

To Integrate or Not to Integrate: A Case Study on System-in-Package Integration for MEMS-based Products

In the mid-1990s, a debate was raging among MEMS manufacturers about how to implement MEMS + ASIC functions into products. Motorola SPS (now Freescale) chose a path of system-in-package (vs. system-on-chip) integration for the majority of its new products, with the stated advantage of flexibility for integrating various silicon technologies. This advantage proved very beneficial approximately a decade ago when airbag satellite accelerometers were launched to production, enabling such features as side airbags. The system-in-package approach allowed for rapid product development of small-signal capacitive outputs from the MEMS chip, coupled with high-voltage communication protocol output from the ASIC. This talk will review the history of the Freescale system-in-package development, the key challenges, solutions, and advantages that were realized with this approach, which is now adopted by several competitors in the industry.

David J. Monk

Director, Sensor Research and Development, Freescale Semiconductor



Dave Monk received his BSChE from the University of Iowa in 1989, a Ph.D. from the Berkeley Sensor and Actuator Center at the University of California, Berkeley in 1993, and an MBA with emphasis on technology at Arizona State University in 1997. Dave joined Motorola Sensor Products Division in 1993 and has held positions in MEMS package development, project management of a CMOS surface micromachining integration for a pressure sensor, and is presently the manager of the Sensor Development Engineering group, including systems engineering, IC design, transducer design, package development, and test development. He has 11 patents, over 60 publications, and is active in the MEMS community.