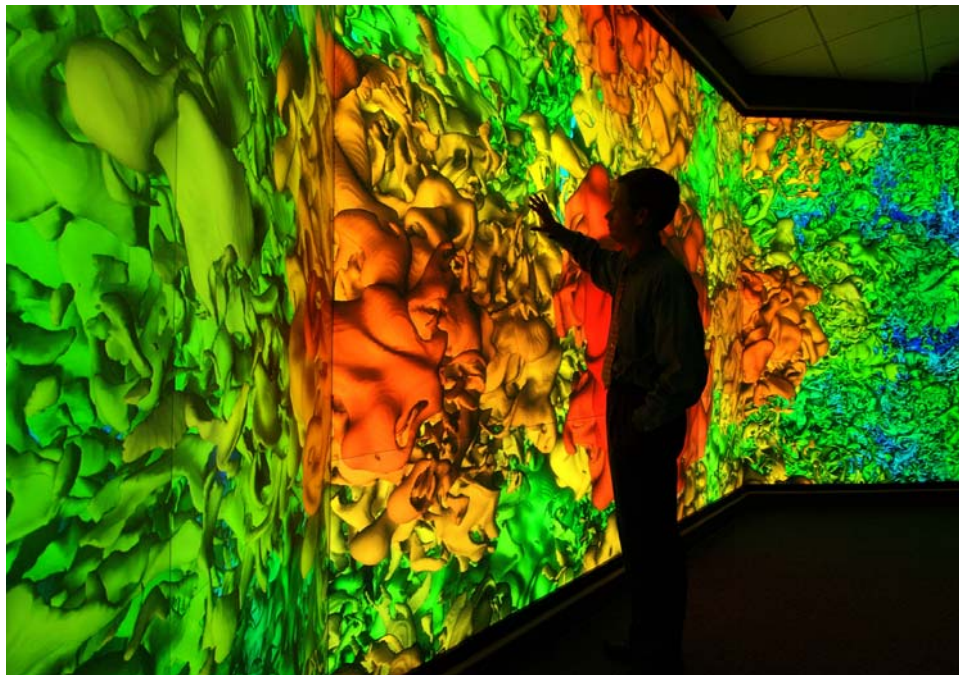




National Nuclear Security Administration ● Washington, DC 20585 ● February 2005



U.S. and U.K. Cooperate On Ridding Russia Of Weapons Grade Plutonium

NNSA and the United Kingdom's Trade and Industry Ministry have signed a Memorandum of Understanding (MOU) to assist the permanent shutdown of the final operating weapons-grade plutonium production reactor in the closed nuclear city of Zheleznogorsk, Russia.

Under this MOU the United Kingdom will contribute \$20M to NNSA's Elimination of Weapons Grade Plutonium

(continued on page 2)

Samuel Bodman Becomes New DOE Secretary

Samuel Bodman, deputy secretary of the Treasury Department, is the President's choice to succeed Spencer Abraham as Secretary of Energy. At a January confirmation hearing in the Senate Energy and Natural Resources Committee, the Secretary-designate made these comments about NNSA:

"As the members of the committee know, one of the most important responsibilities of the Secretary of Energy - in cooperation with the

Secretary of Defense - is certifying to the President that our nation's nuclear weapons stockpile is safe, secure and reliable. The nuclear deterrent was a vital factor in winning the Cold War, and it continues to be a key strategic component of our national security posture.

"Since the beginning of this administration, the Energy Department has made significant progress in upgrading the capabilities of the nuclear weapons complex and the

facilities that support it. I look forward to continuing that progress. I also believe that we must build on the department's impressive programs in the area of nuclear nonproliferation. Few things are more important in today's world than keeping weapons-usable nuclear material away from terrorists and enemy regimes."

Secretary Bodman was confirmed on January 31.

US And UK Cooperate On Ridding Russia Of Weapons Grade Plutonium

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Production Program (EWGPP).

