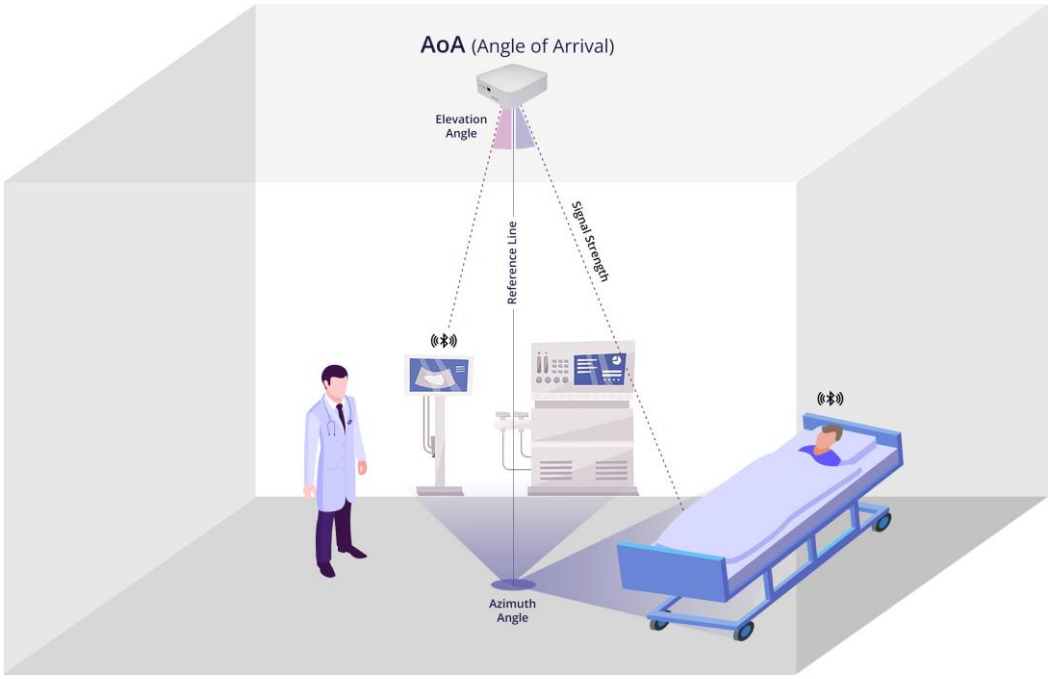
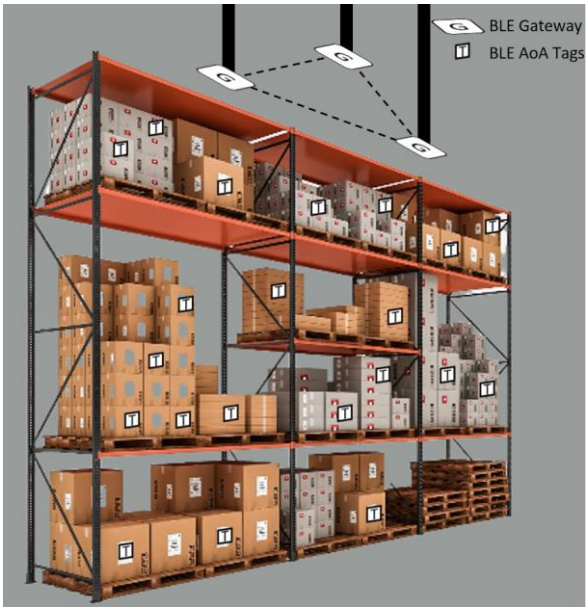
sentrax

