

A UWB Interference Platform

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MICS UWB Network

EPFL / HEIG-VD / ETHZ / Eurecom

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Outline

1 Introduction and Motivation

- Who are we? What are our motivation?

2 A UWB Interference Platform

- What do we want to do?

MICS UWB Network: Who Are We?

EPFL

- Jean-Yves Le Boudec
- Anja Skrivervik
- Catherine Dehollain
- Jean-Dominique Decotignie (CSEM)
- Gian Mario Maggio (STMicroelectronics)
- Ruben Merz
- Manuel Flury

HEIG-VD

- Stephan Robert
- Jerome Vernez

ETHZ

- Armin Wittneben
- Frank Althaus
- Christoph Steiner

Eurecom

- Raymond Knopp

UWB From a Wireless Networking Point of View

Very wide bandwidth

- Trade power for bandwidth: very low emitted power
- Lots of multipath
 - Random signature for concurrent transmitters
 - Excellent robustness against fading
- Interference not an issue anymore: much simpler MAC design
- Hard to take advantage of the multipath
 - Have a proper receiver
 - Estimate the channel
- Channel synchronization and acquisition

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A UWB Interference Platform

- Have a platform to test new ideas and algorithm
in the presence of interference
 - Synchronization with interference (v1)
 - Localization in harsh environment
 - Aggregation of several sources
 - Narrowband interference
- Wideband and narrowband interference
- It is not a hardware project (i.e. not small)
- “Software” radio:
new ideas and algorithms should be easy to implement

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Requirements and Challenges of a UWB Interference Platform

Very wide bandwidth

- RF components must have a wide flat frequency response
 - Antennas, filters, amplifiers, up/down-conversion
 - Platform v1: 500 MHz in the 4 to 5 GHz band
- Many pulse/signal generators
- Coherent receiver
 - Fast sampling at several GS/s or analog components?
- Easily reconfigurable receiver

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Status and Roadmap of the Project

- Iterative process: have something ready every year
- 3 months evaluation / 9 months implementation
- December 2005: start to implement
- September 2006: v1 ready
- October 2006: start evaluation
- ...

For Further Information

- You can contact me: `ruben.merz@epfl.ch`
- Have a look at
`http://icawww1.epfl.ch/uwb/mics`