Chapter 2
Quality Enhancement in Underwater Sensor Networks Through Node Deployment Plans:
A Performance-Based Classification

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ABSTRACT

Due to widespread applications and an orientation towards dimensionality enhancement, the underwater sensor networks (UWSNs) are going to be in demand for today's researchers. The core idea to design a strong and reliable build under the water revolves around the master plan of sensor deployment. The quality parameters like coverage, connectivity, and network lifespan, etc. are considered as main pillars for these deployment plans. There is always a trade-off between these quality parameters. So, it is quite necessary to maintain a balance among these parameters in order to establish a successful communication system. In this chapter, the authors have categorized the node deployment plans on the basis of the above-stated quality parameters. During this categorization, the view of dimensionality enhancement from two dimensions to three dimensions is also kept in the mind.

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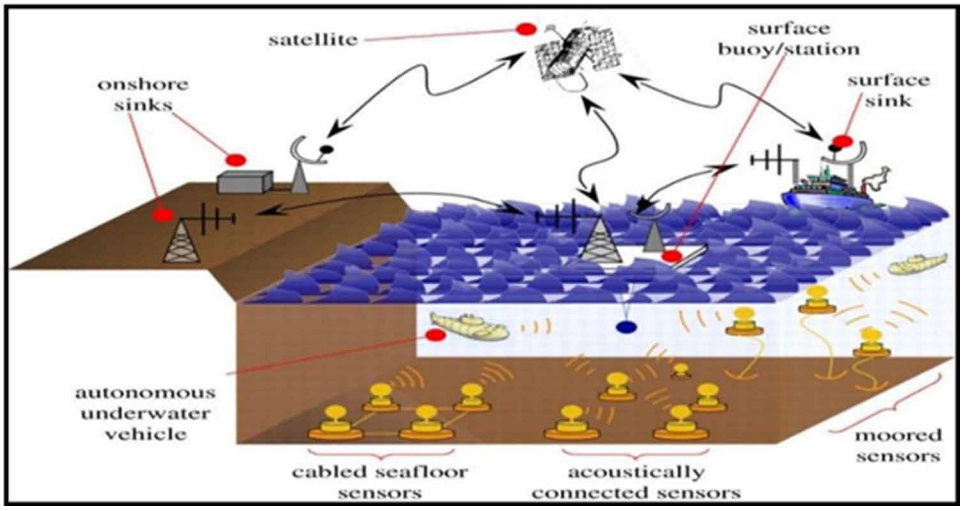
INTRODUCTION

Underwater Sensor Networks (UWSNs)

UWSN is a blend of wireless technologies having tiny micro-mechanical sensor possessing communication capabilities, smart sensing and intelligent computing. UWSN is an underwater network of spatially distributed, autonomous sensor nodes (Akyildiz et al, 2005) which senses certain characteristics such as quality, pressure and temperature of water. These sensors along with the numerous vehicles are deployed in such a way so that they can collect data and perform collaborative monitoring. Sensor node transmits the data to buoyant gateway which in turn relays it to the closest control station and coastal monitoring known as remote station (Felemban, 2013).

Figure 1. Underwater wireless sensor network



Underwater sensor networks (UWSNs) is gaining popularity because of their broad range of applications in commercial, scientific and military operation underwater. Many potential uses include surveillance of ocean tides and waves, enhanced weather forecasts, detection of climate changes, biological monitoring, estimation and understanding of human impacts on aquatic ecosystems. UWSN plays significant role in exploring precious minerals, reservoir and oilfields. It also assists in determining the route for laying the cables under the sea. Apart from this, sensors can be used to send alert to coastal areas about tsunami by measuring seismic activity from remote locations (Akyildiz et al, 2005; Soreide, 2004). UWSN help in navigation by identifying seabed threats, finding dangerous rocks or shoals in coastal seas, mooring locations, submerge wrecks and conduct profiling of bathymetries. Under-Water Acoustic Sensor Networks supports surveillance, intrusion detection systems, reconnaissance and targeting (Cayirci et al, 2004).