Abstracts

94 GHz Three-Dimensional Imaging Radar Sensor for Autonomous Vehicles

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Sensing 3-D geometrical properties of an environment is essential for an autonomous vehicle operating in indoor situations such as production plants. Since the common acoustical and optical sensors fulfill this task insufficiently, this paper reports on an alternative approach using millimeter-wave images for real-time vehicle guidance. For application in the field of autonomous locomotion, the main advantage of this sensor concept is direct access to range and velocity information. System design and imaging results of a multitask 94 GHz pulse Doppler radar with 25 cm radial and 1.5° angular resolution are discussed. To point out specific millimeter-wave scattering phenomena, various radar images of typically structured indoor situations are presented. Extraction of information from sensor data, for example, obstacle detection, is demonstrated by radar image processing.

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