

## Chapter 2

# Quality Enhancement in Underwater Sensor Networks Through Node Deployment Plans: A Performance–Based Classification

**Anju Sangwan**

 <https://orcid.org/0000-0002-5433-1484>

*Guru Jambheshwar University of Science and Technology, India*

**Anupma Sangwan**

*Guru Jambheshwar University of Science and Technology, India*

**Deepti Rani**

*Chandigarh University, India*

**Rishi Pal Singh**

*Guru Jambheshwar University of Science and Technology, India*

### 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.*

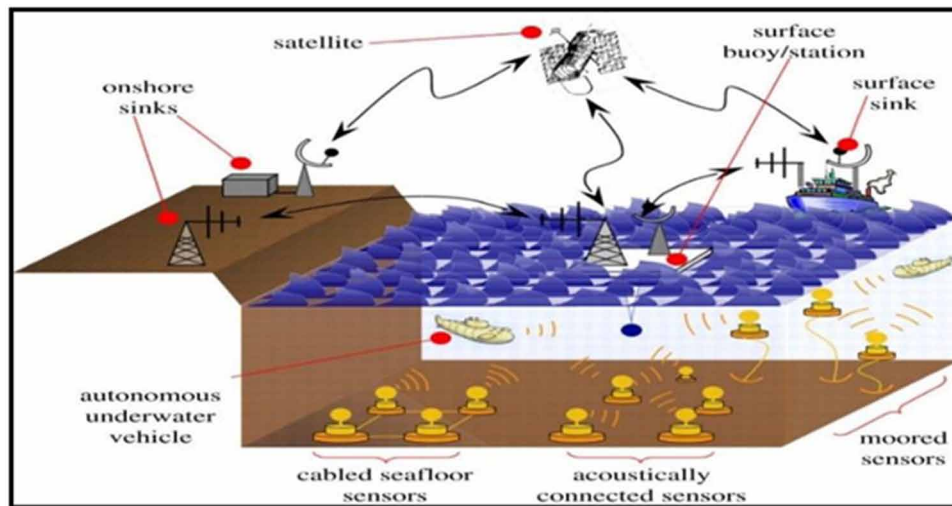
DOI: 10.4018/978-1-7998-3640-7.ch002

## 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 tsunamis 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).

16 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/quality-enhancement-in-underwater-sensor-networks-through-node-deployment-plans/262234](http://www.igi-global.com/chapter/quality-enhancement-in-underwater-sensor-networks-through-node-deployment-plans/262234)

## Related Content

---

### Cooperation Among Members of Online Communities: Profitable Mechanisms to Better Distribute Near-Real-Time Services

M. L. Merani, M. Capetta and D. Saladino (2011). *International Journal of Wireless Networks and Broadband Technologies* (pp. 1-14).

[www.irma-international.org/article/cooperation-among-members-online-communities/62084](http://www.irma-international.org/article/cooperation-among-members-online-communities/62084)

### A Novel QoS Aware Shortest Path Algorithm for VSDN

Amandeep Kaur Sandhu and Jyoteesh Malhotra (2017). *International Journal of Wireless Networks and Broadband Technologies* (pp. 1-14).

[www.irma-international.org/article/a-novel-qos-aware-shortest-path-algorithm-for-vsdn/198513](http://www.irma-international.org/article/a-novel-qos-aware-shortest-path-algorithm-for-vsdn/198513)

### Designing a Compact Wireless Network based Device-free Passive Localisation System for Indoor Environments

Philip Vance, Girijesh Prasad, Jim Harkin and Kevin Curran (2015). *International Journal of Wireless Networks and Broadband Technologies* (pp. 28-43).

[www.irma-international.org/article/designing-a-compact-wireless-network-based-device-free-passive-localisation-system-for-indoor-environments/133997](http://www.irma-international.org/article/designing-a-compact-wireless-network-based-device-free-passive-localisation-system-for-indoor-environments/133997)

### Evaluation of Long Term Evolution Cellular Network Performance when Transmitting Multi-view Video Content

Carl James Debono and Gloria-Anne Ellul (2014). *International Journal of Wireless Networks and Broadband Technologies* (pp. 16-32).

[www.irma-international.org/article/evaluation-of-long-term-evolution-cellular-network-performance-when-transmitting-multi-view-video-content/121657](http://www.irma-international.org/article/evaluation-of-long-term-evolution-cellular-network-performance-when-transmitting-multi-view-video-content/121657)

### Online Virtual Learning Environments: A Review of Two Projects

Nicoletta Adamo-Villani and Hazar Dib (2016). *Mobile Computing and Wireless Networks: Concepts, Methodologies, Tools, and Applications* (pp. 327-348).

[www.irma-international.org/chapter/online-virtual-learning-environments/138188](http://www.irma-international.org/chapter/online-virtual-learning-environments/138188)