URSI Austria Commission Meeting

Institute of Microwave and Photonic Engineering

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Institut für Hochfrequenztechnik

Radar and Wave Propagation

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Optoelectronics and Photonics

Ao. Prof. Dr. Erich Leitgeb

Institute of Microwave & Photonic Engineering

ihf

RFID Technologies

Dr. Helmut Schreiber

Dr. Jasmin Grosinger

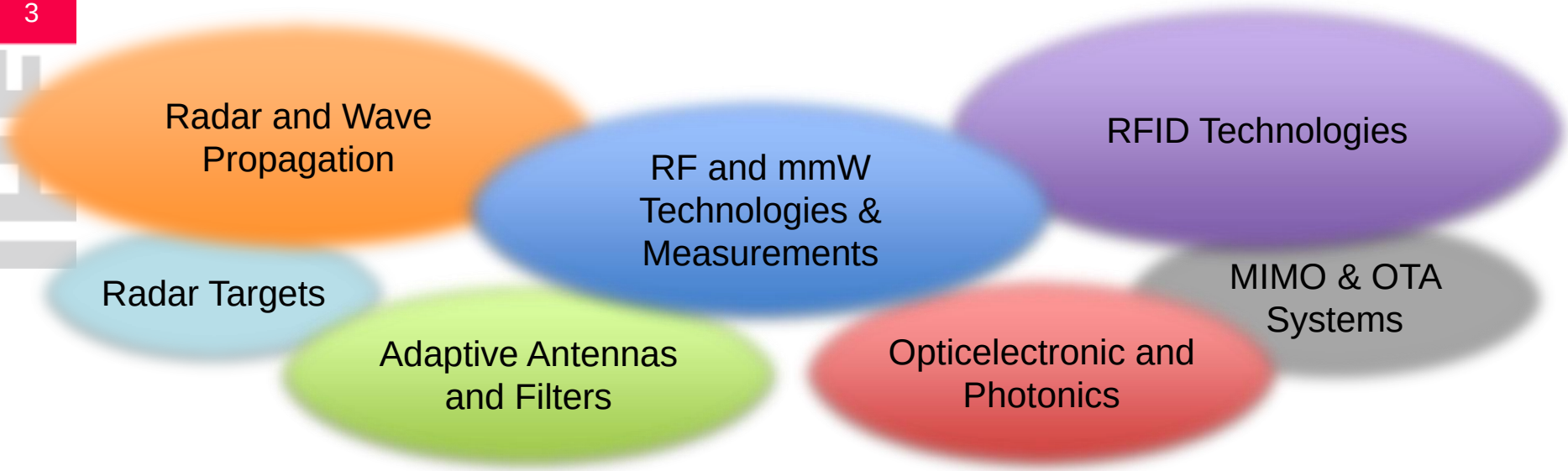
Microwave and mmW Technologies

Dr. Michael Gadringer

Dr. Fabrizio Gentili

Radiofrequency Antennas and Filters

IHF – Research Areas



Research Partners:

Infineon, AVL, NXP, AT&S, Rohde & Schwarz, austro CONTROL, Rosenberger, DWD, JOANNEUM RESEARCH, VIPER RF

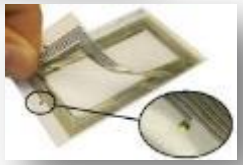
Current Research Projects:

SeCos
- RFID at mmW
- RFID reader & tag for localisation

MARG
- FMCW weather radar
- HW & SW development

GAZELE
- automotive radar stimulator
- real-time & multiple targets

K@Home
- Potassium sensor
- CMOS clock



IHF – Infrastructure

MW and mmW Laboratory

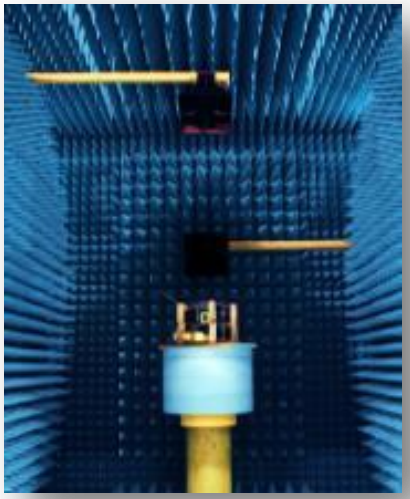
Complex MW measurements 10MHz to 110 GHz
Automated on-wafer measurements (-40degC to 170degC)
80 m^2 clean room

Anechoic Chamber

Emission Measurements
Antenna Patterns
MIMO & OTA measurements

Research Radar

C-Band weather radar
X-Band mono-pulse system



RFID

RFID Reader
Simulink modelling
Localisation

Three Papers at the

2015 IEEE International Symposium on
Antennas and Propagation and
North American Radio Science Meeting
19–24 July 2015 • Vancouver, BC, Canada

The symposium and meeting are co-sponsored by the IEEE Antennas and Propagation Society (AP-S), the all U.S. and Canadian National Committees (USNC/CNC) of the International Union of Radio Science (URSI)

