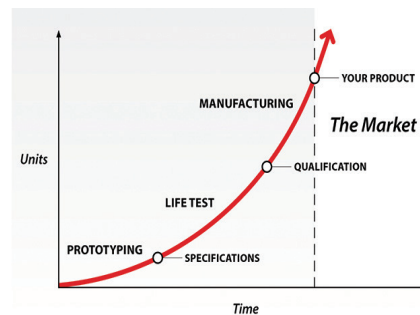


Closing the MEMS Sensor Product Life Cycle Gap from Development to Production

MICROELECTRONIC PACKAGE assembly is a key part of the \$16.5B commercial MEMS sensor market representing 22% of the market. In terms of unit growth, the MEMS microelectronic package assembly market is growing *twice as fast* as the IC package assembly market, but the needs of the entire life cycle of a MEMS product are not met. From development of initial manufacturing processes and materials selection, to prototype development, to environmental life test qualification, to volume production, SMART Microsystems provides the lowest overall development time and cost to satisfy the full life cycle requirements of MEMS sensor products.

Relatively common MEMS devices—such as pressure, chemical, and optical sensors—require custom package development when being integrated into a sub-assembly for niche applications. And while many service providers (who focus on microelectronic package assembly of ICs) often underestimate MEMS sensor development projects, SMART Microsystems **focuses on microelectronic package assembly of MEMS sensor products** to appropriately scope projects. This reduces delays and increases the ability to solve complicated process issues. SMART Microsystems provides companies throughout the United States and Canada with MEMS sensor prototypes and has successfully brought several new development programs to production readiness. Customers include producers, manufacturers, and suppliers who require microelectronic sub-assemblies for sensor products. With expertise and a focus on MEMS sensor products, the SMART Microsystems engineering team has solved many MEMS process challenges and understands the nuances of MEMS sensor product development needs.

Located in Northern Ohio, SMART Microsystems opened a new facility with over 15,000 square feet of ISO 6 (class 1000) and ISO 5 (class 100) cleanrooms. This state of the art facility, furnished with flexible equipment capabilities for assembling a high mix of materials and products, creates a **turn-key solution for microelectronic package assembly of MEMS sensors**. From prototyping all



MEMS Product Life Cycle Captured at SMART Microsystems.

the way through market entry, SMART Microsystems is a single supplier, reducing the total cost of product development. Prototype development and manufacturing capabilities include dicing, die attach/flip chip, vacuum solder reflow, wire bonding (ball and fine/heavy gauge wedge with both wire and ribbon) and encapsulation (adhesive dispense, lid seal and parylene coating). Environmental life testing capabilities at SMART Microsystems include HAST, thermal shock, thermal/humidity cycling, high temperature storage and accelerated UV durability. Advanced inspection equipment is comprised of an acoustic microscope, 3D X-ray, interferometer and a scanning electron microscope (SEM).

Equipment capabilities at SMART Microsystems deliver manufacturable and sustainable solutions. As a

certified ISO-9001 manufacturer, SMART Microsystems incorporates design-for-manufacturing into the initial stages of development—this decreases process iterations and reduces time needed as the product moves into volume production. By working concurrently with the customer's design team and suppliers, SMART Microsystems is able to implement process specifications, design-to-cost goals, and on-time delivery objectives efficiently, reducing overall time and cost. SMART Microsystems applies this approach to aerospace, industrial, medical, and other markets and supports the package format—QFN, DIP, TO-can, chip-on-board, flip chip, or custom housings—that is needed for the application. In all situations, incorporating manufacturing objectives early reduces the development time and cost, enabling SMART Microsystems to scale-up quickly, support volume production, and meet quality assurance requirements.

SMART Microsystems is located near Cleveland, in a Midwest manufacturing hub. Nearby access to an international airport allows for fast and easy transportation to support medical, aerospace and other markets that require the high-value, low-volume applications for MEMS sensors. With a focus on MEMS package assembly and a certified ISO-9001 status, SMART Microsystems creates the turn-key solution for customers. Accomplishing the full life cycle requirements of MEMS sensor products, SMART Microsystems takes a design from prototype, through qualification, to volume production at the lowest overall development time and cost.

More information about SMART Microsystems services can be found at www.smartmicrosystems.com. ♦