



PHYSICS-BASED MODELING IN DESIGN & DEVELOPMENT FOR U.S. DEFENSE CONFERENCE

*“Design Innovation
to Improve DoD
Acquisition”*

ANNOUNCEMENT AND CALL FOR PAPERS

NOVEMBER 14-17, 2011

HYATT REGENCY DENVER TECH CENTER ► DENVER, CO

WWW.NDIA.ORG/MEETINGS/2170

EVENT #2170

CONFERENCE ANNOUNCEMENT

A major conference on advanced physics-based modeling for use within the U.S. defense complex is being initiated to investigate the capability and applications of highly advanced physics-based modeling to improve the acquisition and design, development and testing of U.S. defense systems. This conference is the first of its type and is sponsored by the National Defense Industrial Association's Systems Engineering Division, and is being supported by the Assistant Secretary of Defense, Research & Engineering, High Performance Computing Modernization Program.

BACKGROUND

Acquisition of defense systems now takes far longer than ever before, partly due to increased rules, regulations and oversight and in great part due to the ever-increasing complexity of defense systems. Such lengthy acquisition times are costly and more often than not the real user requirements have changed dramatically since initiation of the system acquisition. One approach that holds promise for reducing acquisition time and risk is the use of multiphysics-based performance analysis and design models and tools utilizing high performance computers. These tools are providing many industries and government organizations significant competitive advantage where they have been utilized. The continuing exponential growth in computing power is enabling those organizations to develop and apply analysis and design codes that include all the important physical effects that determine the physical behavior of complete systems. These codes are now able to provide accurate answers in the critical time frames useful for product development, and future computer systems will allow even greater accuracy and shorter turn-around times. Major barriers to more widespread use include the limited availability of such tools due to the challenges of developing and deploying them, and transition of the tools to the relevant engineering communities and adoption by them. Companies such as Goodyear Tire and Boeing have developed this type of software in-house and are using it in their product development processes. Other companies use commercially developed software for the same purpose. Assistant Secretary of Defense, Research & Engineering, is launching a new research initiative, System 2020, to reduce acquisition time. A key focus of the initiative is model-based engineering.

DoD CREATE PROGRAM

The Department of Defense initiated the Computational Research & Engineering Acquisition Tools and Environments (CREATE) project in 2008 as a long term effort to enable major improvements in the acquisition process with the following goals:

- ▶ Prevent defects and design flaws early in the acquisition process
- ▶ Reduce rework thereby enabling faster system deployment
- ▶ Reduce experimental testing time and effort through analysis of virtual prototypes

It would accomplish this by injecting multi-physics based predictions early within the design and analysis process, by developing and deploying production quality design and analysis software that is adaptable and maintainable, and developing and deploying multi-physics based computational engineering tools that exploit next generation high-speed computer resources. These tools have the real potential to dramatically reduce the overall time and effort required to design and develop DoD systems and products in fixed and rotary wing aircraft, ships, propulsion systems, antennae, and related systems, while greatly improving accuracy as well. Some parts of industry, both commercial and defense, have done similar work in recent years. The Conference seeks to share more details of the CREATE Program models as well as explore the promising tools from other sources.

CONFERENCE OBJECTIVES

The goal of the conference on Physics-based Modeling in Design & Development for U.S. Defense is to facilitate design innovation to improve DoD acquisition by speeding adoption of advanced models and tools by the U.S. defense government/industry complex to reduce acquisition time, cost and risk and improve system performance. The conference will build a community of interest in this area by bringing together the practitioners engaged in developing, deploying and utilizing these types of models and tools to allow them to discuss and share their progress and lessons learned in these areas. The topics of interest include:

- ▶ Methods for development, deployment and support of multiphysics-based application software for defense systems
- ▶ Applications of multiphysics-based software for design and analysis of defense systems for all stages of acquisition
- ▶ Software engineering practices for the development and deployment of these tools
- ▶ Systems engineering approaches that utilize these tools to reduce acquisition time, cost, and risk
- ▶ Conceptual design and design optimization using multiphysics-based computational tools
- ▶ Using these tools to improve test and evaluation effectiveness and efficiency
- ▶ Methods for generating weapon system geometries and meshes for design and analysis

