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Geopositioning ground platform for GPS dead-zone

e-NAILS

x : -49,037
y :-573,921
z : -169,456

Outdoor using   Accuracy < 10cm
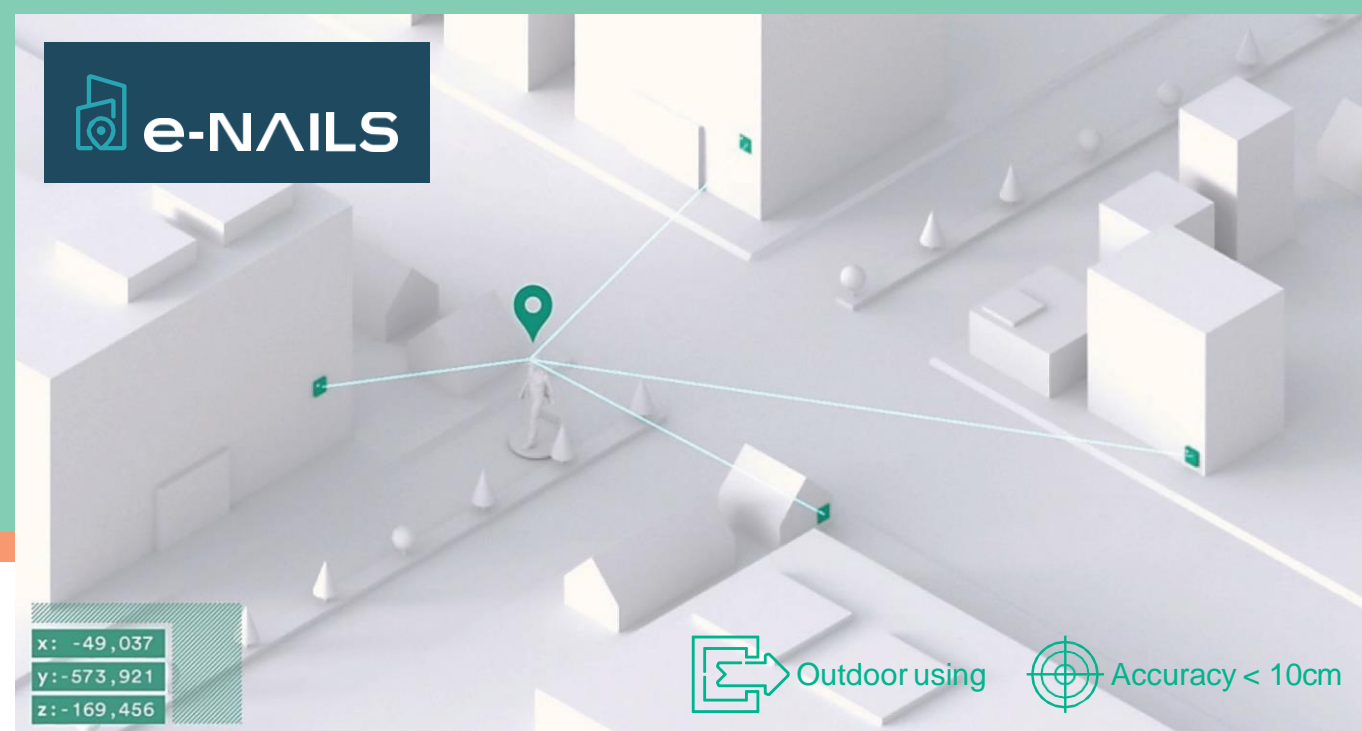
➡ e-Nails is an innovative solution for accurate localization based on a unique infrastructure of UWB (Ultra Wilde Band) radio connected surveyor nails.

➡ Hardware system is about to be tested in our RICE laboratory to evaluate the sensitivity of the system to disturbances.