NNSA Assistant Deputy Administrator for Defense Nuclear Nonproliferation James Turner signed the MOU with the United Kingdom's Minister of Trade and Industry Nigel Griffiths. The governments of the United Kingdom and the United States are supporting the shutdown of the Zheleznogorsk plutonium production reactor as part of their commitment to the G8 Global Partnership.

"The signing of this MOU is a major step in our collaborative efforts to address our mutual nonproliferation objectives," said NNSA Administrator Linton F. Brooks. "When the Zheleznogorsk reactor is finally shut down, there will be one less source of nuclear weapons-grade plutonium in the world."

The EWGPP will result in the permanent shutdown of three Russian nuclear reactors, which currently produce weapons-grade plutonium. These reactors, which are the last three reactors in Russia that produce plutonium that could be used for military purposes, also provide necessary heat and electricity to two regions in Siberia. In order to meet these energy requirements, the EWGPP will provide support to the Russian Federation for provision of replacement fossil energy plants. The Russians have agreed to permanently shut down the reactors once replacement energy is provided.

Y-12 Lends Equipment To South Carolina State's Nuclear Engineering Program

Radiation detection devices loaned by Y-12 to the nuclear engineering program at South Carolina State University (SCSU) will be used to set up a radiation laboratory for practical training in radiation control and health physics for undergraduate nuclear engineering students at the school.

Chris Hill and Danny Rowan of Y-12's Radiological Control also put together several manuals and training materials that accompanied the shipment.

"The loan of this equipment gives the school's nuclear engineering program a real boost," said Ken Lewis of Y-12's Safety Analysis Engineering group, who also has been appointed as the technical liaison between Y-12 and the university. "This will allow them to launch some research projects that will have beneficial outcomes for Y-12, as well."

The devices include a portable alpha-beta sample counter and associated electronics; two portable radiation survey "pancake" detectors; an ionization chamber dose rate instrument; and one of the large stand-in personnel contamination monitors, such as those used in certain areas of

Y-12.

SCSU is the only HBCU (Historically Black Colleges and Universities) with a nuclear engineering program. Y-12 signed a DOE-approved Mentor-Protégé Agreement with the school in September. As part of the program, protégés must be able to fill needs of the sponsoring programmatic organization, which in this case is engineering. In turn, Y-12 has committed to aid SCSU by enhancing their capability to become more competitive in the marketplace.

"The benefits of this relationship are great for us and for South Carolina State," said John Gertsen, manager of Y-12 engineering and champion for SCSU. "What they learn from using this equipment in their research can be implemented here at Y-12. On the other side of that coin is the immense amount of data and expertise that the school can tap into here, which will help them create a top-notch program."

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*Got an article for the NNSA Newsletter?
Submit it for consideration to astotts@doeal.gov*

Dan Glenn Enjoys Leading Pantex Site Office

When Dan Glenn became site manager of the Pantex Site Office in February 2000, he had already gained experience at Savannah River Site, Los Alamos Site Office and the Albuquerque Operations Office, Weapons Program Division. Embracing a new challenge, Dan looked forward to working at Pantex, getting to know the people, living in the community, and having day-to-day oversight responsibilities.

Pantex plays a key role in the nation's stockpile stewardship initiative with its mission to disassemble, test and evaluate nuclear weapons in the stockpile. Operations at Pantex are conducted under the highest possible levels of safety and security.

Describing his role at Pantex, Dan said, "The site manager is the single point, other than the NNSA Deputy Administrator, in which the responsibility for balancing all the site risks (safety, security, mission and budget) resides. The job requires having a basic understanding of those risks – a difficult and important task - one that is constantly criticized, but also very rewarding."

