

## Chapter 6

# A Taxonomy of Routing Techniques in Underwater Wireless Sensor Networks

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### **ABSTRACT**

*Underwater Wireless Sensor Networks (UWSNs) are finding different applications for offshore exploration and ocean monitoring. In most of these applications, the network consists of a significant number of sensor nodes deployed at different depth levels throughout the area of interest. Sensor nodes on the sea bed cannot communicate directly with the nodes near the surface level, so they require multihop communication assisted by an appropriate routing scheme. However, this appropriateness not only depends on network resources and application requirements, but environment constraints are involved as well. These factors all provide a platform where a resource aware routing strategy plays a vital role in fulfilling different application requirements with dynamic environment conditions. Realizing this fact, much of the attention has been given to construct a reliable scheme, and many routing protocols have been proposed in order to provide efficient route discoveries between the source and sink. In this chapter, the authors present a review and comparison of different algorithms proposed recently for underwater sensor networks. Later on, all of these have been classified into different groups according to their characteristics and functionalities.*

DOI: 10.4018/978-1-4666-0101-7.ch006

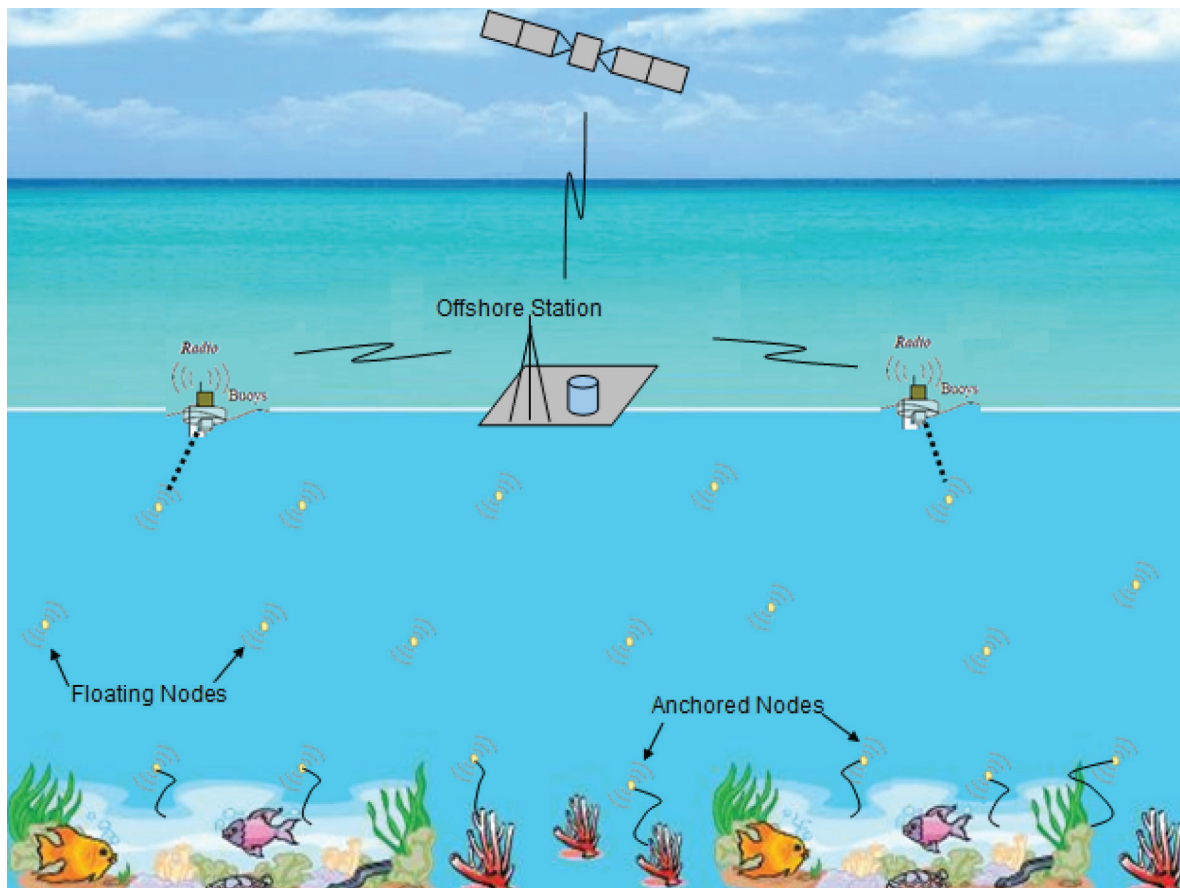
## INTRODUCTION

The ocean is vast as it covers around 140 million square miles; this is more than 70% of the earth's surface. Not only has it been a major source of nourishment production, but with the passage of time it has also taken a vital role for transportation, presence of natural resources, defense and for purposes of entertainment. With the increasing role of oceans in human life, discovering these largely unexplored areas has gained more importance during the last decades. On one side, traditional approaches used for the underwater monitoring missions have several drawbacks. At the same time, these inhospitable environments are not feasible for human presence as unpredict-

able underwater activities, high water pressure and vast areas are major reasons for un-manned explorations. As a result of these reasons, Underwater Wireless Sensor Networks (UWSNs) are attracting the interest of researchers, especially those who belong to terrestrial sensor networks.

Sensor networks used for underwater communication are different in many aspects from traditional wired or even terrestrial sensor networks. Firstly, energy consumption is different because some important applications require a large amount of data, but very infrequently (Heidemann, Wei, Wills, Syed & Yuan, 2006). Secondly, these networks are usually working on a common task instead of representing independent users. The ultimate goal is to maximize the

*Figure 1. A general scenario of the mobile UWSN architecture*



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