**JOINT TOA-AOA BASED LOCALIZATION**

**FOR MULTIPATH CHANNELS IN WIRELESS SENSOR NETWORK**

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**ABSTRACT:** Wireless sensor network localization has drawn attention in a broad spectrum of applications for security, disaster response, monitoring, surveillance and tactical system. The deployment of a large number of low-cost, low-power and multi-functional sensors is preferred, which provides an exceptional localization performance via cooperative communication. In this paper, we consider a cooperative localization in wireless sensor network consisting of multiple anchor nodes equipped with linear sensor array and a single target. We focus on a synchronous network and all the channels are supposed to be multipath type. Our objective is to evaluate the performance of localization technique for the target’s position that jointly exploits both Time-of-Arrival (TOA) and Angle-of-Arrival (AOA) measurements. We derive the Cram$\acute{e}$r-Rao bound (CRB) for a joint TOA and AOA based localization. The analytical results achieved by the CRB are evaluated via numerical results and it is observed that the joint TOA-AOA localization has a superior performance than either TOA- or AOA-based localization.