

# *WP 1 – Antenna Expert Groups*

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## ***WP 1 – Antenna Expert Groups***



*Antenna Expert Groups (AEGs) assure availability of the major antenna fields:*

*AEG1 – Millimetre and Submillimetre Wave (coordinator UR1)*

*AEG2 – Small Antennas and Sensors (coordinator IMST)*

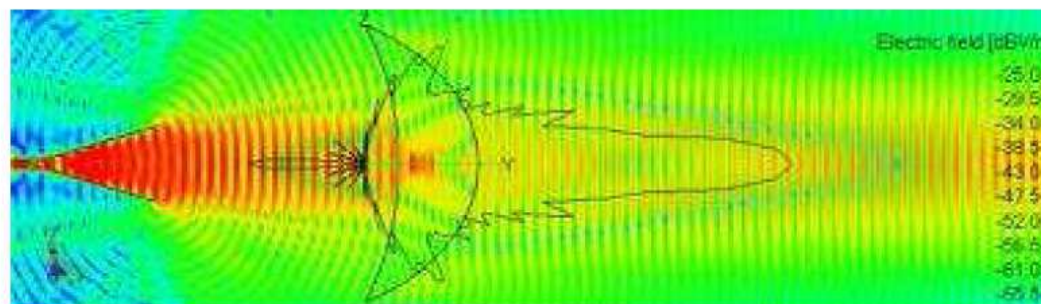
*AEG3 - Wideband Antennas (coordinator KIT)*

*AEG4 – Array Antenna (coordinator UPM)*

*AEG5 – Smart antenna (coordinator UPM)*



### *AEG1 – Millimetre and Submillimetre Wave (coordinator UR1)*

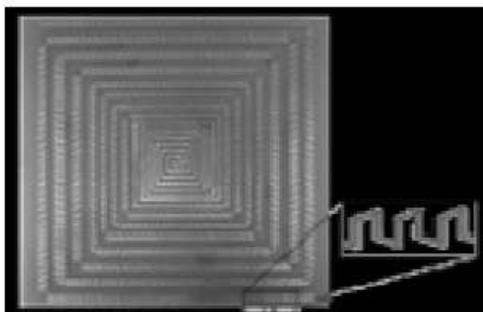


*Fabry-Perot resonator with lens antennas model and testing (CTU)*

### AEG2 – Small Antennas and Sensors (coordinator IMST)



*Tyre pressure control (IMST)*



*Antenna for RFID applications (IMST)*

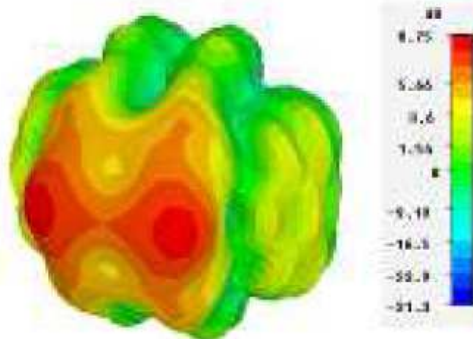


*Folded monopole 2.4 GHz antenna closely spaced over PEC thickness  $d/\lambda \sim 0.01$  (CTU)*

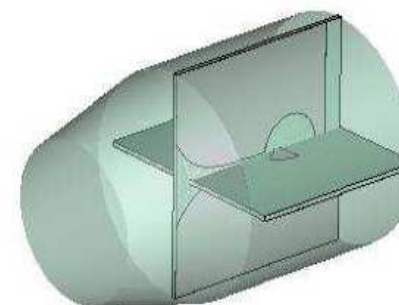
### *AEG3 - Wideband Antennas (coordinator KIT)*



*4-50 GHz double ridge horn  
DHR family from 200 MHz  
(CTU)*



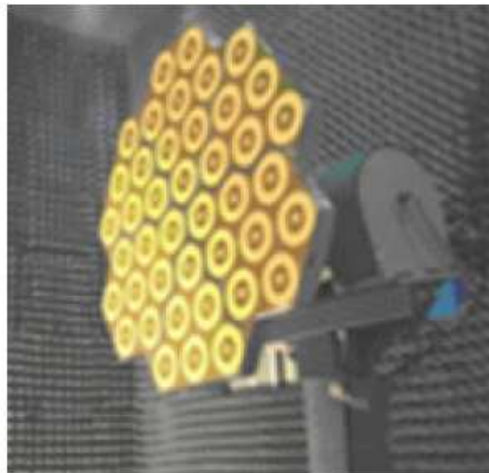
*Calculated radiation patterns  
of TEM Horn without lens 12  
GHz (CTU)*



