



iNEMI

International Electronics Manufacturing Initiative

Programs and Their Value

Jim McElroy
iNEMI

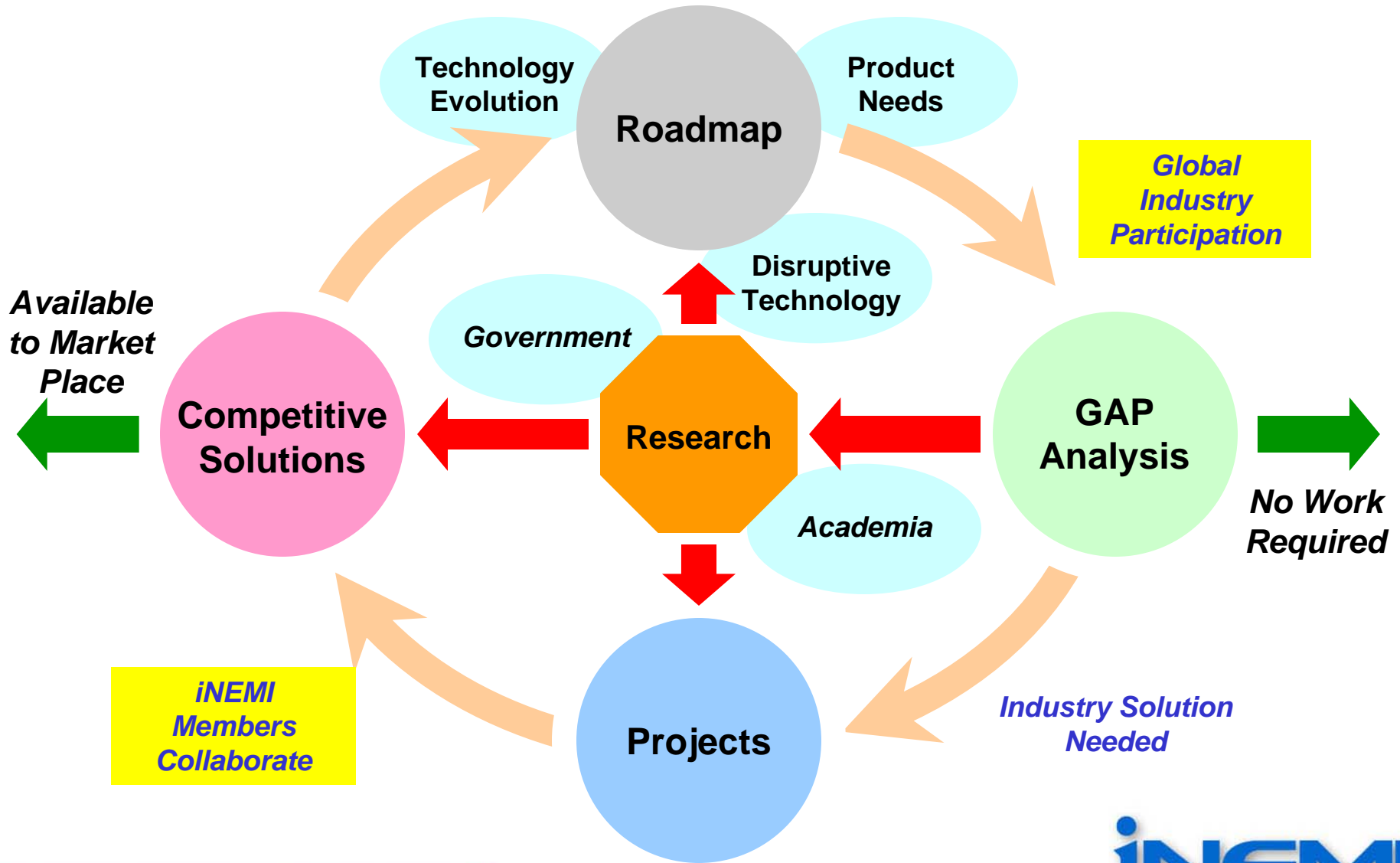
