

## 4 Outreach and Interaction

### 4.1 Technical Outreach

#### Meetings with Rocket Industry

A number of critical and forward-looking interactions were pursued during the past year. Most significant among industrial/government laboratory meetings has been our continued participation in the Air Force-sponsored Integrated Product Team (IPT). The IPT is an outgrowth of a U.S. Air Force Research Laboratory program entitled Integrated High Payoff Rocket Propulsion Technology IX (IHRPT IX). CSAR staff serve on several IPT working groups, including Motor Performance and Environment, Thermal Ablation and Boundary Conditions, Validation Testing, and Software Engineering and Coupled Solutions. The IPT and IHRPT IX are leading to additional industry- and federally-sponsored projects (new funded projects this year include support from ATK/Thiokol and Boeing).

Our relationship with NASA, the Air Force, and the rocket industry continues to grow. Based on our Space Act Agreement with NASA (the NASA equivalent of a DOE CRADA), we have been able to acquire several solid rocket motor designs to use as validation tests for *Rocstar*. The SAA enables CSAR to receive sensitive, unclassified data from NASA, and other government agencies and their industrial contractors, that can be used for validation of our simulations. The SAA was renewed in May 2004.

NASA and ATK/Thiokol teamed to provide the Center with the *Design Data Book for Space Shuttle Reusable Solid Rocket Motor* in 1998. The document contains a detailed description and discussion of the components that comprise the reusable solid rocket motor.

#### External Advisory Board

The seventh annual meeting of the CSAR External Advisory Board (EAB) was held 5-6 October 2005. The EAB membership is drawn from the DOE NNSA laboratories and academia, as well as from the commercial rocket industry, the high-performance computer industry, and other relevant companies. The Board reviewed research studies, was invited to make research recommendations, and continues to provide expertise for translating research findings into practice. The purpose of the EAB is several-fold: assure that the CSAR research program remains aggressive and forward-thinking; gain commercial rocket industry perspective; accelerate high-level technical exchange; catalyze long-term visits; and explore other funding opportunities. Current members of the Board include:

John F. Sparks	Aerojet East
Gary Luke	Aerojet Sacramento
Mike Alkema	Aerojet Sacramento
Hieu Nguyen	Air Force Research Laboratory
Gregory A. Ruderman	Air Force Research Laboratory
David Mann	Army Research Office
I. Lee Davis	ATK Thiokol
Andrew Eaton	ATK Thiokol
Joseph Thompson	ATK Thiokol
Mark Ewing	ATK Thiokol
Andrew Haaland	ATK Thiokol
Micheal Iverson	ATK Thiokol
Thomas Richardson	ATK Thiokol
Merrill Beckstead	Brigham Young University
Fred Culick	Caltech
Dave Wadiak	Lockheed Martin Space Systems

Josh Wilson  
Robert Garcia  
Patrick Lampton  
Fred S. Blomshield  
Mark Salita  
Paul Yarrington  
Douglas Coats  
Robert L. Geisler  
Jeffrey J. Murphy  
Jamie B. Neidert  
David Kassoy  
Joseph Majdalani

NASA Marshall Space Center  
NASA Marshall Space Center  
NASA Marshall Space Center  
Naval Air Warfare Center, China Lake  
Northrup Grumman  
Sandia National Laboratory  
Software and Engineering Associates, Inc.  
Spiral  
The Aerospace Corporation  
U.S. Army AMRDEC  
University of Colorado  
University of Tennessee Space Institute

## Technical Conferences

The Center provides travel funds to investigators to participate in conferences in core areas to enhance their technical expertise and to build global awareness of the ASC/ASAP simulation program. Especially important to the technical community has been CSAR's annual participation in the AIAA/ASME/SAE/ASEE Joint Propulsion Conferences (JPC) from 2000 to 2006. The 2006 JPC was held in Sacramento and included a full session of CSAR papers.

