PhD THESIS

Wide scan antenna array with grating lobe suppression

- **Laboratory**
  - Institut d'Électronique et de Télécommunications de Rennes (**IETR**), UMR CNRS 6164. Rennes, France. www.ietr.fr

- **Doctoral school**: MathSTIC (https://ed-mathstic.u-bretagneloire.fr/en /)

- **Keywords**
  Impedance matching, Millimeter-wave antenna arrays, wide scan range, grating lobe suppression, antenna element spacing.

- **Context and overview of the problem**

  With the 5G roll out and the perspective of dense network deployment of base stations to achieve the expect capacity, the antennas have to be more efficient with low profile and low cost.

  An attractive and simple way to design low cost antennas is by reducing the number of antenna elements in the array. This is possible when the distance between the elements are greater than half wavelength.

  However, the problem of these antenna array resides in the degradation of their performances when scanning away from broadside and are subject to the appearance of grating lobes. They are also pointed out as major interference generators to other existing communication systems especially to satellite services.

- **Main goals**
  The purpose of this PhD project is to analyze and design low-profile low-cost wide-scan antenna arrays with grating lobe suppression capabilities for 5G mm-wave applications and ensure their safe coexistence with other communication systems. The concept will be validated by prototypes.

- **Location and supervision**
  The PhD project will be held at the IETR, Rennes. The main supervisors of the PhD student will be Mauro ETTORRE, IETR, HDR, CRCN CNRS (mauro.ettorre@univ-rennes1.fr) and Ronan SAULEAUI, Pr., University of Rennes 1, France.

- **Candidate profile**
  The PhD candidate should hold a MSc degree M2R in electrical engineering, physics or an equivalent title recognized by the doctoral school MathSTIC. In particular, s/he should master electromagnetic theory, physics, and mathematics. A good level of spoken and written English is required.

- **Application**

  Interested candidate should send a detailed CV, a motivation letter, and the coordinates of 3 references by email to Mauro ETTORRE (mauro.ettorre@univ-rennes1.fr).