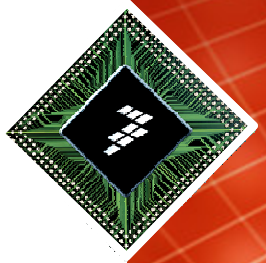
Serving Defense Applications With Commercial 77/79 GHz Packaged Automotive Radar MMICs

Dr. Mark Wilson
Radar Product Line Manager



Sep 25nd, 2013

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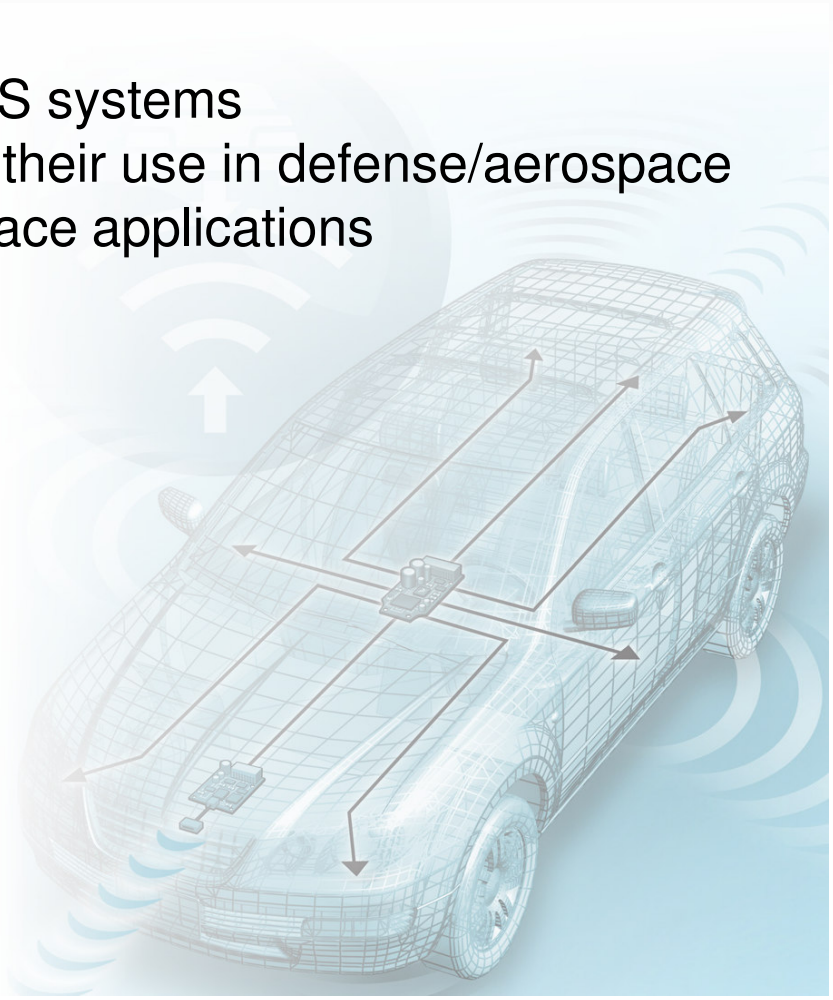
Overview

- The trends in RADAR for ADAS systems
- Freescale radar solutions and their use in defense/aerospace
- Challenges in defense/aerospace applications



