

Advances in Model-driven System Design Symposium

Keynote Presentation:

“System Models for Systems Engineering and Product Development: How and When do We Need Them, and at What Cost”

Dr. Laurent Balmelli, Manager – Rational Software Group, IBM

Prospectus

In this presentation, we give an overview of the trend for applying a modeling paradigm to cope with the inherent complexity of the system engineering activities. Although often seen as an attractive approach, modeling comes at a cost, and benefits are not earned without a careful application of this emerging technology. As a result, the industry has been slow in adopting modeling as a solution to product development pains. We discuss some current successful applications and expose some of the key issues related to this approach.

Presenter Biography

Dr. Laurent Balmelli is currently a manager at IBM Rational Software Group in charge of architecting and executing the development of the new generation of offerings and tools for Systems Engineering and Product Development. Before that, he had been a Research Staff Member at T.J. Watson Research Center and IBM Tokyo Research Labs for six years.



Dr. Balmelli holds a Ph.D. in applied mathematics and M.S. in Computer Science. In addition, he has more than 15 patents, two best paper awards and is one of the lead authors of the OMG SysML language specification. Dr. Balmelli also is an invited professor at Keio University in Tokyo, Japan, where he currently resides. At Keio, he is teaching a graduate course on model-driven systems engineering and product development.

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Presentation: **“Recent Experiences in Model-driven Development”**

Andrew Vandivort, Manager – Advanced Programs,
Common Software Technology Section, Raytheon Missile Systems

Prospectus

This presentation will explore recent trends in Model-Driven Development (MDD) – both within Raytheon and the larger mil-aero community – with specific focus on recent experiences using MDD approaches to developing real-time embedded software. A discussion of MDD lessons learned, including motivations for using MDD, risks and paths forward will be addressed.

Presenter Biography

Andrew Vandivort is the manager of the Advanced Programs, Common Software Technology Section at Raytheon Missile Systems in Tucson, AZ, and serves as principal investigator for multiple software R&D initiatives – focused on the adaptation and insertion of DoD, university and commercial technologies into the Missile Systems product portfolio. Mr. Vandivort is on the leadership teams of the Raytheon Software and Processing Systems Technology Networks.



He has over 25 years of experience in systems and software development and has published papers in the areas of component based software architecture and model-based software development. He is currently a Senior Principal Software Engineer, and holds B.S. degrees in Electrical and Biomedical Engineering from the University of Southern California and an M.S. degree in Electrical Engineering from The University of Arizona.

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Presentation:

“Agile Methods and Practices in a Model-driven World”

Kevin Gary, Assistant Professor — Department of Engineering,
Arizona State University at the Polytechnic Campus

and

Harry Koehnemann, Professor of Practice — Department of Engineering,
Arizona State University at the Polytechnic Campus

Prospectus

Over the past few years, agile development practices have seen a recent resurgence. What some viewed a few years ago as the *counter culture* of software development practices has become mainstream and even espoused by the *establishment*. This resurgence is due in part to the many documented agile success stories for rescuing failing projects through practices including continuous development, team communication, customer collaboration, adaptive planning, and many others. However, most agile success stories come from relatively narrow projects – very small teams, mostly co-located team members, narrow solution technology skills, etc. This talk discusses how agile practices can scale to large, model-driven projects. It first presents the agile practices and then discusses how well individual ones do or do not scale. Participants will learn the agile practices that scale well, those that don't, and those that scale with some assistance.

Presenter Biographies

Kevin Gary is an Assistant Professor in the Department of Engineering at Arizona State University at the Polytechnic Campus w. Kevin's areas of specialization include software engineering, business process automation/workflow, agile methods, and open source software. Kevin is active in promoting ASU Polytechnic's ties to industry by serving as co-Director of the Distributed and Enterprise Applications Consortium (<http://deac.asu.edu/home/>), leading industry-funded projects, and connecting students to industry leaders through the Software Enterprise. Kevin joined ASU after several years in industry as a software architect and developer in domains such as eLearning and C4I systems. In addition to funded applied research projects, Kevin actively consults with various organizations in areas such as agile methods, open source software, software architecture, and enterprise system performance analysis.



