



iNEMI

International Electronics Manufacturing Initiative

iNEMI 2009 Roadmap European Kick-off Meeting Welcome/Introduction

**Chuck Richardson, iNEMI
Productronica 2007
November 14, 2007**

Advancing manufacturing technology

Agenda (To - Break)

13:00 – 13:10	Welcome and Introduction iNEMI Overview	Chuck Richardson, iNEMI Jim McElroy, CEO, iNEMI
13:10 – 13:25	iNEMI Roadmapping Process	Chuck Richardson, iNEMI
13:25 – 13:35	CPMT Participation in Roadmap	Rolf Aschenbrenner, Fraunhofer IZM
13:35 – 13:45	IMAPS Participation in Roadmap	Giovanni Del Rosso, Pirelli
13:45 – 14:05	2007/9 Automotive PEG*	Peter Grossmann, Delphi Germany
14:05 – 14:25	2007/9 Portable / Consumer PEG	Bob Pfahl for Susan Noe, 3M
14:25 – 14:45	2007/9 Medical PEG	Anthony Primavera, Boston Scientific
14:45 – 15:00	Break	

Agenda (Post Break)

15:00 – 15:20	Netcom Systems PEG	Jim McElroy, iNEMI
15:20 – 15:40	2007 Environmentally Conscious Electronics TWG	Chen PanFeng, Huawei
15:40 – 16:00	2007 Board Assembly TWG	Fredrick Mattson, Flextronics
16:00 – 16:20	2007 Final Assembly TWG	Reijo Tuokko, Tampere Tech. U.
16:20 – 16:40	2007 Packaging TWG	Juergen Wolf, Fraunhofer IZM
16:40 – 16:50	Discuss European Areas of Interest	Grace O'Malley, iNEMI
16:50 – 17:00	Summary and Next Steps	Bob Pfahl, Chuck Richardson
17:00 – 18:00	Social Hour	All



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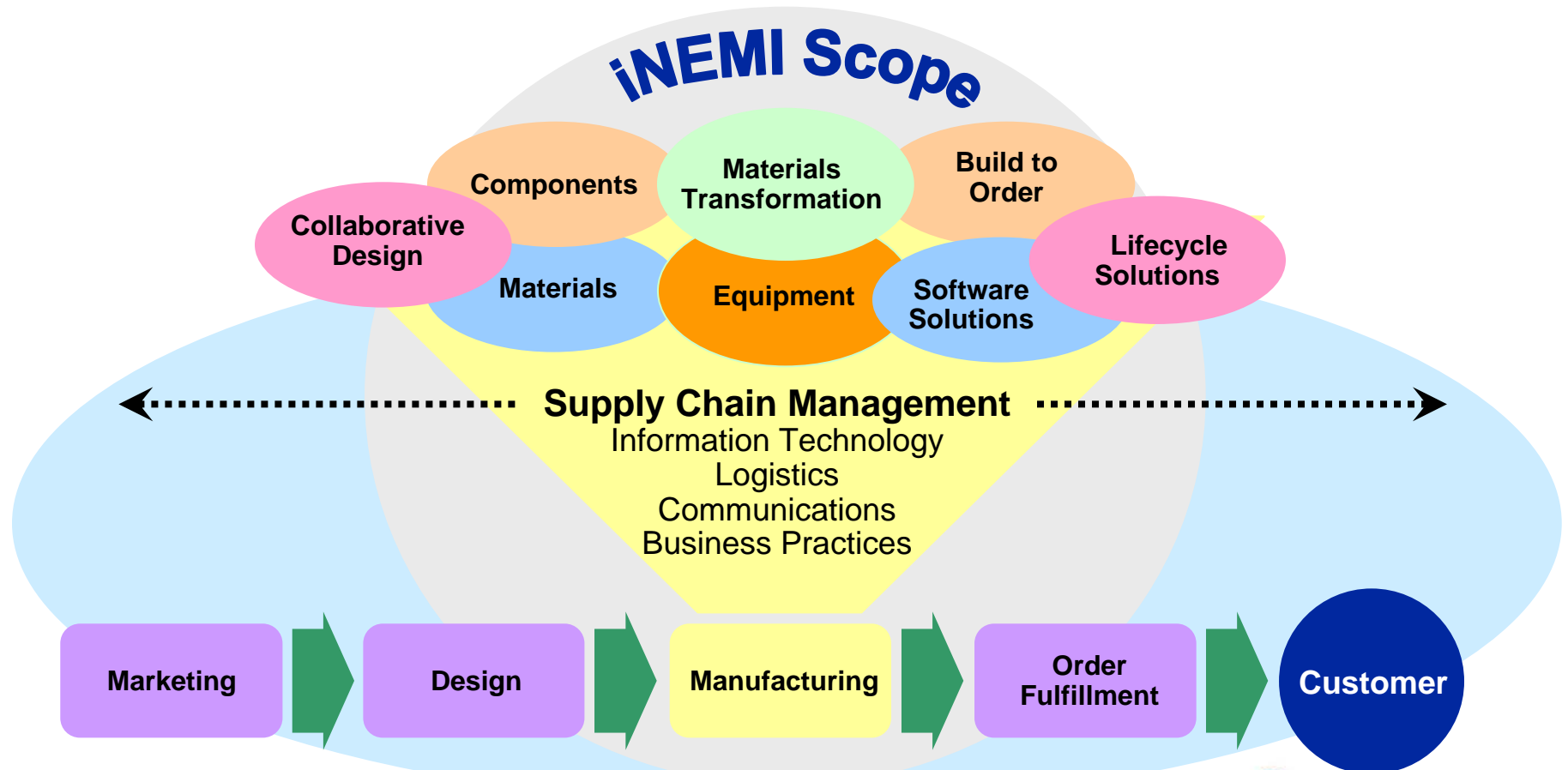
Industry Collaboration

