Karlsruhe Institute of Technology

Institute of Radio Frequency
Engineering and Electronics (IHE)

Imaging Radar for Cars – The Big Challenges Ahead

Talk by Dr.-Ing. Martin Kunert, Radar Expert (retired), Germany

Thursday, February 5th, 2026, 15:45 p.m. – 17:15 p.m., NTI lecture hall (Geb. 30.10)

First vehicular radars saw the light of day at the turn of the millennium in premium cars like the Mercedes S-class or the BMW 7 series. During the radar generations brought in the market since then the performance and capability has steadily improved. Since several years a novel specimen of radar devices saw the light of day in the category of so-called imaging radars. First imaging radars were not worth their name with a maximum number of detections per scan below 1000, resulting in 2D pictures in the size of a small post stamp.

Meanwhile, with some good will, traffic scenarios recorded with a high-end imaging radar, can be interpreted by a 3D point cloud representation with sufficient realism. For a fusion of imaging radar point clouds with high-resolution camera systems there is still a long way to go due to the obviously very high gap in resolution capability. While radar systems in the current allocated frequency range from 76 to 81 GHz are rather weatherproof and have a very good instantaneous speed information, their horizontal and vertical resolution capability is rather poor compared to a e.g. 8 Megapixel camera.

Recently some new research results appeared that have the potential to improve the radar resolution capability significantly and thus bring imaging radars roughly on par with video sensors.

This talk will lead you through the existing toolkit of new, innovative radar technologies and identifies possible directions for further improvement potential.

M. Kunert studied electrical engineering at the Munich University of Technology (TU München) from 1980 to 1986. From 1987 to 1990 he started work as a research engineer for ultrasonic mass airflow meter at the central research center of the Siemens AG in Munich, Germany. From 1990 to 1995 he was project leader for radar signal processing at Siemens Automotive S.A. in Toulouse, France where he also accomplished his PhD thesis at the Institut National Polytechnique de Toulouse with focus on digital radar signal processing. From 1995 to 2002 he was project leader for 24 GHz radar sensors at Siemens VDO Automotive AG in Ratisbon, Germany. Afterwards, from 2002 to 2008 he was Head of radar research projects and strategic frequency management at Continental Automotive GmbH in Ratisbon, Germany. From 2008 onwards he worked within the advanced development department of the Robert Bosch GmbH in Leonberg, Germany as a coordinator for publicly funded project and advanced radar systems and concepts. End of 2024 he changed in the passive phase of his partial retirement at his last workplace.

The event is co-organized by the IEEE Student Branch Karlsruhe
https://www.ieee-ka.de/