

# 利用時間同步解決水下感測網路之空間不公平性

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相較於陸地上的無線感測網路，水下感測網路具有高的傳輸延遲、高的錯誤率以及低的傳輸頻寬之特性。其空間與時間的不確定性與空間的不公平性為協定的設計帶來許多挑戰。為了解決空間不公平性的問題，本論文利用時間同步讓第一個傳送 RTS 的傳送端能夠第一個傳送資料給接收端。首先，Sink 廣播時間封包給鄰居節點，鄰居節點根據相對距離與傳輸速率計算正確的時間，直到所有節點都更新自己的時間。接著，所有競爭者的 RTS 都會在競爭時期內抵達接收端。最後，接收端根據 RTS 的發送時間做排序，回覆 CTS 給最小發送時間的傳送端，然後完成一次的資料傳輸。接收端將剩下的 RTS 依其發送時間，依序回覆 CTS 來完成資料傳輸。

## Using time synchronization to solve the unfairness of space in Underwater Sensor Networks

### Abstract

Compared with terrestrial wireless sensor networks, underwater sensor networks present longer propagation delays, higher bit error rates and low bandwidth characteristics. The space and time uncertainty and space unfair agreements designed to bring many challenges. In order to solve the problem of the unfair nature of the space, this paper uses the time synchronization so that the first transmission of RTS sender can send data to the receiving end. First, Sink broadcast time packets to the neighbor, the neighbor node according to the relative distance and transmission rate to calculate the correct time, until all nodes update their time. Then the RTS of all competitors in the competition period arrived at the receiving end. Finally, the receiving end to sort according to the sending time of RTS, reply CTS to the sender according to the minimum send time, and then completed once the data transmission. Receiving end will be the rest of the RTS according to the send time sequence reply CTS to complete the data transmission.