SENSOR ARRAY PROCESSING

1. KEY INDICATORS

CFU/ECTS: 6
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2. OBJECTIVE OF THE COURSE

The course presents in an unified view the wave propagation and sensor array models (antennas, geophones, hydrophones, microphones, etc...), the main imaging and parametric estimation techniques and the associated parallel computing architectures.
The course furnishes the elements for understanding and developing telecommunications, remote sensing and laboratory instrumentation applications, based on sensor arrays, within industrial workgroups.

3. ACQUIRED ABILITIES

Basic knowledge of digital signal processing, electro-magnetic wave-fields, radio and radar technology, detection and estimation theory. The language of teaching is English.

4. PROGRAM

Wave propagation elements (recalls). Sensor arrays. Receiver architectures. Narrow band and wide band array models. Source localization, beamforming and imaging. Echo, reverberation, diffraction and mutual coupling models. Robust processing in the presence of model mismatch, impulsive noise and interference. Optimization algorithms and parallel architectures for signal array processing. Vector computer languages (Matlab).

5. REFERENCES

H. L. Van Trees, “Optimum array processing”, Part IV of Detection, Estimation and Modulation Theory, Wiley 2002.
Material provided by the teacher on CD-Rom or his website.

6. COURSE WEBSITE

http://segrinfo.ing.uniroma1.it/ingtlc/