Sapienza University of Rome Uses AWR Microwave Office Software for RF/Microwave Classes and Graduate Research

UNIVERSITY BACKGROUND
The PhD Program in Electronic Engineering was established at Sapienza University of Rome over 25 years ago. The program provides young engineers with a skill set that facilitates their future employment, as confirmed by the excellent results achieved by graduates to date, who have found employment in the manufacturing, infrastructure and services sectors, in companies such as: ABB, ENEL, TERNA, ACEA, FIAT Engineering, RAIWAY, TIM, NORTEL, CONTRAVES, ITALFER, and IVECO.

PhD students are offered a thorough training in applied research, starting with the integration of basic technical and scientific knowledge, and leading to cutting edge science in the specific field of the research, all under the guidance of a supervisor assigned to each student.

THE DESIGN CHALLENGE
Professor Pisa uses Microwave Office® circuit design software for his microwave/RF design classroom studies. The course covers basic blocks to advanced active circuits and teaches circuit schematic, layout, and linear/nonlinear simulations. Professor Pisa also uses Microwave Office for his advanced graduate research projects.

THE SOLUTION
Professor Pisa supervised a graduate research project that resulted in two published papers. The first, “A Circuit Model of an Ultra Wideband Impulse Radar System for Breath-Activity Monitoring,” was published in the International Journal of Numerical Modelling: Electronic Networks, Devices And Fields. The aim of this work was to present a circuit model to analyze and design ultra wideband (UWB) radars for the remote monitoring of breath activity. The model included the impulse signal source, the transceiver antenna, the transmission medium, and the human thorax. The model was used for analyzing the feasibility of a UWB radar operating in the 3–6-GHz range. The model outlined the possibility of the considered UWB radar of monitoring the breath activity of a subject up to distances of about 10 m in open air.

"We rely on AWR software for basic RF/microwave studies as well as in complex research projects. AWR software is intuitive to use and offers all the capabilities necessary to succeed in RF/microwave design."

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Block diagram of the UWB radar for breath-activity monitoring system.
A follow-on to this paper, “Design, Realization, and Test of a UWB Radar Sensor for Breath Activity Monitoring” was published in the IEEE Sensors Journal. This paper describes the development of an analytical model of an ultra-wideband range gating radar. The model was then used for the system design of a radar for breath activity monitoring.

WHY MICROWAVE OFFICE?
For the classroom, Professor Pisa thought the software was very competitively priced and was easy to install and use, making it ideal for teaching purposes. For his research project, the availability of models, the comprehensive online help and product documentation, and excellent match with simulation versus results made it a good platform for exploring RF/microwave design. The simple layout generation and ability to export to printed circuit board (PCB) IsoPro tool for prototype fabrication has been very useful in the research.

Microwave Office layout and photo of the range-gating receiver which is an essential part of the system.

Microwave Office layout, photo and simulation versus measurement results of the strobe source found in the system.

Complete realization of the UWB radar system prototype.