Dan received a Naval Reserve Officers Training Corps (NROTC) Scholarship to Penn State where he earned his BS in Nuclear Engineering and received a commission into the Navy. His Navy experience reflects the standard Navy Nuke "with a

twist." As one of the first dual-trained submarine officers (nuclear propulsion and strategic weapons), Dan said his studies included the full spectrum of nuclear energy, "from fission to fusion and all the stuff in between, along with strategic missile technologies." He enjoyed being a submariner because he liked the challenge of responding to abnormal

various technical reports when opportunities present themselves because there is still so much left to learn."

Constantly pursuing additional qualifications in an effort to keep his work fun, Dan encourages others to do the same. He served as a Radiological Assistance Program team leader and currently serves as a

Senior Energy Official on the Accident Response Group. He voluntarily tests to both the marksmanship and physical testing requirements in order to maintain a Federal Officer's qualification. According to Dan, "The best way to understand security requirements is to experience them first hand. This helps to give me a better appreciation of the

tasks we are asking of our security professionals."

Dan's boundless energy continues outside of the regular workday. He maintains an ongoing, positive relationship with neighboring landowners through one-on-one visits, public meetings and occasional social events. One of his favorite community outreach activities is devoting four weekends every other year to teach Boy and Girl Scouts about radiation, resulting in each scout earning the coveted Atomic Energy Merit Badge.



COMMUNITY OUTREACH: Pantex Site Manager Dan Glenn relaxes with scouts at the 2003 Atomic Energy Merit Badge Seminar. Boy and Girl Scouts learn about radiation in order to earn the Atomic Energy Merit Badge.

situations in a way that still allowed the boat to accomplish its mission, which he says is "surprisingly, a situation I still find myself in."

Dan was a recipient of the DP fellowship program in which he earned his MS in Nuclear Engineering. "I really value the opportunity DOE gave me to advance my education," he said. "In support of my thesis, I had the opportunity to conduct several experiments on the SHEBA reactor at TA-18 in Los Alamos, giving me a better understanding of the research environment. I continue to read

2004 A Banner Year For The Jasper Gun

Calendar year 2004 witnessed a record 15 successful shots of the JASPER two-stage gas gun at the Nevada Test Site (NTS). The JASPER team at Lawrence Livermore National Laboratory (LLNL) and NTS fired a successful shot in every calendar month except February and

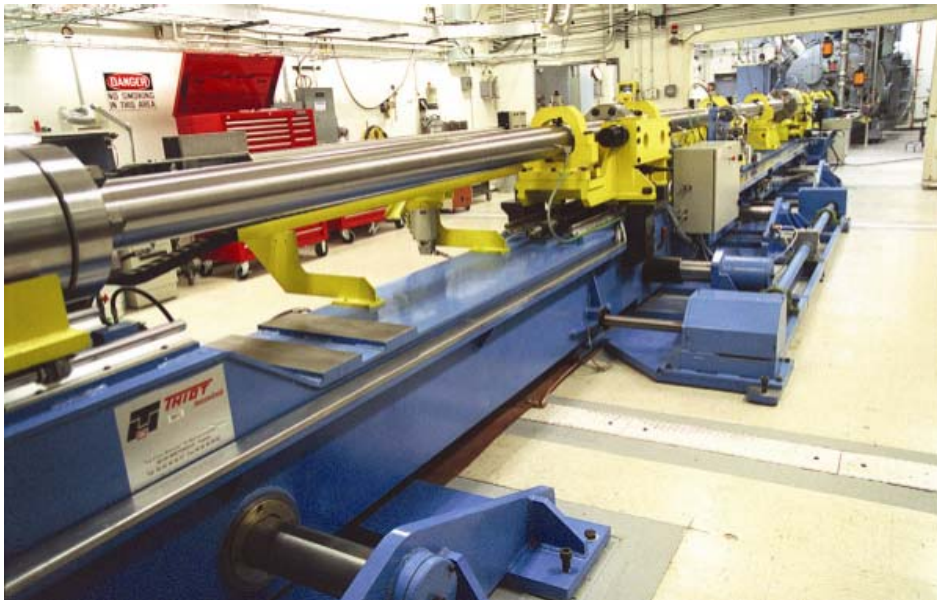
plutonium's equation of state (EOS). EOS is the relationship between the pressure, density and temperature of plutonium at extreme conditions that encompasses millions of atmospheres pressure, and temperatures in thousands of degrees Kelvin. JASPER uses shock waves generated by high-velocity impacts to

