

Short Range mm-Wave Imaging and Applications

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ABSTRACT

Recent advances in the area of automotive radar led to the development and availability of integrated components (MMICs) in the millimeter-wave range. Besides the automotive sensors also industrial and security applications can take benefit from these components. This presentation reports on different sensors and imaging principles with respect to the above mentioned fields.

A switched array at 24 GHz together with digital beam forming (DBF) was successfully tested in brown coal surface mining areas, on the one hand to protect the surrounding of bucket excavators, but also to monitor the surface profile [1]. In the meantime this sensor principle has been ported to 78 GHz in three steps. In the first step a bistatic FMCW frontend with one transmitter and two receiving channels was developed. The second step was a SP32T (Single Pole 32 Throw) switch matrix with waveguide interfaces. Finally also the antennas have been integrated in a compact design. All the building blocks will be presented at this topical meeting

Runway surveillance on airports has become a very important topic in the last few years. A distributed system consisting of several mechanically steered broadband sensors has been proposed recently [2]. New results obtained with a modified antenna and additional CFAR processing (constant false alarm rate) will be presented.

With the rapidly growing computing power of (personal) computers and digital signal processors (DSP) in mind even synthetic aperture radar (SAR) in strip-map or spotlight mode could be a possible candidate for surveillance applications. First results using a broadband 78 GHz sensor in a simple demonstration environment will be shown.

REFERENCES

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- [2] Feil P., W. Menzel, T. P. Nguyen, C. Pichot, C. Migliaccio, "Foreign objects debris detection (FOD) on airport runways using a broadband 78 GHz sensor", *Proc. European Radar Conference EuRAD*, 2008