**WPNC** 13
Workshop on Positioning, Navigation and Communication

HTW
Hochschule für Technik und Wirtschaft Dresden
University of Applied Sciences



10th Workshop on Positioning, Navigation and Communication 2013

20th/21st of March 2013, Dresden, Germany

## Day 1 - 20<sup>th</sup> of March 2013

| 08:00 – 09:00 | Registration |
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| 09:00 – 10:00 | **Keynote** |
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**On the role of positioning in cyber-physical systems**

Henk Wymeersch, Chalmers University of Technology

| 10:00 – 10:20 | **Coffee break** |
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**SESSION 1 – WLAN Localization and Fingerprinting**

| 10:20 – 10:40 | **S1WF1: Genetic Algorithm Optimized DCM Positioning** |
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Rafael Saraiva Campos, Universidade Federal do Rio de Janeiro
Lisandro Lovisolo, Universidade do Estado do Rio de Janeiro

| 10:40 – 11:00 | **S1WF2: Joint Time Delay and DOA Estimation Using 2-D Matrix Pencil Algorithms and IEEE 802.11ac** |
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Abdo Gaber, University of Magdeburg
A.S. Omar, University of Magdeburg

| 11:00 – 11:20 | **S1WF3: Search Space Reduction in DCM Positioning using Unsupervised Clustering** |
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Rafael Saraiva Campos, Universidade Federal do Rio de Janeiro
Lisandro Lovisolo, Universidade do Estado do Rio de Janeiro
Marcello L. R. de Campos, Universidade Federal do Rio de Janeiro

| 11:20 – 11:40 | **S1WF4: A Pocket Guide to Indoor Mapping** |
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Pascal Bissig, ETH Zurich
Roger Wattenhofer, ETH Zurich
Samuel Welten, ETH Zurich

| 11:40 – 12:00 | **S1WF5: Real Time Evaluation of RF Fingerprints in Wireless LAN Localization Systems** |
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Nuha Alkhanbashi, EBTIC, Khalifa University of Science, Technology and Research
Nayef A. Alsindi, EBTIC, Khalifa University of Science, Technology and Research
Saleh Al-Araji, College of Engineering, Khalifa University of Science, Technology and Research
Nazar Ali, College of Engineering, Khalifa University of Science, Technology and Research
Zdenek Chaloupka, EBTIC, Khalifa University of Science, Technology and Research
Vivek Yenamandra, The Ohio State University
James Aweya, EBTIC, Khalifa University of Science, Technology and Research

| 12:00 – 12:40 | **Lunch** |
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**POSTER SESSION**

| 12:40 – 13:20 | **Poster talks (find a list of posters at the end of this programme)** |
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## SESSION 2 – Localization Systems Design and Applications

**13:20 – 13:40**  **S2LS1: Design Considerations and Performance of Low-Cost Ultrasonic Ranging System**

Dragan S. Zivkovic, Bitgear Wireless Design Services d.o.o
Bogdan R. Markovic, BItgear Wireless Design Services d.o.o.
Dejan Rakic, Bitgear Wireless Design Services d.o.o.
Srdjan Tadic, Bitgear Wireless Design Services d.o.o

**13:40 – 14:00**  **S2LS2: System Considerations and VCO Design for a Local Positioning System at 2.4 GHz for Rescue of People on Ships and in Sea**

Markus Schulz, Technische Universität Dresden
Axel Strobel, Technische Universität Dresden
Frank Ellinger, Technische Universität Dresden

**14:00 – 14:20**  **S2LS3: Analytical Localisation Method for Wireless Sensor Nodes Embedded In Industrial Processes**

Michalis Antoniou, University of Manchester
P.N. Green, University of Manchester

**14:20 – 14:40**  **S2LS4: RSS-based Localization Considering Topographical Feature for Pasturing**

Kaoru Yokoo, Fujitsu Laboratories Ltd.
Takeshi Nishidoi, Fujitsu Laboratories Ltd.
Jun Sugiyama, Fujitsu Laboratories Ltd.
Makoto Yoshida, Fujitsu Laboratories Ltd.
Teruhisa Ninomiya, Fujitsu Laboratories Ltd.
Hiroo Urabe, Mobile Techno Corporation
Takayuki Ikenouchi, Mobile Techno Corporation

**14:40 – 15:00**  **S2LS5: EasyPoint - Highly accurate Distance Measurement with Radio Wave Methods for Low Cost Localization**

