

ISIF-SPONSORED EVENTS AND WORKSHOPS

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IMPRESSIONS OF THE 11TH IEEE AESS SYMPOSIUM ON SENSOR DATA FUSION—TRENDS, SOLUTIONS, APPLICATIONS (SDF 2017), OCTOBER 10–12, 2017, BONN, GERMANY

Before any thoughts of technical realization or scientific reflections on it, all living creatures perform Sensor Data Fusion (SDF): they combine sensations from mutually complementary sense organs with their past experiences and the communications they receive from other creatures. By doing so, they generate “situation pictures” of their particular environment, the very basis for behaving appropriately to reach certain goals or to avoid harm.

As a key activity of the International Society of Information Fusion (ISIF) community, Sensor Data Fusion tries to understand “natural orientation” of creatures in their environment, to automate the generation of situation pictures as far as possible, and to extend them far beyond “natural” capabilities.¹ The megatrends towards miniaturized sensors, autonomously operating mobile platforms as well as navigation, communication, and computing are technological driving factors for developing advanced algorithms for Sensor Data Fusion. These algorithms enable the design of “cognitive tools” for enhancing our mental capabilities to understand vast sensor data streams in analogy to mechanical tools that enlarge our physical strengths. Needless to say, Sensor Data Fusion is a key technology in many defence and civil applications.

The ISIF symposium “Sensor Data Fusion—Trends, Solutions, Applications” (SDF 2017) took place on October 10–12,

¹ See e.g., Koch. W. *Target Tracking and Sensor Data Fusion—Methodological Framework and Selected Applications. Mathematical Engineering Series*. Springer, 2014.



SDF Symposium is represented in social media for the first time.

2017, at the University of Bonn, Germany, and was the 11th in a row of small conferences that have been technically cosponsored by the ISIF and the Institute of Electrical and Electronics Engineers (IEEE) Aerospace and Electronics Systems Society (AESS). Designed as a small scale annual conference with a very personal atmosphere, it is complementary to the large ISIF International Conferences on Information Fusion, where the global fusion community regularly meets at varying locations. All workshop papers that have been accepted in a peer-reviewed process are made globally accessible via IEEE Xplore.

The SDF Symposium was created to reach three goals: With 24 high-quality oral presentations in comfortable time slots of 30 minutes, it firstly provides insight into most recent developments in Sensor Data Fusion, addressing methodological advances as well as innovative applications and fostering discussions. Secondly, a keynote lecture enables more comprehensive understanding of upcoming topics. At SDF 2017, Lennart Svensson from the Chalmers University of Technology, Göteborg, Sweden, a leading researcher in Sensor Data Fusion, delivered a highly inspiring and enthusiastically presented lecture on “*Sets of Trajectories, Conjugate Prior Densities and Metrics: Three General Tools for Multi-Target Tracking.*” Last but not least, the SDF Symposium is a sort of “family meeting” of “fusionaries” stimulating networking and personal interaction by an “icebreaker” dinner in a traditional German beer-house on the first day and a workshop dinner at the second day, which is traditionally opened by a musical event.

SDF 2017 was jointly organized by Wolfgang Koch, Fraunhofer FKIE/University of Bonn, and Peter Willett, University of Connecticut, acting as executive co-chairs. Technical Program Chair was Felix Govaers, Fraunhofer FKIE, while Stefano Coralluppi, Systems and Technology Research, USA, served as a Publicity Chair. Seven technical sessions addressed *Advances*



Felix Govaers, Roy Streit, Lennart Svensson, Chee-Yee Chong, Stefano Coralluppi, and Wolfgang Koch (from left to right). The ISIF banner can be seen in the background.

ISIF Sponsored Event Report



Chee-Yee Chong talking on 40 years history of distributed estimation.



Lennart Svensson giving his keynote speech of 90 minutes with great depth and broad applications.

in Methodology, Indoor Tracking and Navigation, Models and Estimation Theory, Classification and Detection, Radar and Sonar Applications, Advances in Random Finite Set Filters, and Higher Level Fusion and Fusion Architectures. There were about 60 participants with a diverse mixture of interested people from industry, academia and research institutes. The audience was international (Italy, France, the Netherlands, Great Britain, and Greece for instance) but the majority were from Germany due to the local attraction. The audience stayed in a single group, which often resulted in interesting and feisty discussions.

The “Best Paper Award” was won by Manuel Stübler, Stephan Reuter, and Klaus Dietmayer (*A Continuously Learning Feature-based Map using a Bernoulli Filtering Approach*), who

wrote on a new strategy for Bernoulli-filter based feature estimation for simultaneous localization and mapping applications. Among other talks of high interest were Roy Streit’s presentation on Analytical Combinatorics, which was used to present the probability generating functional of the multi-hypothesis tracking family. Great attention was given to Chee-Yee Chong with his presentation on 40 years of distributed estimation history. Also highly convincing was the talk of Umut Orguner on fast optimization of weights for covariance intersection methods.

We will continue our series regularly in 2018 with the upcoming SDF Symposium. More information on this and future SDF workshops can be found at <http://fkie.fraunhofer.de/sdf2018>.