Highlights from the 2013 CIMdata PLM Road Map

CIMdata Commentary

Key takeaways:

- *CIMdata and MarketKey collaborated on the first-ever combined PI Congress and PLM Road Map, 9-10 October 2013 at the Indian Lakes Resort, Bloomingdale, Illinois*
- *As many as five parallel tracks kept the 330+ attendees moving to hear the many informative speakers*
- *Overall the move to Chicago was a success, bringing a new audience and energy to the PLM Road Map, providing new opportunities for knowledge sharing and collaboration*

On October 9 and 10, 2013, over 330 delegates attended the Product Innovation (PI) Congress 2013 and PLM Road Map™ at the Indian Lakes Resort in the Chicago suburbs. For the first time, CIMdata delivered its annual PLM Road Map conference in conjunction with the PI Congress, helping to draw the large crowd, populated with business and technical professionals from multiple manufacturing and process industries and countries. Stan Przybylinski, CIMdata's Vice President of Research, acted as the PI Congress Chair while Peter Bilello, CIMdata's President chaired the PLM Road Map.

The PLM Road Map™ included five tracks over the two day event:

- Simulation & Analysis (S&A)
- PLM Enterprise Value and Integration (PEVI)
- Systems Engineering
- Social Product Development & Collaboration (SPD&C)
- Digital Manufacturing

Simulation & Analysis Track

Dr. Keith Meintjes of CIMdata opened the Simulation & Analysis (S&A) track with a presentation entitled "Simulation Governance: Managing Simulation as a Strategic Capability." S&A has been among the fastest growing components of PLM for some years and CIMdata now estimates the global market to be about US$4 billion. In 2013 CIMdata published an S&A Market Overview and a full S&A Market Analysis Report[1] for calendar year 2012 results. In his talk, Dr. Meintjes noted there is increasing concern about simulation as a strategic capability to gain a competitive edge in product and manufacturing system development. One way to address this concern is Simulation Governance, described by Dr. Meintjes as a methodology to help better manage simulation at all levels.

He also described some recent research focused on adapting CIMdata's PLM Readiness Assessment to help companies understand how prepared they are to adopt Simulation Data Management. The assessment tool helps with project planning, and assesses capabilities in three areas: Organization (people), Process, and Technology. One assessment case study focused on a company revealed to be very weak in terms of process. The recommendation

[1] http://www.cimdata.com/en/online-store/market-analysis-reports?page=1

was to proceed with pilot studies to develop use cases and deepened understanding, and to not proceed with a production deployment in the short term.

Matthew Loew, Technical Director of Maverick Innovation Labs, discussed product development from a unique perspective: a manufacturer with legacy products whose basic architecture is decades old. In his talk, "Challenges and Opportunities in Advancing Modeling & Simulation and Conceptual Engineering Methods," he noted that tribal knowledge and long experience can inhibit innovation, and that concerted efforts must be made to bring modeling and simulation to bear early on, before any definition of the physical design, so the design space can be more completely explored.

Kenneth Rasche, Senior Engineering Manager from Whirlpool, spoke about "Collaboration with Systems of models within PLM." Mr. Rasche described how Whirlpool uses their PDM system (Windchill) to manage "Systems of Models" that characterize product performance. Whirlpool developed a hierarchy of models to describe components, subsystems and systems. Surrogate models are then used to carry 3D geometric effects into the system-level simulations.

Dr. Patrick Prescott, Leader of Modeling & Design, Manufacturing Sciences, at Owens Corning illustrated how simulation is used to improve and optimize the manufacturing process for glass fibers. In his presentation, "Modeling & Simulation of Composites Glass Fiber Manufacturing Processes and Data Management," Dr. Prescott stated that to improve collaboration and to support increased levels of simulation, Owens Corning adopted a simulation data management solution, ANSYS Enterprise Knowledge Manager (EKM). He claimed that this new solution improves data security, while also enabling sharing and reuse of simulation information.

Aymeric Rousseau, Manager of Vehicle Modeling and Simulation Section at Argonne National Laboratory (ANL), described "Autonomie," a collaborative model-based approach to address the coming fuel economy challenge. This project is a unique collaboration of government (ANL) and industry (General Motors, LMS) to develop a sustainable software solution that provides a plug and play environment for a diverse set of modeling tools and plant or component models.