Benefits of Participation

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iNEMI Mission

Identify and close technology gaps, which includes the development and integration of the electronics industry supply infrastructure.

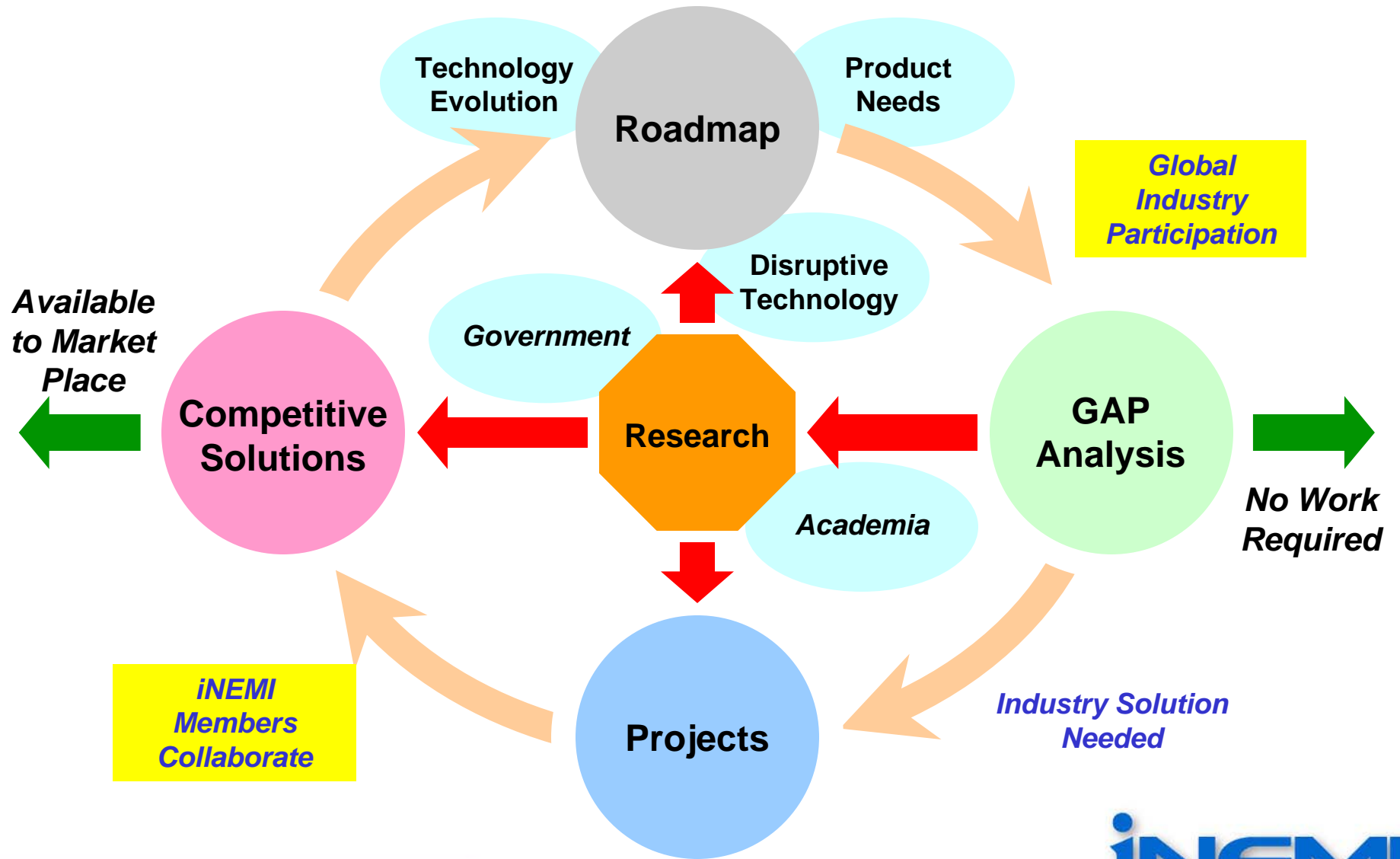


iNEMI

Collaboration Environment

- **Organization:**
 - 501 (c) (6) not-for-profit, R&D consortium
 - Collaboration framed by organization by-laws, intellectual property policy, and project agreements.
- **Anti-trust considerations:**
 - Anti-trust guidelines used to bound collaboration between competing firms.
 - Anti-trust laws are complied with.
- **Capabilities/services:**
 - Support to help organize & manage projects
 - Teleconference & WebEx
 - Project specific Information (web/ftp sites)
 - Monthly Member Newsletter
 - Project meetings at appropriate industry venues
 - Project report publication
 - Relationships with other Organizations
 - Roadmapping
 - Standards
 - Joint projects