### 4.2 NNSA/ASC Interaction

Center personnel have traveled extensively and were involved in a large number of technical and informational meetings. These included meetings intended to explore rocket science and technology, identify technical collaborators, describe the ASC/ASAP program, and establish relationships among Center investigators, DOE lab scientists, and industry leaders. Individual CSAR senior investigators and technical staff have traveled to DOE/NNSA labs to serve on ASC/ASAP panels, to participate in ASAP-wide workshops (materials and computational environment), to offer research seminars and technical interaction, to receive training on the ACS computational resources, and to discuss ASC resource issues with the CRT.

### 4.3 CSAR Students and Staff Hired by DOE/NNSA Labs

CSAR has been very successful in encouraging student-lab interactions. Leading opportunities for UIUC graduate and undergraduate student interactions with the NNSA laboratories include:

- Summer student interns at DOE Labs
- Joint research
- Undergrads hired in CSAR labs performing collaborative research with NNSA/DP scientists

#### *Former CSAR/CSE Students Now at DOE/NNSA Labs*

- Christopher Siefert, SNL (PhD, Computer Science, 2006)
- Rebecca Hartman-Baker, ORNL (PhD, Computer Science, 2006)
- Balakumar Balasubramaniam, LANL (PhD, Theoretical and Applied Mechanics, 2006)
- Tyler Alumbaugh, LLNL (MS, Computer Science, 2005)
- Byounggak Lee, LBNL (PhD, Physics, 2005)
- Vanessa Lopez, LBNL (PhD, Computer Science, 2005)
- Michael Tonks, LANL (PhD, Mechanical and Industrial Engineering, 2005)
- Bradley Wescott, LANL (PhD, Theoretical and Applied Mechanics, 2005)
- Michael Bange, LANL (PhD, Mechanical Engineering, 2004)

- Jonghyun Lee, ANL (PhD, Computer Science, 2004)
- Xiaosong Ma, ORNL (PhD, Computer Science, 2004)
- Greg Mackey, SNL (PhD, Computer Science, 2004)
- Michael Parks, SNL (PhD, Computer Science, 2004)
- Jason Petti, SNL (PhD, Civil Engineering, 2004)
- Jason Weber, BBL (MS, Nuclear, Plasma and Radiological Engineering, 2004)
- Zhiqun Deng, PNNL (PhD, Theoretical and Applied Mechanics, 2003)
- Nathan Crane, SNL (PhD, Civil Engineering, 2002)
- Ali Pinar, LBNL (PhD, Computer Science, 2002)
- Thomas Hafenrichter, SNL (MS, Mechanical Engineering, 2002)
- Michelle Duesterhaus, SNL (MS, Mechanical and Industrial Engineering, 2001)
- Eric Draeger, LLNL (PhD, Physics, 2001)
- Jason Hales, SNL (PhD, Civil and Environmental Engineering, 2001)
- Jack Yoh, LLNL (PhD, Theoretical and Applied Mechanics, 2001)
- Benjamin T. Chorpene, SNL-L (PhD, Mechanical Engineering, 2000)
- Burkhard Militzer, LLNL (PhD, Physics, 2000)
- Christopher D. Tomkins, LANL (PhD, Theoretical and Applied Mechanics, 2000)
- Jeff J. Murphy, SNL-L (PhD, Mechanical Engineering, 1999)
- Jin Yao, LLNL (PhD, Theoretical and Applied Mechanics, 1999)
- Donald Siegel, SNL (PhD, Physics, 1999)
- Steven F. Wojtkiewicz, SNL (PhD, Aero and Astro Engineering, 1999)
- Boyana Norris, ANL (PhD, Computer Science, 1999)
- Jeffrey C. Grossman, LBNL (initially LLNL) (PhD, Physics, 1998)
- Arne Gullerud, SNL (PhD, Civil Engineering, 1998)
- Michael Ham, LANL (MS, Computer Science, 1998)

*Former CSAR Employees Now at DP Labs*

- Michael Ham, ORNL (initially LANL)
- Dennis Parsons, LLNL
- James Quirk, LANL
- Mark Short, LANL
- Jeff Vetter, LLNL (initially ORNL)