



iNEMI[®]

International Electronics Manufacturing Initiative

Medical TIG Forum

Welcome

*Chuck Richardson
Director, iNEMI*

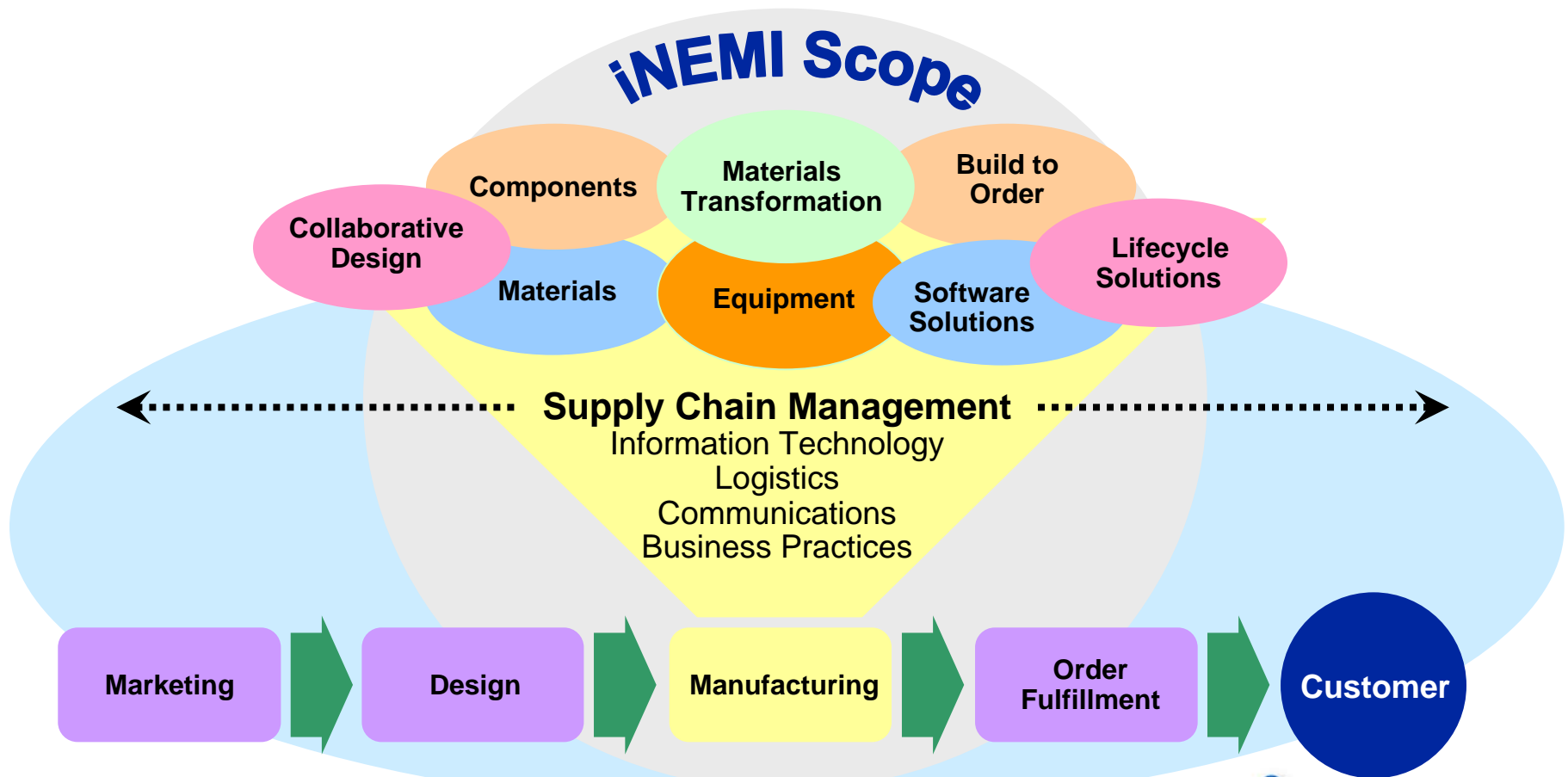
Advancing manufacturing technology

Hosted by:

FDA

iNEMI Mission

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



iNEMI

Who Are We?

