on Underwater Wireless Communication (UWC), an emerging field essential for enabling effective data transmission in aquatic environments. With increasing interest in underwater applications such as oceanographic monitoring, oil and gas exploration, and naval operations, the demand for robust communication systems has grown significantly. This paper explores the primary technologies used in UWC, including acoustic, optical, and radio frequency (RF) communication, highlighting their respective advantages, limitations, and suitability for different scenarios. Particular focus is given to acoustic communication due to its extended range capabilities, despite facing challenges like limited bandwidth and high latency. Furthermore, the paper reviews recent advancements in modulation techniques, channel modeling, energy-efficient protocols, and the integration of hybrid systems. By evaluating the current state-of-the-art and identifying key challenges, this paper outlines potential future directions for improving the performance and reliability of underwater wireless networks*

Keywords: Underwater Wireless Communication, Optical Communication, RF Communication, Underwater Sensor Networks, Modulation Techniques, Hybrid Communication Systems, Bandwidth

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