

Bonn, October 12 – 14, 2022



14th 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 2022, the 14th in a row of annual conferences (except a break in 2020 and 2021 due to COVID-19), addresses numerous application aspects of sensor data fusion, as well as methodology oriented topics. Its 23 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/sdf2022.

Location: Universitätsclub Bonn e.V., Konviktstr. 9, 53113 Bonn, Germany. www.uniclub-bonn.de

Organisation

Executive Chairs: **Wolfgang Koch**, Fraunhofer FKIE and University of Bonn, w.koch@ieee.org;

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Technical Program Committee

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Day 1 – Wednesday October 12th

Start of SDF Symposium 2022

12:30 – 13:30 Registration

Session #1: Estimation Theory and Target Tracking I

13:30 – 14:00 **Audun G. Hem and Edmund F. Brekke**
Compensating radar rotation in target tracking

14:00 – 14:30 **Ling-Feng Shi, Zhi-Yong Hou, Yifan Shi, and Lushi Liu**
Improved initial alignment algorithm of SINS on shaking base based on Kalman filter

14:30 – 15:00 **Patrick Hoher, Johannes Reuter, Felix Govaers, and Wolfgang Koch**
Tracking of Partially Visible Elliptical Objects with a Lidar Sensor using Random Matrices and a Virtual Measurement Model

Session #2: Deep Learning based Data Fusion I

15:30 – 16:00 **Warre Geeroms, Gianni Allebosch, Stijn Kindt, Loubna Kadri, Peter Vee-laert, Nilesh Madhu**
Audio-Visual Active Speaker Identification: A comparison of dense image-based features and sparse facial landmark-based features

16:00 – 16:30 **Felix Kielmann, Peter Knott, and Wolfgang Koch**
Core temperature estimation of food items based on non-contact thermal and high frequency sensor data with an LSTM network

16:30 – 17:00 **Bastian Urschel, Lejla Begic Fazlic, Marlies Morgen, Rüdiger Machhamer, Guido Dartmann, Klaus-Uwe Gollmer**
A Machine Learning Approach for Optimal Ventilation based on Data from CO₂ Sensors

17:00 – 17:30 **Jingxuan Su, Sean Anderson and Lyudmila Mihaylova**
A Deep Learning Method with Cross Dropout Focal Loss Function for Imbalanced Semantic Segmentation

17:45 **Guided Tour**
Guided tour through the city of Bonn to the icebreaker reception at Brewery Machold at Heerstr. 52.

19:00 **Icebreaker Reception**
Brewery Machold

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Day 2 – Thursday October 13th

Keynote Talk

09:00 – 10:30

Simon Maskell

Towards Using Large-Scale Sequential Monte Carlo to Get Big Information out of Small Data

Session #3: Fusion Architectures and Information Retrieval

11:00 – 11:30

Bernhard Krach, Dimitrios Palioselitis, Fotios Katsilieris, Bastian von Hasler zu Roseneckh-Köhler, Kaeye Dästner, Felix Opitz

Joint All Domain Modular Data Fusion for Distributed Cloud/Fog/Edge Applications

11:30 – 12:00

Almuth Müller and Achim Kuwertz

Evaluation of a Semantic Search Approach based on AMR for Information Retrieval in Image Exploitation

12:00 – 12:30

Jonas Rockbach, Luka-Franziska Bluhm, Laura Over, Sabine Apfeld, Isabel Schlangen, Lukas Henneke, and Kevin Wilkinghoff

Towards Human-Machine Integration for Signals Intelligence Applications

Session #4: Estimation Theory and Target Tracking II

13:30 – 14:00

Chi-Jen Roger Lo, Hung-Yun Hsieh

Information-Centric Scheduling: Queue Shortening in WSNs via Spatio-Temporal Compression

14:00 – 14:30

Timothy M. McCormick, Zipporah Klain, Ian Herbert, Anthony M. Charles, R. Blair Angle, Bryan R. Osborn, Roy L. Streit

Multiple Target Tracking and Filtering using Bayesian Diabatic Quantum Annealing

14:30 – 15:00

Dominik Heimsch, Chinmaya Mishra, Yan Han Lau, Sutthiphong Srigrarom and Florian Holzapfel

Re-Identification for Multi-Target-Tracking systems using Multi-Camera, Homography Transformations and Trajectory Matching

15:00 – 15:30

Chong Ghee Lua, Yan Han Lau, Dominik Heimsch, Sutthiphong Srigrarom

Multi-Target Multi-Camera Aerial Re-identification by Convex Hull Topology

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Session #5: Automotive Applications

16:00 – 16:30	Christopher Kniewel and Lars Krueger <i>Sensor Object Plausibilization with Boids Flocking Algorithm</i>
16:30 – 17:00	Gokulesh Danapal, Christian Mayr, Ali Kariminezhad, Daniel Vriesmann, and Alessandro Zimmer <i>Attention Empowered Feature-level Radar-Camera Fusion for Object Detection</i>
17:00 – 17:15	Martin Kugelmann <i>Industry Talk</i>
17:30	Get Together <i>Piano recital and Dinner</i>

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Day 3 – Friday October 14th

Session #6: Navigation and Localization I

	Devanand Palur Palanivelu, Marc Oispuu, and Wolfgang Koch
09:00 – 09:30	<i>Experimental Results on Direct Position Determination by Exploiting the Multipath Environment</i>
	Jae Un Lee
09:30 – 10:00	<i>A Localization Method with UKF/MAF for Stand Alone GNSS/IMU Integration of Autonomous UGV</i>
	Christian Steffes, Bruno Demissie, Matthias Mandt, and Mathias Böswetter
10:30 – 11:00	<i>Surveillance of Critical Infrastructure using the LTE450 Network as Passive Radar Illuminator: Feasibility Study and Range Assessment</i>
	Adolf Mathias and Klaus Pourvoyeur
11:00 – 11:30	<i>ADS-B Source Location Validation and Receiver Time Bias Estimation</i>

Session #7: Navigation and Localization II

	Clemens Allmann, Stefan Stanzel, Christian Steffes
12:30 – 13:00	<i>TDOA-based Position Verification of ADS-B Information Using a Sensor Network</i>
	Klaus Pourvoyeur, André Schüttpelz, Adolf Mathias and Holger Neufeldt
13:00 – 13:30	<i>Information Modelling of a Validation Service via ASTERIX CAT246 for ADS-B Security in Air Traffic Management</i>
	Tom Taeschner and Fotios Katsilieris
13:30 – 13:00	<i>Comparison of 3D Angle-Only Localization Algorithms</i>
14:00	End of SDF Symposium 2022