During past two decades a variety of SAW based wireless sensors were invented and research is still in progress. As different frequencies, varied bandwidths, coding techniques and constantly changing post processing algorithms are being implemented, there is a constant need for a universal and adjustable synchronous communication system able to interrogate new generations of SAW sensors.

This thesis presents the design of a multiple FPGA based communication system with operational frequency range of 450MHz-2.2GHz capable of producing user programmed modulated signal. The synchronous receiver is designed to have interchangeable chip, replacement of which would allow adjustment of receiver’s bandwidth. Within this paper the performance of the system is only evaluated on 915MHz centered 20MHz bandwidth region.

An OFC temperature sensor was interrogated. Post-processing algorithms, measurement results, and proposals for the future use of the system are presented. Detailed overview of the structure and performance of every functional block alone with design considerations are analyzed. Previously designed Matlab based software was adapted for post processing of the received signal. New software with simplified GUI was designed for programming of the desired signal.

Educational Career:
Bachelor's of Electrical Engineering, BS, 2006, Samara State Aerospace University
Master's of Electrical Engineering, MS, 2012, University of Central Florida

Committee in Charge:
Dr. Donald C. Malocha, Chair, Electrical Engineering
Dr. Linwood W. Jones, Electrical Engineering
Dr. Xun Gong, Electrical Engineering

Approved for distribution by Dr. Donald C. Malocha, Committee Chair, on March 14, 2012.

The public is welcome to attend.