- **iNEMI organization:**
 - Corporate membership
 - Not-for-profit, R&D consortium
 - Collaboration defined by organization by-laws, intellectual property policy, and project agreements.
- **Member companies/organizations:**
 - Leadership OEM, EMS, and Supplier companies
 - Government labs
 - Academic Institutions.
- **Small staff provides services to facilitate collaboration:**
 - Support to help organize & manage projects
 - Communication services for collaboration
 - Manage Relationships with other Organizations.

Global Operations

- iNEMI is headquartered in Herndon, Virginia, USA
- Opened an office in Shanghai and added a team member in Europe in 2007.
- Dr. Haley Fu is leading operations in Asia, based in Shanghai, China.
- Grace O'Malley is representing iNEMI in Europe from her base in Ireland.



OEM/EMS Members



Alcatel-Lucent

DELPHI



FLEXTRONICS



i n v e n t



MOTOROLA

JABIL



SANMINA-SCI



Supplier Members



Ciba



NAN YA



Association/Consortium, Government, Consultant & University Members



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®



ITRI
Industrial Technology
Research Institute

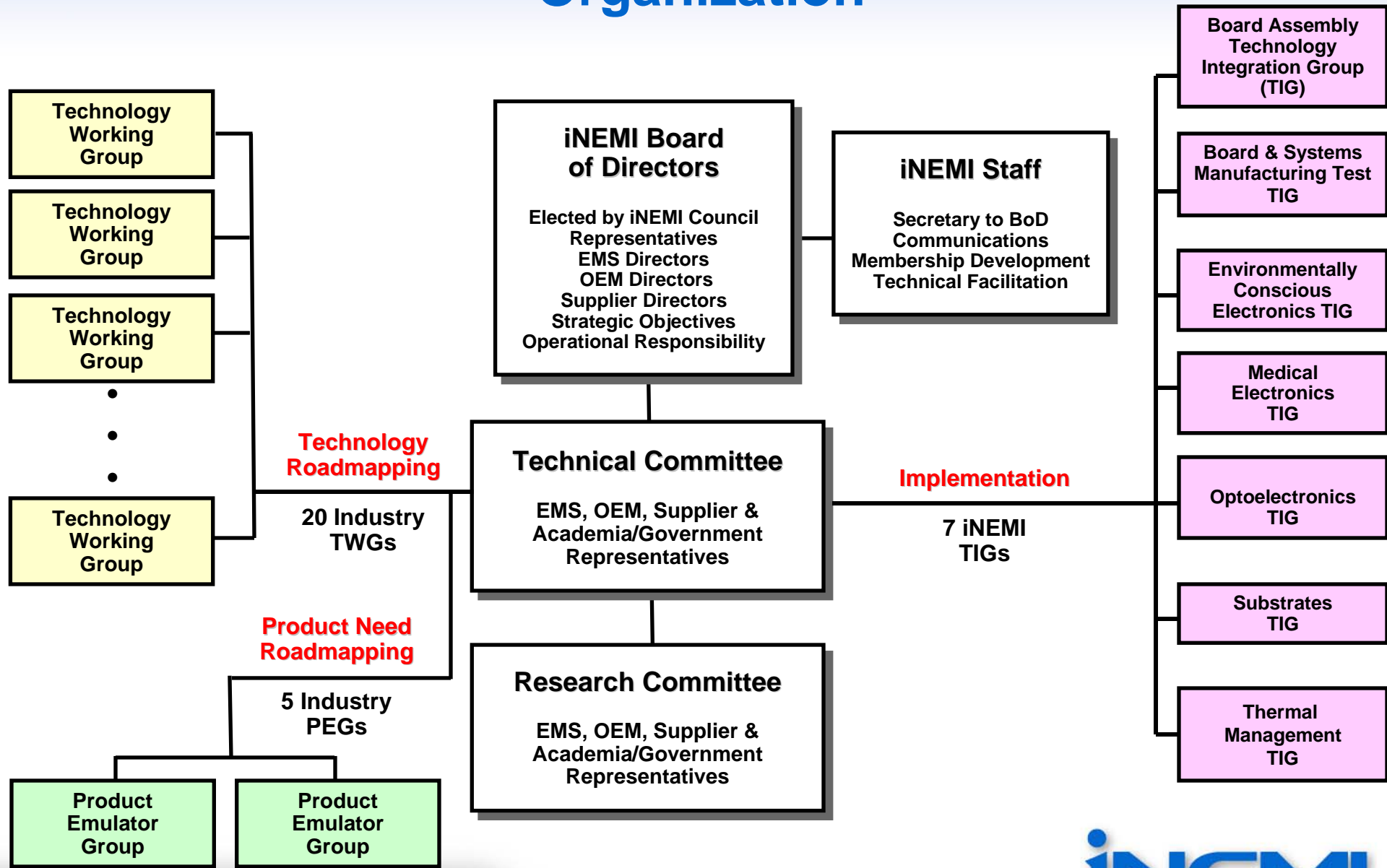


NIST

National Institute of Standards and Technology



Organization



Board of Directors

Directors

- 👉 Dr. Nasser Grayeli, VP of Assy Technology & Mfg., Intel - Chairman of iNEMI
- 👉 Dr. Marc Benowitz, Director, Reliability & Eng. Infrastructure, Alcatel Lucent
- 👉 Mark Brillhart, VP of Mfg. Operations, Cisco Systems
- 👉 Dr. Xu Dong Fei, Director Technical Strategy, Huawei Technology
- 👉 Monroe Huang, Mgr., Mfg. Technology Dev. , Delphi Electronics & Safety
- 👉 Dr. B.J. Han, CTO, STATS/ChipPAC
- 👉 Dr. Sundar Kamath, CTO, Assembly Technology, Sanmina-SCI
- 👉 Minoru Okamoto, President, CCC Electronics, Tyco Electronics
- 👉 Dr. Jean-Luc Pelissier, Chairman & CEO, Francisco Partners CBA Group
- 👉 Michael Toben, Director, Pkg. & Finishing Technology, Rohm & Haas

Ex-officio Members

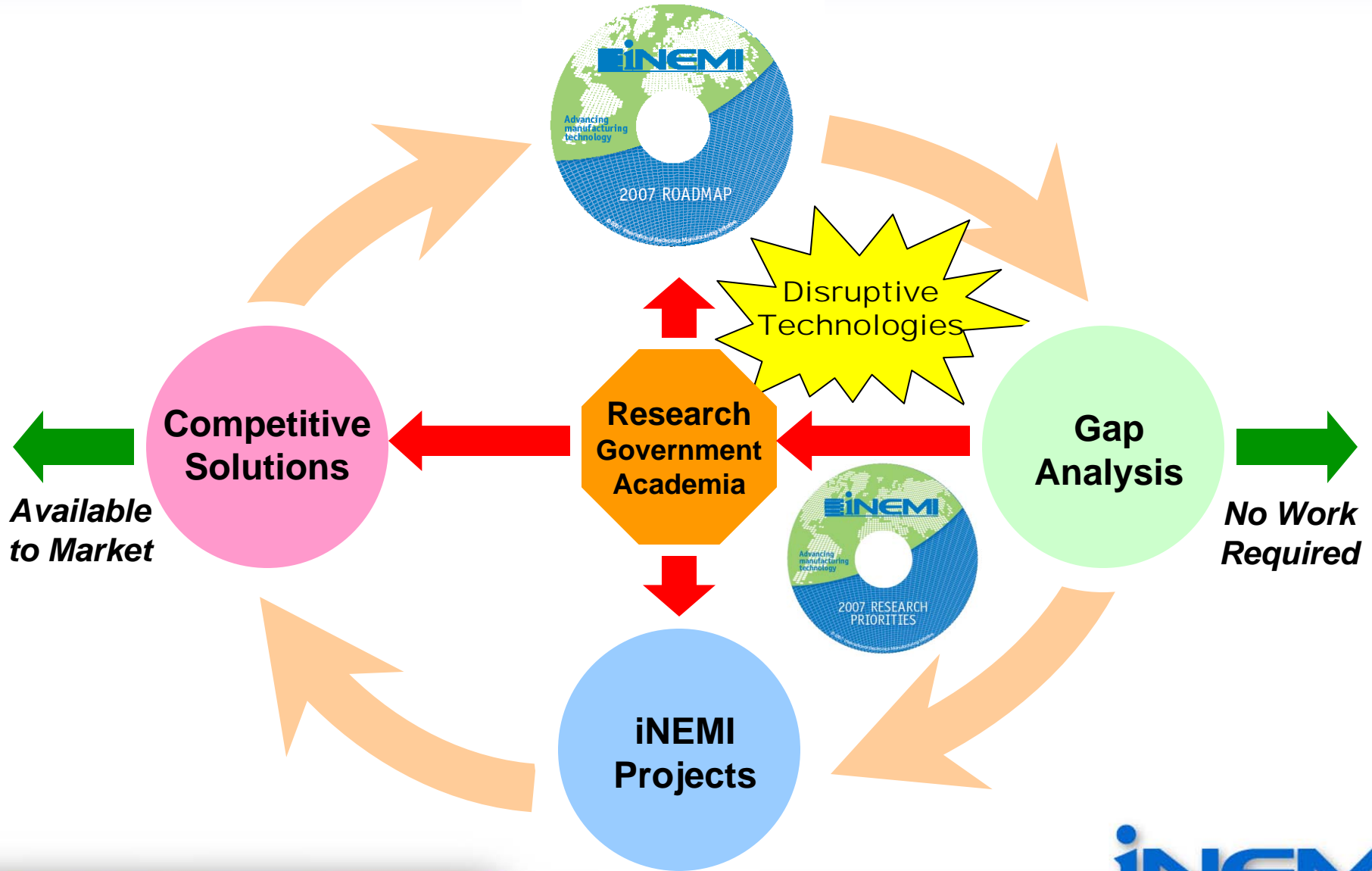
- 👉 Dr. William Anderson, Director, EEE Laboratory, NIST
- 👉 Jim McElroy, CEO, iNEMI
- 👉 Dr. Robert Pfahl, VP of Global Operations, iNEMI
- 👉 Dr. Jie Xue, Co-Chair, iNEMI Technical Committee, Cisco Systems