VERSION 1.1

3D Tracking of Asset in RTLS User Guide

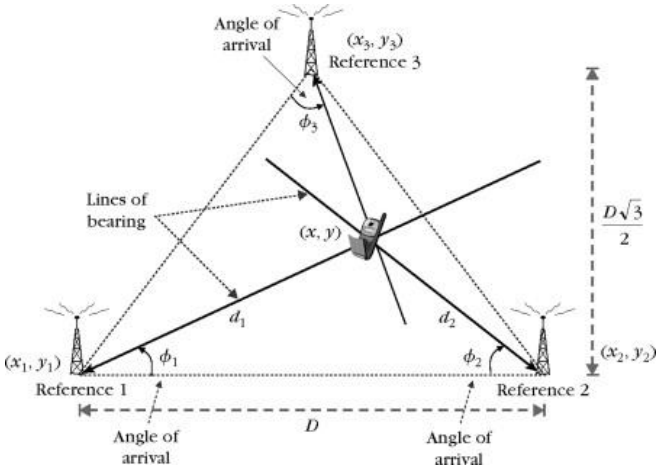


1. Using Triangulation Methodology



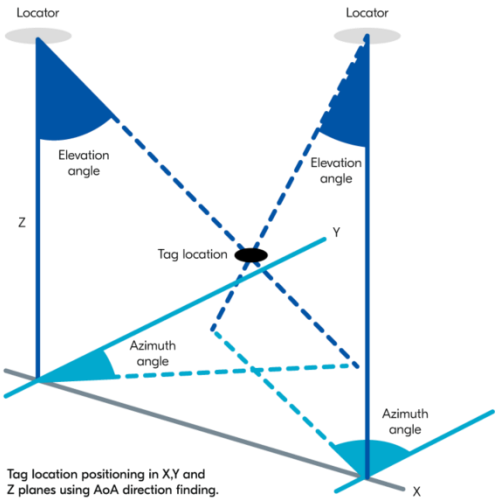
a) Gateway Placement:

- Aim for an equilateral triangle configuration for optimal triangulation accuracy.
- Place the gateways at three distinct locations forming a triangle.
- Ensure that the distance between each gateway is roughly equal.
- Avoid placing the gateway close to the walls, maintain a distance of about 1 to 2m from the walls.



b) Height Consideration:

- Ensure gateways are distributed vertically to cover the entire tracking area effectively.
- Place gateways at an elevated position to minimize signal attenuation.
- Avoid placing gateways too close to the ground or within dense clutter that could block or reflect signals.
- Mount gateways at a minimum height of 2 meters above ground level.
- The tags are at least placed at a height of 1m from ground.



c) Line of Sight:

- Maximize line-of-sight communication between gateways and BLE devices.
- Minimize obstructions such as walls, large metal objects, or other electronic devices that could interfere with signals.
- Minimize potential obstacles, metal sheets and interference sources from the environment.

d) Gateway Orientation:

- Orient the gateways such that their antenna arrays are directed towards the area of interest.
- Ensure antennas are aligned properly for optimal AoA measurements.
- Misalignment of the gateways may results in decreased accuracy of the system

e) Interference Mitigation:

- Identify potential sources of interference and take measures to mitigate their effects.
- Ensure that gateways are not placed near sources of electromagnetic interference such as Wi-Fi routers, microwave ovens, or other BLE devices.

f) Accuracy Assessment:

- **Horizontal Accuracy**: Tag's position is estimated within 1 meters of its actual location along the warehouse's length and width.

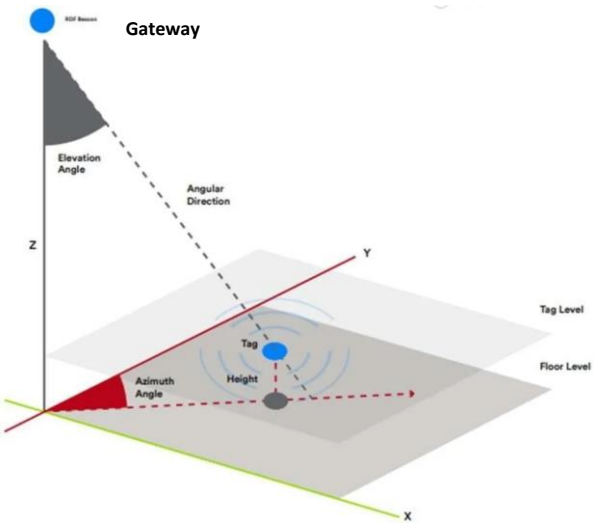
- **Vertical Accuracy**: Tag's position is estimated within 1-2 meters of its actual height within the warehouse. Although the accuracy may decreases as the height of gateway is increased.

- **Overall Accuracy**: Considering both horizontal and vertical dimensions, the tag's position is estimated within 1 to 1.5 meters of its actual location.

2. Using Single Gateway:

a) Gateway Placement:

- Position the gateway at a central location within the tracking area to maximize coverage.
- Ensure that the gateway is placed at an appropriate height to minimize obstructions and maximize line-of-sight communication with the tags.
- Avoid placing the gateway close to the walls, maintain a distance of about 1 to 2m from the walls.



b) Height Consideration:

- Mount the gateway at a sufficient height above ground level to minimize signal blockage and interference.
- Avoid placing gateways too close to the ground or within dense clutter that could block or reflect signals.
- Mount gateways at a minimum height of 2 meters above ground level.
- The tags are at least placed at a height of 1m from ground.

c) Line of Sight:

- Maximize line-of-sight communication between gateways and BLE devices.
- Minimize obstructions such as walls, large metal objects, or other electronic devices that could interfere with signals.
- Minimize potential obstacles, metal sheets and interference sources from the environment.

d) Gateway Orientation:

- Orient the gateway's antenna array to cover the entire tracking area effectively.
- Ensure antennas are aligned properly for optimal AoA measurements.
- Misalignment of the gateways may results in decreased accuracy of the system

e) Interference Mitigation:

- Identify potential sources of interference and take measures to mitigate their effects.
- Ensure that gateways are not placed near sources of electromagnetic interference such as Wi-Fi routers, microwave ovens, or other BLE devices.

