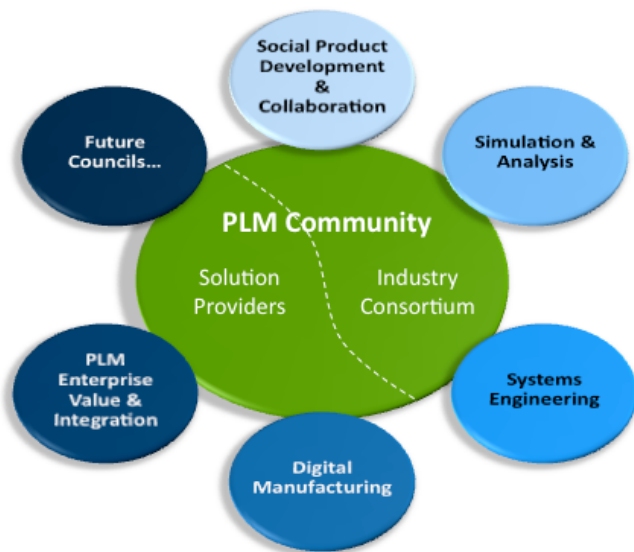


Simulation & Analysis Knowledge Council

Advancing the State of the Art for Simulation & Analysis

CIMdata’s Product Lifecycle Management (PLM) Knowledge Councils conduct in-depth research for both industrial organizations and PLM solution providers. They emphasize strategic as well as practical, tactical options for companies to follow as they further adopt PLM. The research defines best practices for topics of interest to industrial companies who use PLM to support their ongoing product development business strategies and for PLM solution providers interested in understanding and defining their PLM strategies and directions, and associated offerings.



CIMdata currently offers five PLM Knowledge Councils, as shown in the figure above. Council topics are developed from CIMdata’s PLM Community as technology evolves and industry requirements dictate. Additional information related to CIMdata’s PLM Community is located at www.CIMdata.com.

Simulation & Analysis Knowledge Council

Simulation & Analysis (S&A, also called Computer-Aided Engineering, CAE) is the application of physics-based digital simulation tools to evaluate the function and performance of product designs and manufacturing systems.

The Simulation & Analysis Knowledge Council (S&A Council) is concerned with the effective use of simulation in product and manufacturing development, and with providing

decision support over the entire product lifecycle from ideation to end-of-life disposition. For over a decade the S&A Council has provided a forum for end users and solution providers to define requirements and to help drive dramatic improvements in capability.

The S&A Council focuses on simulation-driven design. Simulation is used in conjunction with physical testing to validate final designs and confirm performance to requirements, a critical contribution. Upfront capabilities for multi-discipline (multi-physics) trade studies and model-based collaboration enable concurrent engineering across functional domains like mechanical, electrical, and software and controls.

The S&A Council supports the definition and advancement of a simulation framework—an integrated environment that provides tools to manage access to applications, data, and resources including high performance computing. The framework manages the complexity of multi-disciplinary system-level product performance, and integrates with other elements of the PLM environment, including product geometry, test, and requirements. The low level of PLM maturity at many companies presents a significant problem in defining, deploying, and integrating a simulation framework.

The S&A Council is concerned with people and process in addition to technology. Simulation Governance provides a strategy to make simulation repeatable, reliable, and robust to provide critical decision support for a wide range of users and customers. Best practices and capability assessments provide a basis to leverage simulation for a sustained competitive advantage.

The S&A Council is open to solution provider participants through corporate sponsorships, and to industrial companies through enterprise or individual memberships. More than fifty industrial companies have contributed consistently and participated in both our PLM Road Map™ conferences and our Simulation & Analysis workshops over the years.

S&A Knowledge Council Member Deliverables

Simulation & Analysis Workshops

The Council’s workshops provide a major opportunity for Council members to interact with each other and with other and others interested in the topic. To facilitate open dialogue

and advance industry's adoption of PLM technology, the S&A Council provides highly regarded forums for face-to-face discussions among industrial companies and S&A solution providers.

CIMdata's workshops and conferences encourage and enable leading industrial companies and solution providers to discuss the major issues in applying S&A to support product development. With solution providers actively engaged, these workshops provide an opportunity for the solution providers to identify critical technology gaps that may improve the capability of simulation to support decision-making over the product lifecycle.

With the co-operation of leading industrial users participating in the S&A Council, case studies are shared to provide guidance on strategies for the utilization S&A in the product development process, and for successful deployment to overcome organizational resistance to change.

Simulation Governance

In recent years the concerns of members to make simulation more effective have resulted in studies on how to properly manage simulation activities.

Simulation and analysis is the fastest growing segment of PLM. This growth, and the increasing reliance on simulation to support product development decisions, underscores the need for a Governance framework to manage Simulation and Analysis as a strategic capability that extends over the entire product lifecycle.