➡ RICE has developed 2 algorithm, first one is a triangulation calculation to identifie user position in the area. Second one is to get the best position of nail in the area, taking into account the higher of buildings, the width of the streets and different parameters.
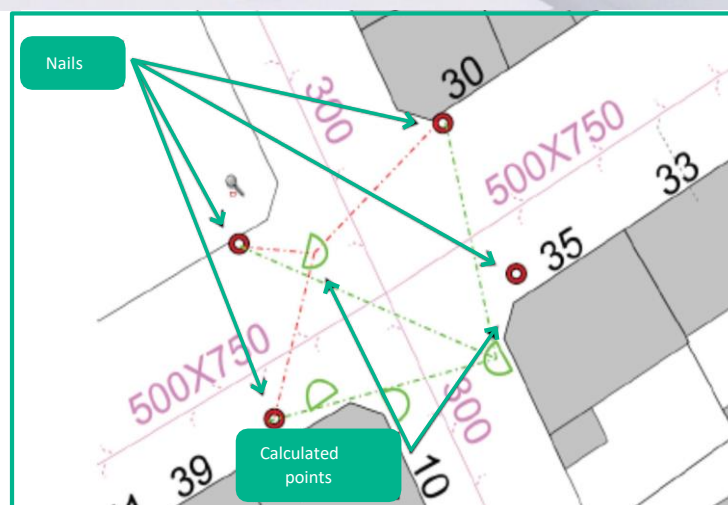

Using GNSS localisation systems couldn't be efficient everywhere because of buildings and trees, especially in urban canyon. Objective of e-Nails is to provide a geolocalisation solution in GNSS dead zones.

## Prototype evaluation and results provided by RICE

Hardware

- The first 4 PCB and antennas has been installed in RICE laboratory.
- Methodology used, able to change some parameters like nail's height, or the orientation of the antennas, and effects on results…

First PCB
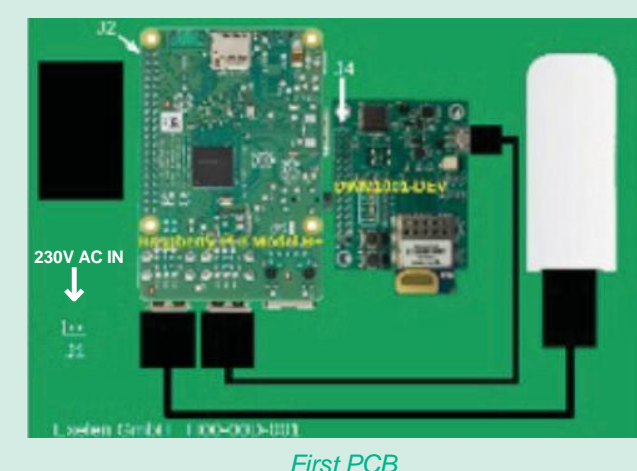
Software

- A typical use case is about augmented reality app that is developed and tested in RICE laboratory.
- Goals are to visualize buried pipe or to get geolocalisation data to store it in GIS.
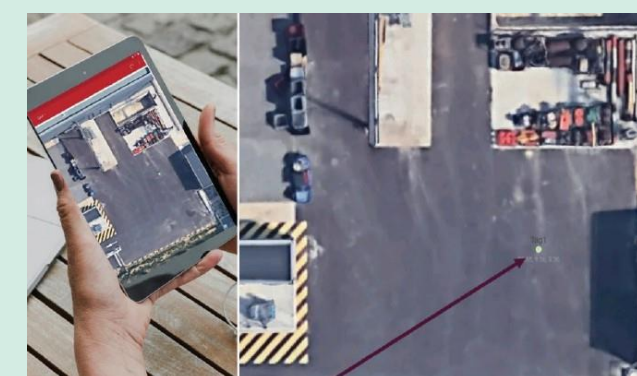
Results

	X	Y	Z
Average	0.13	0.12	0.42
Min	0.06	0.06	0.13
Max	0.2	0.19	0.72

- By comparing with a point repository that have been supply by surveyor task, the first data is clear and shows that goals are achievable.
- Flatness averages are about 12 or 13 cm, and altimetry averages are about 42 cm.

Averages of deviations from measures to references

Field test and references

e-NAILS

Next steps

➡ Vary the radio transmission power to determine the best Nail positions in the area.

➡ Vary the position of the masts, particularly in Z but also in X and Y to increase differences between references point.

➡ Put natural and artificial obstacles (Trees and trucks…)

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