CONFERENCE CHAIRS

Conference Chair:

- ▶ Mr. Bob Rassa, *Director, Engineering Programs, SAS, Raytheon*; rcrassa@raytheon.com

Technical Program Chair:

- ▶ Dr. James Coolahan, *Johns Hopkins University Applied Physics Lab*; james.coolahan@jhuapl.edu

Technical Program Co-chair:

- ▶ Mr. Jeff Bergenthal, *Director, Advanced Programs, Lockheed Martin Global Training and Logistics*; jeff.bergenthal@lmco.com

CONFERENCE PLANNING TEAM

Mr. Sam Campagna, *Assistant Vice President, Operations, NDIA*
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Ms. Allison Doherty, *Meeting Planner, NDIA*
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CALL FOR PAPERS AND CONFERENCE TOPICS

The conference seeks papers and tutorials in the following areas:

- ▶ Use of high-performance computing in design, development, and testing
- ▶ Approaches to rapid design and prototyping
- ▶ Effective user interfaces for physics-based models
- ▶ Components for generating geometries and meshes
- ▶ Uses of physics-based modeling during development testing
- ▶ Software engineering practices in the development of physics-based models
- ▶ Systems engineering approaches in the use of physics-based models
- ▶ Industry and Government collaboration in the use of physics-based models for system acquisition
- ▶ Methods for the effective deployment and support of physics-based models
- ▶ Advances in high-performance computing and physics-based modeling for:
 - ▶ Aircraft and Ship Propulsion Systems
 - ▶ Armaments and Ballistics
 - ▶ Armor and Blast Protection
 - ▶ Bombs, Warhead, and Munitions
 - ▶ Chemical Biological Defense
 - ▶ Combat Vehicles and Tactical Wheeled Vehicles
 - ▶ Command, Control, Communications, Computers, Surveillance, Intelligence, Reconnaissance
 - ▶ Fixed-wing and Rotary-wing Aircraft
 - ▶ Engines and Motors for DoD systems
 - ▶ Explosion and Detonation Phenomena in Air and Water and Their Effects
 - ▶ Hydrodynamics in Ship and Submarine Design
 - ▶ Missiles and Rockets
 - ▶ Reconnaissance networks
 - ▶ RF Antenna Design and Integration with Platforms
 - ▶ Robotics
 - ▶ Sensors (IR, Acoustic, Visual, RF)
 - ▶ Systems Engineering
 - ▶ Ship, Land Vehicle, Space Vehicle, and Aircraft Shock & Damage
 - ▶ Space Systems

Authors are invited to submit a short (300 to 500 words) abstract of a presentation in one of the above topics or related. The abstract should fully describe the planned content and indicate how the presentation supports the conference objectives. All accepted presentations will be delivered at the conference in electronic format; full papers are optional but not required. Proceedings will be provided post-conference and will contain all presentations as well as optional full papers that are submitted.

Abstracts must include the following information: Presentation title; author name, organization, title, email address, phone number, mailing address and the conference session for which the presentation is targeted. Abstracts must be submitted no later than Thursday June 30, 2011 via the following web link: <http://application.ndia.org/abstracts/2170>.

TUTORIALS

On Monday, November 14, 2011, we will conduct a series of tutorials on the subjects of physics-based modeling, for use in design, development, test; as well as on high-performance computing, capability and advances. Tutorial proposals are to be submitted to the same link with the same information as required for abstracts. Please state that the proposal is for a tutorial. Proposed tutorials may be either half-day or full-day, depending on content length and complexity, and must relate to the overall conference topics and objectives. Tutorial proposals must be submitted no later than Thursday, June 30, 2011.

All accepted papers and tutorials will be presented at the conference. Authors and co-authors will be required to register and pay the registration fees for the conference.

TOOL SEMINARS

Tool seminars will also be conducted on Monday, November 14, 2011 by vendors of design engineering tools with applicability in the design, development and test of defense systems. These will be 2-hour sessions conducted by vendors to demonstrate the use and effectiveness of their products. Vendors interested in presenting a tool seminar should contact Ms. Allison Doherty at adoherty@ndia.org for further information.



NDIA

National Defense Industrial Association

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**FOR INFORMATION, VISIT:
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