Pantex Exceeds 2004 FIRP Goals

The Facilities and Infrastructure Recapitalization Program (FIRP) at the Pantex Plant exceeded NNSA goals in FY 04 and retired over \$21 million in deferred maintenance. The achievement is the result of a strong commitment from the NNSA Office of Infrastructure and Facilities Management, Pantex Site Office and RTBF Engineering & Construction Programs. Additionally, the Pantex Capital & Expense Project Division showed its ability to execute the projects.

The FIRP program mission is to restore, rebuild and revitalize the physical infrastructure of the nuclear weapons complex. The program applies new direct appropriations to address an integrated, prioritized series of repair and infrastructure projects focusing on deferred maintenance that will significantly increase the operational efficiency and effectiveness of the NNSA weapons complex.

Because of funding shortfalls within the NNSA weapons complex, degradation and deferred maintenance of facilities would continue to grow without this funding. At Pantex, projects are selected to reduce deferred maintenance on mission critical or mission essential facilities. The program has also provided for the disposition or demolition of older structures no longer used or required to support the Pantex mission.



LLNL AND NTS SHOCK PHYSICS EXPERIMENTS: JASPER two-stage gun at the Nevada Test Site.

August. There were four successful firings in September alone.

The most recent experiment in December was the eighth plutonium (Pu) shot of 2004 as well as the 11th Pu experiment in the series and the 38th shot since the gun became operational in March 2001.

Chief Scientist Neil Holmes of LLNL heads JASPER's shock-physics experiments, which study how materials - especially plutonium - behave as a shock-wave passes through them.

Holmes said, "Specifically, JASPER's main goal is to measure

achieve these extreme conditions."

Holmes said plutonium EOS data is a crucial requirement in nuclear weapons stockpile stewardship. The JASPER EOS input compliments shock-physics data produced by the subcritical experiment series and by the National Ignition Facility at Livermore.

According to Holmes, over the next decade "JASPER will be performing novel experiments with new diagnostic methods never before applied to plutonium investigations."

Virtual Reality Lets Engineers Go Inside Designs

A new world of virtual reality is now available at the NNSA's Kansas City Plant. The "Immersion Room" provides associates with the capability to improve the comprehension of complex designs and analysis, resulting in improved product and architectural designs, while reducing iterations and cycle time.

Taking the Kansas City Plant's virtual reality capability to a larger scale, the room accommodates about 16 people and facilitates a more realistic physical experience of a design before it is ever created.

The facility is equipped with a 14-foot-wide by 6-foot-high rear-projection screen. Users can wear a headmounted display, which works with ultrasonic trackers to create a virtual experience for some applications.

SGI, Linux and PC computing sources can be accessed to drive the display. Construction of the Immersion Room was funded through the ADAPT Digital Collaboration project.

In the Immersion Room, finite element analysis simulation results and animations from a system of supercomputers can be displayed. Architectural walkthroughs allow associates to experience the look and feel of a redesigned work area, and accident reenactments can provide valuable safety lessons.



VIRTUAL REALITY WALK-THROUGH: Kansas City Plant employees perform an architectural walkthrough of a make-believe town. The new system allows designers to share detailed CAD drawings of electrical and mechanical designs in product realization team meetings and customer presentations.

Sandia, NYU Co-Host First-Ever "Big Picture Summit"

An eclectic group of artists and scientists that organizers have dubbed the "dream team" of imaging and visualization gathered recently at New York University to begin creating a photographic system capable of capturing and displaying a gigapixel - one billion pixels - of visual information in a single image.

