

## NASA Briefs

### New device uses reflectivity to detect plant stress earlier

Thanks to a new imaging tool developed at Stennis Space Center in South Mississippi, farmers and foresters may now be better able to detect unhealthy crops and trees before the damage becomes visible to the naked eye—information that may be used to increase crop production. Plant stress is the adverse reaction of plants to environmental conditions that are unfavorable to growth, such as lack of sufficient nutrients, inadequate watering, disease or insect infestation. The reaction with which most people are familiar is a change in leaf color, but research has found that in many cases, pre-visible signs of stress can be detected using the proper instruments and techniques. Plant stress can be monitored, in part, by observing variations of the plant's reflectance in two specific wavebands of light. Relative levels of chlorophyll, the pigment that enables photosynthesis and gives plants their green color, can be determined by measuring the plant's reflectance of light in those parts of the spectrum.

### NASA, EPA help cities study ways to use urban forests

Three U.S. cities will partner with NASA and the Environmental Protection Agency to study how strategically placed "urban forests" and the use of reflective surfaces may help cool cities, reduce pollution, lower energy bills, modify growth plans and help mitigate further deterioration of air quality. Researchers from Marshall Space Flight Center will study bubble-like accumulations of hot air, called urban heat islands, and how these change between day and night. Heat islands develop over cities as naturally vegetated surfaces are replaced with asphalt, concrete, rooftops and other man-made materials. The researchers want to demonstrate that by "cooling" a city, it is possible to directly reduce energy use by buildings, which in turn reduces greenhouse gas emissions and ultimately improves the air quality. Additionally, individuals, businesses and governments can save money by reducing the amount of energy consumed. Based on the results of the project, the science team plans to disseminate its findings nationally so other cities also can incorporate what the team has learned into their long-range growth plans.

# Boy makes first 'Earth walk' on trip to lake

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ed last September to 4-year-old Kyle and 2-year-old Ryan Richards of Shotton Colliery, England. The brothers have Polymorphic Light Reaction Syndrome, a serious allergy to light that causes severe skin lesions. Last fall, the boys, who looked like junior astronauts, wore their protective suits to Disney World in Orlando, Fla., and also viewed a space shuttle launch at the Kennedy Space Center.

Thanks to the "expert" feedback provided by the Richards brothers, NASA developed an upgraded version of the protective garment. The suit's headpiece was redesigned totally to enhance ventilation and reduce overheating in the head area.

"The body cooling system was changed from a battery-powered liquid pump unit to a passive phase change vest, made of material similar to freezer cold packs used for sports injuries. The vest is simple, less expensive and more durable than the original battery pump," said Robert Dotts, assistant director of Technology Transfer and Commercialization.

The new phase change vest is easier to use for both children and their families and brought the cost of the entire suit down to about \$1,700 from more than \$2,000, Dotts said.

MicroClimate Systems Inc., of Sanford, Mich., supplied the phase change vest, and the Solar Protective

Factory of Carmichael, Calif., provided the protective outer garments. DRLI Co., which supplies protective coatings for astronaut's space suit helmet, supplied the clear UV-blocking coating for Mikie's face visor.

According to HED Foundation's Moody, who presented the NASA suit to the Walker family, a giggly, jumping Mikie couldn't wait to don his "space suit" and explore the outdoor world of his home planet for the first time. The family headed for a local lake and, for the first time as well, Mikie could look at the scenery out the van's windows. Previously, the passenger windows of any vehicle Mikie rode in had to be completely covered to prevent

expose to sunlight.

Taking a cue from Apollo astronauts, Mikie picked up rocks and tossed them into the first large body of water he'd ever seen. He became attracted to a patch of buttercups and gathered a bouquet for his mother. Staring up at a tree he announced, "Someday I'm going to climb a tree just like my older brother." He adopted "Sparky," a caterpillar he found crawling on his gloved hand.

"It is said that a person never walks as tall as when he stoops down to help a child. Well let me tell you, there's many, many tall people who work at NASA," said HED Foundation president Moody.



**TOUR DE FORCE**—Russian propulsion systems manager Felix Lebedev (arms folded, sunglasses) and a group of engineers from JSC supporting the International Space Station recently visited White Sands Test Facility. The entourage also witnessed the firing of an OMS engine, examined shuttle flight and test hardware and observed operation of a developmental unit of the space station oxygen recharge compressor being designed and built at WSTF. From left: Charlie Goldstein, Todd Peters, Dave Harris, Maureen Dutton, Terrence Kelly, Tien Nguyen, Lebedev, Mark Kitt and Francisco Hernandez.