Governance is a structured way to develop and ensure technical competence. The focus includes capturing and re-using best practices, standardized work processes, embedded quality assurance, as well as the integration of product development with manufacturing and collaboration across the extended enterprise.

CIMdata will leverage its expertise in developing Maturity Models to assist our Council members to define and implement S&A Governance strategies.

Simulation & Analysis Maturity Model

A maturity model has been applied to measure readiness for Simulation Data Management, and assesses capability in the areas of organization (people), process and technology. The model is being extended to measure other aspects of S&A. It identifies critical competencies and assesses them on a 5-point scale of industry best practices. Such measurements of an organization's maturity provide actionable recommendations to improve capability.

Current S&A Council Research Topics

Under the guidance of collaborative members, the Simulation & Analysis Knowledge Council's agenda for the current research year is concentrating on the following critical issues:

- **System simulation and support for Model-Based Systems Engineering:** Simulation is a critical enabler for model-based systems engineering (MBSE). The council will address best practices for managing system models, including component libraries and configurations, and also for shared models that enable collaboration across functional domains.
- **Simulation process and data management:** SPDM is key to establish simulation as a repeatable, robust and reliable capability, and to capture best practices and organizational learnings (intellectual property). In spite of wide availability, adoption of these tools by end users has been slow. The Council will continue to assess best practices for SPDM and to document use cases, business cases and metrics for SPDM implementations.
- **Best practices, maturity assessment, and capability improvement:** See the maturity model description above.
- **Culture change and organizational resistance:** S&A is just one component of many companies' drive to a complete digital definition of their products and their development processes. Such efforts often encounter significant resistance, and require concentrated efforts to foster adoption, manage change and provide training. The Council will continue to define strategies for the most effective use of simulation and its integration in the overall PLM environment.

2015 Events

- PLM Road Map™
- US Workshop

Publications

- Archived publications and reports.
- Any additional reports generated during the membership term.
- Maturity Model for Simulation & Analysis.

PLM Presentations and Audio from PLM Road Map 2015

All presentations from PLM Road Map events are provided.

Membership Levels

Corporations who sponsor the S&A Council include both industrial companies and PLM solution providers. Two levels of membership are offered: Enterprise and Individual. The benefits for each level of membership are described below.

Enterprise Members

Enterprise members receive the following benefits:

- Two primary contacts who receive all S&A Council deliverables.

- Four secondary contacts.
- Redistribution rights within the company of archived reports from past CIMdata PLM Knowledge Council research activities as deemed appropriate by the S&A Council's Practice Lead.
- A one-hour web conference with CIMdata consultants to cover specific ongoing issues critical to the member company that CIMdata's collaborative analysis may effectively address.
- Each primary contact has telephone and email inquiry privileges to the S&A Council's Practice Lead.
- Participation in surveys and discussions that help drive and shape the critical issues that are researched.
- Each primary and secondary contact has web access to reports issued by other CIMdata programs, where the S&A Council's Practice Lead has determined they are of direct interest to S&A Council members.
- Each enterprise member receives two registrations to CIMdata-organized S&A Council events (e.g., PLM Road Map, S&A Council workshops, seminars, regional briefings, and teleconferences). Additional registrations are available at a discount.

Individual Members

Individual members receive the following benefits:

- One primary contact who receives all S&A Council deliverables.
- Redistribution rights within the company of archived reports from past CIMdata PLM Knowledge Council research activities as deemed appropriate by the S&A Council's Practice Lead.
- Telephone and email inquiry privileges with the S&A Council's Practice Lead.
- Web access to reports issued by other CIMdata programs, where the S&A Council's Practice Lead Manager has determined they are of direct interest to S&A Council members.
- Access to executive summaries from all PLM Knowledge Councils' research.

- One registration to seminars, regional briefings, and teleconferences scheduled at CIMdata's discretion, on timely topics of interest to S&A Council members.
- One registration to the PLM Road Map conference.

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) solutions. Since its founding over thirty years ago, CIMdata has delivered world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM-enabling technologies.

CIMdata works with both industrial organizations and solution providers of technologies and services seeking competitive advantage in the global economy. CIMdata helps industrial organizations establish effective PLM strategies, assists in the identification of requirements and selection of PLM technologies, helps organizations optimize their operational structure and processes to implement solutions, and assists in the deployment of these solutions.

For PLM solution providers, CIMdata helps define business and market strategies, delivers worldwide market information and analyses, provides education and support for internal sales and marketing teams, as well as overall support at all stages of business and product programs to make them optimally effective in their markets.

In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through PLM certificate programs, seminars, and conferences worldwide. CIMdata serves clients around the world from offices in North America, Europe, and Asia-Pacific.

To learn more about CIMdata's services, visit our website at 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.