Methodology



OEM/EMS Members



Supplier Members



Ciba



Association/Consortium, Government, Consultant & University Members



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®



NIST

National Institute of Standards and Technology

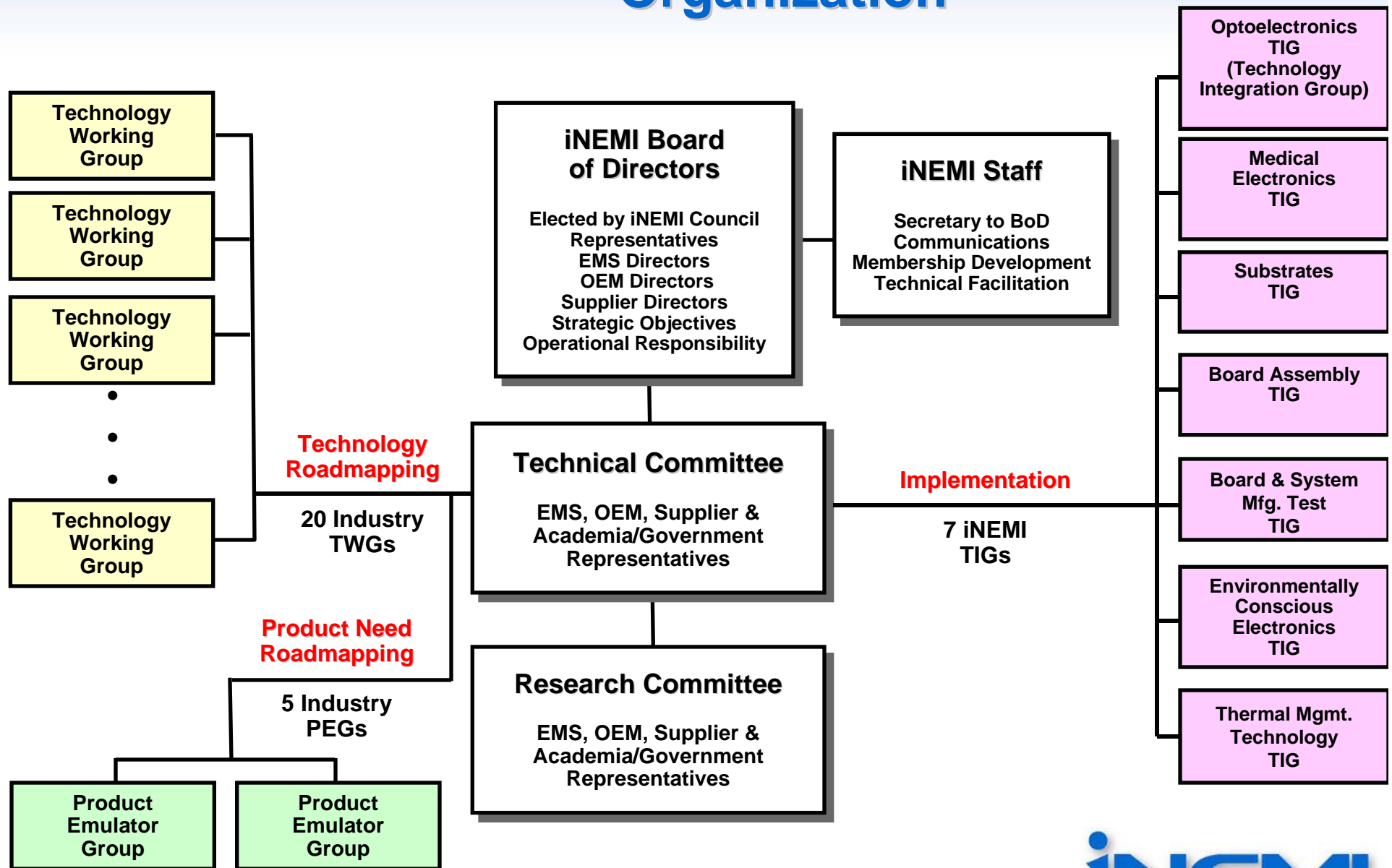
Développement
économique
et régional

Québec



iNEMI

Organization



Board of Directors

Directors

- 👉 Dr. Nasser Grayeli, VP of Assy Technology & Mfg., Intel – Chairman
- 👉 Dr. Marc Benowitz, Director Reliability & Eng. Infrastructure, Alcatel-Lucent
- 👉 Dr. B.J. Han, CTO, STATS/ChipPAC
- 👉 Monroe Huang, Mgr. Mfg. Technology Dev., Delphi Electronics & Safety
- 👉 Dr. Katharine Frase, VP Technology, IBM Microelectronics
- 👉 Dr. Sundar Kamath, CTO Assembly Technology, Sanmina-SCI
- 👉 Minoru Okamoto, VP CCC Electronics, Tyco Electronics
- 👉 Jeroen Schmits, President, Universal Instruments
- 👉 Michael Toben, Director Pkg. & Finishing Technology, Rohm & Haas