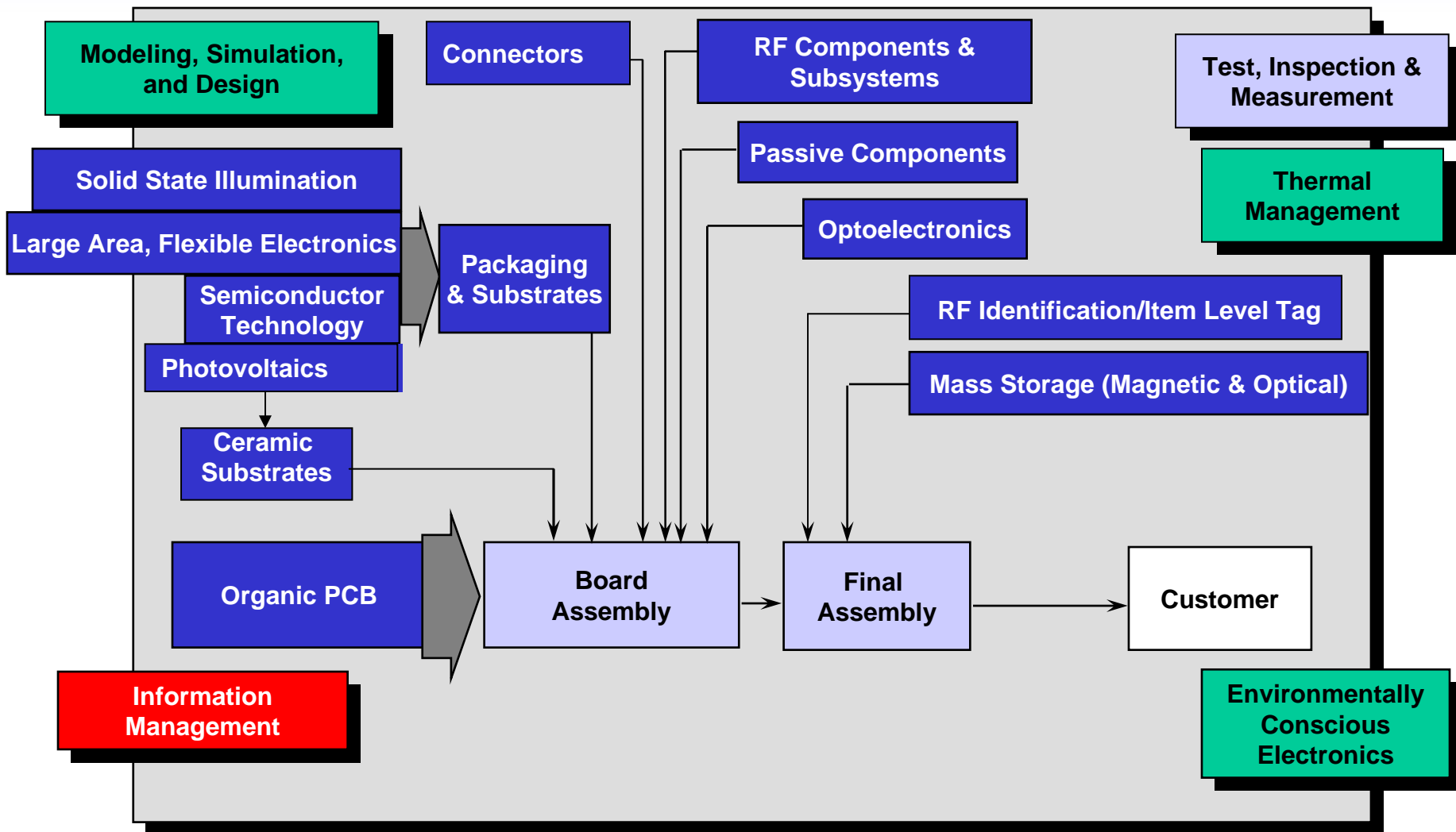
Leadership through Innovation

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

