Abstracts

Multifunctional radar sensor for automotive application

M. Wollitzer, J. Buechler, J.-F. Luy, U. Siart, E. Schmidhammer, J. Detlefsen and M. Esslinger. "Multifunctional radar sensor for automotive application." 1998 Transactions on Microwave Theory and Techniques 46.5 (May 1998, Part II [T-MTT] (Special Issue on Microwave Circuits on Silicon Substrates)): 701-708.

A multifunctional radar system for vehicles consisting of two modules with a combined bistatic/monostatic arrangement is presented. One module acts as a transceiver, whereas the other is a receiving circuit. The transmitting part radiates a frequency-modulated signal alternately in two orthogonal polarizations. The receiving parts work with different local oscillator (LO) frequencies and detect both polarizations of the scattered signal simultaneously. From the resulting Doppler spectra and a distance measurement, the velocity, tilt angle, height with respect to ground, and the direction of the movement of a vehicle can be derived. From the polarimetric information, a classification of the road condition is possible. In a first approach, the sensor was built in a conventional waveguide technique. The second step was to realize the millimeter-wave circuits of both modules with monolithic silicon millimeter-wave integrated circuit (SIMMWIC) technology. To achieve a flat arrangement, a leaky-wave antenna is developed and coupled to the SIMMWIC's.

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