

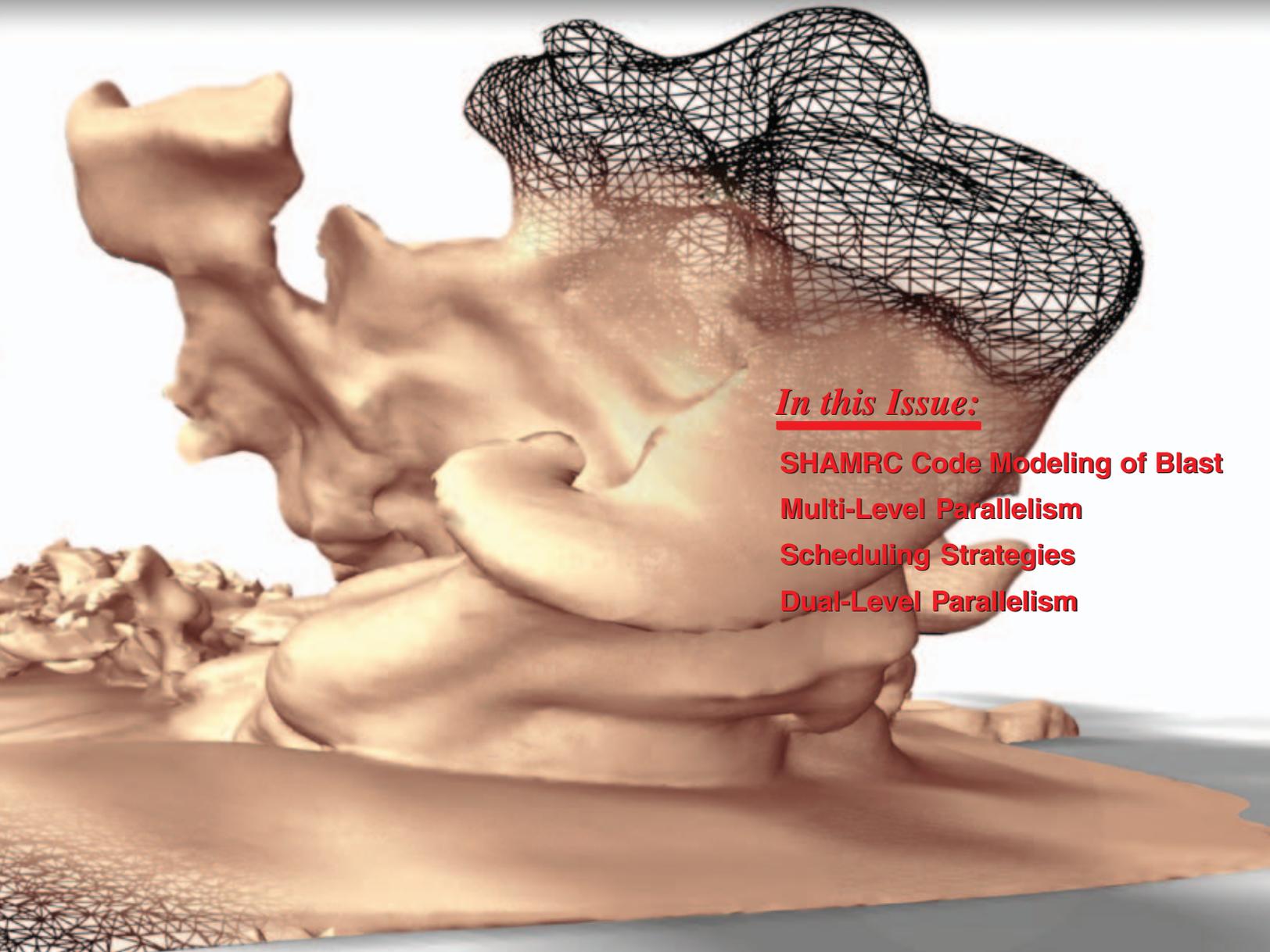
NEWSLETTER

The

FALL 2002

Resource

U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER
INFORMATION TECHNOLOGY LABORATORY



In this Issue:

**SHAMRC Code Modeling of Blast
Multi-Level Parallelism
Scheduling Strategies
Dual-Level Parallelism**

Major Shared Resource Center

ERDC IVISR





High Performance Computing Modernization Program

SC2000

WELCOME

TO SC2000

Simulation of Titan IVB Transonic Buffet Environment

Significance:
The advanced aerodynamic simulation of the Titan IVB transonic buffet environment was possible because of high performance computing power.

