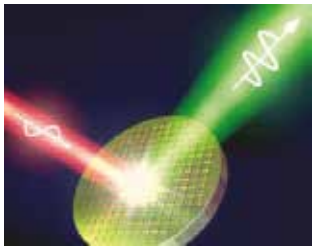
FREESPACE
ELECTROMAGNETIC TECHNOLOGIES

METAMATERIALS
for advanced applications

METAMATERIALS
are made from assemblies of multiple elements fashioned from **composite materials** such as metals or plastics. The materials are usually arranged in **repeating patterns**, at scales that are smaller than the wavelengths of the phenomena they influence.

METASURFACES represent the **2D version of metamaterials**. They have been applied to large number of scenarios.



Free Space has developed a prominent background on this subject and is able to propose industrial solutions for a large variety of applications, as for instance:

METASURFACES

- Metasurfaces and frequency selective surfaces (**FSS**)
- Ultrathin e.m. **wave absorbers** (narrowband or wideband)
- Artificial Impedance Surfaces (**AIS**) and **Bandgap surfaces**
- Tunable **AIS**
- Wide Angle Impedance Matching layers (**WAIM**)

ANTENNAS AND SENSORS

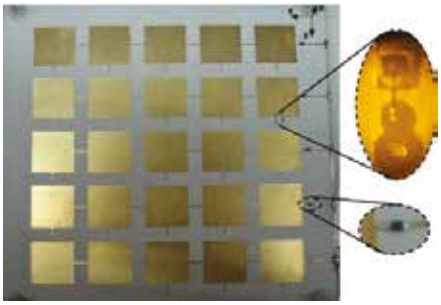
- **Reflectarrays**
- Low-profile **antennas**
- Low RCS **antennas**
- **RFID** sensors
- **Magnetic Resonance** coils
- **Biomedical** RF devices

Free space can provide a **complete electromagnetic characterization of materials and metamaterials** through **novel extraction algorithms from DC to K band.**

ARTIFICIAL IMPEDANCE SURFACES AND BANDGAP SURFACES

■ High Impedance surfaces

TUNABLE AIS



■ AIS loaded withvaractors

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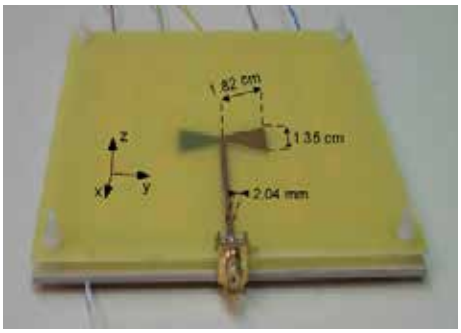
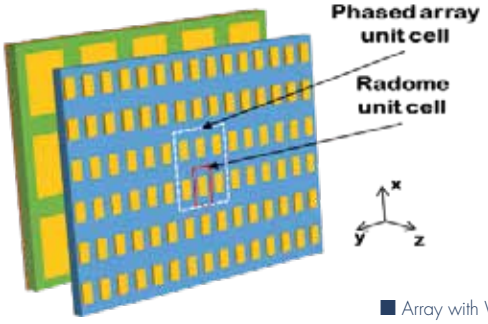
LOW-PROFILE ANTENNAS



■ Dipole backed by a tunable AIS

WIDE ANGLE IMPEDANCE MATCHING LAYERS (WAIM)

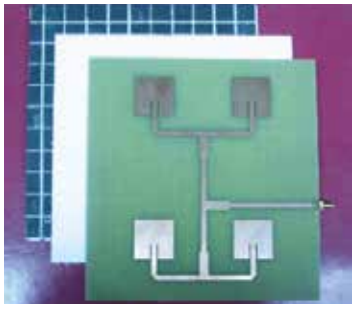


■ Array with WAIM superstrate

REFLECTARRAYS

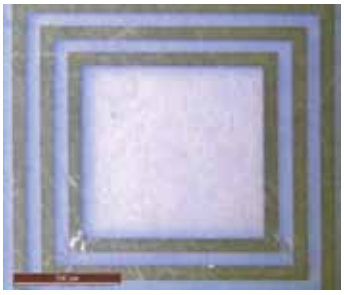
■ Three-band reflectarray antenna

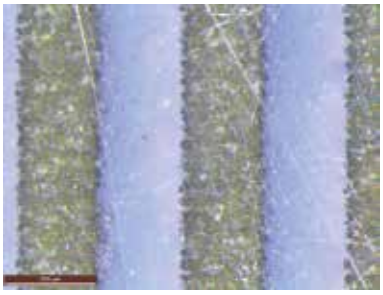
LOW RCS ANTENNAS



■ Array antenna backed by EM absorber

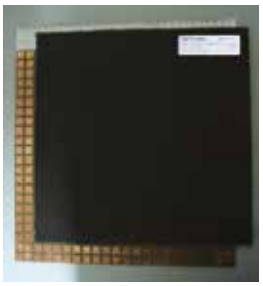
RFID SENSORS





■ Inkjet printed chipless humidity sensor

EM WAVE STRUCTURAL ABSORBERS



■ EM absorbers with lossy or metallic FSS

WIDEBAND POLARIZERS

■ Genetically optimized metasurface for wideband polarization conversion

WE PROVIDE HIGH LEVEL SUPPORT FOR **INTEGRATING METAMATERIALS** IN CONVENTIONAL ELECTROMAGNETIC SYSTEMS.

Contact us for exploring unveiled possibility to improve your technology