Antennas and Propagation Research activities

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Research Lines

- **Numerical Electromagnetics**
  - Hybrid techniques
    - Collaboration with Agilent Technologies
- **Active flexible/stretchable antennas**
  - focus on textile/wearable antenna systems
    - FP7 ARMOURS project
- **Body-centric communication**
  - MIMO techniques in a body-centric context
- **Electromagnetic Compatibility**
  - including signal/power integrity and RF exposure
Robust antenna design on standard materials readily available in application

- Fleece
- Aramid
- Protective foam
- Dashboard foams
- Implantable antenna
Active textile antennas

Textile multi-antenna system integrated in rescue workers' clothing – Hendrik Rogier
Information Technology Department – Electromagnetics Group

... for communication
Connecting bus
Electronic box
Outer garment
Textile Antenna
GPS
Inner garment
Bluetooth
Wearable battery

... for localisation

Bending radius 7.5cm

... for sensing

Project FP6-2004-IST-4-026987
FP7-GALILEO

Public Regulated Service

imec

iminds
Integration of energy harvesters

- Autonomous textile antenna modules
  - 900 MHz ISM band antennas

Direct integration of solar cells on antenna without affecting performance
Substrate Integrated waveguide technology

- Technology enables miniaturization

Four-element textile antenna array

Dualband WiFi textile antenna
Available infrastructure

- **Antenna Measurement Chamber**
  - N5242A PNA-X 4-port Network Analyzer
  - Fully automatic positioning system for 2D antenna patterns
Available infrastructure

Software defined radio testbeds

- Signalion HaLo 420 4x4 MIMO testbed
  - 2.45 GHz ISM and 5-6 GHz band
- HaLo 430 4x4 phase-coherent MIMO testbed
  - 2.45 GHz ISM band
Available infrastructure

Software defined radio testbeds

- National Instruments SDR testbed
  - Currently: 12 ETTUS N210 modules
    - SISO/MIMO communication
  - Upcoming: 20 ETTUS/RIO modules with programmable FPGA
    - Cooperative communication
Available infrastructure

- **UWB testbed (25 modules)**
  - Localization and communication