Smart basestation antenna for next generation mobile communication
Airrays is providing a ground breaking technology for cellular base station antennas that increases capacity by a factor of 10 and more keeping cost at same level.
Problem:
Wireless transmission is growing dramatically!

Solution:
Increase capacity using multiple beams!

- Transmission is doubling every 18 months
- Revenue is remaining flat

- Focus of energy: Energy 1/10
- Multiple beams: Capacity x 10
Airrays Approach/Solution

1. **Power by scaling**

Instead of one big radio-antenna unit, take 100 small ones.

- 10 W power
- $100 \times 0.1 \text{ W power} = 10 \text{ W}$

2. **Beamforming by synchronization**

Synchronize 100 radio-antenna units to form multiple beams.

- Array of radio-antenna units
- Multiple beams

3. **Modularization**

To facilitate synchronization, create modules.

- Modules
Airrays develops

**Key IP**
- SW
- HW
- Algorithm

IP implemented on FPGA

**Radio Module**
- Standard components
- Special interfaces

**Development**

Airrays develops

**Antennas**

**Products**

Airrays integrates modules to form complete **Radio Units**

These are active antenna systems with interface towards baseband for different use cases.

- **8 x 8 x 2 Radio Unit**
  - Outdoor (Panel)
- **16 x 4 x 2 Radio Unit**
  - Outdoor (classic)
- **4 x 4 x 2 Radio Unit**
  - Indoor halls
- **Indoor Radio Unit**
  - 16 elements ceiling mounted

**Customer**

- Antenna Manufacturer
  - Amphenol
  - Commscope
  - Kathrein
- Established OEM's
  - Alcatel-Lucent
  - Samsung
  - Ericsson
  - HUAWEI
  - Cisco
  - NEC
  - Altiostar
- New Entrants
  - Corning
  - Airspan
- Small Cell
  - Airvina

**Differentiators**

**Capacity Gain**
- Up to factor 10
- Key component for 5G

**Scalable**
- Different Size and Shape
- Distribute Signal processing

**Easy to use**
- Fully electronic adjustments

**Competitors**

- Chinese infrastructure provider
  - Huawei
  - ZTE

Airrays GmbH - Semicon/Innovation village

06. October 2015
Base Station Market

- Market 2020
  - 2 Million Macro Basestation
  - 10 Million Small Cell Basestation
- Beginning 2018 capacity becomes an issue leading to replacement of 4G antennas.
- Beginning 2020, 5G standard will be rolled out replacing older technology.
- Airrays technology can be used in current 4G system and will become a lead provider for 5G (Massive MIMO)
- Multi Billion $ Market
Development plan & Roadmap
Schrittweiser Einstieg in den Markt

Looking for partnerships

- Baseband solution (will become integrated into antenna)
- Cost reduction (via ASIC development)

**Turnover**
- 200 k €
- 0.5 Mill €

**Investment**
- Seed: 1.5 Million
- Series A: 4.5 Million
- Series B: dependent on growth and ASIC
- Profitable

**Development**
- Start Prototyp: 1.012.15
- Prototype available: 1.12. 16
- First generation product available: 1.12. 17
- Second generation product available: 1.12. 18
- High volume product ASIC for cost reduction: 2019
- 2020

**Timeline**
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020

**Finances**
- 1.5 Million
- 4.5 Million
- Profitable
- 50 Mill €
- 125 Mill €

Airrays Gmbh - Semicon/Innovationvillage
06. October 2015
Team

Excellent network in wireless and in semiconductor industry

Growth plan to develop product with highly qualified engineers
- 15 in 2016
- 30 in 2017

Team members:
- Dr. Peter Meyer, Managing Director
- Dr. Volker Aue, CTO
- Dr. Wolfram Drescher, Advisor
- Prof. Gerhard Fettweis, Advisor

Two successful exits with Technology-Start-Ups for wireless transmission systems

Strong relationship to Vodafone-Chair of TU-Dresden

3 PhD Graduates
4 years experience in advanced network-architectures

Airrays Gmbh - Semicon/Innovationvillage
06. October 2015
Thank you
Airrays GmbH, Kramergasse 4, 01067 Dresden
info@airrays.com