The Titan IVB has requirements much larger than expected buffet level during maximum flight according to flight test results. A comprehensive aerodynamic analysis of the vehicle, full three-dimensional, turbulent flow simulation was performed to identify and understand the range of transonic buffet. The analysis was primarily used to provide design guidance for the vehicle and to provide a better understanding of the buffet phenomenon.

Project Lead: Dr. Jeffrey B. Bredt

APC Computer Resources: 1000000 nodes, 1000000 processors

V-22 Osprey Operational Evaluation

Significance:
The V-22 Osprey is a unique aircraft that can operate from short, unimproved runways and land on water. It is a key asset for the U.S. Marine Corps and is being evaluated for its operational capabilities. The evaluation is being conducted using high performance computing to simulate the aircraft's performance in various environments.

Project Lead: Dr. Jeffrey B. Bredt

APC Computer Resources: 1000000 nodes, 1000000 processors

Unsteady Aerodynamics of Advanced Guided Munitions

Significance:
Three advanced multidisciplinary predictive techniques will decrease the time and cost of development and improve the performance and effectiveness of future advanced munitions.

The goal of this project was to develop improved predictive techniques for unsteady aerodynamics and aerodynamic stability analysis. This was achieved by using high performance computing to simulate the unsteady flow field around advanced munitions.

Project Lead: Dr. Jeffrey B. Bredt

APC Computer Resources: 1000000 nodes, 1000000 processors

Analysis of Infrared Radiance Effects from Divert Jet Exhaust Flow Over the THAAD Seeker Window

Significance:
The advanced aerodynamic simulation of the THAAD divert jet exhaust flow over the seeker window was possible because of high performance computing power.

The THAAD divert jet exhaust flow over the seeker window is a complex problem that requires high performance computing to simulate. The simulation was used to provide design guidance for the vehicle and to provide a better understanding of the exhaust flow phenomenon.

Project Lead: Dr. Jeffrey B. Bredt

APC Computer Resources: 1000000 nodes, 1000000 processors

Parallel Simulations of Spray Combustion

Significance:
The advanced aerodynamic simulation of the spray combustion process was possible because of high performance computing power.

The spray combustion process is a complex problem that requires high performance computing to simulate. The simulation was used to provide design guidance for the vehicle and to provide a better understanding of the combustion process.

