Title: Software Radio: A Broad Change in RF Communications Systems Design

Speaker: Dr. John Chapin, Vanu, Inc.

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Abstract: Software radio is a deceptively simple idea: Identify all the features that specialize an RF communications device to a particular waveform (e.g. GSM cell phone or FM walkie talkie), and implement these features in flexible software on a generic platform, rather than in fixed-function hardware. This change should provide significant advantages compared to legacy hardware radios: the ability to support multiple waveforms on the same device, to upgrade the waveforms on the device through software downloads, and to dynamically adapt modulation or other physical layer parameters to a wide range of channel conditions. However, taking full advantage of software radio turns out to require a broad change in communications systems. Affected hardware components include antennas, filters, A/D converters, and power amplifiers. Affected device-level software components include signal processing, timing control, inter-layer APIs, and security. At the network level, new MAC algorithms and topology management are needed to truly exploit the flexibility of individual nodes. Even more broadly, industry structures, business models and regulatory mechanisms must evolve in new directions. In this talk I present a slice through these varied and interrelated systems and research challenges, taking a total systems view of software radio. I will discuss both our results at Vanu, Inc. and the work of other organizations and researchers.

Biography: Dr. John Chapin is Chief Scientist at Vanu, Inc. and a visiting scientist at MIT. Prior to joining Vanu, Inc., he was on the faculty of MIT in the Electrical Engineering and Computer Science department. He has responsibility for the company's research and standardization efforts in software radio and cognitive radio technologies. John serves in multiple industry leadership roles including: member of the SDR Forum Board of Directors, member of the DARPA next-generation networks research advisory panel, program committee member and tutorial chair for the DYSPAN conference. He publishes frequently on software radio technology and policy topics. In 2000, President Clinton awarded Dr. Chapin the Presidential Early Career Award for Scientists and Engineers. In 2005 the SDR Forum honored him with the SDRF Industry Achievement award. John earned his Ph.D. in Computer Science from Stanford University in 1997.