i-GOing

i-GalileO indoor navigation

SEVENTH FRAMEWORK PROGRAMME

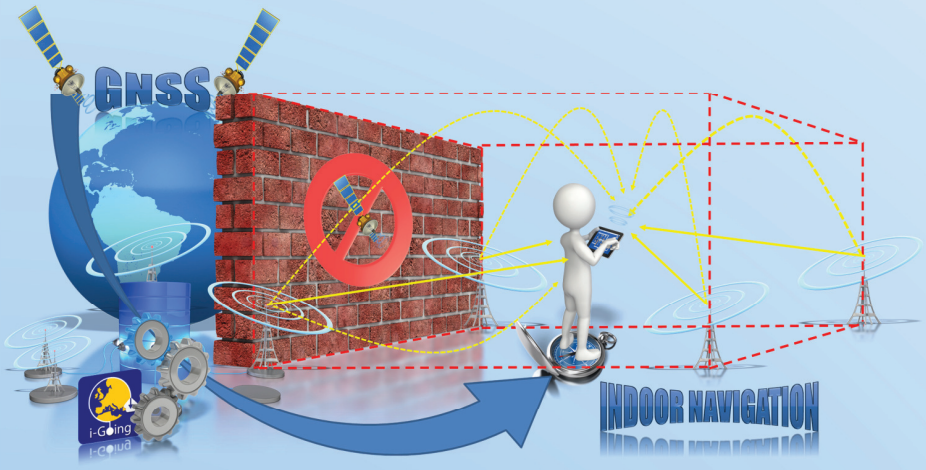
Motivation

Challenge: Although 90% of phone usage occurs indoors, there exists no suitable technology to provide accurate positioning of these devices inside buildings, yet. Therefore, the demand for indoor LBS applications has steeply risen, and the market needs location technologies that fulfill three key success factors: scalability, compatibility and accuracy.
Current solutions: A number of technologies have been envisaged (UWB, RFID…) but only two have been retained: Wi-Fi and indoor GNSS. Although Wi-Fi is scalable and compatible its advantages are outweighed by its main drawbacks, poor accuracy and need for recurrent calibrations. On the opposite, indoor GNSS ensures high accuracy, relies on chipsets which are already deployed in phones, and does not need any calibration.
Applications: Linked to geo-marketing application the idea of versatile (outdoor-indoor) navigation will allow the customer to be guided from any location to the targeted shop or even to the shelf where the product is exposed: "from your home to the product" can be the main marketing catcher. This functionality will be very useful in huge commercial malls. In the same way such technology can offer the smartest itinerary for the customer in large indoor infrastructures according to a planned shopping list.

Objectives

Indoor navigation: contribute to the development of GNSS and in particular Galileo-based pseudolite systems the best overall solution to face the challenges of positioning and navigation within large buildings.
Pseudolites: implement a prototype of a system that generates specific indoor signals by using a network of pseudo satellites installed inside the building, that is connected to a localization server which manages them.
Receiver modifications: mobile receivers will correlate pseudolite signals, compute a pseudorange per antenna and send that information back to the localization server. The localization server indicates the mobile devices their position in a predefined, downloaded map of the building.

Indoor navigation

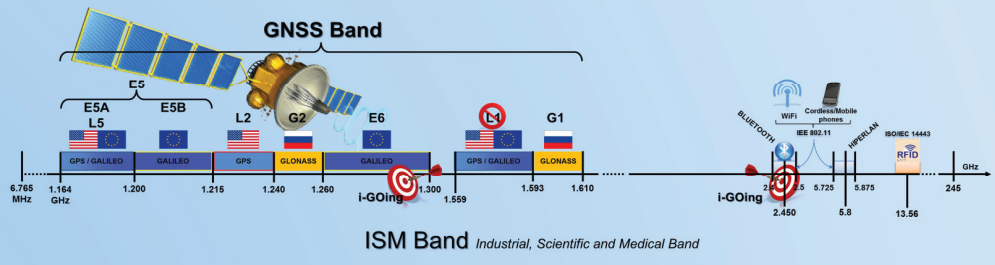


Technological challenges:
- Near-far effect
- Acquisition/ tracking algorithms
- Multipath mitigation
- Chipset integration

Pseudolite innovation:
- Prototype on 2.4 GHz
- Testing using real E6 Galileo signals
- Lab testing of pseudolite and receiver
- Live testing (demonstration in a mall and in a fair)

Why using E6?

- L1 and L2 as ARNS are protected bands
- E6 is free from aeronautical services
- Modification of chipsets is straight-forward
- Intermediate tests will be performed on the ISM band (2.4GHz)
- Use of E6 pseudolites is subject to a standardisation agreement about the use of pseudolites



ISM Band *Industrial, Scientific and Medical Band*

Project team

INSITEO · csr · SILICOM · Fraunhofer IIS · DLC Daniel Ludwig Consultant · itrust consulting

i-GOing project website: http://www.igoing.eu

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