Project Lead: Dr. Jeffrey B. Bredt

APC Computer Resources: 1000000 nodes, 1000000 processors

New Technology—the Leading Edge at SC2000

by David Stinson

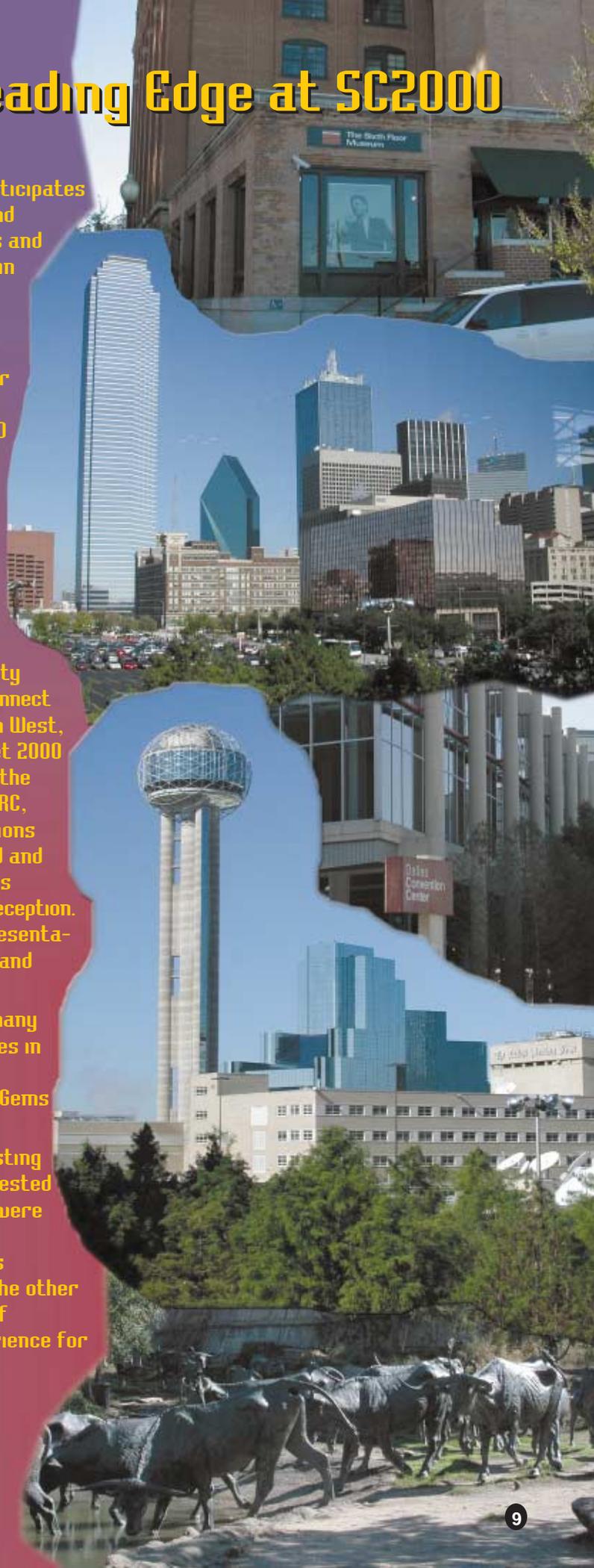
Each year the HPC Modernization Program (HPCMP) participates in SCxy, a large conference where computer hardware and software vendors show off their wares, and universities and research organizations present projects that they have in the works.

During the week of November 4-10, Dallas, Texas, served as the host site for SC2000. SC2000 is sponsored by the Institute of Electrical and Electronics Engineers Computer Society and the Association for Computing Machinery's Special Interest Group on Computer Architecture. The DoD HPCMP has participated in the conference each year since 1994.

New features added to this year's conference included Venture Village, eSCAPE 2000, a reconfigured HPC Games, Co-Chaired by NAVO MSRC's Eleanor Schroeder, and a new networking award. Venture Village showcased a collection of entrepreneurial information technology companies, all creating new products to build the infrastructure of tomorrow. The eSCAPE 2000 thrust demonstrated the ability to "escape" from today's technological boundaries and to connect and compute anywhere. Messrs. Stephen Jones and John West, ERDC MSRC, served as Co-Chairs for this event. The SCinet 2000 network showcased leading-edge technology throughout the conference. Dr. Louis Turcotte, formerly of the ERDC MSRC, served as the overall Conference Chair. After presentations of tutorials and the education program over the weekend and through Monday morning, the convention center floor was opened to the public Monday evening with a Gala Opening Reception. The week was laced with talks from invited speakers, presentations of technical papers and awards, panel discussions, and Birds-of-a-feather sessions.

The DoD HPCMP was well represented. In addition to the many HPCMP persons serving in key leadership and planning roles in the conference, HPC Modernization Program participants presented papers and posters (referred to as Research Gems this year).

Each year, one of the HPCMP MSRCs is responsible for hosting a booth at the conference. This year, the responsibility rested with the ERDC MSRC. Although many hours of hard work were spent preparing for the booth, those participating in the preparation found it a great experience. Only one MSRC is responsible each year for organizing the DoD booth, but the other MSRCs and Distributed Centers provide input in the way of graphics, demonstrations, and booth workers. The experience for all was great—the leading-edge technology exhibited was extraordinary.



