

TRANSMITARRAY ANTENNAS

FIXED BEAM, SWITCHED BEAM AND ELECTRONICALLY RECONFIGURABLE HIGH-GAIN TRANSMITARRAY ANTENNAS FOR FUTURE SMART WIRELESS SYSTEMS

+ WHAT IS A TRANSMITARRAY ANTENNA?

Transmitarrays embody cutting edge technology. They typically comprise a focal source that illuminates a planar or conformal array of unit-cells. P-i-n diodes, RF-MEMS switches, varactors and other components can be integrated on the unit-cell to electronically control the transmission phase and hence reconfigure the antenna beam in real time.

Core characteristics of transmitarray antenna mean they:

- Are easy to integrate and interface
- Can be implemented in standard PCB technology
- Exhibit a small form factor
- Are high-gain
- Are wide-band
- Are easy to customize
- Are of robust design
- Offer smart skin systems

+ APPLICATIONS

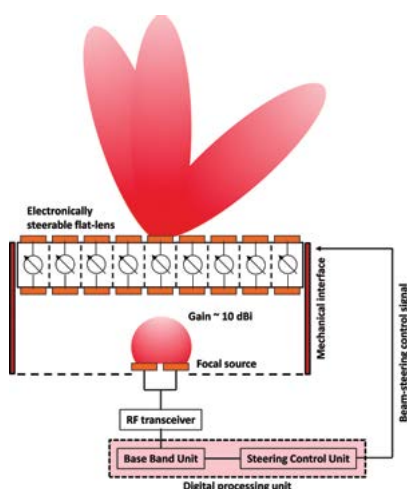
Possible transmitarray applications:

- 5th generation networks (5G)
- Ultra-high-speed wireless communications
- mmWave small cells
- mmWave backhauling and fronthauling
- Fiber optic network replacement
- WiGig
- SATCOM earth stations and terminals
- Short- and long-range radars
- Automotive systems
- Imaging systems
- Security and surveillance
- Intelligent transport systems

+ WHAT'S NEW?

Transmitarrays are an excellent solution in the development of new generation, smart, high-performance telecommunication, radar and imaging systems.

Transmitarrays are high-gain antenna systems implementing multilayer printed circuit technology. They enable cost-effective, robust, reliable, and ultra-competitive solutions for high volume applications in the 10 – 300 GHz frequency range.



The concept of spatial feeding makes both transmitarrays and reflectarrays extremely attractive compared with conventional phased arrays, which suffer from major loss of their bulky beamforming network. A unique advantage of transmitarrays over reflector antennas and reflectarrays is that they can be integrated into various platforms (buildings, vehicles, aircraft, UAV, high-speed trains, public transportation systems, etc.) since they are not subject to any feed blockage effect. This enables them to provide smart skin systems. Transmitarrays are also suitable for high-power applications.

+ WHAT'S NEXT?

Transmitarray antennas based on multi-faceted architecture and reduced focal distance are now being developed, while new unit-cell tunability technology and hybrid beamforming solutions are being researched.

Further advances will involve higher frequencies to exploit wider bandwidth and greater technological integration capability.

Leti is cooperating closely with manufacturers to design the first mass-market systems at mmWave frequencies and to develop specifications for future architectures.

KEY FACTS:

- IEEE France Section Young Scientist Award at ANTEM 2012
- Best Paper Award at JMN (Journées Nationale des Microondes) 2015
- 5 patents
- More than 60 papers in international journals and at conferences
- Industrial (Radiall) and institutional (IETR - Univ. Rennes I, CNES and DGA) cooperation agreements



INTERESTED IN THIS TECHNOLOGY?

Contact:

Martin Gallezot

martin.gallezot@cea.fr

+33 438 785 105

Leti, technology research institute

Commissariat à l'énergie atomique et aux énergies alternatives

Minatéc Campus | 17 rue des Martyrs | 38054 Grenoble Cedex 9 | France

www.leti.fr