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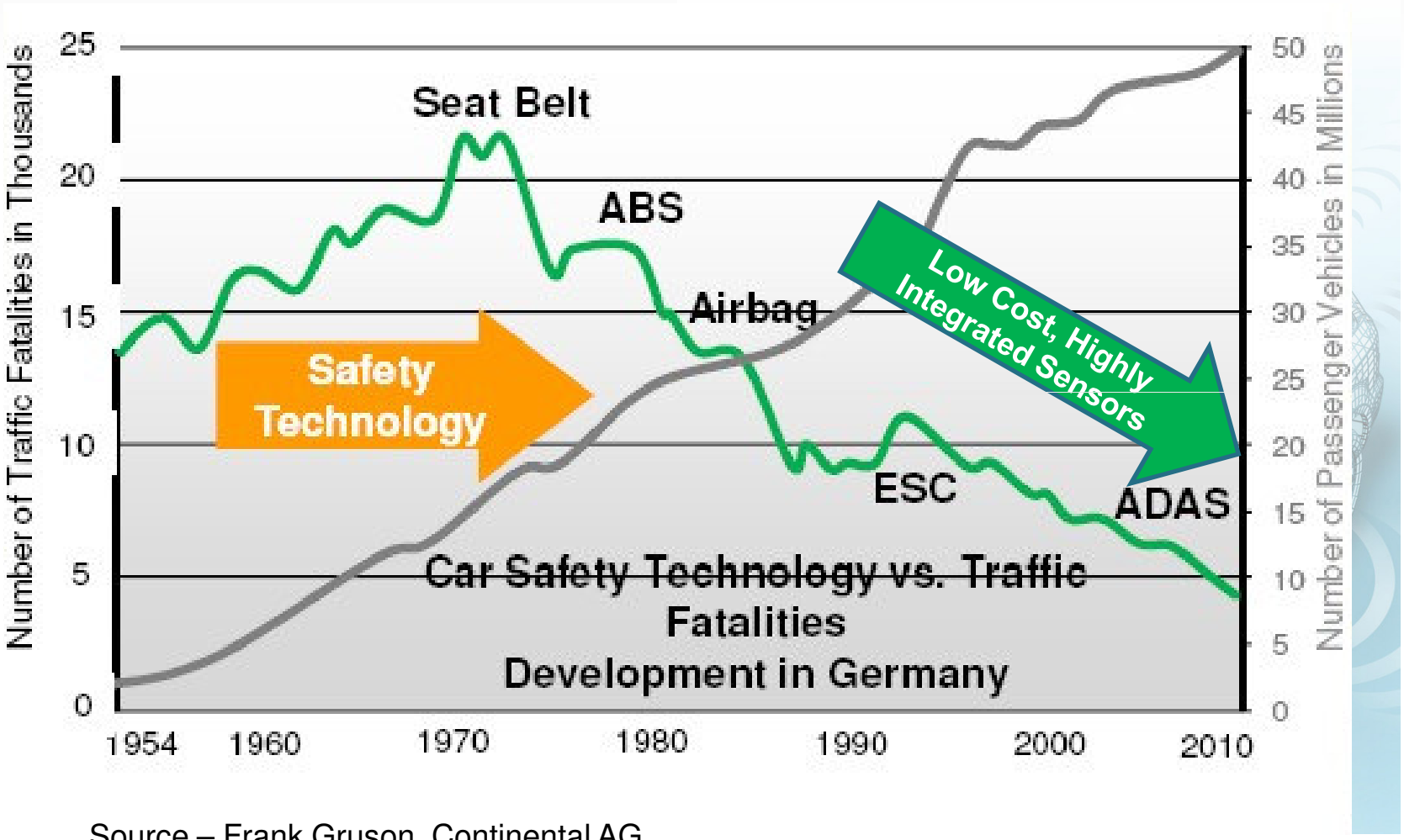
Accident Free Driving is Within Our Sight



Source – Frank Gruson, Continental AG

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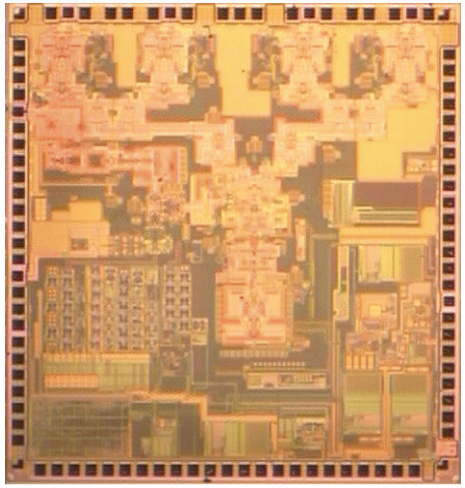
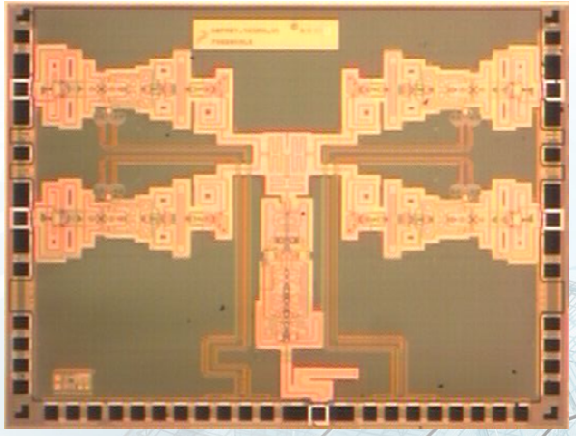
FRDxX1050x 77GHz Radar Transceiver Chipset

