



Winter 2010



IMTI is a non-profit, member-based organization that supports and strengthens our nation's manufacturing community. For information about joining, call (865) 862-5667, email: info@imti21.org or visit imti21.org. [View the newsletter online.](#)

Inside this issue:

- IMTI—Ten Years in Pursuit of a Dream 1
- IMTI Year in Review 1
- Ten Imperatives for the Model-Based 2
- Radical Innovation in Design and Manufacturing 3
- Meet Charlie Neal 4
- Power Sources Technology Roadmaps 4
- InRAD unveils InSpire 5

IMTI – Ten Years in Pursuit of a Dream

It seems like only yesterday that DoD, DoC, DoE, NSF, and NASA representatives met with industry in Washington, DC and decided that a new organization was needed. The mission of that organization was to support the nation's manufacturing infrastructure, and the foundation of the decision was that we lacked a neutral broker with no agenda except a passion for the maintenance of a vision for manufacturing success. From that beginning, IMTI launched its pursuit of the dream – to support the resurgence in the nation's manufacturing sector. However, we soon became aware that our efforts needed focus. We developed a strategy that we have called (usually only to ourselves) our 1, 2, 3 strategy. This strategy has guided our efforts over most of the decade:

1. Produce the best plans that can be developed with input from a broad collection of perspectives.
2. Develop tools to provide unprecedented access to and knowledge about what is being done and what capabilities are available.
3. Based on the knowledge of what needs to be done – the plans – and what is being done, identify the voids and develop a means to fill them.

We have now spent a decade in executing this strategy and pursuing the dream of a better design and manufacturing enterprise, and have had some great blessings along the way. We have written literally thousands of pages of technology plans, but, far more importantly, we have seen initiatives created and solutions provided that had their genesis in the roadmaps. We have been blessed with great friends, great sponsors, and people who trusted us with their visions and ideas. We look forward to the next decade with renewed energy and excitement. Much has been done; however, there is still much to do.

IMTI's Year in review – 2009 was a great year!

IMTI was greatly blessed in 2009! We were fortunate to work for the Office of the Secretary of Defense, the Missile Defense Agency, and the Defense Logistics Agency in providing strategic support including studies, strategic investment plans, and technology roadmaps. In these roles, we were able to work with all of the armed services, other government agencies, industry, the national research community, and academia. Our mantra has always been and continues to be "serve our customers and the nation in the best way that is possible". It cannot be emphasized enough that IMTI is a facilitating organization. The credit for the value of the content goes to the participants in our



Typical Workshop in Progress



workshops and studies. The credit for visionary leadership goes to our sponsors who make the work possible and provide the strong support that is essential.

The assignments were quite diverse. Highlights from the last two years include:

- The conduct of a workshop and the delivery of a set of white papers on the topic of incentives for industry and government cooperation and collaboration.
- The publication of a benchmarking report of the international state of technology development and deployment for large scale composite structures.
- The delivery of a strategic investment plan for portable power sources (batteries).
- The conduct of two workshops that dealt with the important problem of materials and chemicals management and the publication of the documents from those workshops. The process continues with additional workshops planned for early 2010.
- A benchmarking study of industry best practices in integrated product realization. This study will enrich the knowledge base concerning present and emerging practices in addressing the timeline from requirements definition to delivered and supported product.
- Two events jointly sponsored by DoD and NASA with the intent of continually enriching the knowledge base. The Modeling and Simulation Applications in Design and Manufacturing technical meeting was a feast in practical applications. The Radical Innovation in Design and Manufacturing was a great coming together to explore ideas. These events were a beginning. Now we must build the "foundations under our castles in the sky."
- The continuous update of the Intelligent and Integrated Manufacturing Systems document and its vision.

... imagine what could be accomplished if we developed a methodology and toolset to support a broadly implemented infrastructure – raising the level of all boats – and delivering a national global economic advantage.

2010 promises to be a continuation of what has begun. We look forward to working with those who we know and who have supported IMTI over the years. We also look forward to meeting many new friends and setting our goals for higher achievement.

