

LocON

Platform for an inter-working of embedded localisation and communication systems

The project aims at a seamless connectivity and inter-working of embedded localisation and communication systems through a new platform in order to maintain large infrastructures like airports more efficiently, flexibly and securely

At A Glance: LocON

Platform for an inter-working of embedded localisation and communication systems



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Duration: 30 months

Start: 01.06.2008

Total Cost: 3.8 Mio €

EC Contribution: 2.7 Mio €

[KEYWORDS: Platform/Middleware for embedded localisation, inter-working, control systems, large scale infrastructure airport, wireless sensor network]

Main Objectives

One main objective of LocON is to create an inter-working platform for the control of large scale infrastructures and to develop middleware that integrate heterogeneous embedded radio localisation technologies in a scalable and fully flexible manner. The project focuses on seamless and reliable localisation onsite (indoors as well as outdoors).

To maintain large infrastructures like airports in a more efficient, flexible, secure and easy way is the main impact – thus LocON is targeting the following objectives:

- to integrate a **hardware/software platform** including the **middleware** for heterogeneous short range **embedded localisation and communication technologies** focusing on seamless connectivity, scalability, coexistence and inter-working

- to implement the interoperabilities with the satellite based localisation and the **wireless communication** based on Sensor Networks and on standards like WLAN, WIMAX, GSM, UMTS, TETRA.

- to implement a **control system** with new engineering approaches that ensure efficient, robust, predictable, safe and secure behaviour for the **large scale infrastructure airport** (e.g.: controlling the luggage in an airport, controlling the staff, control of movements in restricted areas

- to **demonstrate** the results and benefits in the large scale infrastructure of an airport with strong **security**

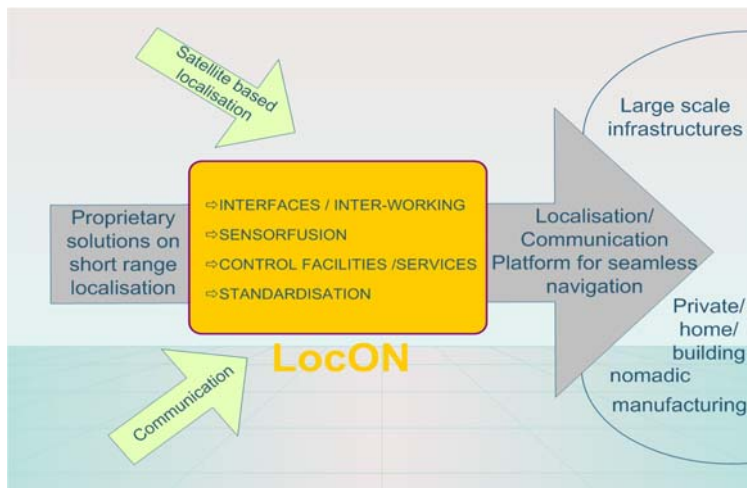
LocON will focus on the development of a platform for inter-working of embedded communication and localisation solutions, developing services to control airport infrastructure and starting standardization activities for an open layer on localisation information

requirements

- and finally to bring together all the main **key players in the European short range localisation** market and to begin a **standardisation process** at European level.

Technical Approach

The first step of the project is to classify the current proprietary short range embedded localisation system in combination with the common communication systems, to harmonize them and to define standardisation processes. Afterwards the inter-working between the harmonized embedded systems can be defined, the platform, the middleware and interfaces can be structured and implemented.



System combinations as well as the fusion of sensors will also be explored in the LocON project in order to exploit the potential of this platform and to give a response to complex user/service requirements, which are not satisfactorily solved yet. Location based requirements, for example, accuracy, cell size and/or frequency bandwidth constraints can be taken into account within one system.

Since the LocON platform can integrate all possible configurations further R&D activities are dedicated to analyse the coexistence between different localisation technologies and wireless communication systems at the radio level. The compatibility and the QoS awareness of the subsystems will be physically tested and the limitations of combination will be determined in order to assure the service quality of the overall system.

To illustrate the goal of the project, the central technical feature of the LocON Platform is to integrate short range localisation systems where the positioning is computed in the mobile part as well as in the infrastructure in a flexible and modular way.

The specific and pivotal characteristic is the definition and implementation of a standardized LocON data stream and protocol for all networks plugged in the LocON Platform.

The next R&D challenge is to fuse all the incoming data, to compute and visualize continuously one positioning per mobile node without gaps, without discontinuity even when systems overlap (defined as sensor fusion).

Key Issues

LocON is a completely new system concept for the integration of localisation systems and technologies. Regarding the applications on one side and the heterogeneity of the localisation systems on the other side, it is imperative, beyond the state-of-the-art, to work on the integration of all systems within one configurable platform to enhance existing services and to provide new ones. The integration will be achieved within the following R&D steps:

- Design of a configurable system and platform
- Interface and inter-working to mobile communication network based on localisation
- Definition of general classification criteria for localisation systems
- Definition of a common data structure and protocol and its standardisation in the European Community
- Concept and implementation of algorithms to fuse the data from the heterogeneous localisation systems
- Analysis of the radio coexistence of the different short range localisation systems
- Concept of algorithms to quantify the quality of positioning and the detection of gaps
- Through constant benchmarking of the processed data, quality control will be assured
- Fusion in the node of GNSS signals or inertial sensors also integrated in the LocON system concept and LocON standard

The LocON system concept will be validated within a security use case in an airport.

Expected Impact

The LocON platform integrating heterogeneous localisation and communication systems is an enabling technology for various applications in different market areas and a basic technology for new services. Through the open positioning information layer, all kinds of localisation systems using the LocON standard can be integrated in the platform, thus making the LocON concept attractive to all types of large infrastructures which require localisation as tool for new or better adapted control services. Moreover, through the fusion of data, reliable information can be provided. In the case of an airport, the aim is to improve user safety, efficiency of operations, and airport safety through surveillance, control, guidance services and decision support.