The chipset is a bare die radar solution for ADAS applications, industrial safety, security, and robotics

4chTxPLL

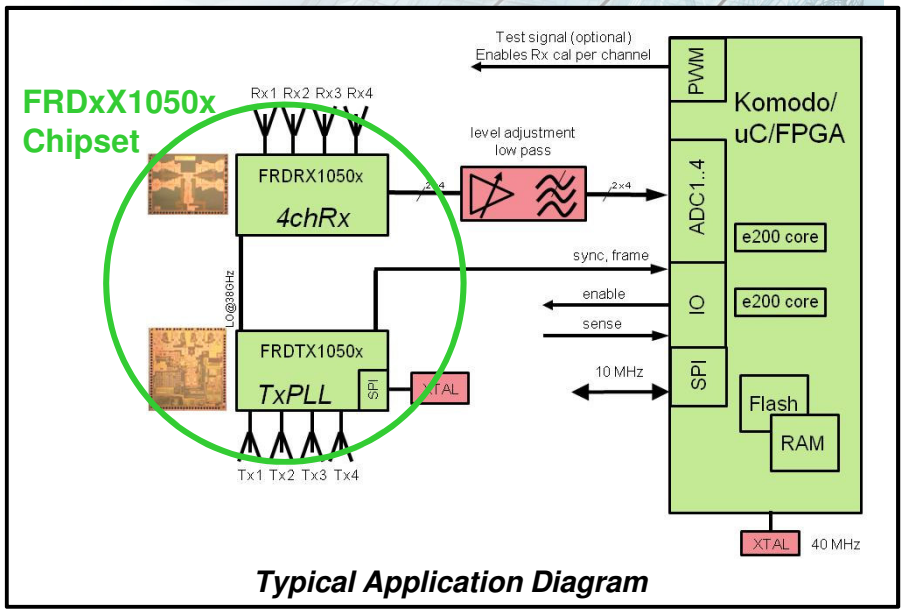


4chRx



Differentiating Points

- Highly integrated 77GHz automotive radar chipset supports up to 4Tx and 16 Rx channel configurations for 2D, 3D, DBF, and SAR automotive radar applications
- Supports slow and fast modulation to 7 MHz / 100 ns
- Fully integrated PLL and chirp generator programmed via SPI along with Tx power level, channel activation, & state machine control
- Designed for integration with a multitude of microprocessors including the Freescale MPC567xK



Typical Application Diagram

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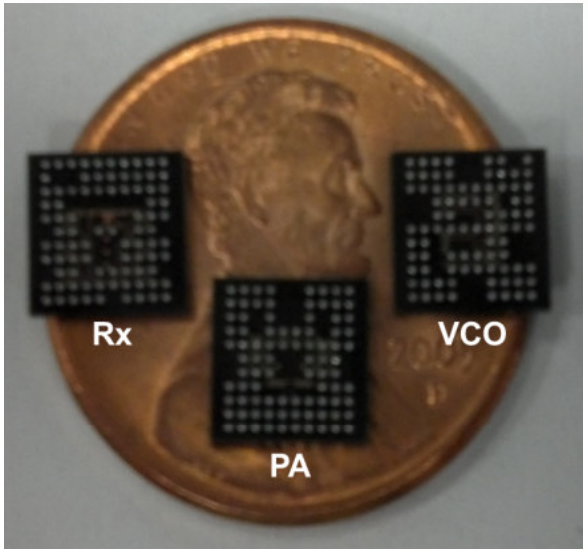
MRD2001 77GHz Packaged Radar Chipset