1. **(URSI)FRP-UB.3A.7:**
   A MM-WAVE RFID SYSTEM BASED ON THE EPC-GEN2 PROTOCOL
2. **(URSI) TU-UC.1A.4:**
   A SOLID-STATE C-BAND FMCW SENSOR SYSTEM FOR PRECIPITATION MEASUREMENT
3. **(URSI) MO-UE.1A.4:**
   ESD PROTECTION FOR MOBILE HANDSET ANTENNA APPLICATIONS

A Solid-State C-Band FMCW Sensor System for Precipitation Measurements

Helmut Paulitsch, Graz University of Technology (Austria)
Ferenc Dombai, MET-ENV, Budapest (Hungary)
Jim Mayock, VIPER RF (UK)
Wolfgang Bösch, Graz University of Technology (Austria)

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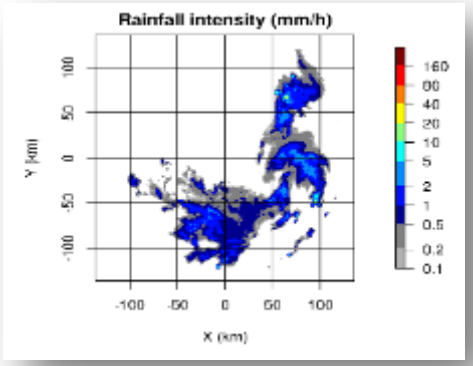
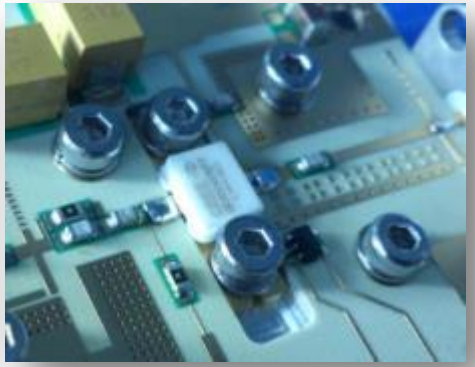
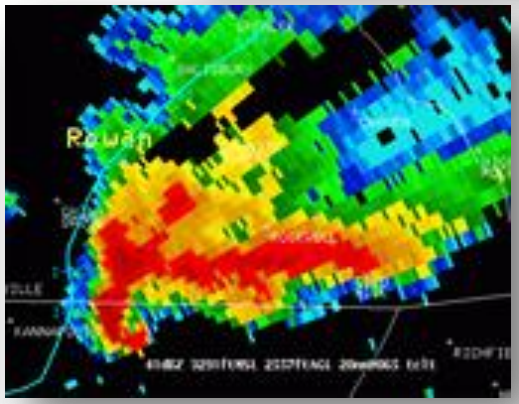
MARG weather radar concept provides

- High range resolution 50m
- Measurement range 30km
- Radar scanning time 30sec
- Highly integrated radar electronic
- Sophisticated FMCW signal processing
- State of the art MW hardware (GaN)
- Low cost implementation







ESD Protection for Mobile Handset Antenna Applications

Thomas Schwingshackl(1,2), Joost Willemen(1)
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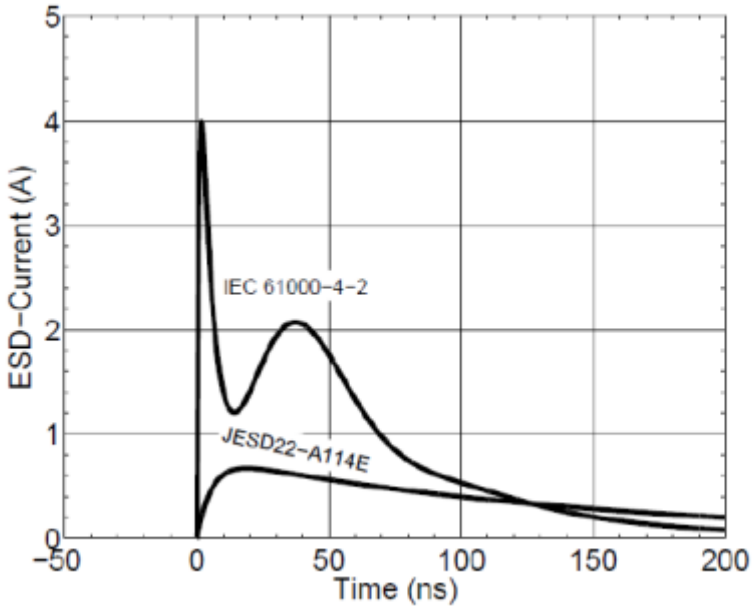
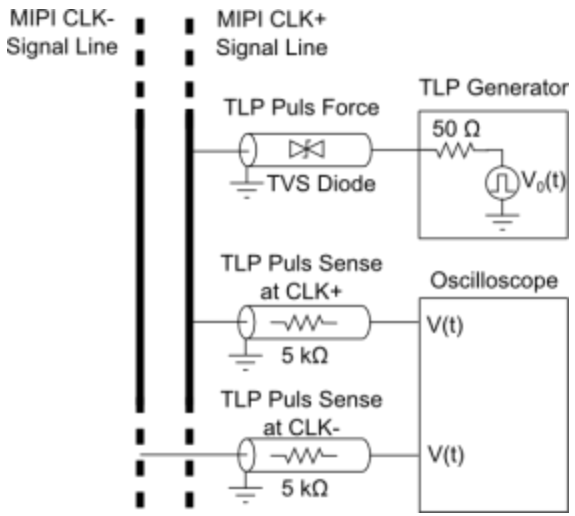
(2) Technical University of Graz, Austria