iNEMI Methodology



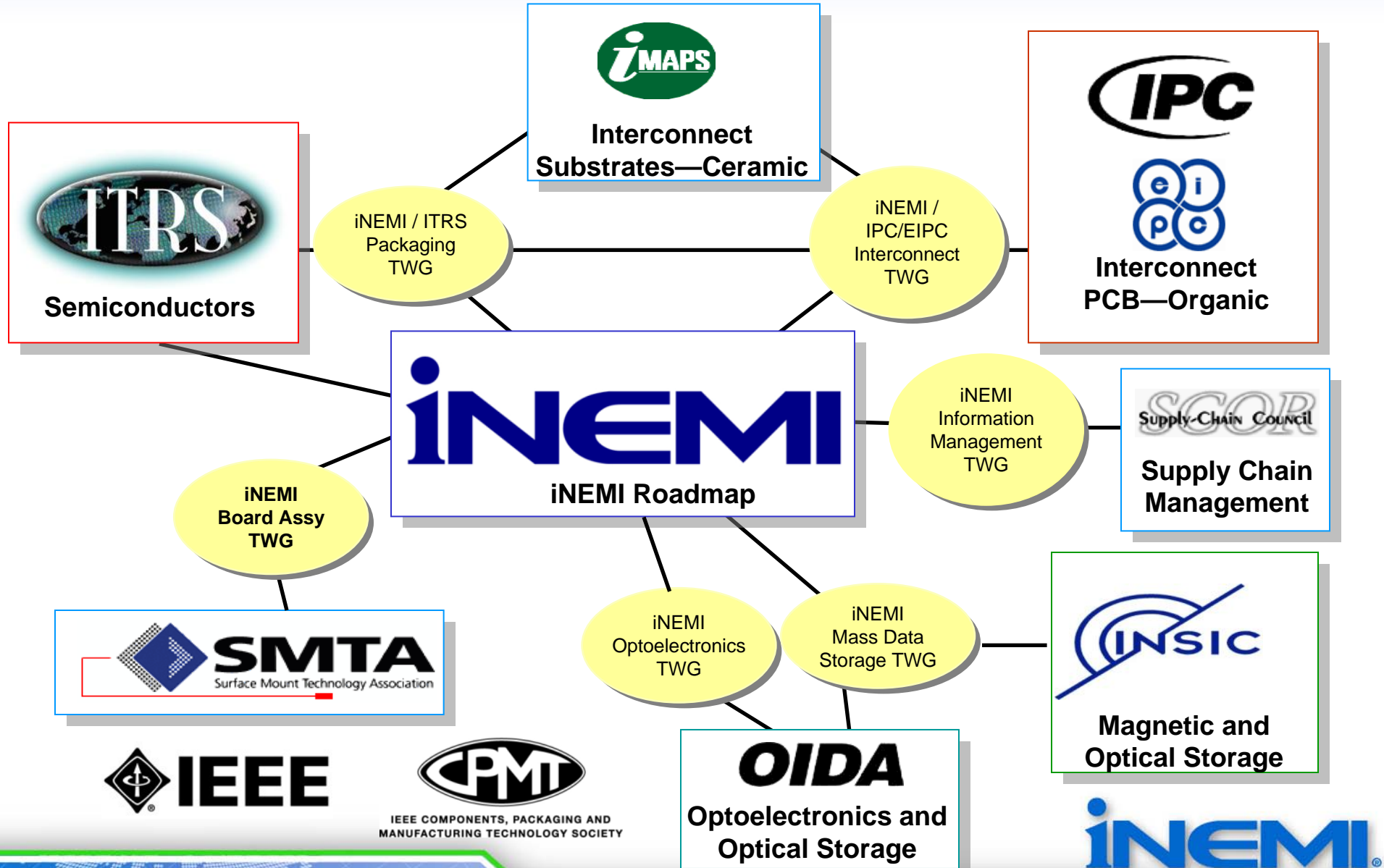
2009 Technology Working Groups (TWGs)