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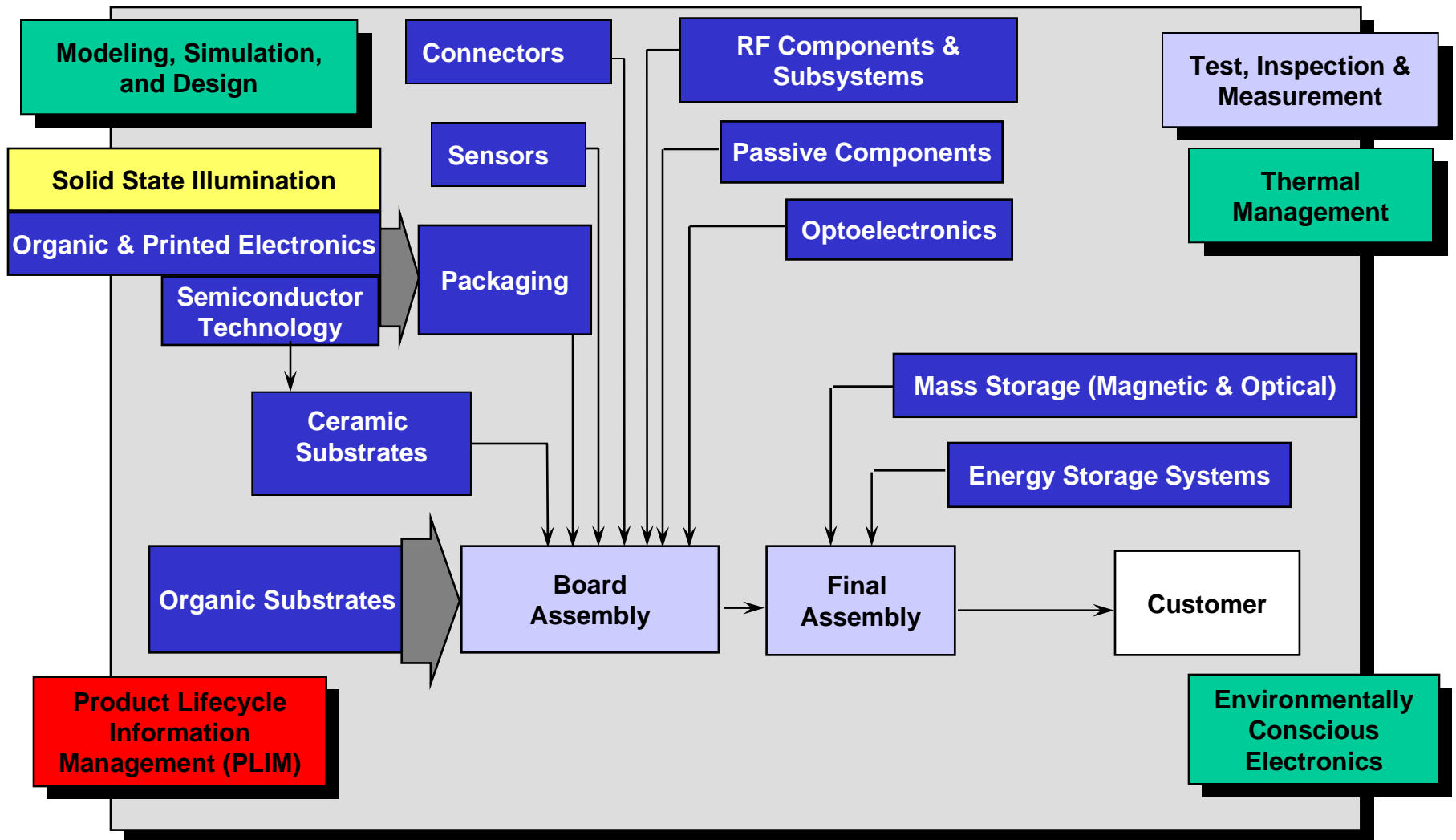
Evolution of iNEMI

