

4 Outreach and Interaction

4.1 Technical Outreach

Meetings with Rocket Industry

A number of critical and forward-looking interactions were pursued during the seventh year of the CSAR program. Most significant among industrial/government laboratory meetings in the past year was our participation in the Air Force sponsored Integrated Product Team (IPT). The IPT is an outgrowth of the new 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 expected to lead to additional industry- and federally-sponsored projects in coming years.

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

External Advisory Board

The sixth annual meeting of the CSAR External Advisory Board (EAB) was held 30 September 2003. The EAB membership is drawn from the DOE DP 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:

EAB Member	Organization	Title
Michael Alkema	Aerojet	Program Manager, Advanced Programs
David H. Bailey	Lawrence Berkeley National Laboratory	Chief Technologist, NERSC Division
Andy Baldi	Lockheed-Martin Missiles & Space	Director, FBM Propulsion and Controls
Felix F. Chen	Aerojet	Technical Principal, Engineering
Fred Culick	Caltech	Professor of Mechanical Engineering and Jet Propulsion
Gary Flandro	University of Tennessee Space Institute	Boling Chair Professor of Advanced Propulsion
Robert L. Glick		Consultant
Fred S. Blomshield	Naval Air Warfare Center, China Lake	Head, Propulsion Research Branch

I. Lee Davis	ATK/Thiokol	Senior Research Scientist
Robert Garcia	NASA Marshall Space Center	Group Lead, Applied Fluid Dynamics Analysis
Robert L. Geisler	Spiral Corporation	Senior Rocket Scientist Consultant
Kent Hennessey	Aerojet	Manager, Thermal Design
Peter Huisveld	Air Force Research Laboratory	Technical Manager
Micheal Iverson	ATK/Thiokol	Scientific Programming
Taras Jarymowycz	Lockheed-Martin Missiles & Space	
David Kassoy	University of Colorado	Associate Vice President for Technology
Gary Luke	Aerojet	Technical Lead, Modeling and Simulation
David Mann	Army Research Office	Associate Director, Mechanics and Environmental Sciences Division
Robert Prozan	Colorado Engineering Analysis	President
Gregory A. Ruderman	Air Force Research Laboratory	Mechanical Engineer
John F. Sparks	Aerojet	Director of Engineering Research
Joseph Thompson	ATK/Thiokol	Director, Technical Services
Paul Yarrington	Sandia National Laboratory; TST Lead	Manager, Code Development and Applications Group

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 2004.

4.2 NNSA/ASCI 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 DP 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. A special feature of 2002 was a visit by ten CSAR senior investigators to Lawrence Livermore and Sandia-Livermore to hold the Annual TST Meeting off site. In mid-February 2003, a group of nearly twenty CSAR faculty members, staff and students visited LANL and Sandia-Albuquerque to discuss research results in technical presentation and poster session formats.

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

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

- Michael Bange, LANL (PhD, Mechanical Engineering, 2004)
- Jonghyun Lee, ANL (PhD, Computer Science, 2004)
- Xiaosong Ma, ORNL (PhD, Computer Science, 2004)
- Michael Parks, SNL (PhD, Computer Science, 2004)
- Jason Petti, SNL (PhD, Civil Engineering, 2004)
- Jason Weber, BNL (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. Chorpening, 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, 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

- Jeffrey Vetter, LLNL
- James Quirk, LANL
- Dennis Parsons, LLNL