Ex officio Members

- 👉 Dr. William Anderson, Director, EEE Laboratory, NIST
- 👉 Fred Kuhlman, Co-Chair iNEMI Technical Committee, Delphi
- 👉 Jim McElroy, CEO, iNEMI
- 👉 Dr. Robert Pfahl, VP of Operations, iNEMI



Technical Committee

Members

- 👉 Frederick F. Kuhlman (Delphi Electronics & Safety), Co-Chair
- 👉 Dr. Robert C. Pfahl, Jr. (iNEMI), Co-Chair
- 👉 Mulugeta Abtew (Sanmina-SCI Corporation), Director of Technology Development
- 👉 Dr. Mostafa Aghazadeh (Intel Corporation), Vice President Chandler Assembly Tech Dev.
- 👉 Bill Ballard (3M), Senior Technology Manager
- 👉 Bill Barthel (Plexus Corp.), Manager, Manufacturing Technology Development
- 👉 Dr. Mario A. Bolanos (Texas Instruments Incorporated), Research Director
- 👉 Dr. Tai Yu CHOU (Foxconn), VP Personal Computer and Enterprise Product Groups
- 👉 Mike Davisson (Agilent Technologies), RoHS Tech Program Manager
- 👉 Dan Gamota (Motorola), Director
- 👉 Koen Gieskes (Universal Instruments Corporation), Vice President R&D
- 👉 Barbara Goldstein (NIST), Strategic Advisor to the Director
- 👉 Dr. Carol Handwerker (Purdue University), Professor of Materials Engineering
- 👉 Dr. Mahadevan Iyer (Georgia Institute of Technology), Director of Research
- 👉 Sherwin Kahn (Alcatel-Lucent)
- 👉 Dr. Sunny Liu (Huawei Technologies), Manufacture Technologies Center
- 👉 Dr. Alan Rae (NanoDynamics, Inc.), VP, Market and Business Development
- 👉 Rob Rix (Tyco Electronics), VP, Business Development
- 👉 Michael Roesch (Hewlett Packard), Manager Reliability and Test Engineering
- 👉 Peter Tomaiuolo (Celestica), Director of Corporate Technology
- 👉 Dr. Jie Xue (Cisco), Senior Manager



Leadership through Innovation

- **A proven approach for identifying the technology needs and gaps of the industry through our roadmapping process.**
- **A strong track record of developing a supply chain to introduce new materials, processes, and technologies into production.**
- **A research vision with three major thrusts:**
 - **Energy & the environment**
 - **Miniaturization**
 - **Medical electronics**

Key Accomplishments for 2007

- Released 2007 Roadmap to industry.
- Completed 2007 iNEMI Technical Plan.
- Completed 2007 Research Priorities.
- Supporting members in RoHS/WEEE transition.
- Establishing projects in new thrust areas for iNEMI.
- Expanded iNEMI efforts to Asia & Europe.
 - Opened Shanghai office
 - Hired consultant in Europe
- Recruiting leadership companies.



Statistics for the 2007 Roadmap

- **> 500 Participants**
- **> 265 Companies/organizations**
- **17 Countries from 4 Continents**
- **19 Technology Working Groups (TWGs)
(added Organic & Printed Electronics)**
- **5 Product Emulator Groups (PEGs)**
- **Over 1300 Pages of Information**
- **Roadmaps the needs for 2007-2017**



iNEMI

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iNEMI Asia

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Regional Center in China

- **iNEMI China Collaboration has been active for three years**
 - Member forums
 - Project support
- **Made decision in 2006 to proceed with China center**
- **China representative office registration was approved in July 2007**
- **Office is in the Cimic Tower in Pudong, Shanghai**
- **Dr. Haley Fu, Manager of Operations-China**





iNEMI

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iNEMI Europe

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2007 Priorities for iNEMI Europe

