Technische Universität Dresden

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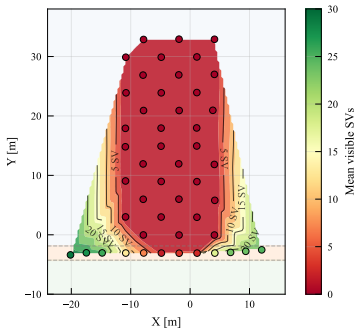
Bridging the Indoor-Outdoor Gap

Cross-Technology Ranging for Seamless Robot Navigation

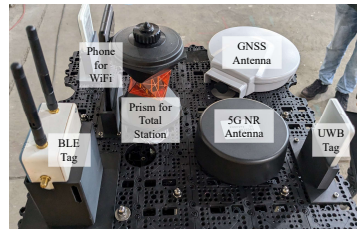
1st Workshop on Robot Meets GNSS and Ranging for Seamless Autonomy · ICRA 2026, Vienna

GNSS collapses at the threshold

Both signal classes fail at the boundary



Mean visible satellites: ∼30 outdoors → 0 inside the hall.



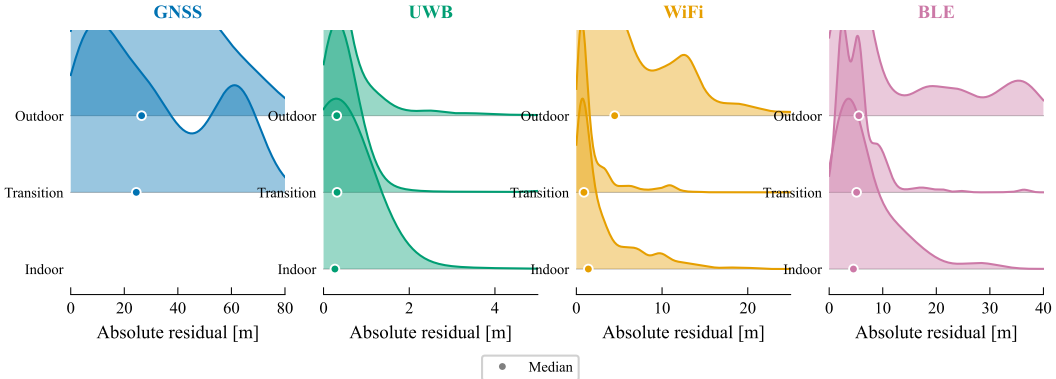
HYMN dataset — four time-aligned ranging technologies on one platform: GNSS, UWB, WiFi FTM, BLE

Ground truth — Leica TS16 total station, mm precision, 48-point grid

Open — Zenodo 10.5281/zenodo.17979434

Every technology has a per-zone fingerprint

Absolute ranging residuals across outdoor, transition, and indoor zones



…and they fail in *different* places — that is the fusion opportunity.

Seamless means surviving the doorway



Complementary failures across zones point to **zone-aware sensor fusion**.

The full per-zone breakdown is at the **poster**. Come discuss.

Read the paper