Harry Koehnemann is a Professor of Practice in the Department of Engineering at Arizona State University at the Polytechnic Campus where he teaches classes on distributed and web-based computing, enterprise software architectures, and agile software engineering practices. His areas of interest include agile software processes, distributed applications and model-driven systems development practices.



Harry has played a variety of roles during the last 15 years as developer, mentor, and educator. He has worked on projects ranging from 5-developer web applications to large systems involving hundreds of geographically and organizationally distributed developers. In addition, Harry has consulted for a variety of customers both large (Motorola, Intel, General Dynamics, Raytheon, Ameritech) and small (Unicon, Buzzeo, Orbital Sciences) to name a few. This experience provides him a broad perspective on the unique needs of different software development organizations. Harry continues to consult in industry as a Senior Technical Consultant for Rocket Gang, an IBM-Rational Premier Business Partner. Harry received a B.S in Computer Engineering from Northern Arizona and a M.S. and Ph.D. in Computer Science from Arizona State University.

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Presentation: “Obstacles to Successful Model Based Development and How to Overcome Them”

Stephan vanHorn, Staff Systems Engineer – Model-based Development Initiative,
Software Center of Excellence, Honeywell Aerospace

Prospectus

This presentation will explore common obstacles to successful adoption of model-based development (MBD) technology along with techniques to overcome them. The major obstacles discussed are:

- misperceptions of what MBD really is and how its benefits can be realized
- how to deal with legacy systems and work products
- organizational barriers between system and software engineering
- general resistance to change, and
- cost of MBD training/tools/resources.

Presenter Biography

Stephan vanHorn leads the Software Center of Excellence Model-based Development Initiative and chairs the Honeywell Aerospace Model-based Development User Group. He serves as a consultant to model based software intensive product development teams across Honeywell Aerospace and is a member of several Honeywell Aerospace software and systems leadership teams. His current focus is on supporting model-based development practitioners and demonstrating practical applications of modeling and simulation technologies.



Stephan has over 25 years of systems and software development experience ranging from Trident ballistic submarine weapons systems to C-130J flight management systems. He is currently a Staff Systems Engineer and holds a B.S. degree in Computer Engineering from the University of New Mexico.

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Presentation: “Harmony/SE – Model-based Systems Engineering”

Dr. Hans-Peter Hoffmann, Chief Systems Methodologist,
IBM

Prospectus

This presentation gives an introduction to the model-based systems engineering process Harmony/SE that systems engineers can use to capture requirements and specify a system architecture. SysML is used exclusively for the representation and specification of system characteristics. This allows a seamless transition to UML-based software development. The approach uses model execution as a means for requirements verification and validation.

Harmony/SE is part of the integrated systems / embedded software development process Harmony and has been applied successfully at various customer sites.

Presenter Biography

Dr. Hans-Peter Hoffman Dr. Hoffmann received a Master’s degree in Nuclear Physics, and a Ph.D. in Fluid Dynamics (Shipbuilding). He has over 25 years of experience in the design and development of complex systems in the aerospace/defense industry (submarines, tanks, missiles, space crafts, and commercial/military aircrafts) as well as in the automotive industry. As Director of the Simulation Department of the Missile Division at MBB, Germany (now EADS) he developed a model-based methodology for the design and analysis of missile flight control systems — especially via hardware-in-the-loop simulation.



A renowned and respected specialist in model-based, real-time systems design, he is responsible for delivering senior-level consulting, mentoring, and training to embedded systems developers.

Companies in the aerospace/defense industry include Alenia, Airbus Industries, BAE Systems, Boeing, Chengdu Aircraft, EADS, Eurocopter, General Dynamics (USA, Canada), GIAT, JPL, Lockheed Martin, Northrop Grumman, NASA, SAAB, Raytheon, and Thales. Companies in the automotive industry include BMW, DaimlerChrysler (Germany, USA), Ford (UK, USA), GM, PSA, Fiat, VW, and respective suppliers in Europe and the US.

Dr. Hoffmann developed together with Dr. Bruce Douglass the Telelogic Integrated Systems/Embedded Software Development Process HARMONY⁰, which combines SysML-based systems engineering and UML-based software engineering.

Dr. Hoffmann can be reached at hoffmape@us.ibm.com.