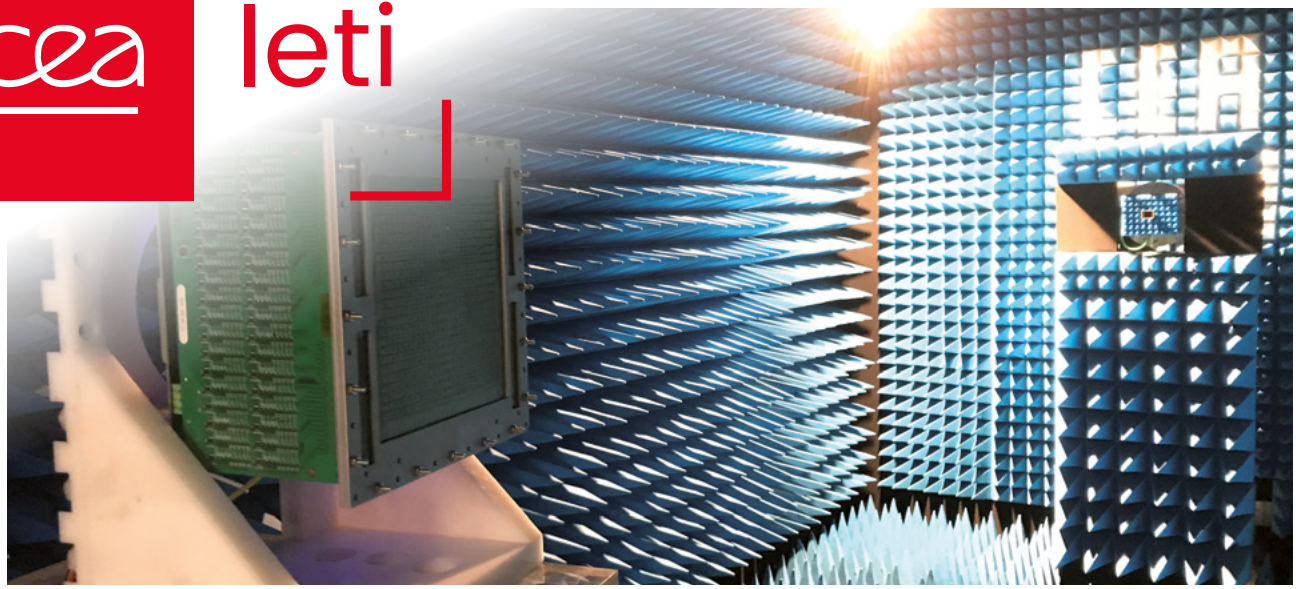
cea leti



Transmitarray Antennas

PATENTS 15 PATENTS

Fixed, switched-beam and electronically reconfigurable high-gain transmitarray antennas for wireless systems

What is a transmitarray antenna?

Transmitarray antennas implement cutting-edge technology and typically include a focal source that illuminates a planar or conformable array of unit cells. P-i-n diodes, RF-MEMS switches or varactors can be integrated with the unit cells in order to electronically control the array phase distribution and thereby provide real-time reconfiguration for the antenna beam.

Fundamental features of a transmitarray antenna:

- Easy to integrate and interface
- Based on standard printed circuit board technology (PCB)
- Planar form factor
- High-gain
- Wideband
- Easy to customize
- Robust design
- Low consumption for reconfigurable beams

Applications

Our transmitarray antennas offer support for a variety of applications and markets, including:

- 5th& 6th generation networks (5G & 6G)
- Ultra-high-speed wireless communications
- mmWave small cells
- mmWave backhauling & fronthauling
- Fiber optic network replacement
- WiGig
- SATCOM earth stations and terminals
- Short and long range radars
- Automotive systems
- Security and surveillance
- Intelligent transport systems

What's new?

Transmitarray antennas represent an excellent solution to develop next generation smart and high-performance telecommunication and radar systems.

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

The spatial feeding technique of transmitarrays makes them extremely attractive when compared to traditional phased arrays, which suffer from major insertion loss for their beamforming network. Transmitarrays also possess a unique advantage over reflector antennas and reflect arrays: they can be integrated into various platforms (buildings, vehicles, aircrafts, UAVs, high-speed trains, public transportation systems, etc.), because they do not suffer from the effects of feed blockage. As a result, they enable the development of planar systems and are also suitable for high-power applications.

What to expect in the future?

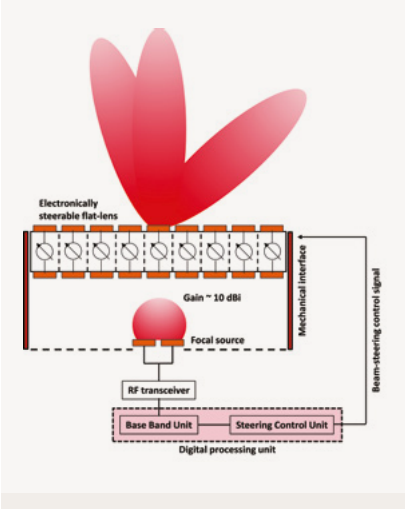
We are currently developing transmitarray antennas with multi-source, surface curved lens to ensure better control of radiation patterns. New technological solutions are also being pursued for unit cell tunability and hybrid beam-forming.

Developments are being made at higher frequencies to exploit wider bandwidths and improve technological integration capabilities for multi-gigabit wireless systems.

CEA-Leti is working in close collaboration with industrial companies to design reconfigurable beam-steering transmitarrays at the millimeter wave level for mobile connectivity.

Key facts

- 100+ papers in international journals and conferences
- Collaborations with industrial (Radiall, Thales) and institutional (Univ. Rennes I, CNES, and DGA) partners
- IEEE France Section Young Scientist Award at ANTEM (International Symposium on Antenna Technology and Applied Electromagnetics) 2012
- Best Paper Award at JNM (Journées Nationales des Microondes) 2015
- Best Antenna Design and Applications Paper Award at EuCAP (European Conference on Antennas and Propagation) 2019



Interested in this technology?

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