Ten Imperatives for the Model-Based Enterprise

The idea of achieving a model-based enterprise is catching on like a wildfire. Companies are becoming more aware that being fast to market at low cost and rapid response to requirements is essential for success, whether the customer is the government, the college student, or "Joe the plumber". We are seeing early implementations with dramatic impacts. Impacts, like a ten-fold reduction in response time from requirements to complete manufacturing plans and a factor of five times reduction in the cost and time of managing change, are being documented. Forty to sixty percent total impact in cost and time of all engineering functions, and reductions in manufacturing costs due to improved processes and process control are being realized. With these benefits from early implementation coming to fruition, imagine what could be accomplished if we developed a methodology and toolset to support a broadly implemented infrastructure – raising the level of all boats – and delivering a national global economic advantage. Toward that end, IMTI continues to refine the Intelligent and Integrated Manufacturing Systems document, and continues to seek the compelling business case for implementation. The "full load" of the IIMS document is overwhelming; we are dedicated to defining the vision in clearer terms. To begin a conversation that we hope will be important in 2010, we offer ten imperatives for achieving the model-based enterprise:

- Intelligent conceptualization & visualization capability supporting innovation in product and process design.
- Requirements-driven, accurate cost and risk modeling that supports trades for optimization.
- A complete, intelligent, product definition capable of driving all downstream applications.
- Automated, integrated, knowledge-based design and manufacturing planning advisors.
- Interoperable, accurate, and pervasive models that enable integration of processes across the enterprise.
- Integration of business, product realization, and operations functions.
- Model-Ready Supply Network that functions in a globally collaborative environment.



- Complete virtual product documentation that provides a comprehensive Technical Data Package integrating as-designed, as-planned, as-built, and as-used.
- Model-Based operations systems that drive production and sustainment, including model-based control.
- A flexible, well trained workforce enabled for model-based design and manufacturing.

Please note that there is no claim that these are “The Ten”. They are a starting point for exploration as we seek to identify the important goals, define our present capability, and put in place solutions that fill the voids and move us to the realization of a rapid response, cost effective, assured quality design and manufacturing environment. After all, it doesn’t matter what you call it; the goal is dramatically better performance.

Radical Innovation in Design and Manufacturing

The Department of Defense and the National Aeronautics and Space Administration hosted a national leadership forum on October 27 and 28, 2009. The purpose of the forum was to evaluate best practices in putting innovation to work and to seek methods that provide a clear understanding of ways to accelerate the incorporation of the process of innovation in producing new and exciting products – quickly and affordably.

The forum was held at Walt Disney World in Orlando, Florida with 147 participants from industry, government, and academia. The goals of the meeting were to:

- Learn about innovation success models from industry leaders.
- Benchmark some of the leaders in applied innovation: Procter & Gamble, General Electric, Parker Hannifin, Boeing, and Disney.
- Provide a hands-on innovation experience.
- Apply lessons learned from the emerging best practices to design and manufacturing.
- Brainstorm ways that a culture dedicated to radical innovation can change the economic competitiveness equation in

Start a movement that will plant innovation champions in our government agencies, corporate offices, engineering centers, and factories and grow the movement to drive new ideas to a waiting marketplace



Opening Session at Radical Innovation Forum in Orlando

favor of U.S.-based enterprises.

- Start a movement that will plant innovation champions in our government agencies, corporate offices, engineering centers, and factories and grow the movement to drive new ideas to a waiting marketplace.

The major challenge posed by this forum addressed methods to build a cultural, business, and technological foundation that embraces human creativity and supports a wellspring of innovation.

For more information about Radical Innovation or for access to the password protected website, contact Marilyn Giles at marilyn.giles@imti21.org or visit our website at imti21.org.

Meet Charlie Neal, IMTI Senior Manufacturing Strategist

Charlie Neal is the project manager for IMTI's work with DoD Power Sources. He has supported the development of the Power Sources Roadmap for the Power Sources Technical Working Group (PSTWG) and more specific documents on Fuel Cells and Hydrogen Pathways for the Defense Logistics Agency (DLA). He has led our work on Incentives and on Orthotics & Prosthetics. He also serves as a facilitator for most of IMTI's workshops with an emphasis on environmental issues and sustainability. Our customer's regularly remind us that Charlie is a good partner and a real asset to IMTI!