Finally, a standing-room only crowd was present to hear Laura Michalske, Engineering Section Head, Health Modeling & Simulation for Procter & Gamble (P&G), describe their applications of simulation, and P&G's efforts to integrate and manage simulation in their PLM environment. P&G has many interesting applications of simulation to high volume, high speed manufacturing.

PLM Enterprise Value and Integration (PEVI) Track

The PEVI track included three presentations related to the core theme of PLM enterprise value and integration. Pam Schwandtner reviewed how Insitu, a Boeing-owned company that develops drones, successfully restarted a stalled PLM program. After spending almost a year working on their project, and being almost a year behind, they stopped and revisited their selection process. For the re-start, they chose Aras Innovator and used an Agile methodology to implement the solution. The project was completed on schedule and under budget, and the presentation highlighted metrics that illustrated the success of the implementation.

Mike Williams from Dow Chemical presented best practices for "Getting a PLM Program Approved." Mr. Williams reviewed the issues and expectations for Dow's global PLM implementation to support a large user base across 134 manufacturing facilities. According to

Mr. Williams, the key requirements for success were senior executive support, investment justification and planning, work process harmonization, and metrics linked to company objectives. He also cited the importance of developing a "functional coalition" of stakeholders to lead and support the project. The coalition included representatives from commercial, R&D, manufacturing, but also needed support from supply chain, quality and IT.

Tom Gill from CIMdata, owner of the PEVI track, reviewed the progress on developing a model to measure PLM Investment Sustainability. The model defines "sustainable PLM investments" as enabling the PLM solution to meet current and future needs without having to "rip and replace" significant parts of the PLM environment. The model consists of 17 elements including upgradeability, maintainability and openness. It is currently being tested and a production release is anticipated for the end of the 2013.

Systems Engineering (SE)

John MacKrell of CIMdata, and the leader of this track, spoke about CIMdata's work on a Systems Engineering Maturity model. The effort leverages previous model developments, and is undergoing early testing. CIMdata is conducting an initial surveys with industry, and Mr. MacKrell asked the attendees for help to expand his pool of potential respondents.

Cody Farinacci, President of the C-NO chapter of INCOSE spoke about "Living in the White Space – The Framework of Systems Engineering." The International Council on Systems Engineering (INCOSE) is a not-for-profit membership organization founded in 1990 to develop and disseminate interdisciplinary systems engineering principles and practices that enable the realization of successful systems. Mr. Farinacci described the systems engineering landscape, and asked the audience where they fit. He claimed that companies need to develop a systems engineering mindset. They need to move beyond pen and paper, and simple tools to deal with the increasing complexity in today's products. His talk highlighted the different requirements in different industries.

Craig Brown, the PLM Leader for GM, spoke about the "Benefits Realized from Systems Engineering." Mr. Brown is responsible for GM's enterprise-wide PLM strategy and planning. He claims that most people looking at or using systems engineering strategies and tools lack a real understanding of the benefits that can be achieved. He spoke about some early, promising results from his work at GM.

The Systems Engineering track also included a panel on "The Role of Multi-Disciplinary Simulation & Analysis" that included representatives from several leading PLM solution providers who are members of CIMdata's Systems Engineering Knowledge Council[2]:

- Todd McDevitt, Director of Product Planning & Strategy, ANSYS
- Sky Matthews, CTO, IBM Rational Systems Solutions
- Derek Piette, Product Manager, Embedded Systems, PTC
- Mark Sampson, Teamcenter Product Management Requirements / Systems Engineering, Siemens PLM Software

The lively discussion ranged across many topics, including:

- How can we improve the ability to do cross-physics verifications—is there anything new on the horizon?

[2] Information about CIMdata's Knowledge Councils can be found at http://www.cimdata.com/en/memberships

- What are best practices for managing software as a product item along with the electrical and mechanical parts (such as for a car)?
- What are the obstacles you most often see to integrating SE into the product development process?
- What can be done to facilitate implementing (and using) an SE infrastructure?
- What is the state of SE training today? What can companies do to increase the number of SE-knowledgeable resources today?
- As more things become "connected," creating the Internet of Things (IoT) is there a positive or negative impact on SE strategies?
- How do we promote systems thinking in the product development disciplines of today?
- What are the security issues that arise when we expose full systems designs to a broad audience?

