IndoorNaviSp z o.o.
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Technical Specification for IndoorNaviDevelopement Kit

Overview

IndoorNaviDevelopment Kit is a release candidate of a real-time location system. IndoorNavi is able to localize previously tagged objects in defined areas including inside buildings such as offices, hospitals, warehouses and factories.
What makes IndoorNavi a unique solution:

- Precision in localization up to 0.5m (in an open area it is possible to reach accuracy of 0.1m, however we include disorders from walls or other objects).
- Ability to track very dynamic objects in real-time - up to 100 scanned tags per second per one net.
- Independent from weather – IndoorNavi can operate indoor and outdoor.
- Secure communication channel - optional AES encryption.
- Two way communication channel.
- Can cooperate with additional devices through UART.
- Low measures deviation.
- Prepared to store data in cloud – IndoorNavi Management App is a server application.

How does it work

General

The development kit consists of:

- *Tag*- a battery powered device which sends signal about its position to *anchors*. There is a possibility for the tag to work as a transmitter and cooperate with additional system through UART interface. When there is an extra frame to transmit from tag then distance measurement in that measurement cycle will be aborted. Maximum length of extra frame is 24 bytes to achieve time restrictions.
  The only source of power in tag is build-in, removable li-ion cell with a charger. To reduce current consumption, after distance measurement tag is in a sleep mode and a receiver is disabled to reduce current consumption.
- *Anchor* - is a stationary device mounted in building, powered from power grid but with an auxiliary battery system. Each anchor must have a constant and known position. To achieve best results anchors should be located under a ceiling to minimize the amount of obstacles in the line between anchor and tags.
- *Sink*–generally it is an *anchor* with connection to a server through the Internet. *Sink* can be powered from a power grid or over the Internet cable. In demo set *sink* is connected to PC via USB port and PC application works as a server.
- *Server* - management app working on computing device which is working in web technology.

Communication from *anchor/sink* to *anchor* and *anchor/sink* to *tag* is realized by the radio.

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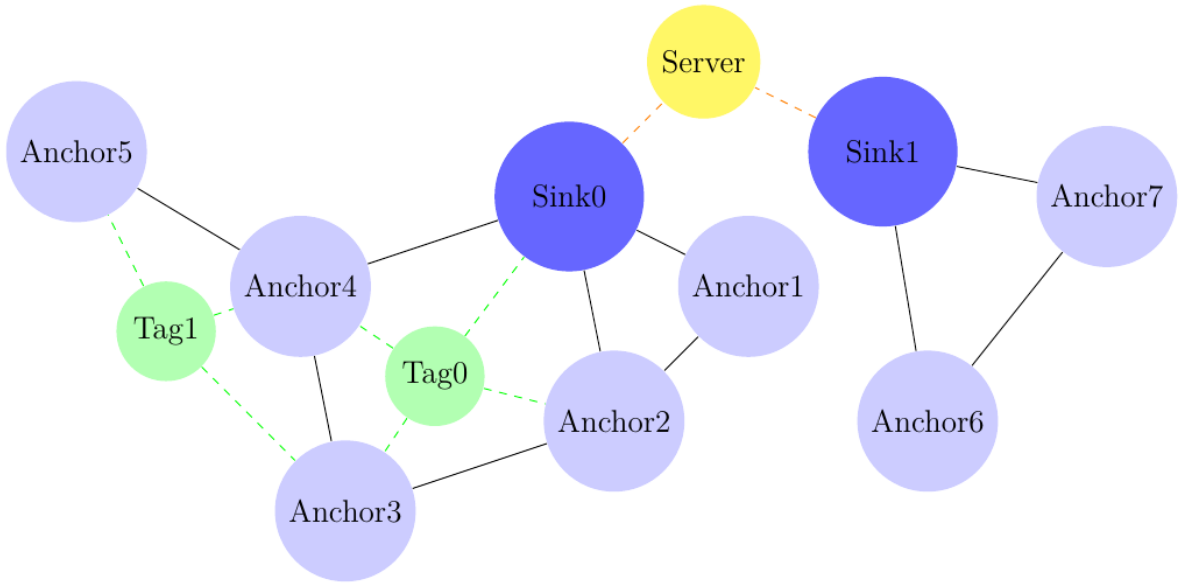
Server is connected to *sink* via the Internet. Each *sink* creates independent *anchors* net connected directly to *server*. *Server* is essential to connect more than one net in a complex system.



Inside the box

Inside the development kit the user will find:

- 2 *Tags*
- 4 *Anchors* – One configured as a *Sink*
- *Server application* to manage the system.

Potential applications

IndoorNavi Development Kit could be applied to system which benefits from information of object location in a defined area. IndoorNavi technology is a perfect fit to:

- Process management applications
- Security systems
- Object monitoring systems
- Access control system
- Process optimization
- Area analytics of object movement
- Indoor Navigation of autonomous machines

Detailed Specification

Communication:

- The System uses Ultra Wide Band (500MHz) on the range from 3.5GHz to 6GHz band. The connection between the sink and server is realised by Web Sockets.
- UART – other sensors can by connected to the *Tag* by this port.

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Range

- Up to 150m in the open space. Range is dependent on obstacles between anchors and tags.

Battery and power supply

Tags

- Power cell li-ion 3.7V 1900mAh.
- Power consumption peak of 140mA during scanning/broadcasting.
- Cell powered device lifetime up to 7 days with maximum power transmission on a single charge. The device's lifetime is dependent on the power of transmission and scanning/broadcasting frequency.

Anchors/Sink

- Independent supply through micro USB socket from 5V DC (standard USB voltage) supported by power cell li-ion 1900mAh (as a back-up power supply during blackout)

Dimensions and weight

Tags/Anchors

- Height x Width x Depth – 80mm x 40mm x 20mm

Microcontroller

- Microcontroller - STM32L443CCT 256kB
- Core –ARM Cortex M4
- RAM- 64kB SRAM

Available transmission power levels

- Step 0,5 dB
- Max power 9,3dBm

Liability disclaimer

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IndoorNavi Sp z o.o. reserves the right to make changes to the product without further notice to improve reliability, function or design. IndoorNaviSp z o.o. does not assume any liability arising from the application or use of any product or circuits described herein.

Life support applications

IndoorNavi Development Kit is not designed for being used in any life support appliances, devices or systems in which malfunction of these products can possibly be expected to result in personal injury. IndoorNaviSp z o.o. customers selling or using these products, in order to be used in such applications, do so at their own risk and agree to transfer responsibility from IndoorNaviSp z o.o. to a third party for any damages resulting from such an improper use or sale.