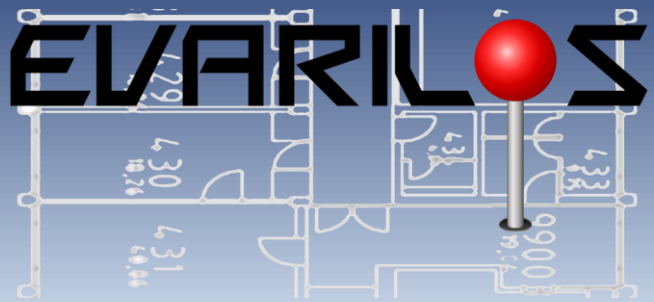
EVALUATION OF RF-BASED INDOOR LOCALIZATION SOLUTIONS FOR THE FUTURE INTERNET



EVARILOS is an experimental project aiming on objective benchmarking and evaluation of RF-based indoor localization solutions. Experiments are run on top of the FIRE facilities w-iLab.t@iMinds and TWIST@TKN.

Keywords: Indoor localization, ranging, benchmarking of localization solutions, experimental evaluation

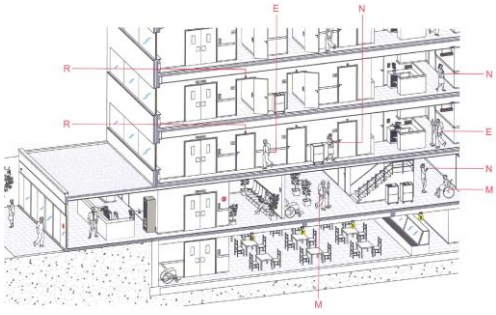
Project Overview

Advancing the frontiers of RF-based indoor localization

The **EVARILOS** project addresses one of the major problems of indoor localization research: The pitfall to reproduce research results in real life scenarios suffering from uncontrolled RF interference and the weakness of numerous published solutions being evaluated under individual, not comparable and not repeatable conditions. Accurate and robust indoor localization is a key enabler for context-aware Future Internet applications, whereby robust means that the localization solutions should perform well in diverse physical indoor environments under realistic RF interference conditions.

Scientific and Technical Objectives

The objectives of the **EVARILOS** project are: Firstly, **EVARILOS** will develop a benchmarking methodology enabling objective experimental validation of and fair comparison between state-of-the-art indoor localization solutions. Contrary to previous approaches, the **EVARILOS** benchmarking methodology not only considers accuracy metrics, but also complexity, cost, energy, and, most importantly, RF interference robustness metrics. Next, the project aims to improve the interference robustness of state-of-the-art localization solutions through (a) introducing multimodal approaches leveraging the diversity of different localization methods; (b) introducing environmental awareness and cognitive features; (c) by leveraging the presence of external interference. Thirdly, the **EVARILOS** benchmarking methodology and interference-robust localization solutions will be validated in two real-life application scenarios: healthcare in a hospital setting and underground mining safety. The main outcomes of the project are a public handbook on the use of the **EVARILOS** benchmarking methodology and the **EVARILOS** benchmarking suite. The EVARILOS Benchmarking Handbook is available at:



www.evarilos.eu/docs/EVARILOS_Benchmarking_Handbook.pdf

Contract number
317989

Project coordinator
TU Berlin

Contact person
Prof. Dr.-Ing. Adam Wolisz

Technische Universität Berlin
Telecommunication
Networks Group
Einsteinufer 25
10587 Berlin, Germany
Email: awo@ieee.org

Project website
www.EVARILOS.eu

Community contribution to the project
1.379.944 Euro

Project start date
1 November 2012

Duration
30 months

Evaluation Opportunities – Invitation

Evaluate your Indoor Localization Algorithms and Solutions

http://www.evarilos.eu/evaluation

Technical Approach

EVARILOS will analyze through experimental validation existing state-of-the-art ranging techniques and location estimation solutions in terms of multiple performance criteria (accuracy, robustness, energy efficiency, cost, simplicity, response time). To this end a benchmarking methodology and software suite will be developed that includes various application scenarios (office, health-care, industrial), corresponding configuration parameters of experiments (network parameters, application traffic parameters and parameters of interference sources), and the performance measurements & analysis. Experiments in different physical wireless environments and under different interference conditions will be conducted in order to make a fair comparison of the performance of existing localization solutions.

EVARILOS will devise methods for localization that are robust and accurate even under external RF interference. It will develop and benchmark solutions by adding interference-robustness to the localization approaches investigated before. At first **EVARILOS** will concentrate on the evaluation of the comparative benefits of different multi-modal localization approaches as means for reducing the interference sensitivity. One examples of such approach is to combine RSSI information from multiple wireless interfaces like WiFi, Bluetooth, 802.15.4, etc. Another example is to combine different ranging technologies, e.g., proximity and RSSI, or RSSI and angle-of-arrival. The second part will investigate how environmental information can be leveraged to improve localization accuracy and the possibility to exploit interference to improve localization accuracy. This includes investigating the benefits of both adjusting to the environment by e.g. selecting the “best” frequency for ranging measurements, and leveraging the implicit proximity information given by e.g. RSSI values of interfering WiFi signals.

What is to be tested?

The tests will validate the new robust localization solutions, developed during the investigations on Interference-robust localization, in real life environments, and check if the benchmarks in lab conditions lead to similar conclusions in the field. The setups will be validated in two cases: healthcare & mining environment.

Project partners	Country
Technische Universität Berlin (TUB)	DE
Advantic Sistemas y Servicios (ADV)	ES
iMinds	BE
SICS Swedish ICT AB	SE
Televic Health Care NV (THC)	BE

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 317989.