Scuola di Dottorato in ICT

Doctoral School in ICT

Research project for a PhD curriculum in ICT – Electronics and Telecommunications

**Tutor**: L. Vincetti

**Proposed Title of the research: “Development of innovative microwave antenna arrays for localisation and ranging based on angle of arrival and beamforming methods for automotive/aerospace applications”**

**Keywords: (5) Antennas, Propagation, Angle of Arrival, Beamfoarming, Localisation**

**Research objectives: --(max 10 rows)**

• Theoretical investigation of new and innovative microwave antenna arrays

• Realization and characterization of antenna arrays for 3D ranging and localisation

• Development of optimum configurations of MW antenna arrays vs installation structures.

**Proposed research activity --(max 10 rows)**

There is a growing interest in developing efficient and low cost microwave antenna arrays for localisation and ranging in automotive/aerospace applications. Usually localisation and ranging is done by means of active radars and at present most of the hardware tends to be bulky, costly and lack fine data measurement. Setting up an antenna array in the microwave spectrum, thanks to the higher frequency and resolution power at those specific wavelengths, constitutes an effective alternative in the way the angle of arrival method or beamforming is optimised. Not only, once the set of antenna arrays have been identified, they can be further optimised so as to achieve 3D discrimination of the signal source. This application becomes particularly interesting in automotive anti-collision systems, in aerospace surveillance data validation as well as warfare jammer identification.

**Supporting research projects (and Department )**

The research activity will be carried on in the PhEm lab of the Department of Engineering “Enzo Ferrari”

**Possible connections with research groups, companies, universities..**

University of Parma (It), and other Research Institutes