Rönne Reimann, Lambda:4 Entwicklungen GmbH
Arne Bestmann, Lambda:4 Entwicklungen GmbH
Mirjam Ernst, Lambda:4 Entwicklungen GmbH

**15:00 – 15:20**  **Coffee break**

## SESSION 3 – Data Fusion and Indoor Navigation

**15:20 – 15:40**  **S3DI1: Sensor fusion for relative altimetry using an hybrid Gaussian mixture filter**

Lara Thomas, Airbus SAS Operation
André Monin, LAAS-CNRS
Philippe Mouyon, ONERA-DCSD
Nour-ed-din Houberdon, Airbus SAS Operation

**15:40 – 16:00**  **S3DI2: Extensive Ultrasonic Local Positioning System for navigating with mobile robots**

Daniel Ruiz, University of Alcala de Henares
Enrique Garcia, University of Alcala de Henares
Jesus Urena, University of Alcala de Henares
Daniel de Diego, University of Alcala de Henares
David Gualda, University of Alcala de Henares
Juan Carlos Garcia, University of Alcala de Henares

**16:00 – 16:20**   **S3DI3: Pedestrian Navigation in Harsh Environments using Wireless and Inertial Measurements**

Javier Prieto, University of Valladolid
Santiago Mazuelas, Massachusetts Institute of Technology (MIT)
Alfonso Bahillo, University of Valladolid
Patricia Fernandez, University of Valladolid
Ruben M. Lorenzo, University of Valladolid
Evaristo J. Abril, University of Valladolid

**16:20 – 16:40**   **S3DI4: Block Localization Methods for Mobile Robot Tracking and Navigation**

Yuiko Tanaka, Osaka City University
Shinsuke Hara, Osaka City University

**16:40 – 17:00**   **S3DI5: Joint Motion Capture and Navigation in Heterogeneous Body Area Networks with Distance Estimation Over Neighborhood Graph**

Jihad Hamie, CEA-Leti Minatec Campus
Benoît Denis, CEA-Leti Minatec Campus
Cedric Richard, Université de Nice Sophia Antipolis

**17:00**   **Open Meeting**

**Invited Session – WHERE2 and COOPNET Project Results**

**08:20 – 08:40**   **ISWC1: Impact of Human Crowd Activity on Indoor Wireless Channels – Assessment and Modeling**

Emanuel Staudinger, German Aerospace Center (DLR)
Julien Stéphan, SIRADEL
Yoann Corre, SIRADEL
Yves Lostanlen, SIRADEL

**08:40 – 09:00**   **ISWC2: MAC Delay in Belief Consensus for Distributed Tracking**

Christopher Lindberg, Chalmers University of Technology
L. Srikar Muppirisetty, Chalmers University of Technology
Karl-Magnus Dahlén, HiQ Consulting
Vladimir Savic, Linkoping University
Henk Wymeersch, Chalmers University of Technology

**09:00 – 09:20**   **ISWC3: On the Sensitivity of RSS Based Localization Using the Log-Normal model: An Empirical Study**

Jose Vallet, Aalto University
Ossi Kaltiokallio, Aalto University
Jari Saarinen, Aalto University
Matthieu Myrsky, Aalto University
Maurizio Bocca, ECE Department, The University of Utah

**09:20 – 09:40**   **ISWC4: Refined characterization of RSSI with practical implications for indoor positioning**

Mohamed Laaraiedh, University of Rennes 1, IETR Lab
Nicolas Amiot, University of Rennes 1, IETR Lab
Bernard Uguen, University of Rennes 1, IETR Lab

**09:40 – 10:00**   **ISWC5: Velocity-Based CRLB Predictions for Enhanced Cooperative Links Selection in Location-Enabled Mobile Heterogeneous Networks**