Charlie came to IMTI in 2005. Although his education is in chemical engineering and a general management MBA, Charlie served as the Deputy CIO for a major corporation for several years with responsibility for information technology management and infrastructure support. His rich IT heritage and diverse experience base that includes corporate-wide business process re-engineering contributes greatly to the broader understanding that he brings to his present work. Charlie and his wife, Linda, enjoy hiking, movies, quiet Friday evenings, and sunny days on the golf course.



Power Sources Technology Roadmaps

Initiated from the OSD ManTech program through the Joint Defense Manufacturing Technology Panel (JDMTP) and the DoD Power Sources Technical Working Group (PSTWG), the work in batteries and fuel cells – more generally power sources – started in 2004 with a workshop at SCRA in Charleston, SC. Since that time, IMTI has worked in a support role to the PSTWG on batteries and fuel cells and an additional roadmap for fuel cells and hydrogen pathways for the DLA.

The **Power Sources Technology Roadmap** has evolved over the last few years, headed in the beginning by a dear friend who we lost over a year ago, John Thompson, and now by Mark Gietter of the Army. Mark has provided consistent and insightful leadership - technical and managerial - as the team has driven toward better definition and clearer communication. The initial focus was on non-rechargeable, rechargeable, and reserve batteries - which comprise the current military technology base. Emphasis has also been placed on emerging fuel cell technologies in the lower power output range. These fuel cell technologies occupy the same application space as the batteries. The present roadmap takes key battery chemistries and key fuel cell types through an analysis of the important functionality and an assessment of the ability – with and without DoD investments – to meet that functionality. The assessment addresses both current capability and projected future capability. The roadmap is a large and complex document, and it provides rich information on which wise investments can be made for better satisfying the power sources needs of the young men and women who serve us as our warfighters. The document is now being managed in cooperation with the National Defense Industries Association and is undergoing review for broad based release anticipated for late 2009.

The **Fuel Cells and Hydrogen Pathways Roadmapping** document is less mature than the broader power sources document and is focused on the use of fuel cells and the Hydrogen fuel they consume. As fuel cells continue to advance, Hydrogen pathway development is needed to assure the necessary infrastructure for the production, storage, transportation, and finally – at the nozzle – the dispensing of hydrogen. The content of that document resulted from a workshop that was held in July, 2009 under the leadership of Leo Plonsky of the DLA – primary sponsor for this effort. Pete Devlin from the DOE was also a partner in this workshop to help leverage the strong DOE hydrogen





fuel cell program already in place.

InRAD Unveils InSpire at the Defense Manufacturing Conference 2009 in Orlando

In the opening section of this newsletter we talked about the 1, 2, 3 strategy. To pursue the second strategy, an unprecedented understanding of what is being done, IMTI created a subsidiary company, *InRAD*, LLC, which has pursued the development of a knowledge discovery system that aligns activities, projects, publications . . . to the needs of the individual. The early version of that system was called the Automated Knowledge Discovery System. It now has a completely new look and feel, and sports a new name.

We're excited to announce that the next version of *InRAD*'s Automated Knowledge and Discovery System will be released soon with a completely new and intuitive user interface. This, and future versions of the product, will be known as *InSpire*. *InSpire* will radically change the way you obtain information, convert it to knowledge, and apply it to the decision making processes that brings innovation to your workplace. *InSpire* maps information from a document based upon an analysis of the document's content far more accurately than the results of a simple keyword search. *InSpire* builds a single useful repository of current and historic information, all the technology info you need, in one easy-to-access place.

InSpire's users can tailor the system to almost any technology or business domain. *InSpire* is an Internet-based, platform-independent product that does not require installation on your local computer. It requires only your existing browser, such as Firefox or Internet Explorer. The *InSpire* engine runs on InRAD's servers and the results of your knowledge queries are delivered to your browser almost instantly. All you need is an Internet connection.

All IMTI members have full access to *InSpire* for Manufacturing Processes and Equipment. To request a demonstration of this powerful product please contact Rene' Graves at 865-862-5695 or rene.graves@inradllc.com

InRAD, LLC, was founded to provide tools for technology management. The resulting family of web-based software systems utilizes InRAD's leading edge semantic processing capabilities to support strategic technology decisions for enterprise and government. Please visit *InRAD*'s website at www.inradllc.com.

InSpire will radically change the way you obtain information, convert it to knowledge, and apply it to the decision making processes that brings innovation to your workplace.