The first Big Picture Summit was organized by artist-photographer Clifford Ross and co-hosted by NNSA's Sandia National Laboratories and the Interactive Telecommunications Program at NYU's Tisch School of the Arts.

Computational scientists at Sandia believe a display system of the magnitude proposed by Ross will enhance the ability of its scientists to

visualize and gain insight from massively complex data sets that can be understood only through human intuition, ranging from supercomputer-generated physics simulations to high-resolution satellite imagery.

"We have a lot in common with an artist like Clifford Ross and his quest to make extremely detailed images that evoke a powerful emotional response," says Carl Diegert, Sandia computational scientist. "We want to understand from an intuitive standpoint what it is that enables viewers to gain insight - for example, a visual metaphor that makes a human viewer comfortable and thus better able to interact with an image. Computer science alone is not likely

to invent a means for scientists to intuitively comprehend highly complex problems."

Artist photographer Ross invented the newly patented R1 camera system capable of gigapixel single-shot images. The quality of the first landscape images created with the R1 convinced many of the scientists involved in the summit to join in the effort, says Diegert.

The project could have major implications for all industries that rely on precise imaging, including environmental science, space exploration, telecommunications and homeland security, says Diegert.

Highly Enriched Uranium Repatriated From Czech Republic

Six kilograms of highly enriched uranium (HEU) that could be used for nuclear weapons were safely returned to the Russian Federation from the Czech Republic in a secret mission completed in December in a joint effort between the United States, the Czech Republic, Russia and the International Atomic Energy Agency (IAEA). It is another accomplishment of the Administration's Global Threat Reduction Initiative (GTRI).

"The recovery, return and eventual elimination of this highly enriched uranium is an important milestone in our efforts to reduce this dangerous nuclear material worldwide."

"We applaud the strong leadership of the Czech Republic for taking measures to secure this material and working cooperatively with the United States, Russia and the IAEA to successfully return it to Russia," departing Secretary Spencer Abraham said.

According to Abraham, the highly enriched uranium was airlifted under guard from an airport near Prague, Czech Republic to a secure facility in Dimitrovgrad, Russia. There, the highly enriched uranium will be down-

blended to low enriched uranium.

The nuclear fuel was originally supplied to the Czech Republic by the Soviet Union for use in the Soviet-designed 10 megawatt LVR-15 multi-purpose research reactor, located in Rez near the Czech capital, Prague. In 2000, NNSA and the Czech Nuclear Research Institute completed a joint

project to upgrade security of the nuclear material at Rez until it could be returned to Russia. Earlier this year, Secretary Abraham and Russian Federal Atomic Energy Agency Director Alexander Rumyantsev signed a bilateral agreement between the U.S. and Russian Federation governments to facilitate the repatriation of Russian-origin HEU research reactor fuel to Russia.

During the one-day mission, approximately six kilograms of HEU were loaded into four specialized transportation containers. IAEA

safeguards inspectors and NNSA technical experts were present in Rez to monitor the process of loading the fuel into canisters. The facility in Russia that received the material has worked closely with the NNSA to implement security upgrades.

The mission of the GTRI is to identify, secure, recover and/or facilitate the final disposition of high-risk vulnerable nuclear and radiological materials around the world that pose a threat to the United States and the international community. The initiative will comprehensively address vulnerable material and radiological materials throughout the world and secure and/or remove these materials of concern as expeditiously as possible.

This is the sixth successful shipment of HEU being returned to Russia. In the past two years, NNSA has repatriated a total of 51 kg of HEU to Russia from Romania, Bulgaria, Libya and Uzbekistan.

Conference On Security Of Radioactive Sources

Thirty-five representatives from twelve countries took part in a recent Panama City, Panama, conference on the security and control of radioactive sources. NNSA's Office of Global Threat Reduction (GTR) sponsored the conference to promote a wide exchange of information and to raise governmental awareness in the region of key issues relating to the security of radioactive sources, including those posed by their potential malevolent use. Participating countries were:

Honduras, Nicaragua, Costa Rica, El Salvador, Panama, Colombia, Ecuador, Trinidad and Tobago, Bahamas, Jamaica, and the Dominican Republic. Several countries expressed their interest in cooperating with the International Radiological



Threat Reduction Program, which is a major component of the GTR.