Soumaya Zirari, CEA-Leti Minatec
Benoît Denis, CEA-Leti Minatec

**10:00 – 10:20**   **Coffee break**

**SESSION 4 – Range Estimation, Analysis and Error Mitigation**

**10:20 – 10:40**   **S4RA1: Semi-blind Channel Estimation for Joint Communication and Positioning**

Rebecca Adam, University of Kiel
Peter Adam Hoeher, University of Kiel

**10:40 – 11:00**   **S4RA2: Low Complexity TOA Estimator for Multiuser DS-UWB System**

Hang Ma, CNRS-LAAS, INSA, University of Toulouse
Pascal Acco, CNRS-LAAS, INSA, University of Toulouse
Marie-Laure Boucheret, IRIT/ENSEEIHT
Daniele Fournier-Prunaret, CNRS-LAAS, INSA, University of Toulouse

| 11:00 – 11:20 | **S4RA3: Improving Ranging Accuracy of Active and Passive Anchors in the Presence of Clock Imperfection** |
|---|---|
| | Yue Wang, Chinese Academy of Sciences |
| | Weiming Xiong, Chinese Academy of Sciences |

| 11:20 – 11:40 | **S4RA4: Non-parametric Estimation of Error Bounds in LOS and NLOS Environments** |
|---|---|
| | Omotayo Oshiga, Jacobs University, Bremen |
| | Stefano Severi, Jacobs University Bremen |
| | Giuseppe Abreu, Jacobs University Bremen |

| 11:40 – 12:00 | **S4RA5: Sparse Subcarrier Allocation for Timing-based Ranging with OFDM Modulated Signals in Outdoor Environments** |
|---|---|
| | Emanuel Staudinger, German Aerospace Center (DLR) |
| | Armin Dammann, German Aerospace Center (DLR) |

| 12:00 – 12:20 | **S4RA6: NLOS Mitigation in TOA-Based Localization Using Semidefinite Programming** |
|---|---|
| | Reza Monir Vaghefi, Virginia Tech |
| | Javier Schloemann, Virginia Tech |
| | R. Michael Buehrer, Virginia Tech |

| 12:20 – 13:00 | **Lunch** |
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**SESSION 5 – GNSS and Cellular-based Localization**

| 13:00 – 13:20 | **S5GC1: Accurate Lane Detection Using Commercial GNSS Devices** |
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| | Roi Yozevitch, Ariel University Center |
| | Boaz Benmoshe, Ariel University Center |
| | Amit Dvir, COLMAN College |

| 13:20 – 13:40 | **S5GC2: 2.5D Mapping using GNSS Signal Analysis** |
|---|---|
| | Ayal Weissman, Bar-Ilan University |
| | Boaz Benmoshe, Ariel University Center |
| | Harel Levi, Ariel University Center |
| | Roi Yozevitch, Ariel University Center |

| 13:40 – 14:00 | **S5GC3: A Precise Proximity-Weight Formulation for Map Matching Algorithms** |
|---|---|
| | Ali Oran, Singapore MIT Alliance for Research and Technology (SMART) |
| | Patrick Jaillet, Massachusetts Institute of Technology (MIT) |

| 14:00 – 14:20 | **S5GC4: Performance analysis of PRS-based synchronization algorithms for LTE positioning applications** |
|---|---|
| | Marco Panchetti, University of Pisa |
| | Cecilia Carbonelli, Intel Mobile Communications GmbH |
| | Michael Horvat, Intel Mobile Communications GmbH |
| | Marco Luise, University of Pisa |

| 14:20 – 14:40 | **S5GC5: A low cost TDOA Localization System: Setup, Challenges and Results** |
|---|---|
| | Noha El Gemayel, Karlsruhe Institute of Technology |
| | Sebastian Koslowski, Karlsruhe Institute of Technology |
| | Friedrich K. Jondral, Karlsruhe Institute of Technology |
| | Joachim Tschan, LS Telcom |

| 14:40 – 15:00 | Coffee break |
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## SESSION 6 – Hybrid Positioning Systems

**15:00 – 15:20**    **S6HS1: A bi-modal ad-hoc Localization Scheme for Wireless Networks based on RSS and ToF Fusion**

Tobias Gädeke, Karlsruhe Institute of Technology (KIT)
Johannes Schmid, Karlsruhe Institute of Technology (KIT)
Marcel Krüger, Karlsruhe Institute of Technology (KIT)
Josefin Jany, Karlsruhe Institute of Technology (KIT)
Wilhelm Stork, Karlsruhe Institute of Technology (KIT)
K.D. Müller-Glaser, Karlsruhe Institute of Technology (KIT)

