



Design Review: What is the best indoor localization technology?

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What technologies are used for indoor localization?

1. Wi-Fi positioning system (WPS)
 - a. Localization technique used for positioning with WaP, using RSSI to determine distance.
 - b. Gaussian process theory can improve accuracy.
 - c. Use MAC address or ssid of access point for geolocation.
2. Bluetooth
3. RFID
4. Ultra-wideband

Source: https://en.wikipedia.org/wiki/Indoor_positioning_system



What do we need in a anchor-tag system?

Accuracy	< 1 meter
Range	~25 meters indoor - cover long hallways
Battery life - Anchors	~3 hours if testing ~1 year if permanent solution No battery?
Battery life - Tag	> 4 hours



Which technologies are the best?

Technology	Accuracy	Range	Cost
Wi-Fi	1-8 m	<150 m	Low
BLE 5.1	<1 m *	<75 m	Medium
<u>UWB</u>	<0.3 m	<150 m	High
RFID	<1 m	<1 m	Low

*with line of sight

(unreliable source):

<https://www.infsoft.com/blog/technologies-for-server-based-indoor-positioning-compared/>,

**Better, yet
more
qualitative
source:**
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10536338/>

Table 1

Advantages and disadvantages of positioning methods.

Positioning Methods	Advantages	Disadvantages
ZigBee [14,15]	Low power consumption, low cost for a single node.	Short signal transmission distance, signal susceptible to interference.
Bluetooth [16]	Low power consumption, small device size, low cost for single Bluetooth beacon.	Poor signal stability, short effective distance.
UWB [17]	High accuracy, interference resistance, low power consumption.	High device cost.
RFID [18,19]	Low power consumption, small size, and low cost of electronic tag.	High system complexity, hard to integrate electronic tag with mobile devices, short effective distance.
Ultrasonic [20]	High accuracy.	Signal susceptible to interference, high device cost.
Infrared [21]	High accuracy.	Signal susceptible to interference, high device cost.
Wi-Fi [22]	Long effective distance, low device cost, easy deployment, low power consumption.	Signal susceptible to interference, low accuracy.



UWB Devices

Device	Chips	Range	Price	Other
ESP32 UWB Pro	DW1000 ESP32	<200m outside <40m inside	\$51.84	Has Wi-Fi
ESP32 UWB	DW1000 ESP32	<45m outside <20m inside?	\$35.83	Has Wi-Fi
DWM1001c DWM1001-DEV	DW1000 NRF52832	45 m ???	\$37.77 \$29.50	~10x lower power No Wi-Fi Needs dev board?
DWM3000EVB	DW3000 NRF52832	45 m ?	\$29.50	Newer, less documentation