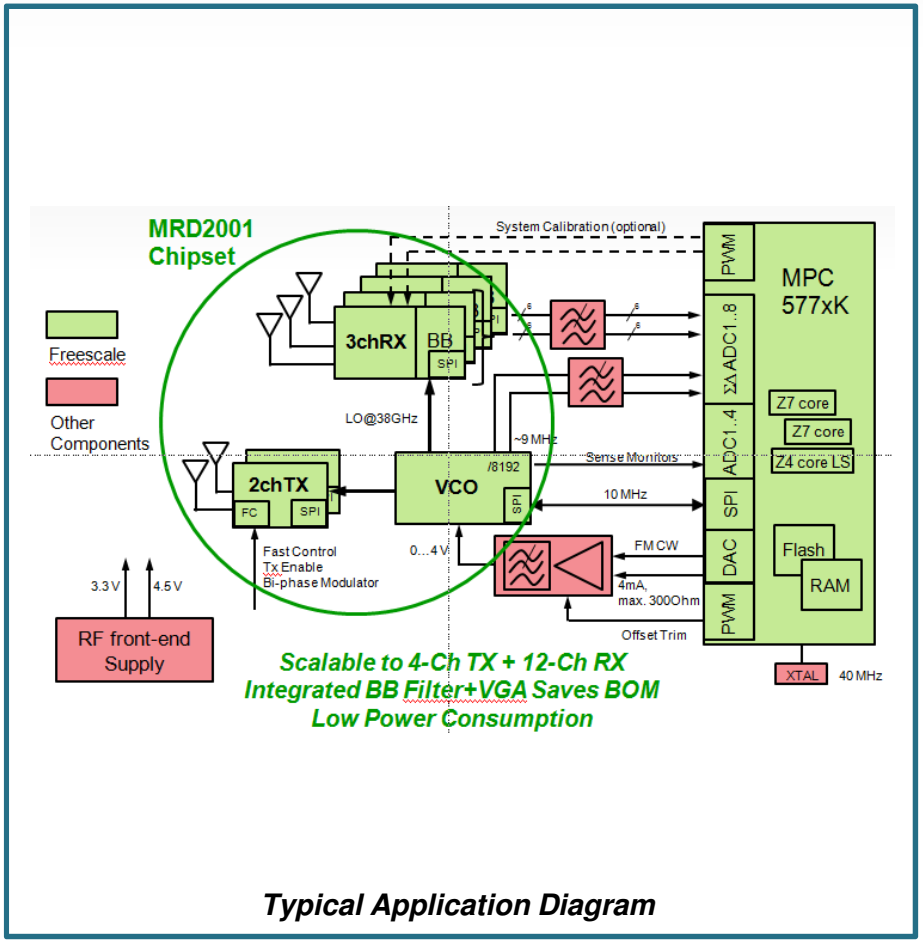
The MRD2001 chipset is a scalable radar solution for high end and low end ADAS applications, industrial safety, security, and robotics



RoHS

Differentiating Points

- Advanced packaging technology with BGA format
- Scalable to 4 TX channels and 12 RX channels
- Activate simultaneous Tx channels for electronic beam steering
- Supports fast modulation to 100 MHz / 100 ns
- Integrated baseband filter and VGA saves system bill-of-materials cost
- Designed for integration with MPC577xK microprocessor



Typical Application Diagram

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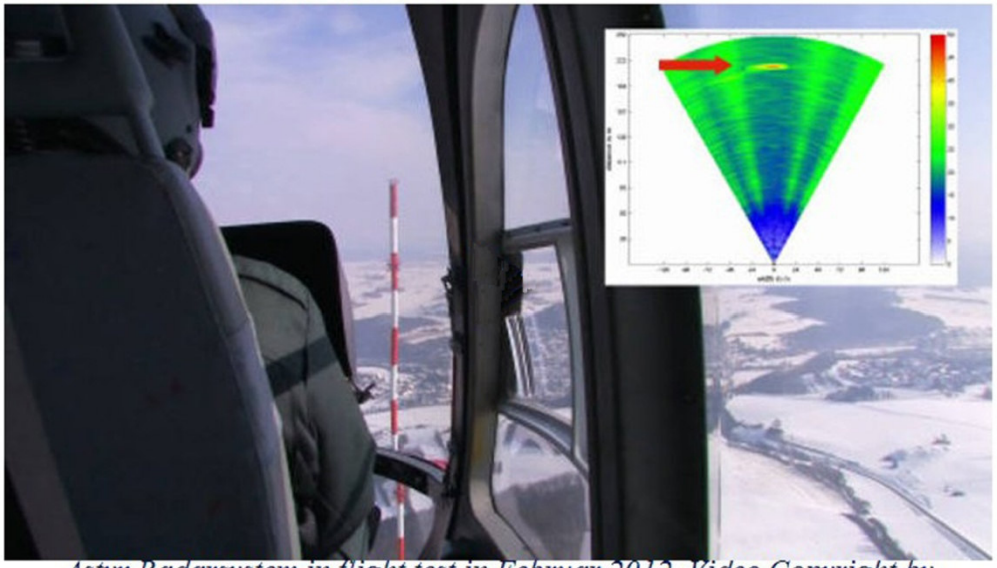
Aerospace/Defense Application Example Using Standard Automotive Radar Technology