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

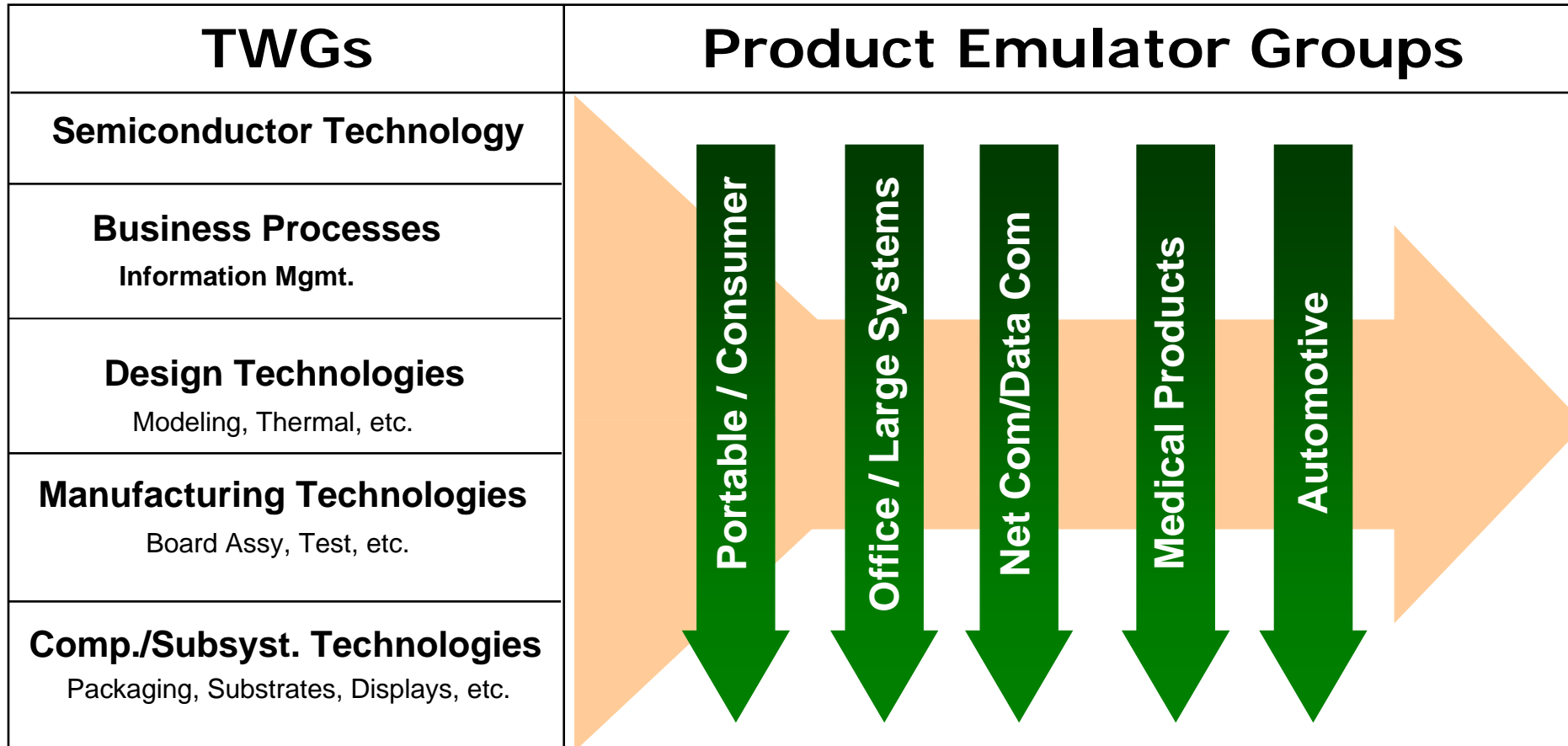


9 Contributing Organizations



Roadmap Development

Product Sector Needs Vs. Technology Evolution





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International Electronics Manufacturing Initiative

