

# Bonn, October 10<sup>th</sup> – 12<sup>th</sup>, 2017



## 11<sup>th</sup> Symposium *Sensor Data Fusion: Trends, Solutions, and Applications*

### Technical Program

Prior to its technological realization or the scientific reflection on it, sensor data fusion is an omnipresent capability. The result is a mental model of their individual environment, the basis of behaving appropriately. SDF Symposium 2017, the 11<sup>th</sup> in a row of annual conferences, addresses numerous application aspects of sensor data fusion, as well as methodology oriented topics. Its 21 presentations are grouped into 7 sessions. Particular emphasis is placed on advances in the theory of estimation and tracking, emitter localization, ground surveillance, resource management, and selected aspects of higher-level fusion. The contributions from industry, academia, and research institutions let us expect an exchange of ideas, lively discussions, and mutual cross-fertilization. For more detailed information see: [www.fkie.fraunhofer.de/sdf2017](http://www.fkie.fraunhofer.de/sdf2017).

**Location** Universitätsclub Bonn e.V., Giergasse 9, 53113 Bonn, Germany. [www.uniclub-bonn.de](http://www.uniclub-bonn.de)

### Organisation

*Executive Chairs:*

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### Technical Program Committee

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# Bonn, October 10<sup>th</sup> – 12<sup>th</sup>, 2017



## Day #1 – Tuesday October 10<sup>th</sup>

09:00 – 10:00 Registration

10:00 – 10:30 Opening

### Session #1: Estimation Theory and Target Tracking I

**Umut Orguner**

10:30 – 11:00 *Approximate Analytical Solutions for the Weight Optimization Problems of CI and ICI*

**Roy Streit**

11:00 – 11:30 *Analytic Combinatorics in Multiple Object Tracking*

**Muhammad Altamash Khan, Allan De Freitas, Lyudmila Mihaylova, Martin Ulmke, and Wolfgang Koch**

11:30 – 12:00 *Bayesian Processing of Big Data using Log Homotopy Based Particle Flow Filters*

### Session #2: Automotive Applications

**Ole Schumann, Markus Hahn, Jürgen Dickmann, and Christian Wöhler**

13:30 – 14:00 *Comparison of Random Forest and LSTM Performances in Classification Tasks Using Radar*

**Martin Michaelis, Philipp Berthold, Daniel Meissner, and Hans-Joachim Wuensche**

14:00 – 14:30 *Heterogeneous Multi-Sensor Fusion for Extended Objects in Automotive Scenarios Using Gaussian Processes and a GMPHD-Filter*

**Philipp Berthold, Martin Michaelis, Thorsten Luettel, Daniel Meissner, and Hans-Joachim Wuensche**

14:30 – 15:00 *Radar Reflection Characteristics of Vehicles for Contour and Feature Estimation*

### Session #3: Navigation and Localization I

**Manuel Stübler, Stephan Reuter, and Klaus Dietmayer**

15:30 – 16:00 *A Continuously Learning Feature-based Map using a Bernoulli Filtering Approach*

**Christian Steffes, Wolfgang Konle, and Wolfgang Koch**

16:00 – 16:30 *TDOA/TOA-based Geolocation using ADS-B Transponder Signals - Experimental Results*

**Nikolai Kronenwett, Maxim Köhler, Jan Ruppelt, and Gert F. Trommer**

16:30 – 17:00 *Personal Localization of Task Force Members in Urban Environments*

# Bonn, October 10<sup>th</sup> – 12<sup>th</sup>, 2017



## Day #2 – Wednesday October 11<sup>th</sup>

### Keynote: **Lennart Svensson**

09:00 – 10:00

*Sets of trajectories and conjugate prior densities: two general tools for multi-target tracking*

### Session #4: *Multi Sensor Fusion and Distributed Estimation*

10:30 – 11:00

**Michael Ulrich, Florian Maile, Andreas Löcklin and Bin Yang, Bernhard Kleiner, and Nils Ziegenspeck**

*A Model for Improved Association of Radar and Camera Objects in an Indoor Environment*

11:00 – 11:30

**Sascha Graebenitz, Michael Mertens, and Francesco Belfiori**

*Sequential Data Fusion Applied to a Distributed Radar, Acoustic and Visual Sensor*

11:30 – 12:00

**Chee-Yee Chong**

*Forty Years of Distributed Estimation*

### Session #5: *Video Processing and Process Refinement*

13:30 – 14:00

**Hayder M. Amera, Christos Tsotskasb, Matthew Hawesa, Patrizia Francob, and Lyudmila Mihaylova**

*A Game Theory Approach for Congestion Control in Vehicular Ad Hoc Networks*

14:00 – 14:30

**Achim Kuwertz, Jennifer Sander, Uwe Pfirrmann, and Sergius Dyck**

*High-Level Information Management in Joint ISR based on an Object-Oriented Approach*

14:30 – 15:00

**Yifan Zhou and Simon Maskell**

*Moving Object Detection Using Background Subtraction for a Moving Camera with Pronounced Parallax*

### Session #6: *Navigation and Localization II*

15:30 – 16:00

**Sebastian Kram, Christian Nickel, Lucila Patino-Studencki, Jochen Seitz, and Jörn Thielecke**

*Spatial interpolation of Wi-Fi RSS Fingerprints using model-based Universal Kriging: Potential and Limitations*

16:00 – 16:30

**Jorge Trincado, Jorge Sánchez, Jose Manuel Molina, and Jesús García**

*Analysis of real data with sensors and estimation outputs in configurable UAV platforms*

16:30 – 17:00

**James A. Douthwaite, Allan De Freitas, and Lyudmila S. Mihaylova**

*An Interval Approach to Multiple Unmanned Aerial Vehicle Collision Avoidance*

17:00

**Get Together**

*Piano recital and Dinner*

Bonn, October 10<sup>th</sup> – 12<sup>th</sup>, 2017



Day #3 – Thursday October 12<sup>th</sup>

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**Session #7: Estimation Theory and Target Tracking II**

- 09:00 – 09:30 **Stefano P. Coraluppi, Craig A. Carthel, and Alan S. Willsky**  
*Multi-Sensor Tracking of Move-Stop-Move Targets*
- 09:30 – 10:00 **Sebastian Woischneck and Dietrich Fränken**  
*Range/Doppler Tracking with the Kalman Filter and its Relatives – A Comparative Study*
- 10:30 – 11:00 **Hoe Chee Lai, Rong Yang, Gee Wah Ng, Felix Govaers, Martin Ulmke, and Wolfgang Koch**  
*Bearings-Only Tracking and Doppler-Bearing Tracking with Inequality Constraint*
- 11:00 – 11:30 **Vincent Nimier and Kaouthar Benameur**  
*Supervised data fusion algorithm*

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**Session #7: Automotive Applications II**

- 12:00 – 12:30 **Florian Particke, Markus Hiller, Lucila Patino-Studencki, Christoph Sippl, Christian Feist, and Jörn Thielecke**  
*Multiple Intention Tracking by a Generalized Potential Field Approach*
- 12:30 – 13:00 **Josef Steinbaeck, Christian Steger, Gerald Holweg, and Norbert Druml**  
*Next Generation Radar Sensors in Automotive Sensor Fusion Systems*
- 13:00 **End of SDF Symposium 2017**
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