**15:20 – 15:40**    **S6HS2: Soft-Decision based Position Estimation for Wireless Localization in Indoor Scenarios**

Timo Dammes, TU Dortmund University
Ruediger Kays, TU Dortmund University

**15:40 – 16:00**    **S6HS3: Hybrid RFID System-based Pedestrian Localization: A Case Study**

Haowei Wang, Friedrich-Alexander-Universität Erlangen-Nürnberg
Georg Bauer, Clausthal University of Technology
Martin Vossiek, Friedrich-Alexander-Universität Erlangen-Nürnberg
Fabian Kirsch, Friedrich-Alexander-Universität Erlangen-Nürnberg

**16:00 – 16:20**    **S6HS4: Localization Based on Fusion of RFID and Stereo Image Data**

Fynn Schwiegelshohn, TU Dortmund University
Theresa Nick, Information Processing Lab, TU Dortmund University
Jürgen Götze, TU Dortmund University

**16:20 – 16:40**    **S6HS5: Self-Organized Hybrid Channel Access Method for an Interleaved RTD-based Swarm Navigation System**

Siwei Zhang, German Aerospace Center (DLR)
Stephan Sand, German Aerospace Center (DLR)
Ronald Raulefs, German Aerospace Center (DLR)
Emanuel Staudinger, German Aerospace Center (DLR)

| 16:40 – 17:30 | Award Presentation Ceremony, Closing and Wrap-up |
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**Poster Talk (taking place at Day 1, 12:40 – 13:20)**

**PS1: DockingAssist: A Novel Vessel Navigation System Design Based on WiMAX and DGNSS**

Lei Jiang, ITT Department of CRIC
Josep Perello, ITT Department of CRIC
Esteban Gutierrez, CTAE-ASCAMM
Jesus Romero, CTAE-ASCAMM
Jarmo Prokkola, VTT Technical Research Centre of Finland
Jarno Pinola, VTT Technical Research Centre of Finland
Esa Piri, VTT Technical Research Centre of Finland

**PS2: BeSpoon single chip UWB, optimised for Indoor Location**

Jean-Marie Andre, BeSpoon

**PS3: Collaborative Navigation Field Trials with Different Sensor Platforms**

Allison Kealy, University of Melbourne
Guenther Retscher, Vienna University of Technology
Azmir Hasnur-Rabiain, University of Melbourne
Nima Alam, UNSW
Charles Toth, The Ohio State University
Dorota Brzezinska, Ohio State University
Terry Moore, University of Nottingham
Chris Hill, University of Nottingham
Vassilis Gikas, National Technical University of Athens
Chris Hide, University of Nottingham
Chris Danezis, National Technical University of Athens
Lukasz Bonenberg, University of Nottingham
Gethin Wyn Roberts, University of Nottingham Ningbo

**PS4: Server based Indoor Navigation using RSSI and Inertial Sensor Information**

Manh Kha Hoang, Department of Communications Engineering, University of Paderborn
Sarah Schmitz, Department of Communications Engineering, University of Paderborn
Christian Drueke, Department of Communications Engineering, University of Paderborn
Dang Hai Tran Vu, Department of Communications Engineering, University of Paderborn
Joerg Schmalenstroeer, Department of Communications Engineering, University of Paderborn
Reinhold Haeb-Umbach, Department of Communications Engineering, University of Paderborn

**PS5: A Tag Complexity Reduction Approach for Code-Based Cooperative Ranging Systems**

Malek Chaabane, University of Munich
Erwin Biebl, University of Munich

**PS6: Empirical Localisation Method for Wireless Sensor Nodes In Confined Industrial Processes**

Michalis Antoniou, University of Manchester
P.N. Green, University of Manchester

**PS7: Indoor localization on Mobile Phone Platforms with inertial sensor**

Yang Liu, University of Sheffield
Marzieh Dashti, University of Sheffield
Jie Zhang, University of Sheffield

**PS8: Target Tracking in Wireless Sensor Networks by Data Fusion with video-based Object Detection**
Uwe Gosda, TU Dresden
Richard Weber, TU Dresden
Oliver Michler, TU Dresden

**PS9: GPS Integrity Monitoring for an Intelligent Transport System**

Tareq, DeMont fort University
Ali Hilal Al-Bayatti, De Montfort University
Ashwaq H. Al-Hargan, University of Leicester

**PS10: Design of a Multi-Band FMCW Radar Module**

Niko Joram, Technische Universität Dresden
Jens Wagner, Technische Universität Dresden
Belal Al-Qudsi, Technische Universität Dresden
Axel Strobel, Technische Universität Dresden
Frank Ellinger, Technische Universität Dresden