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## Localization of Non-Cooperative Target with Distributed Binary Observations

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### Abstract

This dissertation focuses on localization of a non-cooperative target with distributed binary measurements. In a non-cooperative target localization unlike the cooperative one, we do not receive any assistance from the target on revealing its position. This type of localization has a lot of applications, for example to identify the primary user in cognitive radio, spectrum cartography, identifying the location of an unauthorized user in a mobile network and identifying the location jammer in the battlefield. However, the non-cooperative assumptions make many localization techniques including the ones requiring time reference synchronization impractical. Therefore, instead we rely on binary measurements of signal power from a large number of sensors scattered in the field which better lends itself to energy and complexity requirements of a Wireless Sensor Network realization. In other words, the location of the non-cooperative target could be carried out through processing of the data and locations of all sensors.

In this dissertation, we study the localization of a non-cooperative target with distributed binary measurements in the presence of uncertainty. One is the uncertainty involved in each sensor decision which can be the result of noise, fading or other random process effect on the received signal and shows itself in terms of false alarm or missed detection. The other one is the intrinsic error resulting from estimating a source transmitter location through scattered binary measurements which a