Home > Radar - Assistance Systems > Aerospace

Radar Systems for Aerospace Applications



Astyx Radarsystem in flight test in Februar 2012, Video Copyright by Eurocopter Germany 2012

We develop radar solutions for periphery monitoring in aerospace applications based on our 77 GHz automotive sensor technology. These systems support obstacle detection for pilots of helicopters or airplanes in difficult weather conditions in flight and on the ground.

Our digital beamforming technology (DBF) is particularly suited for the robustness requirements in this segment.

Source: ASTYX Web Site

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Eurocopter Researches Low-cost Obstacle Warning

AVIATION INTERNATIONAL NEWS » MAY 2012

by **THIERRY DUBOIS**

May 2, 2012, 5:25 AM

A low-cost obstacle detection system suitable for civilian helicopter use is under study at Eurocopter. Using automotive radar sensors, the company is confident it can help helicopter pilots in the landing and takeoff phases.

The majority of obstacle warning systems for helicopters are expensive and often bulky, heavy and power-greedy, essentially limiting the market to military operators.

To find a technology with a price compatible with civil aviation, Eurocopter scoured the automotive industry. Mission system research engineer Tim Waanders and his teams turned to Astyx, a company specializing in millimeter-wave radar sensors for various automotive applications such as parking assistance. The sensors, which use the 76-GHz frequency, have to be modified to meet Eurocopter's needs. For example, their field of view is limited and has to be extended.

Source: Aerospace International On-Line Web Site

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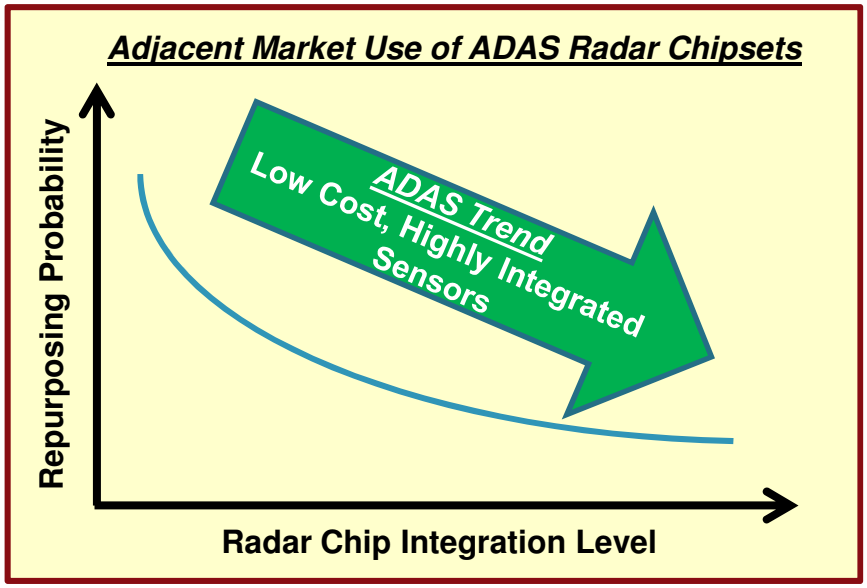
Challenges to Using Commercial Automotive Radar Solutions for Defense Applications



Typical Defense Application Questions

- Can the frequency band be changed?
- Can the frequency band be agile?
- Can the modulation scheme be altered?
- Can the output power be increased for longer range operation?
- What are the range, velocity, and cross section of the targets to be tracked?
- What security features exist in the RF and microprocessor solutions?
- How long will you offer this product in production?

There is no question that automotive radar solutions can serve segments of the defense and aerospace application space, but the repurposing of these solutions becomes more difficult as integration and functionality levels increase

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