Array Signal Processing Research

This project focuses on research in improved spectrum sensing and reception using array processing; and characterization of signal and its exploitation to improve the array signal model.

One of the aims of the research is to explore the possible exploitation of diversity to improve HF signal reception. Due to its large wavelength, diversity reception is not frequently employed in HF environment. However, HF signal suffers from one of worst fading (and most interfered) possible for wireless communication. In this research, we are studying on the possibility of enhancing the HF signal quality through diversity reception, and its effectiveness in array processing.

To understand fully the performance of a radio, a complete understanding of the characteristics of its transmitted signal is essential. In this research, studies will be conducted to confirm the known characteristics and will propose other possible parameters that can be employed for the characterisation.

Another objective of this research is to investigate the possible exploitation of the structure of communication signals due to their finite number of degrees of freedom (or finite rate of innovations (FRI)) to improve the detection, beam-forming and localization of such signals with an array of spatially distributed sensors.

The sparsity of spectrum has not been exploited in spectral analysis which can offer the possibility to conduct such operation at lower sampling rate. In this project, we will examine this possibility and aim to design and implement a low power adaptive spectrum detection technique for wireless communication signals that have a sparsely distributed spectrum.