- **Our industry is going through fundamental change.**
- **iNEMI is changing to deal with this in a way that:**
 - **Continues to add value/be relevant to members**
 - **Continues to add value/be relevant to industry**
- **Our early focus had been on North American region.**
- **Our strategy favors volume manufacturing as the activity where change can be effected:**
 - **Technology development/deployment**
 - **Supply Chain integration**
- **As volume manufacturing continues to migrate we have:**
 - **broadened our geographic reach**
 - **modified our thrust areas for collaboration.**

Methodology



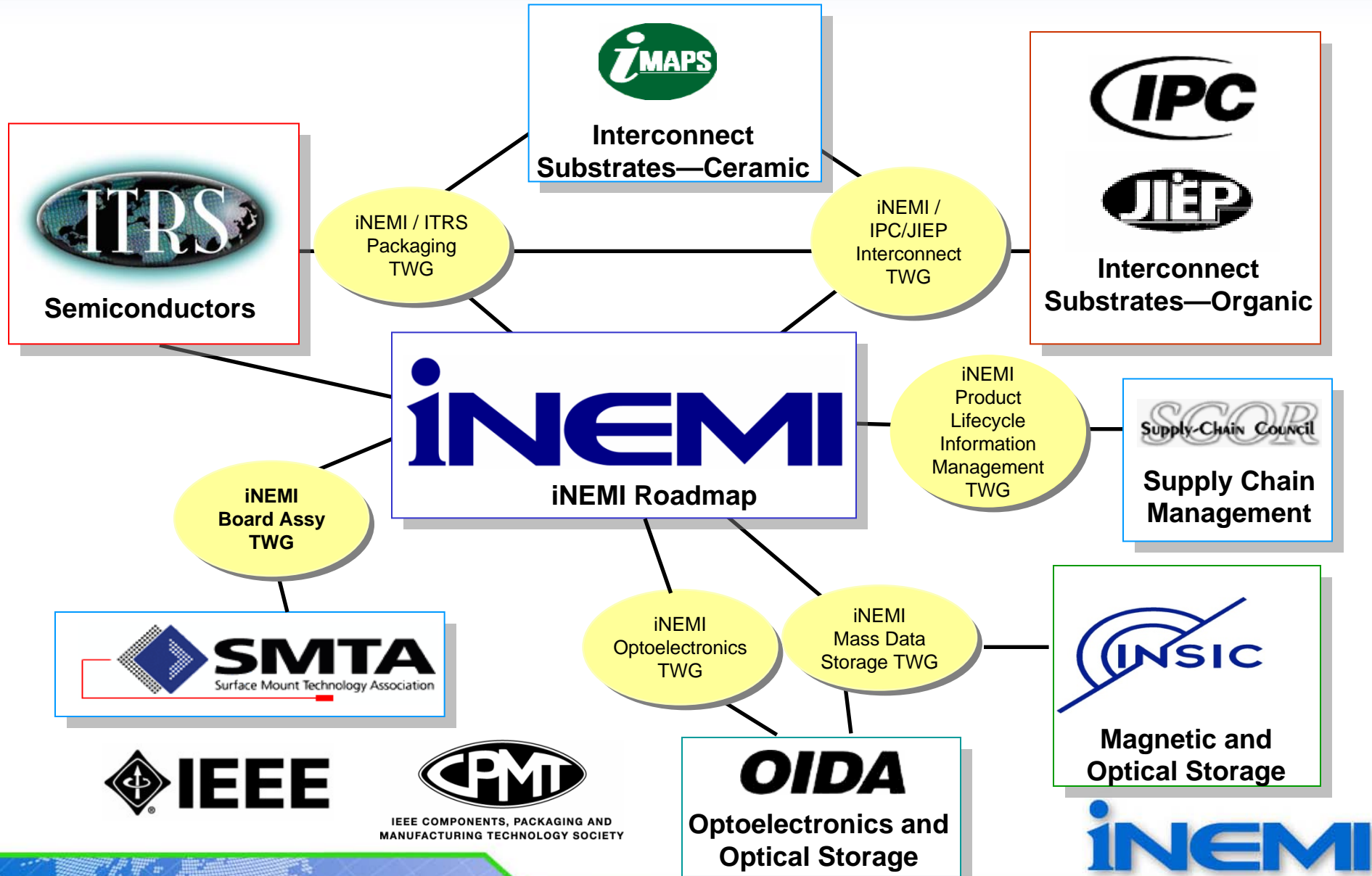
2009 Technology Working Groups (TWGs)



Red=Business Green=Engineering Blue=Manufacturing Blue=Component & Subsystem



9 Contributing Organizations



2009 Roadmap

- **20 Technology Working Groups (TWGs)**
(New Roadmap on Solid State Illumination)
- **5 Product Emulator Groups (PEGs)**
- **Roadmaps the needs for 2009-2019**

