“World of RF MEMS – Small Size with Big Economic Opportunities: Perspectives from Technology Roadmaps”

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Abstract:
Mobile devices such as smart phones and tablets are rapidly growing segments of the electronics industry and are creating more opportunities for increased growth in MEMS manufacturing. As a response to these market demands for MEMS devices that include RF MEMS devices with improved performance at lower cost, the International Electronics Manufacturing Initiative (iNEMI) created in 2010 a Working Group on MEMS/Sensors and the International Technology Roadmap for Semiconductors (ITRS) created in 2011 a Technical Working Group on MEMS. The creation of these two MEMS working groups occurred in collaboration with the MEMS Industry Group. After a brief introduction to NIST and a general discussion on the roles that international technology roadmaps play in accelerating the rates of innovation and commercialization of selected technologies, such as RF MEMS, Dr. Bennett will discuss the history of RF MEMS in technology roadmaps and give some observations from recent public workshops that included MEMS and RF MEMS. 
Two main observations for MEMS in general and RF MEMS in particular are:
1) Packaging and testing that include measurements and associated standards for the buyer-seller interface account for about two-thirds of the manufacturing cost; but,
2) Most of the current R&D investment goes to device technologies and process development.
A common theme among roadmapping deliberations is that limited resources and knowledge for meeting the major RF MEMS challenges of characterizing, understanding, modeling, and controlling key properties and performance figures of merit require sustained effective communication, cooperation, and collaboration among all global stakeholders.

Speaker’s Biography:
Herbert Bennett has many years of experience in measurements and international standards for electronic, magnetic, and optical materials and devices. He has held research and management positions at NIST and Departments of Defense and Commerce, and was the Director of the Materials Research Division at the National Science Foundation from 1978 to 1980. His research is archived in over 200 publications on diverse topics such as magnetic phase transitions, color centers, damage in laser materials, semiconductor physics, optoelectronics, video technologies, quantitative medical imaging, and nanoscale interfaces. He has contributed to many international roadmaps for semiconductors and RF and analog/mixed-signal (AMS) technologies. He co-founded in 2002 the RF and AMS Technical Working Group of the ITRS and recently the ITRS MEMS Technical Working Group. An IEEE Life Fellow and a Fellow of the American Physical Society, he received A.B. and Ph.D. degrees from Harvard University in theoretical solid-state physics and M.S. degree from University of Maryland in physics and mathematics.