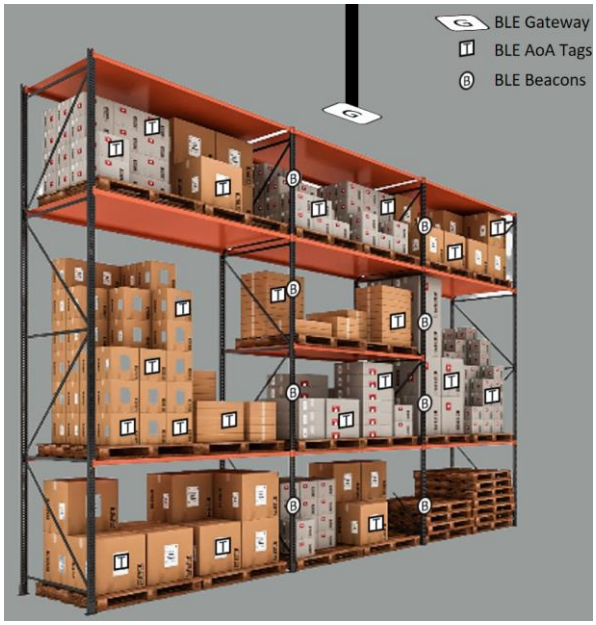
f) Accuracy Assessment:

- **Horizontal Accuracy**: Tag's position is estimated within 1 to 2 meters of its actual location along the warehouse's length and width.

- **Vertical Accuracy**: Tag's position is estimated within 1 to 2 meters of its actual height level within the warehouse.

- **Overall Accuracy**: Considering both horizontal and vertical dimensions, the tag's position is estimated within 1 to 3 meters of its actual location.

3. Using Single Gateway with BLE Beacons:



a) Gateway Placement:

- Position the gateway at a central location within the tracking area to maximize coverage.
- Ensure that the gateway is placed at an appropriate height to minimize obstructions and maximize line-of-sight communication with the tags.
- Avoid placing the gateway close to the walls, maintain a distance of about 1 to 2m from the walls.

b) Height Consideration:

- Mount the gateway at a sufficient height above ground level to minimize signal blockage and interference.
- Avoid placing gateways too close to the ground or within dense clutter that could block or reflect signals.
- Mount gateways at a minimum height of 2 meters above ground level.
- The tags are at least placed at a height of 1m from ground.

c) Line of Sight:

- Maximize line-of-sight communication between gateways and BLE devices.
- Minimize obstructions such as walls, large metal objects, or other electronic devices that could interfere with signals.
- Minimize potential obstacles, metal sheets and interference sources from the environment.

d) Gateway Orientation:

- Orient the gateway's antenna array to cover the entire tracking area effectively.
- Ensure antennas are aligned properly for optimal AoA measurements.
- Misalignment of the gateways may results in decreased accuracy of the system

e) Interference Mitigation:

- Identify potential sources of interference and take measures to mitigate their effects.
- Ensure that gateways are not placed near sources of electromagnetic interference such as Wi-Fi routers, microwave ovens, or other BLE devices.

f) Height Estimation of Target:

- Height estimation of target device is not reliable using a single scanner only.
- In order to estimate the height of target device accurately, BLE beacons are also used along with BLE tags. These beacons are placed at different point of interest's heights and the height of target device is estimated according to these height levels where the beacons are placed.
- There should a minimum of 1m vertical distance between the beacons and about 1m horizontal distance between the target device and the beacons.

g) Accuracy Assessment:

- **Horizontal Accuracy**: Tag's position is estimated within 1 to 2 meters of its actual location along the warehouse's length and width.

- **Vertical Accuracy**: Tag's position is estimated within 1 meters of its actual height level within the warehouse.

- **Overall Accuracy**: Considering both horizontal and vertical dimensions, the tag's position is estimated within 1 to 2 meters of its actual location.

Disclaimer:

This guide is intended for informational purposes only. If in doubt at any stage of the installation or operation of the locator/gateway always consult Sentrax's authorized dealer, distributor, or get in touch directly with Sentrax GmbH.

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