Introduction / Abstract

iNEMI has been developing MEMS roadmap for 5 years. The 2013 iNEMI roadmap reviews the major applications for MEMS in Consumer Portable and Automotive, and introduces an emerging area of killer applications that the industry calls Consumer Medical. Each of these segments have very different needs and challenges. We believe it is time to expand the collaborative agenda for MEMS technology.

MEMS market forecast 2010 - 2017 (US$M)
(Source: Status of the MEMS industry report, to be released mid 2012, Yole Development, March 2012)

Technology Needs & Opportunities

- Detailed understanding of the basic material failure mechanisms.
- Generic reliability test standards for all MEMS.
- Stiction, thermally induced deformation, fatigue, creep, fracture
- 8” wafer manufacturing capability to meet the projected growth
- Test procedures for the long term hermeticity and out-gassing behavior of packages
- Low Cost Functional Testing

Challenges | Potential Solutions
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Integration of MEMS in the Package | Standardization for MEMS packaging to support integration.
Testing of MEMS | More testing towards the wafer level.
Validated accelerated life testing for MEMS | More knowledge of the physics of failure is required to develop accelerated life tests.

iNEMI Collaborative Projects on MEMS

- MEMS Reliability Methodologies
  - A compilation of the end use environments, or "mission profiles," for a range of applications from users, designers, and manufacturers of inertial MEMS devices. A compilation of reliability testing performed to demonstrate reliability in each of these respective applications.
  - http://www.inemi.org/project-page/mems-reliability-methodologies

- MEMS Test Methods
  - Collection of performance specifications reported in device data sheets for various manufacturers and the identification of opportunities and needs (or gaps) to create a common practice(s). Identify test methods and protocols used to measure the performance metrics.
  - http://www.inemi.org/project-page/mems-test-methods