Simulating ADAS Sensors, their Placement and Environment

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Abstract – **With the advent of autonomous vehicles, carmakers are increasingly involved in developments of Active Safety and Advanced Driver Assistance Systems. Those systems are part of complex electronic equipment, that – with its sensors, microcontrollers, cable harnesses – will represent up to 40% of the total manufacturing cost. Today, virtual prototyping is integral part of development process, assuring fast innovation cycles and minimizing costs. A multiscale hybrid strategy is proposed to simulate Advanced Driver Assistance Systems (ADAS) in both Short Radar Range (SRR) and Long Radar Range (LRR). While SRR devices (typically blind spot / dead-angle radars) are operating at 24 GHz, the LRR devices used for Adaptive Cruise Control systems are utilizing the 77 GHz band. The sensor itself is modeled using FDTD or MoM/MLFMM methods. Then, the related electromagnetic environment is computed by means of Physical Optics (PO). Dedicated PO upgrades are utilized to handle plastic parts (bumper, front grille) in front of a sensor.**

Keywords: virtual prototyping, simulations, computational electromagnetics, sensor, ADAS

References:

[1] CEM One at ESI Group official site: https://www.esi-group.com/software-solutions/virtual-environment/electromagnetics/cem-one-solution.
[2] Virtual Prototyping at ESI Group official site: https://www.esi-group.com/smart-virtual-prototyping.

Jaroslav Rymus is with MECAS ESI, the Czech subsidiary of ESI Group. Jaroslav is involved in development of dedicated modules for Visual-CEM, a part of ESI's virtual prototyping platform also including CEM One, a complete solution for computational electromagnetics. His current professional interests include antenna optimization, antenna matching as well as use of characteristic modes for antenna design.

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