Livermore, Sandia Team For Math, Science Program

More than 300 young women in grades 6 through 12 converged on the Stockton, Calif. campus of the University of the Pacific (UOP) for a recent day of career exploration at the Twelfth Annual San Joaquin County Expanding Your Horizons (EYH) in Math and Science Conference sponsored by the Lawrence Livermore and Sandia National Laboratories, and the UOP School of Engineering and Computer Science.

EYH participants were offered some 30 hands-on, interactive workshops throughout the campus. From biology and DNA to robotics and chemistry, the presentations are the focal point of every EYH conference, inviting girls to take a closer look at science, mathematics, and non-traditional

careers, and to meet and talk with professionals.

Most of the workshops were led by LLNL and Sandia staff. Cathy

hands-on environmental sampling workshop that demonstrated analytical measurements.

The mother-daughter team has been participating in EYH for three years. Marie, currently a junior pre-med major at UOP, is herself an EYH alumnus.

Linda Dibble of LLNL's Cyber Security Program has co-chaired the conference for the past seven years.

"Our success is realized when we hear the chatter of the young participants during the conference or review their evaluations that read 'I'm sad because this is my last conference; I'm in the 12th grade.' When you hear a young girl say 'I'm going to be a veterinarian' or 'I had fun with science today,' you know you made a difference in one girl's life for one day," Dibble said.



MATH AND SCIENCE CONFERENCE: Expanding Your Horizons participants analyze samples in a chemistry lab.

Bartholdi of Lawrence Livermore's Chemical Biology and Nuclear Science Division teamed up with her daughter, Marie, to provide a

DOE Extends Acceptance Policy For Spent Nuclear Fuel

The Department of Energy has extended a policy that to date has enabled the United States to recover nearly 500 kilograms of uranium-235, enough to build about 20 crude nuclear weapons, in U.S.-origin highly enriched uranium (HEU) used to fuel foreign research reactors. The decision to extend the period for spent fuel acceptance will provide additional time for research reactors to convert from HEU to low-enriched uranium (LEU) fuel.

The current acceptance policy established by DOE and the State Department in 1996 permits the United States to accept certain eligible spent fuel that is irradiated by May 2006,

and returned to the United States by May 2009. A revised record of decision, signed by NNSA Administrator Linton Brooks, extends the irradiation deadline to May 2016, and the acceptance deadline to May 2019.

"A principal goal of this administration's nonproliferation policy is to secure and reduce worldwide stocks of HEU to keep potential weapons material out of the hands of terrorists and hostile countries," departing Secretary Spencer Abraham said. "This extension will enable the United States to recover HEU that will not

be ready for return to the United States by the original deadlines."

Some countries with eligible fuel have not used their fuel as rapidly as projected or have made alternative fuel processing arrangements, and there have been technical delays in the development of LEU alternatives. The acceptance policy is a cornerstone of the DOE Global Threat Reduction Initiative (GTRI), which focuses on minimizing, and, where possible, eliminating the use of HEU in civil applications by converting research reactors to LEU and securing, returning or recovering vulnerable nuclear material.

Los Alamos Wizardry To Aid New Mars Science Lab

Having analyzed Mars from afar via orbiting satellite, Los Alamos National Laboratory instruments will be on their way to Mars. Two of the eight instruments aboard NASA's planned Mars Science Laboratory rover, scheduled for launch in 2009, include Los Alamos technology.

The laboratory's contribution to the new Mars effort is two-fold; providing a laser unit to measure elemental composition of rocks and soils, plus an X-ray diffraction device to analyze minerals in complex soil and rock samples from a different perspective. The rolling Mars Science Laboratory rover will

be designed to operate for a full Martian year, or two Earth years, exploring potential habitats for evidence of past or present life.