Social Product Development & Collaboration (SPD&C) Track

"Great presentations in the Social Product Development and Collaboration track at the 2013 PI Congress / PLM Roadmap Conference," stated Dana Nickerson, Track Chair and CIMdata SPD&C practice lead. The attendees were really interested in how social is impacting product development and product lifecycle management (PLM).

Dana Nickerson's presentation, "Social Product Development and Collaboration – Engineering Perspective," discussed how applying information theory concepts improves collaboration and resulting innovation. When an information channel is stable and low entropy, a huge amount of information, new data can be put over the channel. Innovation requires newness, change and lots of information transfer. He also discussed how to create a stable information channel using social media concepts and capabilities.

John Mannisto, Engineering Director, Simulation Based Design from Whirlpool Corporation discussed his team's collaboration techniques in his "Simulation-Based Design" presentation. He described The "Commons," a place where Social Layers can combine and cross over to maximize cross-flow of knowledge. He wants to be able to "go viral" with good ideas. The Commons social layer is the "water cooler" where explicit and tacit knowledge can be combined.

Mr. Mannisto also told the audience that they need to do more than adopt new tools and new behaviors, they need to get their kids involved. People need to learn from outside of work, because social media is outpacing corporate collaboration. Workers need to combine the new-generation behavior with the old engineering. According to Mr. Mannisto, most engineering is based on "Newton, Euler, and a bunch of French mathematicians." What continues to change is the way we execute.

Bruce Richardson from Salesforce.com gave a presentation, "Social PLM and the Innovation Cloud," on the coming combination of customer relationship management (CRM), social and PLM. With 4.5 billion people connected to social networks today, social has become the new way for sharing what we are doing and what we care about in our personal lives. And for businesses there are over 150 million daily conversions happening that are related to products and companies—people are talking about your products and your company. This is how your brand is being created. You need to be able to connect with these customers.

Digital Manufacturing

As defined by CIMdata, Digital Manufacturing includes computational simulations, information management and real-time software controls enabling the technologies of manufacturing systems.

Jon Riley, Vice President of the National Center for Manufacturing Sciences (NCMS), told the audience that every great empire has the ability to manufacture. In his talk, "The Test of Timelines: Building a Digital Manufacturing Empire," he claimed that science plus manufacturing equals innovation. But the winning strategy is to innovate constantly, growing an organization's human capital through collaboration. Mr. Riley claimed that applying digital manufacturing technologies can speed up the process.

Tim Storer, a Program Manager at Procter & Gamble spoke about his experiences "Using Consumer Research Methods to Transform PLM Adoption." Getting people to use the system is about more than just functionality. User skills and feelings are just as important. Users may say that they want all of their actions to be "one click away," but they really think that "the U/I is not intuitive enough to quickly complete tasks." At a personal level, if systems are hard to use, individuals may feel "embarrassed and incompetent" and may just avoid the system.

Kevin Jonatzke, a Rapid Prototyping Sales Representative from Roush Manufacturing, focused on additive manufacturing, a rapidly evolving technology that is disrupting traditional manufacturing methods. In his talk, "Additive Manufacturing and Using It To Improve Product Development," Mr. Jonatzke described the technologies available to manufacture using polymers, metals or ceramics to produce the form, fit and function required. He admonished the audience that "what you just learned will be obsolete tomorrow but you need to know where you have been to appreciate where we are going."

Conclusion

For many years, the PLM Road Map conference was a fixture in the Detroit area, drawing manufacturers and technologists from a range of industries, but with a solid representation from the automotive industry. Moving to Chicago was a big change, one that also changed the make-up of the audience. The change resulted in an attendance list with as many business analysts and PLM managers as technologists, adding to the core audience that the Road Map has attracted in past years. The logistics of the event were challenging, but the response was positive. There is still a great energy in the PLM Economy, and events like these can bring together the skilled practitioner and the greenest rookie to the benefit of both parties. CIMdata is happy to provide such a venue, something consistent with our thirty-year history of helping to mature and evolve technologies, solutions, and business processes.

About CIMdata

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM. CIMdata also offers research, subscription services, publications, and education through international conferences. To learn more about CIMdata's services, visit our website at http://www.CIMdata.com or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495.533.666.