

MCEN GRADUATE SEMINAR

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Introduction to Microbolometers for Infrared Imaging

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Abstract

Microbolometers, as the imaging element in infrared uncooled focal plane arrays (UFPA), provide the low-cost alternative in infrared imaging for night vision and other applications. Fabricated using integrated circuit technologies; the microbolometer is considered a micro-electrical-mechanical systems (MEMS) or micro-optical-electro-mechanical systems (MOEMS) product. Additionally, it is an excellent example of a fully integrated analog-CMOS/MEMS device. Physics and operation of microbolometers using Vanadium Oxide (VO_x) as the transducer element will be described. DRS is a major supplier of the 25 μ m pixel pitch 640x480 and 320x240 infrared uncooled focal plane arrays (UFPAs) and camera products for commercial and military markets. The 25 μ m pixel pitch focal plane arrays currently in production provide excellent performance for soldier thermal weapon sights (TWS), vehicle driver vision enhancers (DVE), and aerial surveillance and industrial thermography applications. Recent developments for 17 μ m pitch detectors are enabling smaller, lighter, high-performance thermal imaging for additional applications. For 2012, DRS is sponsoring a student infrared imaging competition to encourage student use of thermal imaging. A camera will be available for the attendees to experience thermal imaging in operation.

Bio:

Dr. Skidmore was awarded his Ph.D. in Physics in 1998 by the University of Minnesota and his two undergraduate degrees in 1993, a B.S. in Industrial Technology and a B.A. in Physics from Western Washington University. He is a Principal Scientist at DRS Infrared Technologies since February of 2006. Before that he spent seven years at Zyvex Corp. becoming Director of Research. Currently he directs and conducts research and development for next generation microbolometers used in infrared thermal imaging. His experience includes design and performance analysis of infrared microbolometers, MEMS design and processing, micro and nanoassembly, and nanofabrication. He has been awarded thirteen patents with others pending. He received the State of Texas Inventor of the Year Award in 2004. He received the DRS Technologies and Finmeccanica Patent of the Year for 2010.