

# Accurate and Robust Indoor Localization Systems Using Ultra-wideband Signals

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**Abstract:**

Indoor localization systems that are accurate and robust with respect to propagation channel conditions are still a technical challenge today. In particular, for systems based on range measurements from radio signals, non-line-of-sight (NLOS) situations can result in large position errors. In this paper, we address these issues using measurements in a representative indoor environment. Results show that conventional tracking schemes using high- and a low-complexity ranging algorithms are strongly impaired by NLOS conditions unless a very large signal bandwidth is used. Furthermore, we discuss and evaluate the performance of multipath-assisted indoor navigation and tracking (MINT), that can overcome these impairments by making use of multipath propagation. Across a wide range of bandwidths, MINT shows superior performance compared to conventional schemes, and virtually no degradation in its robustness due to NLOS conditions.