- **Grace O'Malley is iNEMI Manager of Operations-Europe**
 - Previously Manager of the Motorola Advanced Technology Center, Jaguariuna, Sao Paulo, Brazil.
- **Increase iNEMI Presence at Productronica**
- **Establish relationships with other organizations in Europe**
 - Associations: AEA, IEEE CPMT, SMTA, IMAPS Europe, VDMA/OE-A
 - European Union
 - Universities & institutes: Fraunhofer IZM, IMEC, VTT etc/

Productronica Meetings

- **European Roadmap Kick-Off Meeting- Wednesday, 14 November**
 - Co-sponsored by IEEE's CPMT, Fraunhofer IZM, and IMAPS Europe.
- **3 Meetings on iNEMI Programs**
 - **iNEMI Advanced Materials Research Projects-Tuesday, 13 November, 10:00-12:00**
 - **Development Needs for High Reliability Pb-Free Electronics-Tuesday, 13 November, 13:30-17:00**
 - **Medical Electronics Technical Plan-Thursday, 15 November, 10:00-12:00**
- **2 Medical Electronics TIG project meetings, at Productronica and TI**
- **2 Forum Presentations**
 - **2007 iNEMI Research Priorities and 2009 Roadmap-Tuesday, 13 November, 14:00-14:30**
 - **The Optimization of Pb-Free Soldering-Wednesday, 14 November, 15:00-15:30**

Profile of Successful Projects

The “sweet spot” of iNEMI Projects:

- **Addresses knowledge gap of industry**
 - Common problem
 - Best solved by working together
 - Often a pre-cursor to standards development
- **Brings together segment of supply chain to provide industry-wide response**
 - OEMs
 - EMS providers
 - Materials, Equipment, Software, and/or Component Suppliers
- **Direct alignment with member companies’ commercial interests.**



Examples of iNEMI Process

Gap	Challenges	iNEMI Actions
<p>Ensure reliability for high-reliability/ long-service-life products</p>	<ul style="list-style-type: none"> • Pb-free reliability cannot be predicted with the same certainty that SnPb can deliver. • Manufacturers of high-reliability products are likely to stay with conventional SnPb assembly processes until Pb-free knowledge gaps are closed. • Rapid conversion to Pb-free components is affecting continued availability of SnPb-compatible components – BGA is main concern. • Lack of industry-wide conversion date for high-reliability segments is causing confusion with supply base. 	<ul style="list-style-type: none"> • High-Reliability RoHS Task Force organized to address reliability concerns. • Published recommendations to communicate needs to the supply chain and standards groups. <ul style="list-style-type: none"> - Standardized mitigation practices for Tin Whiskers - Thermal requirements for complex assemblies - Assembly process and reliability requirements for modules. • Develop industry consensus on knowledge gaps and plans to resolve. • Spin-off group formed to address availability of SnPb BGAs.
<p>Reduce processing temperatures required by Pb-free soldering</p>	<ul style="list-style-type: none"> • Higher reflow temperatures can: <ul style="list-style-type: none"> - Negatively affect product reliability - Require tougher qualification requirements for components - Result in significant changes in manufacturing processes 	<ul style="list-style-type: none"> • Pb-Free Nano-Solder Project is working to develop a nano-solder paste that can suppress the melting point of Pb-free solders. • Have demonstrated the ability to produce nanoparticles of tin and confirmed a melting point depression on these particles.

iNEMI 2008 Priorities

- **Evolve iNEMI structure to meet needs of members (both users & suppliers) in key segments:**
 - Medical electronics
 - High reliability (Telecom, Computing)
 - High volume/portable
- **Complete initial Medical Electronics Project & build momentum for this segment.**
- **Establish “End Game” for High Reliability segments for Pb-free conversion:**
 - Prioritize remaining knowledge gaps
 - Spawn projects as required to close gaps.
- **Expand & strengthen miniaturization projects.**
- **Strengthen and expand activities in Asia & Europe.**





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