2009 Roadmap Schedule

- **November 13, 2007 – Roadmap kick-off Europe, Productronica**
- **February 20-21, 2008 PEG Workshop/TWG Kick-off, Santa Clara, CA:**
- **May 14, 2008 – North American Roadmap Workshop, Herndon, VA**
- **June 2008 – European Roadmap Workshop**
- **June 2008 – Asian Roadmap Workshop - China**
- **August 6-7, 2008 – TC Review with TWG Chairs, Liberty Lake, WA**
- **September 22, 2008 – Final Chapters of Roadmap Due**
- **December, 2008 – Roadmap Released to iNEMI Members**
- **April, 2009 – Industry presentation at APEX**

Roadmapping

- iNEMI roadmaps technology in 20 different areas.
- Each roadmap chapter is created by a Technology Working Group (TWG).

Deployment

- iNEMI has technology deployment activities in 7 different areas.
- Each project area is organized by a Technology Integration Group (TIG).
- Projects address technology and business gaps.

Roadmap and project groups are made up of industry people (including leadership).



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**iNEMI
Thrust
Areas**

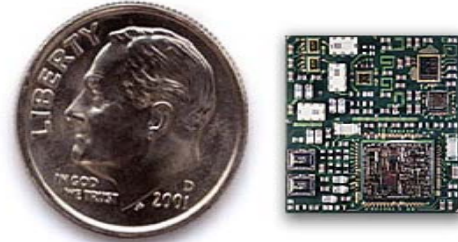
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Miniaturization Thrust Area

Goal: Provide the customer maximum product value in the smallest possible form factor

Strategy:

- Minimize product size by converting substrate from a space transformer to a circuit element
- Minimize substrate & assembly conversion costs to shrink product costs
- Expand product capabilities by adding intelligence to component type products yielding new applications
- Enhance global testing and manufacturing processes



SiP with radio functions for a GSM mobile phone radio

Tactics

- Develop advanced PWB and assembly technologies that increase substrate and component packing density
- Develop new materials systems & assembly processes
- Introduce smart technology & software into component type products
- Create methodology that enables reliable comparison of test coverage between test environments, revisions, & assessors
- Create & disseminate industry roadmaps
- Manage increased heat densities to enhance reliability

Impact

- Increased product throughput while minimizing capital investment
- Increase manufacturing margins
- Enable new value added product applications with increased margins
- Enables more informed decision making on issues pertaining to test.
- Establish efficient supply chains to meet industry growth rates

Energy and the Environment Thrust Area

Goal: Provide low cost electronic assembly processes that encompass environmental attributes, meet current and future regulations, are sustainable & energy efficient

Strategy:

- Create a proactive stance in the electronics industry to evaluate environmental impact with stakeholders
- Increase global communication and cooperation within industry regarding recycling challenges
- Promote basic principles for effective energy efficiency requirements
- Increase technology input to government policy making on material & energy restrictions



Tactics

- Conduct R&D to create a sustainable infrastructure and viable recycled materials market for use in new products and other applications
- Develop Product Lifecycle Integration Management (PLIM) standards to expected energy reporting requirements
- Develop solutions to compliance requirements that are transparent, implementable, and not unnecessarily burdensome
- Create & disseminate industry roadmaps to drive technology development

Impact

- New revenue streams to support recycling efforts
- Provides assessment methodology to support decision making
- Reduce energy usage
- Minimize risk of both negative environmental performance and business disruption
- Establish efficient supply chains to meet industry growth rates

Medical Electronics Thrust Area

Goal: Provide the patient and medical community with seamless end-to-end solutions for improved health management

Strategy:

- Wirelessly connect implantable devices, portable devices and diagnostic imaging tools for clinical and home-health monitoring.
- Increase substrate and component packing density for producing small, easy to use, cost effective medical devices
- Increase device reliability for long term product life cycles



Tactics

- Develop modeling tools to understand RF traffic issues in the wireless clinical and home-health environment.
- Develop advanced PWB technologies that address the performance & I/O density requirements of medical devices.
- Develop component reliability standards & test methods that address the unique performance requirements and use environments that characterize the medical products sector
- Create & disseminate industry roadmaps to drive technology development

