

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



Raytheon



ITS INFORMATION TECHNOLOGY SERVICES



GENERAL PATTERN COMPANY The Albright Strategy Group

KOOOPS Automotive Systems

L.D. Systems, Inc. Expanding the range of wireless solutions

UGS Transforming the process of innovation

Oxonica GE Aircraft Engines

DEKA

PlasticsResource.com Information to Plastics & the Environment

SIEMENS

LOCKHEED MARTIN We never forget who we're working for™

Clockwork Solutions The Art of Clockwork Solutions

R. Morley Incorporated

Eclipse International Corporation

CIMS Center for Integrated Manufacturing Studies

FIATECH

OAI

Cross Hüller ThyssenKrupp

Honeywell



GAGE

Henkel

Michigan Tech Create the Future

NOVALENT

MICHIGAN STATE UNIVERSITY

UNIVERSITY OF MICHIGAN

BCT BCT Technology AG

imes

GFM



Ben Franklin Technology Partners

CAMP

GAI RESOURCES, INC.

STEP Tools, Inc.

centerline (NASDAQ:CLNE)

Protonex

AVPro Launching the Way

PENNSYLVANIA STATE UNIVERSITY



Stratasys

vision Solutions International, Inc. 3D Robotic Guidance Systems



SYSTEMS DOCUMENTATION INCORPORATED

EX ONE



BOEING

NEXT ENERGY

Parker



CHRYSLER



Vought Aircraft Industries, Inc.



ASPIRE Solutions

CABOT



TOYOTA



AGS

BLACK & ROSSI

RADIANT TOOL & ENGINEERING

Millennium Cell

Foster-Miller



NAVSEA

ASM

NCMS National Center for Manufacturing Sciences

GM

Rolls-Royce

SYSTEMS AND SOFTWARE CONSORTIUM

DIMENSIONAL PROTOTICS



OESA

NACFAM

Support Systems Associates, Inc.

precarn

TOBYHANNA ARMY DEPOT



CINCINNATI MACHINE Cincinnati Technologies

WISCONSIN Department of Commerce

Sikorsky Lockheed Martin Company



Rexroth Bosch Group

PURDUE UNIVERSITY

CATERPILLAR

Camber

net-inspect

smiths BIODE

EWI

SAVANT TECHNOLOGY GROUP



Georgia Institute of Technology

Profile Composites

ADAM AIRCRAFT

Coherix

GENERAL LASERTRONICS CORPORATION

REI SYSTEMS

NORTHERN ILLINOIS UNIVERSITY

GKN AEROSPACE



ASTRA THE ALLIANCE FOR SCIENCE & TECHNOLOGY RESEARCH IN AMERICA PROMOTING THE PHYSICAL AND MATHEMATICAL SCIENCES AND ENGINEERING

AMT The Association for Manufacturing Technology Over 100 Years of Building Global Productivity

Electro-Mechanical Associates, Inc.

GOODRICH

VCFM

POSTAL WORKSOLUTIONS

moore tool precision manufacturing solutions



Renaissance Services

NAVSEA WARFARE CENTERS KEYPORT

MATERIALS AND MANUFACTURING ONTARIO

HARDINGE

CAR CENTER FOR AUTOMOTIVE RESEARCH

LOGCOM

Rockwell Automation Focus: HOPE Celebrating Diversity Since 1968

United Technologies

eos

OPTOMECH

imaginestics



National Research Council Canada

Conseil national de recherches Canada

Decagon Devices, Inc.

Kinefac Corporation 100 Goddard Memorial Drive, Worcester, MA 01602-1262 U.S.A.

ARIZONA STATE UNIVERSITY

SOLIDICA

SCRA

ATS Advanced Technology Services, Inc.



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 -

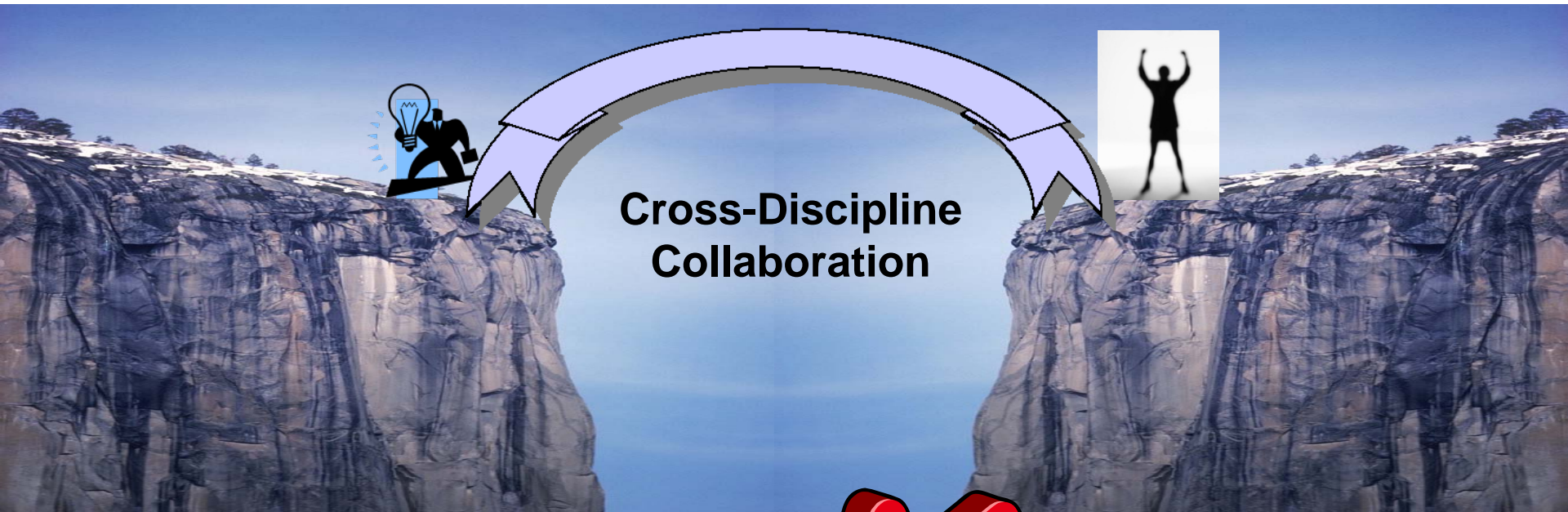
a full complement of program support capabilities

- Program Management
- Finance and Accounting
- Contract Administration
- Legal
- Communications & Public Relations
- Management Information Systems
- Electronic Collaboration



NCMS -

Bridging the Innovation Chasm




**Innovative Ideas or
New Research**

**New Products,
Practices and Industries**



Economic Development and Growth



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





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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 **National Center for
Manufacturing Sciences**

Celebrating over **20** Years
of Ideas **20** that Work