LOW COST MICROPHONES ARRAY FOR INDUSTRIAL APPLICATIONS

Universida de Vigo

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MAIN MOTIVATIONS

- Improve knowledge of sound theory .
- Develop skills in processing acoustic signal .[1], [2], [3], [4].
- Acquire theoretical and practical knowledge on Phased Array System Matlab Toolbox. Develop scripts and functions with Matlab Toolbox [5], [6].
- Study and analyze the actual performance of industrial low cost microphones array. [7], [8], [9].
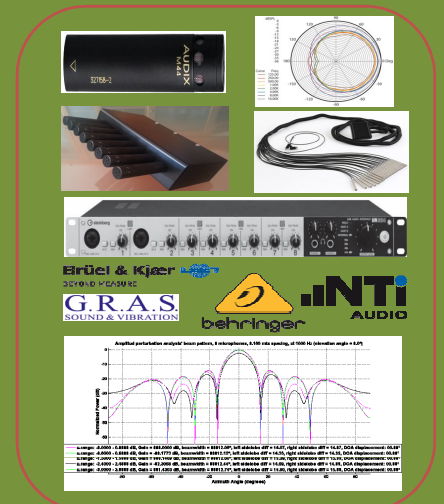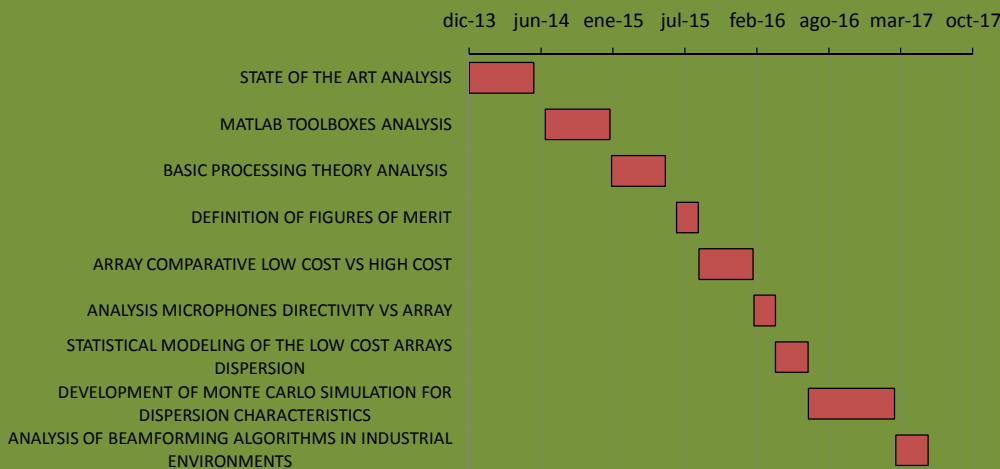
OBJECTIVES

GENERAL

- Study and design of microphones array and its applicability to monitor equipments in industrial environments.

  This application has two major implications: the need to reduce the cost of the array to extend its applicability, and being able to deal with adverse measurement conditions (noisy or inaccessible environments or with high reverberation).

TECHNICAL

- Evaluate the effect of the microphones low cost characteristics (poor quality, sensitivity and directivity dispersion, phase response) on the array performance.

- Evaluate the impact on the array performance of different compensate techniques of the differences in amplitude and phase functions between the array elements.

- Evaluate the effect of the microphones directivity in the presence of other noise and reverberation sources.

- To perform a study of the applicability of several pointing algorithms developed for voice and acoustic measurements in industrial environments.

RESEARCH PLAN

dic-13 jun-14 ene-15 jul-15 feb-16 ago-16 mar-17 oct-17

- STATE OF THE ART ANALYSIS
- MATLAB TOOLBOXES ANALYSIS
- BASIC PROCESSING THEORY ANALYSIS
- DEFINITION OF FIGURES OF MERIT
- ARRAY COMPARATIVE LOW COST VS HIGH COST
- ANALYSIS MICROPHONES DIRECTIVITY VS ARRAY
- STATISTICAL MODELING OF THE LOW COST ARRAYS DISPERSION
- DEVELOPMENT OF MONTE CARLO SIMULATION FOR DISPERSION CHARACTERISTICS
- ANALYSIS OF BEAMFORMING ALGORITHMS IN INDUSTRIAL ENVIRONMENTS

PLANNING RESEARCH 2014-15

T1 – Analysis of advantages and disadvantages of Matlab Toolboxes

T2 – Analysis of basic processing theory for microphones array.

T3 – Definition of figures of merit.

T4 - Execution of experimental measures in semianechoic chamber in order to compare low cost vs high cost microphones array performance.

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