Impact

- Reduce paperwork and recording errors between patient and care-giver
- Enable new cost effective device designs, products and treatments
- Reduce time investment for medical approvals by governmental agencies
- Establish efficient supply chains to meet industry growth rates



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The “i” in iNEMI: a Phased Approach

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Phase 1 – Global Roadmapping

Key goals:

- **Expand roadmap process to create global view of future**
- **Explore regional deployment collaboration using China as vehicle**

Operational strategy:

- **Targeted approach to global best-in-class roadmap input**
- **Regional collaboration within existing membership**

Success criteria:

- **Acceptance of Roadmap as global document**
- **Regional collaboration within membership**

Phase 2 – Regional Collaboration

Key goals:

- **Strengthen global roadmapping and gap analysis**
- **Establish regional centers of collaboration**

Operational strategy:

- **Attract suppliers through regional centers**
- **Formal alliances with regional organizations**

Success criteria:

- **Acceptance of Roadmap as the global leader for manufacturing**
- **Successful integration of regional firms as members**

Phase 3 – Regional Operations

2007

- Opened an office in Shanghai and added a team member in Europe.



- Dr. Haley Fu is leading operations in Asia.



- Grace O'Malley is representing us in Europe from her base in Ireland.





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**iNEMI
Value**

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Value Proposition

“Connect with and Strengthen Your Supply Chain”

- **iNEMI offers the opportunity to collaborate with the entire supply chain in an efficient manner**
 - To understand and accelerate strategic directions
 - To define future needs and opportunities
 - To jointly create industry standard solutions.
 - Today’s increasingly distributed supply chain makes collaboration more important than ever.
- **iNEMI is a “virtual organization” that adapts to industry changes and provides timely leadership.**
- **iNEMI provides Important deliverables:**
 1. Technology roadmaps
 2. Forums on Key industry issues: Today’s Forum is an example
 3. Deployment projects

iNEMI's Highest Value Product

- **Roadmapping**
 - **Global acceptance as the source that provides systems view of electronics manufacturing – published biennially.**
 - **Coordinated with other major organizations: ITRS, IPC, JIEP, IMAPS, OIDA, NSIC, SMTA, IEEE/CPMT.**
 - **Has accurately predicted importance of a number of manufacturing technologies (e.g. Microvia PWB, open systems architectures in mfg. software, Pb-free assy).**
 - **Broad industry view (2007 version created by 500+ people from 265 companies/organizations):**
 - **Participating from 17 countries**
 - **Across 4 continents**
 - **Evolving to address changing priorities: Supply Chain Management, Environmentally Conscious Electronics, Challenges of distributed manufacturing model.**



Examples of iNEMI Project Results: Value to Members and Industry

- **Meet Product sector Needs for Miniaturization:**
 - High Density Interconnect 1996-1999
 - Infrastructure for Embedded Passives 2000-2003
- **Improve Manufacturing Efficiency:**
 - High Speed Chip Placement 1996-1998
 - Manufacturing standards for Optical Interconnect 2000-Present
- **Help Industry Address Challenges of Materials Restrictions:**
 - Supply Chain Readiness for RoHS/WEEE 2003-Present
 - Transition to Pb-free assembly 1999-Present

Transition to Pb-free Assembly Will be Discussed in Detail at Forum

- **1998 Roadmap Identified the Gap**
- **Phase I Project developed the alloy, process, components and reliability from 1999-2002**
- **Phase II Project expanded the technology base to include rework, wave-soldering, and reliability of lead finishes**
- **Phase III Project teams addressed these supply chain transition issues identified in the 2002 Roadmap**
- **Phase IV Projects worked to optimize and standardize manufacturing processes**
- **Phase V Projects are currently addressing the needs for High Reliability Products**

Results:

- **The iNEMI efforts have accelerated the establishment of SAC alloys as the standard and reduced the effort in each member company.**



iNEMI Strengths

- **Strong support of member companies at senior levels.**
- **Technology roadmaps known and used on world wide basis.**
 - Evolution of existing technologies
 - Predictions of disruptive/break-through technologies
- **Proven track record/methodology to conduct collaboration across the supply chain.**
 - Focus on challenges identified in Roadmap that are best addressed by working together
 - Address issues/gaps related to technology development & deployment

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