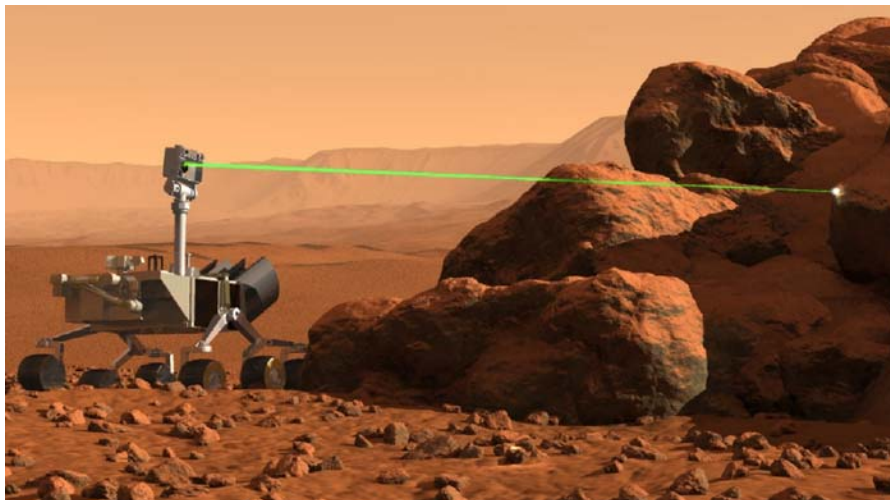
The Los Alamos laser unit, called ChemCam, uses laser-induced breakdown spectroscopy (LIBS), to measure the chemical content of the target samples. ChemCam works by firing an intense pulse of laser light at a

surface from as far as 13 meters away.

The laser beam zaps a pinhead-sized area on the target, ablating or vaporizing it. A spectral analyzer then peers closely at the light from the vaporized sample. Atoms ablated in ionized states emit light and each

coatings from the sample prior to the analysis without the need to drive up to the target rock.

"ChemCam is the only instrument that can determine the elemental compositions of dust-covered rocks remotely," said Roger Wiens, Los



LANL TECHNOLOGY: Mars Science Laboratory rover using ChemCam to analyze a rock. Artist's conception provided by the French Space Agency and Los Alamos National Laboratory.

Alamos' principal investigator on the project. The unit can recognize all known elements, noted Wiens, so detailed information on possible future Mars base sites can then begin flowing back to Earth for analysis.

The other piece of the ChemCam combo, the Remote Micro-Imager, will give very close-up

sample yields a unique spectral emission of bright lines characteristic of the elements present in the material. Like fingerprints, the emission line wavelengths can be matched to a library of known chemical compounds. Even dust-covered rocks will reveal their inner secrets to the ChemCam interrogation. The laser also can be used to clean dust or weathering

images of the samples being analyzed, with an effective resolution that exceeds MER's Pancam by 5-10 times. The laser and camera are provided by the French space agency. Los Alamos is in charge of the spectrographs, data processing unit, power supply, software and project management.

LANL Camera Will Probe Edge Of Solar System

A new NASA mission, IBEX, will probe the very edge of the solar system, capturing the quiet hum of a vast, distant shock wave. One of its two instruments is a compact Los Alamos device called the High Energy Neutral Atom Imager.

The mission, called the Interstellar Boundary Explorer (IBEX) satellite,

will launch in 2008 and carry two Energetic Neutral Atom cameras (ENAs) out beyond the Earth's magnetosphere, where they will watch for telltale particles ricocheting back across millions of miles from the outer boundary of the solar system.

"The new technology on IBEX will finally let us measure this hum in all

directions of the sky and see how it changes over time. This will allow us to understand the properties of the shock and the nature of local interstellar cloud," said Herb Funsten, Los Alamos' principal investigator on the instrument.