*Dual polarized, integrated  
antenna  
(KIT)*



### ***AEG4 – Array Antenna (coordinator UPM)***



***GALILEO antenna  
(Courtesy of EADS-  
CASA, Spain).***



***Multibeam base station  
antenna for GSM-  
UMTS.***

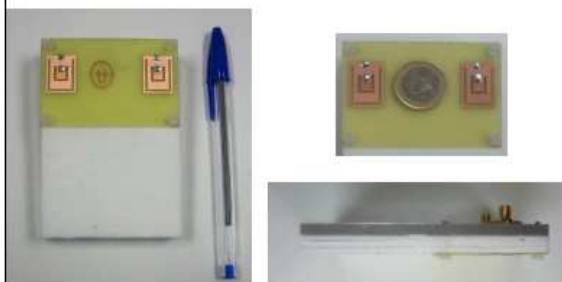


***X-band transmit-array.***

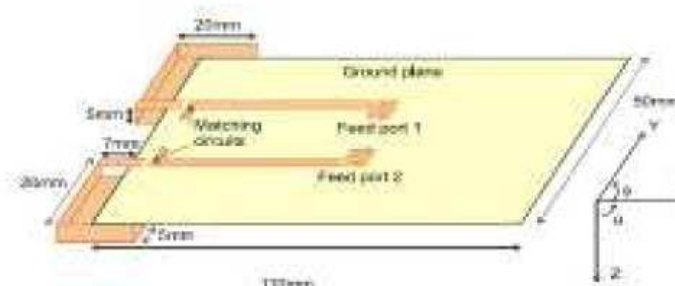
## *AEG5 – Smart antenna (coordinator UPM)*



*MIMO Testbed (UPM)*



*UPM new MIMO antennas*



*DVB-H MIMO antenna  
configuration based on capacitive  
coupling elements*



**Claudia Casali**

University of Pisa

TNO

Host advisor: Prof. Giampiero Gerini

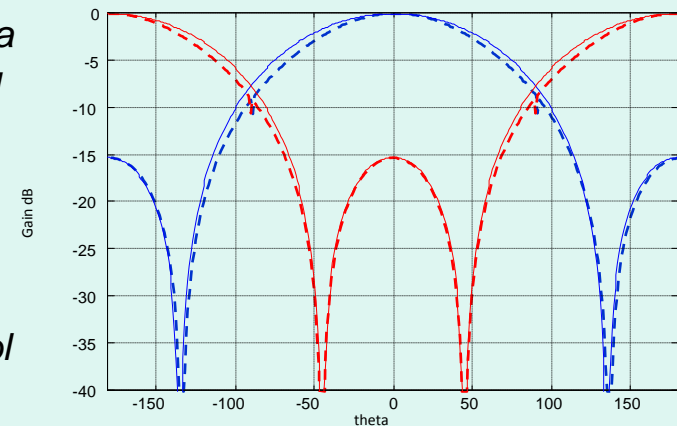
## Cross-polarization reduction techniques in phased arrays

· Study and evaluate techniques to reduce the field cross-polarization components for an antenna configuration consisting of two orthogonal dipoles set along y-axis and x-axis. In order to reduce the cross-pol associated with the dipole along x (x-dipole), a weight  $q(\theta, \varphi)$  can be multiplied to the amplitude of the dipole along y. This weight  $q(\theta, \varphi)$  is chosen so that the following equation is satisfied:

$$y \times q(q, f) Co = -Cross$$

## Antenna CAD tools evaluation

· Evaluate the computation time performances of the ADF CAD tool when applied to the analysis of large array antennas (consisting of connected array of dipoles larger than 16x16 elements with an inter element distance of  $\lambda/2$ ).



**Arnab Bhattacharya, PhD student**  
 Université catholique de Louvain, Belgium  
 Advisor: Prof. Christophe Craeye

Laboratorio Elettromagnetismo Applicato,  
 University of Siena, : prof. Stefano Maci

## Realizing a cylindrical cloak in free space

**Topic:** Transformation Optics based cylindrical cloak in free space from the anisotropic volumetric cloak in the virtual space

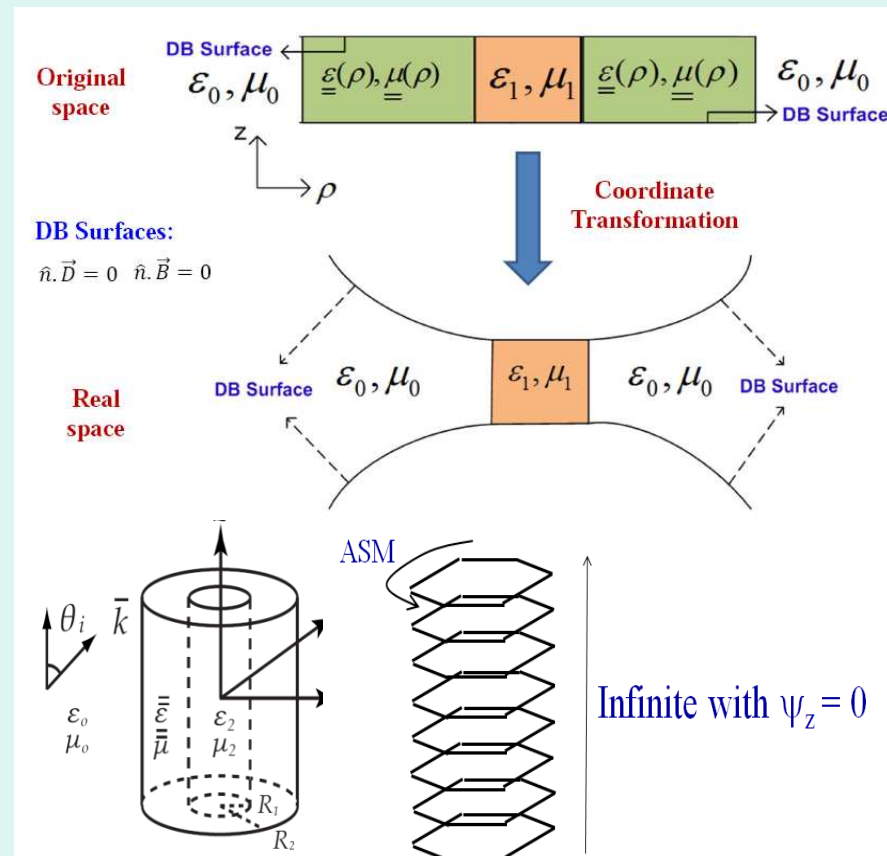
**Objective:** to realize a cloak for dual polarization by using DB surfaces to fulfill the boundary conditions

