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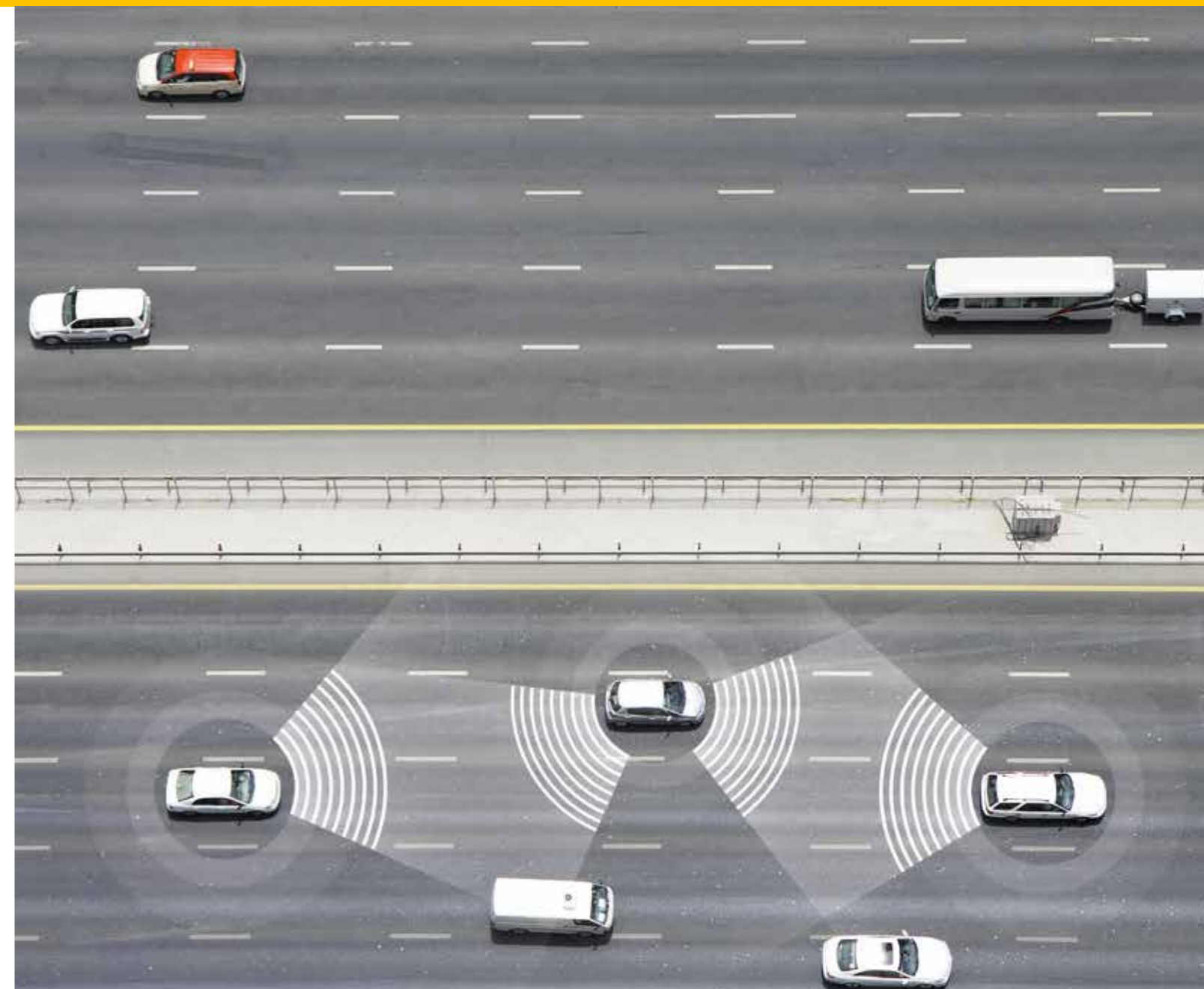
Speaker Business Unit Traffic

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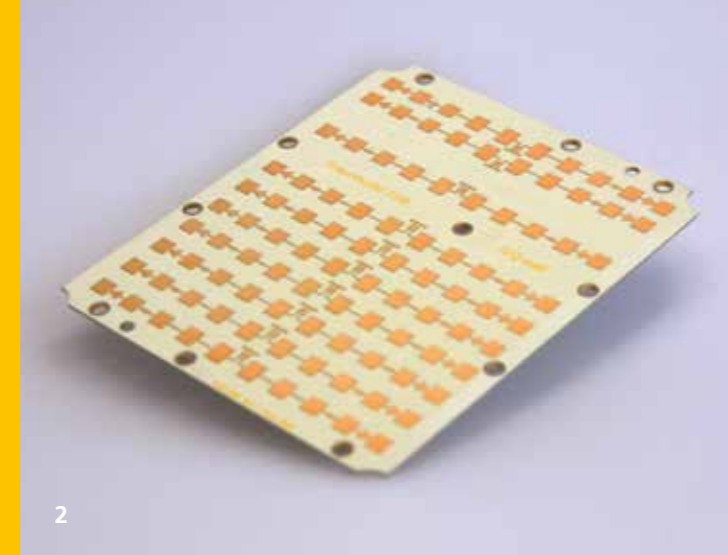