Project Development

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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

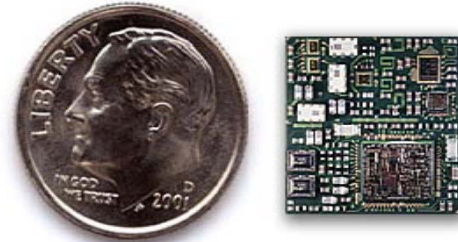
- New revenue streams to support recycling efforts
- Provides assessment methodology to support decision making
- Reduce energy usage
- Minimize risk of both negative environmental performance and business disruption
- Establish efficient supply chains to meet industry growth rates

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



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

Roadmapping

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

Projects

- iNEMI has projects in 7 different areas.
- Currently 20+ projects
- Projects address technology and business gaps.

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

Roadmaps and Projects

- **Board assembly**
- **Final assembly**
- **Test, inspection & measurement**
- **Connectors**
- **Interconnect substrates – ceramic**
- **Interconnect PCB – organic**
- **Mass data storage**
- **Optoelectronics**
- **Large Area, flexible electronics technology**
- **Packaging**
- **Passive components**
- **Photovoltaics**
- **RF components & subsystems**
- **RF Identification/Item Level Tags**
- **Semiconductor technology**
- **Solid State Illumination**
- **Information management**
- **Environmentally conscious electronics**
- **Modeling, simulation & design tools**
- **Thermal management**
- **Medical**

Roadmaps

- **Open to Industry**
- **Cover Entire Infrastructure**
- **Developed by TWGs**

Projects

- **Open to Members**
- **Focus on High Priority Areas**
- **Managed by TIGs**

Red = Both Roadmapping & Projects

Black = Roadmapping

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 a 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.**

Current iNEMI Projects

Board Assembly Technology Integration Group (TIG)

- **Pb-Free BGAs in SnPb Assemblies (writing final report)**
- **Pb-Free Component & Board Finish Reliability (*joint with Substrates TIG*)**
- **Pb-Free Nano-Solder**
- **Warm Assembly — Nano-Attach**
- **Board Coplanarity in SMT**
- **Pb-Free Alloy Alternatives**
- **Pb-Free Early Failure**
- **Solder Paste Deposition**

Board and Systems Manufacturing Test TIG

- **Functional Test Coverage Assessment**
Board Flexure Standardization
- **Boundary Scan Adoption**

Thermal Management TIG

New initiative:

- **Liquid Cooling**

Current iNEMI Projects

Environmentally Conscious Electronics TIG

- High-Reliability RoHS Task Force
 - Pb-Free Rework Optimization
 - Pb-Free Wave Soldering
 - BFR-Free, Phase II (*joint with Substrates TIG*)
- New initiatives:*
- Tin Whisker, Phase II
 - BFR-Free High Reliability PCB

Medical TIG

- Medical Components Reliability Specifications, Phase II
- Medical Substrates

New initiatives:

- Medical Reliability for MLCC

Optoelectronics TIG

- Fiber Connector End-Face Inspection, Phase II

Substrates TIG

- BFR-Free, Phase II (*joint with ECE TIG*)
- Pb-Free Component & Board Finish Reliability (*joint with Board Assembly TIG*)
- IPC-2581 Industry Adoption Initiative



Deliverables

“Advancing Manufacturing Technology”

iNEMI provides five important deliverables:

- 1. Technology roadmaps**
- 2. Technology deployment projects**
- 3. Research priorities**
- 4. Forums on key industry issues**
- 5. Position papers to focus industry direction**

www.inemi.org

Haley Fu-Asia

haley.fu@inemi.org

Jim McElroy

jmcelroy@inemi.org

Bob Pfahl

bob.pfahl@inemi.org

Grace O'Malley-Europe

gomalley@inemi.org

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