**Application:** Antenna decoupling

**Numerical analysis:** Full wave simulation of the free space cloak using a software based on Method of Moments developed at UCL

**Analytical formulation** of the anisotropic volumetric cloak based on a Differential Equation formulation

**Measurements:** construction of the cloak and experimental validation through field scattered measurements (to be done in



**Marko Bosiljevac**

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Computing, University of Zagreb  
Advisor: Prof. Zvonimir Sipus

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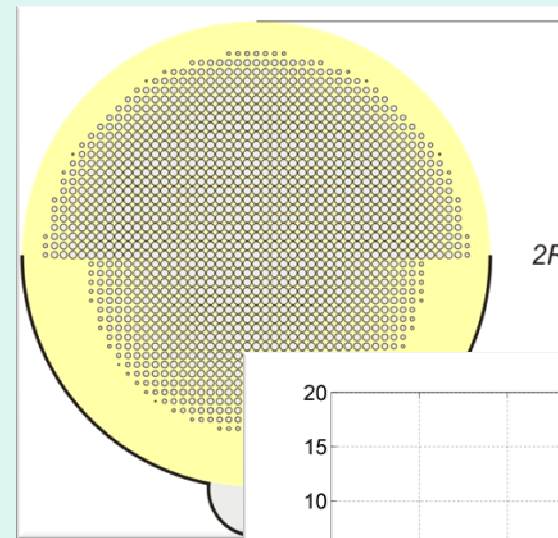
### Planar Luneburg lens based on Metasurfaces

**Research summary:** Analysis, design and development of a highly directive Luneburg-lens based antenna realized using the concept of surface impedance modulation inside a parallel-plate structure.

**Analysis method:** MoM

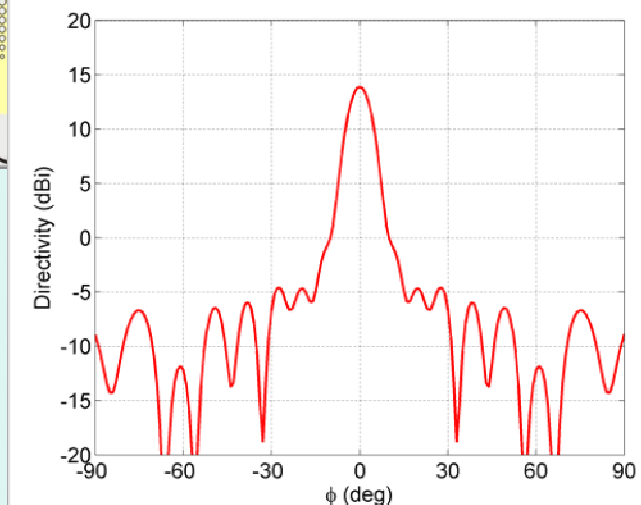
**Realization:** a prototype has been fabricated and tested

**Measurements:** experimental validation will be done in April, in a successive visit of Marko in Siena

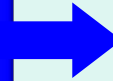


Top view of the  
antenna

Simulated  
radiation pattern  
in the H-plane



Jan Kracek, PhD student  
Czech Technical University  
Advisor: Prof. Milos Mazanek



Laboratory of Elettromagnetic Applications  
University of Siena,  
Host advisor: Prof. Stefano Maci

### Wireless power supply through surface waves

The principles suitable for wireless power supply of Notebook by surface waves has been investigated.

Operational Frequency: 2.5 Ghz

Coupling method: Surface waves on periodic grating

Analysis Method: Mode Matching

Coupling System: loaded FSS on PC case

Prototype: foreseen in a next visit

Measurements: foreseen in a next visit



### ***Conclusion***

- ***Much antenna expertise is available in CARE***
- ***Secondments are available in most antenna areas***