

Development of an Indoor-Tracking System Based on a Triangulation Radar

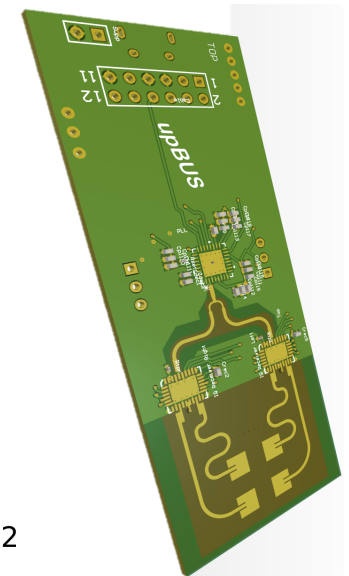
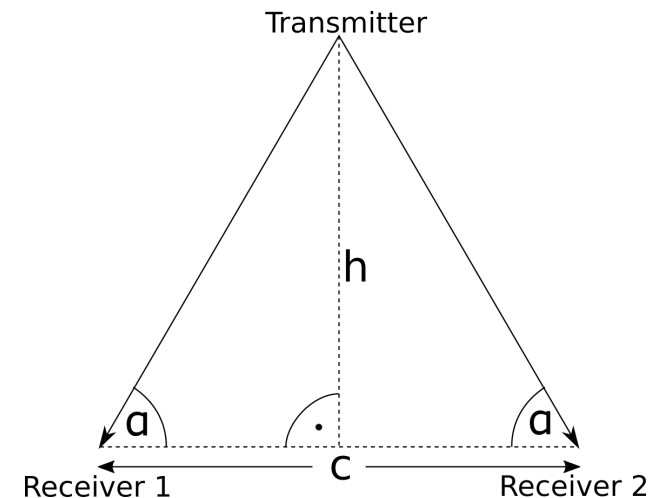
Background

The chair of High Frequency Electronics developed a new triangulation radar based on a secondary approach. An active radio transmitter emits a known signal, which will be detected by at least two receiving antenna arrays. These receivers measure the angle of incidence and a central processing unit calculates the position of the transmitter relative to the receivers. This approach works perfectly, when the transmitting antennas are facing the receiving antennas but fails, when the line-of-sight between the antennas is blocked. Furthermore, multiple paths act as interferences and distort the angle of incidence measurement. These interferences can be coped by distributing several receivers in the room. With proper error and state estimation (Kalman-Filter), the position of the transmitter in the room can be determined more precisely.

Tasks

The students' task is the development of an indoor-tracking system based on the triangulation radar from HFE. For this, error and state estimation algorithms need to be developed.

- Literature review on error and state estimation algorithms.
- Development of a receiving mesh, which communicate with a central processing unit (Arduino/Raspberry Pi or similar) via a radio link (WiFi, Bluetooth or similar).
- Development of the tracking algorithm using error and state estimation
- Measurement and testing



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