Karlsruhe Institute of Technology

Institute of Radio Frequency Engineering and Electronics (IHE)

Automotive Radar – Past, Presence and Future Achievements and Challenges

Talk by Dr.-Ing. Martin Kunert, Robert Bosch GmbH, Germany

Thursday, January 23rd, 2025, 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 generation brought in the market since then the performance and capability has steadily improved while simultaneously the product price was lowered significantly. Currently the sixth generation of radar products is introduced on almost all automotive platforms from small entry vehicles up to large luxury SUVs. The number of radar sensors per car has increased over time from a single forward looking devices to many radars that are building a 360 degree surveillance zone or safety belt around the vehicle. The requirements and specifications enlarged from product generation to product generation, beginning from simple adaptive cruise control functionality towards partial autonomous driving nowadays. For future fully self-driving robotaxis or goods transportation trucks the needed radar premises are even higher and may require new radar signal processing concept and modulation schemes. Most likely artificial intelligence will play a major role in reaching the challenging radar performance to cope with complex road scenarios anywhere and at any time, independent on weather conditions, day and night and so-called corner case situations. This talk will lead you through the history of automotive radar systems from the early beginnings until the far future.

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.

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