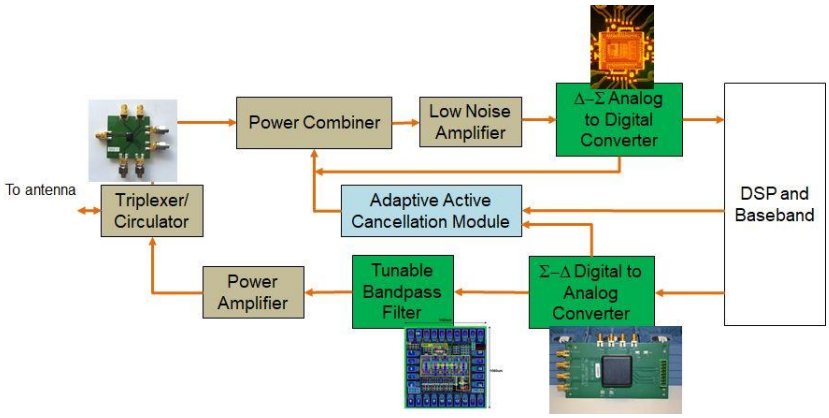
BUENAVENTURA ELECTRON DEVICES / CIRCUITS AND SYSTEMS SOCIETIES CHAPTER

Tunable Sigma-Delta Data Converter Based Flexible Radio Frequency Front-Ends (FlexRF) for Evolving 4G/5G Applications

Speaker: Dr. Mohiuddin ("Mohin") Ahmed, HRL Laboratories, LLC

September 25, 2018 at 6:30 PM

Location: Skyworks Solutions, Newbury Park, CA



At the heart of all modern mobile communications systems, and all the industries and services that it enables (voice calls, messaging, social media, web access, streaming, etc.) is an actual radio. This radio needs to operate in a rapidly evolving, standards driven domain (e.g. GSM to EDGE to 4G LTE to upcoming 5G), and the technology solution to date has been to continually upgrade the radio hardware as the standards and customer needs have evolved. However, this is an inflexible hardware approach that does not scale well e.g. for automobiles or aircraft platforms (HRL's owners are General Motor and Boeing) that need to support "telematics" services on vehicles for much longer periods than a couple of years, without going obsolete. The goal of HRL's "flexible radio front-end" (FlexRF) approach has been to leverage HRL's expertise in the design of high performance "sigma-delta" wideband data converters and execute a wideband (up to 2.7 GHz) direct to baseband ADC receiver chip, a matching wideband CMOS DAC chip, and an active tunable bandpass filter to control spurious emissions in the transmit chain. The combined system forms the basis of a unique software defined radio that is not commercially available and yet shows a path forward to LTE/4G/anticipated 5G communication standards.

Dr. Mohiuddin ("Mohin") Ahmed is a Senior Research Staff Scientist in the Sensors and Electronics Laboratory, and Manager of Corporate Partnerships at HRL Laboratories, LLC. He received his B.S. in Electrical Engineering and Mathematics from the University of Texas, Austin (1992) and his Ph.D. in Electrical Engineering from UCLA (2002). His training and expertise is in digital communications and applied mathematics, specifically Information Theory, Signal Processing & Optimization. Professionally, he has focused primarily on research areas for defense applications (while employed at General Dynamics 1992-1997, and HRL Laboratories (2000-present)) and has publications and patents in diverse topics stemming from various government and corporate funded research projects in RF and electromagnetics systems design, network protocols and coding, LPI/LPD waveforms and rapid prototyping for electronic warfare, radar/SDR systems, and recently in mixed signal IC design. He is a licensed professional engineer (P.E., State of California) and adjunct lecturer in signal processing and communications at UCLA EE department.

Location

Skyworks Solutions

649 Lawrence Drive, Newbury Park, CA 91320

Intersection of West Hillcrest Drive and Lawrence Drive

(**NOT** the main building, please use link below to arrow that pinpoints building)

http://maps.google.com/maps?q=34.187542,-118.930994&num=1&t=h&vpsrc=0&ie=UTF8&z=18&iwloc=A

Directions

From Los Angeles

Highway 101 North
Take exit 47A for Rancho Conejo Blvd
Use the left lane to turn right onto Rancho Conejo Blvd
Turn left onto W Hillcrest Dr.
Destination will be on the right

From Ventura

Highway 101 South
Take exit 47B for Wendy Dr. toward Newbury Park
Turn right onto N Wendy Drive
Continue onto Camino Dos Rios
Turn right onto W Hillcrest Drive
Destination will be on the left.