INTRODUCTION

The International Conference on Localization and Global Navigation Satellite Systems (ICL-GNSS) 2011 was held on June 29-30, 2011 in Tampere, Finland. This was the inaugural issue of an annual localization event. ICL-GNSS is devoted to all aspects of localization, positioning and navigation, whether using satellites, communication network signals, inertial sensors, or any signal of opportunity. Driven by both market trends and legal regulations, there is a high demand for providing a robust localization solution, which will be available continuously, regardless the specific environment, i.e., outdoors and indoors, and which would overcome and complement the drawbacks of the current stand-alone single-frequency satellite-based navigation systems. The research and development activities on wireless location techniques and technologies have been increasing at a fast pace during past years and currently represent one of the most timely and challenging research topics in the wireless electronics field.

The ICL-GNSS conference uses peer review of full papers, and is technically co-sponsored by the Communications Society of IEEE. The conference papers are distributed to the participants in electronic proceedings, and stored in the IEEE Xplore database.

ICL-GNSS 2011

In the conference opening, the General Chairman Prof. Jari Nurmi emphasized the need for a new peer-reviewed conference covering not
only GPS but all the emerging satellite navigation systems, and definitely also network-based and collaborative positioning, hybridization of multiple localization data sources, and all the new ideas for localization systems. That is exactly what ICL-GNSS was set up for. The idea was maturing in GRAMMAR project (Grammar, 2012) meetings, and a steering committee was invited to start working on the organization. The steering committee members are:

Jari Nurmi, TUT, Finland (chairman)
Fabio Dovis, Politecnico di Torino, Italy
Gonzalo Seco-Granados, UAB, Spain
Elena-Simona Lohan, TUT, Finland
Kaveh Pahlavan, WPI, USA
John Raquet, AFIT, USA
Stephan Sand, DLR, Germany
Jari Syrjärinne, Nokia, Finland

For the first issue of the conference, Dr. Elena-Simona Lohan, Prof. John Raquet and Dr. Stephan Sand were nominated as Program Co-Chairs, and Dr. Heikki Hurskainen as Sponsor, Exhibitor and Publication Chair. A highly experienced team of professionals was invited to join the organization as technical program committee members. They carried out the review, and finally 32 papers were selected to the conference either as oral or poster presentations, and for final publication in the proceedings after addressing the reviewers’ comments. Additionally, six keynote speakers were invited. Total of 60 people from 14 different countries were participating the event. Europe was well represented, but also guests from Argentina, Australia, China and USA were attending.

Invited Talks

Lauri Wirola from Nokia, Finland discussed Location Standards in Wireless Networks in his keynote presentation. The location information can be generated on the control plane as an integral part of the cellular network, or it can be done on the user plane as location-based value-added services. Dr. Wirola discussed the standards on delivering location assistance data in the network, and how the user plane can be used on top of that. The emphasis was in the current and future GNSS assistance methods. Also cellular positioning and non-cellular additional methods were briefly addressed. As a conclusion, the selection of different standardized positioning technologies in use for tomorrow in cellular devices is much larger than what it used to be.

Prof. Henk Wymeersch from Chalmers University of Technology, Sweden talked on Cooperative GNSS. A cooperative architecture uses both GNSS measurements and peer-to-peer (P2P) measurements to determine the position as accurately as possible. One of the proposed technologies for P2P measurements is Ultra Wide Band (UWB). The position solution uses Bayesian inference, where marginal posteriors of the likelihood of a position estimate are calculated using factor graphs. The methodology used for cooperative positioning decreases the horizontal position error over time, as the solution is iterated multiple times. The main advantage of the proposed C-GNSS is that it allows navigation also when the GNSS signal is blocked.

Kaveh Pahlavan from Worcester Polytechnic Institute, USA discussed an interesting localization case: RF Localization inside Human Body - Enabling micro-robotic navigation for medical applications. Prof. Pahlavan first presented the bounds on the performance of Received Signal Strength (RSS) based localization of a micro-robot inside the digestive system of the human body using known location of body mounted sensors. It was shown that using RSS-based localization one may achieve accuracies around a few centimeters inside the human body. In order to gain more accuracy, the researchers are investigating the use of Time-of-Arrival (TOA) based localization. There are fundamental differences, e.g., between indoor positioning and doing localization inside the human body, such as the dense medium (mostly liquid) and heterogeneity (different tissues) in the human body case. In traditional TOA localization applications the time of flight of a transmitted pulse is measured at the receiver...
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