Retrospective –The 2002 DoD Users Group Conference

By David Stinson, Users Group 2002 Facilities Chair

Nearly 400 attendees turned out for the 2002 DoD Users Group Conference in Austin, Texas. Almost everyone agreed that the food during the week was excellent, thanks to the DoubleTree catering staff and Catering by Rosemary. As in previous years, this conference provided an excellent opportunity to renew acquaintances and collaborate with others in the HPC Modernization Program.

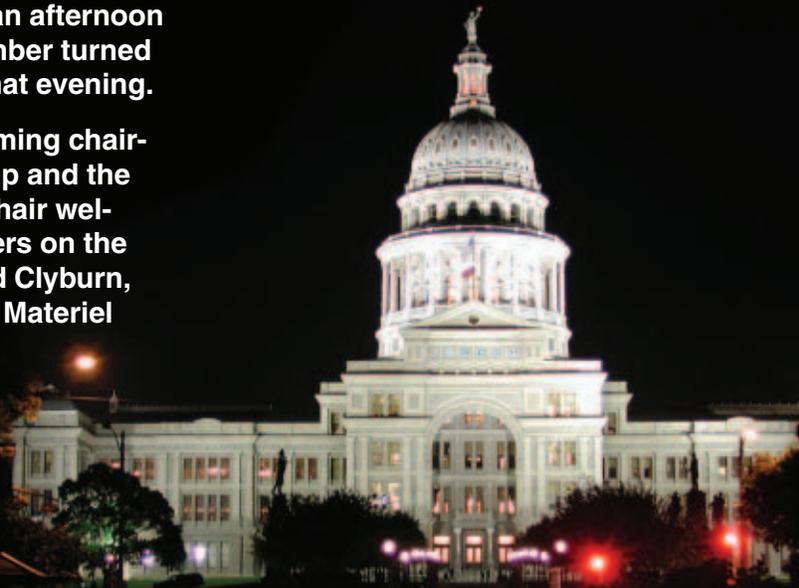
About 170 attendees participated in the tutorials on Monday. The most popular tutorial, with about 50 attendees, proved to be the Comprehensive Introduction to Scientific Visualization jointly taught by the University of Texas, Texas Advanced Computing Center, and the ERDC MSRC. This was followed by the DoD Grid Computing Using Kerberized Globus tutorial also taught by the ERDC MSRC with about 30 in attendance. Many thanks to Steve Schraml for the excellent job he did as the Tutorials Chair.

On Tuesday, Mr. Steve Scherr, the General Chair, kicked off the day by welcoming everyone and introducing Dr. Charles Holland, Deputy Under Secretary of Defense, as the keynote speaker followed by the HPCMP Director, Cray Henry. Invited speaker, Mr. Robert Graybill, Program Manager for the Information Processing Technology Office, Defense Advanced Research Projects Agency, rounded out the morning. After an afternoon of technical papers, a record number turned out for the poster presentation that evening.

Wednesday, Steve Finn, the incoming chairman of the Users Advocacy Group and the conference Technical Program Chair welcomed attendees. Invited speakers on the morning agenda included Conrad Clyburn, U.S. Army Medical Research and Materiel

Command, Dr. William Feiereisen, Department of Energy, Dr. Kyle Squires and Major Jim Forsythe from Arizona State University and the U.S. Air Force Academy, respectively, and Dr. Joseph Baum from SAIC. The evening social was held at the Texas State History Museum. A good crowd turned out to see the IMAX presentation “The International Space Station” and enjoy the Fajita buffet. Jeanie Osburn and Lynn Parnell warmed up the dance floor to the sounds of The Daddios, a local rock and roll band. Others took advantage of the three floors of exhibits, including a new one on Davey Crockett and visited the Texas Spirit Theater, a special effects theater where one could experience hurricanes and plagues of varmints.

