# 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:
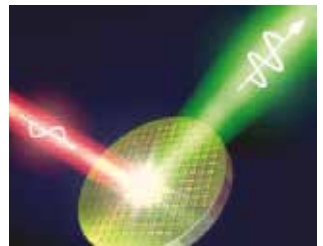
METASURFACES	ANTENNAS AND SENSORS
Metasurfaces and frequency selective surfaces (**FSS**)	**Reflectarrays**
Ultrathin e.m. **wave absorbers** (narrowband or wideband)	Low-profile **antennas**
Artificial Impedance Surfaces (**AIS**) and **Bandgap surfaces**	Low RCS **antennas**
Tunable **AIS**	**RFID** sensors
~~Wide Angle Impedance Matching layers (**WAIM**)~~ *Wireless Power Transfer (WPT)*	**Magnetic Resonance** coils
	Biomedical RF devices

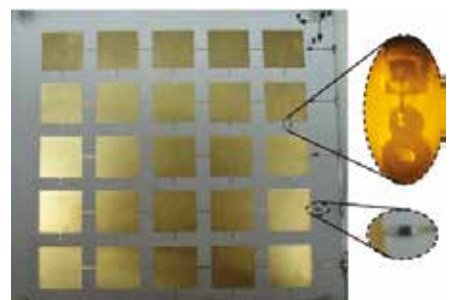Free space can provide a **complete electromagnetic characterization of materials and metamaterials** through **novel extraction algorithms from DC to K band.**

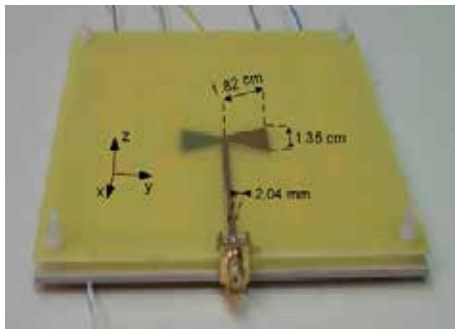## ARTIFICIAL IMPEDANCE SURFACES AND BANDGAP SURFACES

■ High Impedance surfaces

TUNABLE AIS

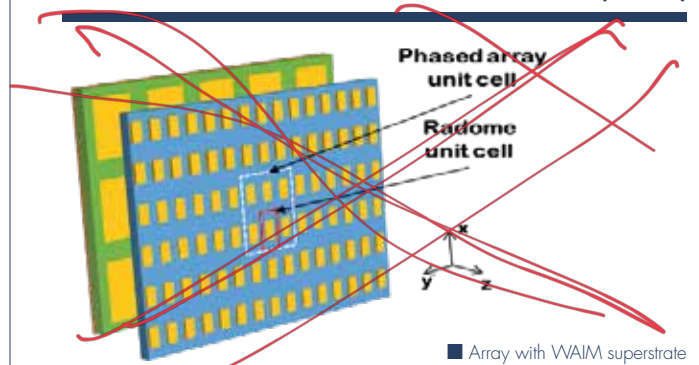■ AIS loaded withvaractors

LOW-PROFILE ANTENNAS

■ Dipole backed by a tunable AIS

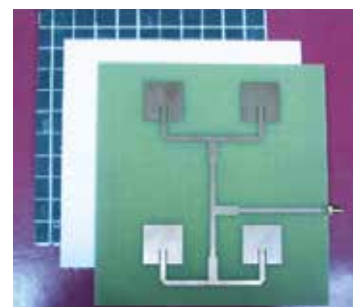## WIDE ANGLE IMPEDANCE MATCHING LAYERS (WAIM)

Phased array unit cell

Radome unit cell

■ Array with WAIM superstrate

REFLECTARRAYS

■ Three-band reflectarray antenna
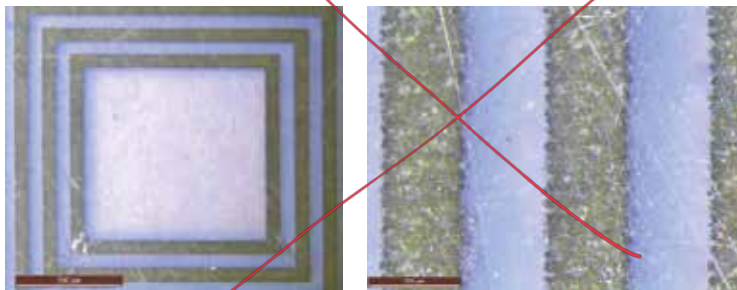
LOW RCS ANTENNAS

■ Array antenna backed by EM absorber
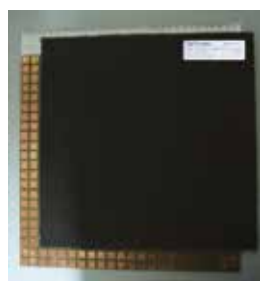
RFID SENSORS

■ 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