Reference Projects:
<http://www.fhr.fraunhofer.de/traffic>

BUSINESS UNIT TRAFFIC



TITLE Driver assistance systems – such as the lane change assistant and the automatic distance warning system – protect the occupants over growing distances and pave the way for autonomous driving.



RADAR: ALWAYS ON BOARD

Fraunhofer FHR develops customized and cost-efficient radar solutions that are designed to enhance safety and comfort in air, sea and road traffic: from optimized sensor systems and simulation techniques for development and testing to smart signal processing.

Radar for manned and unmanned air traffic

Radar systems can reliably detect obstacles such as high-voltage lines and wind turbines even in restricted visibility, e. g. foggy conditions. They can measure distances with a high level of precision and therefore function as an altimeter when other information sources such as barometers or GPS are not available. Hence, they play an extremely important role in collision prevention.

Fraunhofer FHR develops powerful radar systems with sophisticated signal processing which not only support pilots e. g. when landing helicopters in zero visibility conditions, but also the realization of autonomous flying drones. For the latter the researchers have developed two compact radar sensors for navigational support: a monostatic radar at 80 GHz for short distances and a bistatic radar at 94 GHz for considerably larger distances.

In addition, Fraunhofer FHR enhances aviation safety with radar systems for airspace and airfield surveillance, e. g. for the detection of drones near airports.

Sensors, signal processing and tests for highly automated driving

Driver assistance functions such as active cruise control, lane departure warning and parking assistance can not be implemented without radar. Fraunhofer FHR supports automobile manufacturers and suppliers in the development phase, from the design of new components and systems to prototype construction and testing.

Thanks to miniaturization down to radar-on-chip systems and the development of structurally integrated antennas, Fraunhofer FHR offers developers a new degree of freedom with antennas that are adapted in line with the design of the vehicle. A 24-GHz radar from Fraunhofer FHR has already been installed a million times over in over 40 vehicle types. A new 77-GHz system will allow even compacter designs and new assistance functions. Apart from the hardware, the intelligent signal processing is an essential focal point. Automotive radars must be capable of reliably detecting targets in city traffic with a lot of diverse objects within a heterogeneous background as well as on highways with faster objects and larger distances. Fraunhofer FHR uses innovative, fast and resource-friendly signal processing techniques to achieve high-precision estimates of distances and speeds under these different conditions. The institute also offers extensive electromagnetic simulations. These pave the way for the selection of the ideal installation

site during development and also allow the detection and elimination of suboptimal interaction between the sensor and the vehicle at an early development stage. In addition, the institute is currently implementing the radar simulator ATRIUM, an automotive test environment for radar in-the-loop testing and measurements. This simulator will allow the full simulation of all critical traffic scenarios and for the reliable qualification of automotive radars.

Maritime radar with improved detection accuracy and reduced transmit power

Conventional maritime navigation systems with magnetron signal generation and mechanically rotating antennas are by no means ideal when it comes to detecting objects and, in particular, small objects. Fraunhofer FHR has developed an innovative, stationary array antenna with electronic beam scanning for maritime radar. This offers improved performance with reduced transmit power at a comparable cost. It is considerably better at detecting small objects at sea and will therefore significantly increase safety in regular maritime traffic. However, the radar reflections of very small objects, e. g. shipwrecked people, are very too weak compared to the reflections from the uneven water surface with the result that they are nearly impossible to detect with conventional maritime radars, particularly in the presence of increasing swell. Within the framework of the publicly-funded joint project SEERAD, Fraunhofer FHR and its project partners are currently conducting research into a sea rescue system that will also be capable of detecting these objects.

With its technologies, processes and systems, Fraunhofer FHR improves sensor systems for traffic applications and also creates decisive competitive advantages for its customers through the implementation of feasibility studies, system designs and the construction of prototypes.

1 With the ACoRad-94 on an octocopter, flight altitudes and distances between the drone and obstacles can be measured down to the last centimeter at any time

2 An automotive antenna in the 24-GHz range which was developed by Fraunhofer FHR and has already been installed in modern passenger vehicles and trucks a million times over.

3 Vision of a sea rescue scenario: the transponder in the life vest allows the detection of shipwrecked persons.



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