Going on all day Thursday were four concurrent tracks of technical papers. By Thursday evening, many were ready to get out on the town and took the opportunity to visit some of the fine restaurants and hear some of the music in downtown Austin. Others took time to see and experience some of the local attractions such as the LBJ Presidential Library, watching bats at the Congress Street Bridge, and enjoying jet skiing at nearby Lake Travis. The conference, by all accounts, was a great success, and we are looking forward to next years conference in Bellevue, Washington.





New Leadership for the ERDC MSRC

by Rose J. Dykes

Exciting new leadership for the ERDC MSRC inspires its personnel to regard each new challenge as an opportunity to continue learning and to imagine that unlimited accomplishments can be made with the potential teamwork of its organization along with its users and associates. Competent and caring new leaders energize motivation and offer encouragement and support.

New leadership for the ERDC MSRC begins with the President of the United States. Although the President is far removed from the MSRC, the top office in the country has a definite impact. George W. Bush was elected the 43rd President of the United States and proposes to strengthen the military with “better pay, better planning, and better equipment.” New Vice President Richard B. Cheney earned the respect of Americans while serving as Secretary of Defense with his direction of two large military campaigns—Operation Just Cause in Panama and Operation Desert Storm in the Middle East. He served three Presidents and as an elected official before his election as Vice President.

The new Chief of Engineers at Headquarters, U.S. Army Corps of Engineers, LTG Robert B. Flowers, shares a consistent vision with that of ERDC and the ERDC MSRC. His visits to the ERDC headquarters in Vicksburg, Mississippi, and personal messages reinforce the ERDC vision and strategy. He expressed his philosophy in a video message to all ERDC employees saying “first understand, then seek win-win solutions.” A “permission slip” signed by General Flowers was presented to each employee following the video presentation.

Less than a year ago, Dr. James R. Houston became the first Director of ERDC. The U.S.

Army Engineer Waterways Experiment Station (WES) is now the site of the ERDC command headquarters. Dr. Houston expressed his support of HPC as follows: “High performance computing is very important to the Corps of Engineers, the Army, and the DoD to ensure that the U.S. warfighter has the advantage on the battlefield of the future. The ERDC MSRC, located in the ERDC Information Technology Laboratory, plays a major role in helping us provide this advantage.”

Permission Slip



Ask yourself:

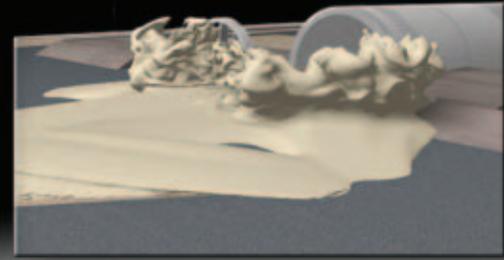
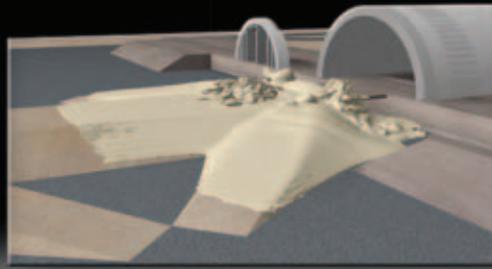
1. Is it good for my customer?
2. Is it legal and ethical?
3. Is it something I am willing to be accountable for?

**US Army Corps
of Engineers**

If so, don't ask for permission. You already have it.

Just do it!

The DoD High Performance Computing Modernization Program (HPCMP), with Cray Henry as its Director, announced a new Deputy Director and a new Chief Scientist. Dr. Larry P. Davis in his new position as Deputy Director of the HPCMP will assist Mr. Henry in managing all Program activities. He will also continue to be responsible for the Program's requirements and resource allocation



**Second-Order
Hydrodynamic
Automatic Mesh
Refinement Code,
SHAMRC, is used
to model the heavy
dust-laden flow
resulting from a
non-ideal air blast
on a military vehicle
using data from the
Defense Threat
Reduction Agency's
Large Blast and
Thermal Simulator
at White Sands,
New Mexico.**

