The NCMS High Performance Simulation for Product Design Program

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Flow of Briefing

• Motivation for use of high performance simulation
• National Center for Manufacturing Sciences
• Lightweight Automotive Materials Program
• High Performance Computing Centers
Motivation

• Reduce the time and cost for the design and introduction of new manufactured products

• Return profitability to manufacturing companies in North America

• Factor environmental sustainability into product design and usage
NCMS Mission

... is to lead the rapid deployment of cross-industry R&D programs to build the global competitiveness of its manufacturing industry partners.
NCMS Basics

• Organized under the National Cooperative Research Act of 1984; formed in 1986
• Largest cross-industry collaborative R&D consortium in North America
• Devoted to manufacturing technologies, process, and practices
• Two decades of experience in the formation and management of complex multi-partner collaborative R&D programs
NCMS

• Provides neutral third party facilitation of intellectual property management, project management, and collaboration agreements
• Research & development activities are conducted through the leveraged resources of its members and participants
• Headquartered in Ann Arbor, MI with offices in Washington, DC; Bremerton, Washington; and Farmington Hills, MI
Who we are -
Cross-Industry Collaborations

• Aerospace
• Automotive
• Communications
• Computers
• Controls
• Electronics

• Health Care
• Heavy Equipment
• Machine Tools
• Sensors
• Software

Supporting both Commercial and Government needs
Who we are...

...diverse public partners

- U. S. Departments of Defense, Energy, Commerce, Transportation, and Labor
- Environmental Protection Agency
- National Science Foundation
- States of Michigan and Washington
- Cities of Washington, DC; and Detroit, MI
NCMS Track Record

Over two decades of experience in the formation and management of complex multi-partner collaborative R&D programs

- 339 multi-participant projects, $600 M in collaboration funds involving over a 1000 participants and 37 Universities, including
  - Over 168 DoD projects totaling more than $393 Million
- Over 64 Cooperative Research & Development Agreements and Memoranda of Understanding
- Six Defense Manufacturing Excellence Awards
- Four R&D 100 Awards
Who we are -

a full complement of program support capabilities

• Program Management
• Finance and Accounting
• Contract Administration
• Legal
• Communications & Public Relations
• Management Information Systems
• Electronic Collaboration
NCMS – Bridging the Innovation Chasm

Cross-Discipline Collaboration

Innovative Ideas or New Research

Economic Development and Growth

New Products, Practices and Industries
Lightweight Automotive Materials Program

• Partnership with the US Department of Energy

• Overall issue in automotive manufacturing:
  – Increased CAFÉ standards necessitate the use of lighter weight materials
  – Product R&D and design being pushed down to suppliers
  – Lesson from the aerospace industry: new material developments take 10 years and $10 million
Approach

• Target complex issues in:
  – Material functionality to meet safety requirements
  – Manufacturability
  – Lowering development costs
  – Product sustainability from raw materials to end-of-life

• Use high performance computing as a tool for identifying relationships between key issues
  – Direct R&D and product development efforts
Now Forming Detailed Projects

- Expect ~4 project efforts involving automotive OEMs, suppliers, and aerospace companies

Allied Composite Technologies LLC
Looking Into the Future

- Department of Defense – use of high performance computing to simulate entire maintenance and repair process
  - Where are the key choke points?

- NCMS High Performance Computing Centers
  - Working with manufacturers of all sizes
  - Creation of tools to speed commercialization
SAVE THE DATE

NCMS and AMT
Together with
The Council on Competitiveness
Presents a

High Performance Computing Conference
March 16th-18th, 2009
New Orleans, LA

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NAFEMS 2020 Vision of Engineering Analysis and Simulation