A mm-Wave RFID System based on the EPC-Gen2 Protocol

Ph. Freidl[1], M. Gadringer[1], U. Mühlmann[2], G. Holweg[3], W. Bösch[1]

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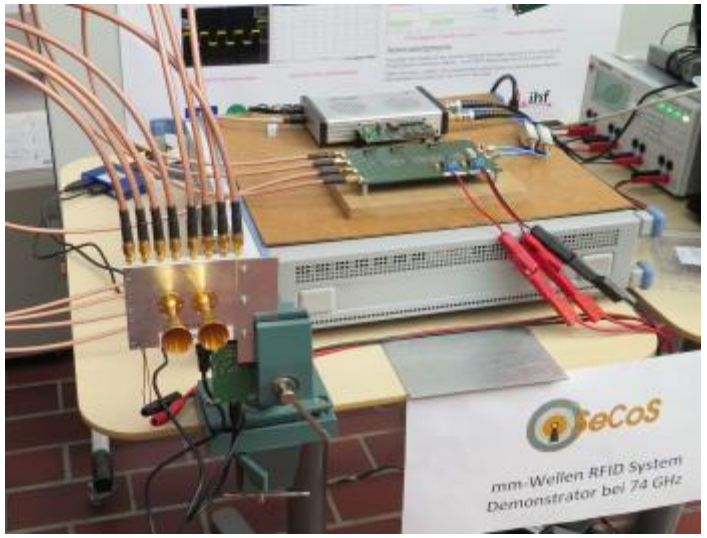
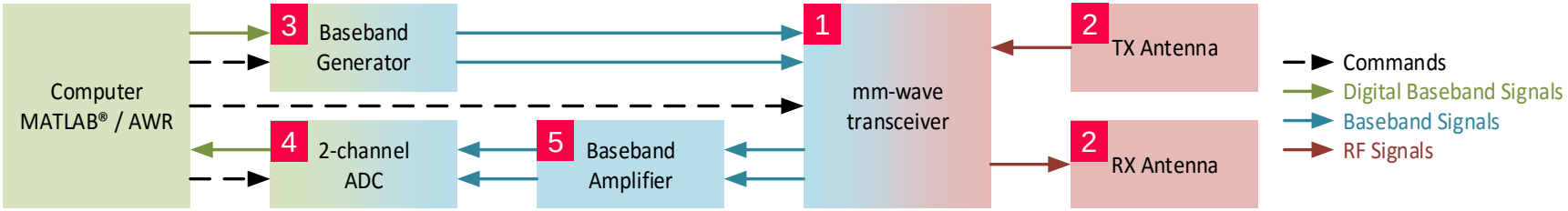


MMID Basestation

1. mm-wave transceiver chipset
2. standard gain horn antennas
3. arbitrary signal generator for IQ signals
4. sampling card for IQ signals
5. 2-channel variable baseband amplifier



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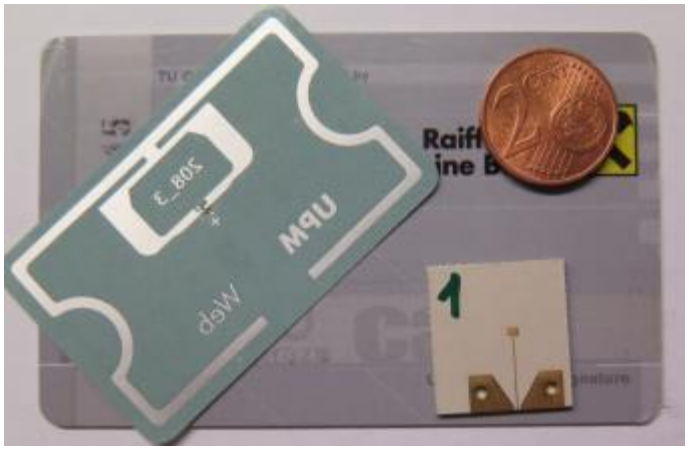

MMID Transponder

1. antenna(-array)
2. matching network
3. mm-wave diode
4. microstrip low-pass filter
5. lumped elements low-pass filter with a bias-tee
6. adapter circuitry between the mm-wave frontend and the digital baseband chip
7. EPC Gen2 digital baseband chip