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## New pagers have local area code

Starting this month, almost all JSC employees who use pagers will get new ones as the center joins other NASA installations using the new agencywide pager contract awarded to Air Touch Inc.

The pager contract provides new pagers using the 281 area code and reduces JSC's costs, said Jim Doyle the Information Systems Directorate's pager coordinator. The contract offers paging capabilities and services comparable to the pagers being replaced.

During the past five years, JSC's pagers have been provided by Mobilecomm. That contract expires in July. The incremental exchange of pagers will be conducted from May 1 to July 1 through directorate and division offices. ISD will work with those offices to minimize the impact and inconvenience of the exchange.

"I've laid out a plan to exchange pagers within an organization to allow them to update their contact lists once," Doyle said. "This is also a good time to look at where pagers are assigned to make sure they are being used appropriately."

Replacement pagers will be issued to contractors with approval by the appropriate JSC contracting officer. Lost Mobilcomm pagers will be reported by completing a Report of Survey describing the nature and circumstances connected with the loss of this leased equipment. For details, call Doyle at x34048.

## Don't forget to recognize implementers: Low lecturer

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the newly created GM University. "People need to feel a sense of participation in the decision process. People need to be involved in decisions that affect them.

"Think about this country. That's what we're founded on," he said. "As a result, our government sustains itself through some very tough times."

When GM began to explore these different ways of doing things, he said, management decided that if union workers were going to begin participating in the decision-making process, it would have to teach them about business. Saturn started a program that would require 92 hours a year of education and training for everyone in company. Each employee would be involved in a risk and reward system that included a 20 percent pay cut that they would "buy back" by completing their training.

Saturn managers also had to take the pay cut and were required to

teach the classes, but earned double credit for teaching. The kicker was that all of their employees had to complete their 92 hours as well.

"It was a magical thing," LeFauve said. "In the process of 92 hours, we had to think up what it is we were going to teach, what it is we wanted people to know. We began to teach people simple things, like what are we all about? What is the purpose of Saturn? What's the purpose of NASA? What's the purpose of General Motors? You've got to know that in order to do your job. In the process it was very interesting how hungry the people were for that knowledge."

The classes made it clear to workers that the company would not survive if customers didn't buy its product. Employees on the factory floor began asking questions like "How many cars do we have to sell to pay for this thing you in management want to do?"

Management had never been challenged in that way before, he said. And it led to the establishment of core values for everyone in the company, one of which was a dedication to "customer enthusiasm."

"You will never be second guessed if you do the right thing for the customer" was the slogan, LeFauve said. "We generally exceeded the customer's expectations. I think that's what really built the Saturn brand, was this sense of focus on the customer."

LeFauve, who began his GM career in 1956 as an engineer with Packard Electric Division in Warren, Ohio, said he is sometimes asked whether leaders are born or made.

"It doesn't make any difference. There are so many of them around us that we don't know about. There are leaders everywhere at different parts of the organization at different stages of development. There are hundreds of leaders that haven't

been recognized yet. That's what we learned at Saturn."

The key, he said, is helping them along in their development.

"The way you transfer knowledge is through a formal recognition of education and training. Every one of us as a leader has a responsibility to be exposed to new ideas, to discuss them, to buy into them and then to teach them. If you are still teaching or managing the way you managed 10 years ago, shame on you unless you're a wonderful person and were 10 years ahead of your time."

In honoring employees, those who are often forgotten, LeFauve said, are the implementers.

"In my company, I recognize implementers, I don't recognize new ideas. Ideas are a dime a dozen—it's the people who make new ideas work. We would like to have people fail on new ideas with the idea that we'll know at least that we're trying new ideas."

## High school students learn much from zero-g flights

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per, that curious sensation of not-ready-for-prime-time physics comes about. They are experiencing what only a handful of human beings have—the feeling of weightlessness.

Bobbing and weaving like a boxers in a prize fight, the first members of the high school KC-135 flight program take their readings and make observations. Back at Ellington, ground crews and other team members huddle around the TV set in the flight ready room. Images of their teammates alternately floating and then being pressed into the KC-135's padded floor fill the screen.

This is science in action, proving the concepts that they have only read about; this is loosing the surly bonds of Earth and learning that science has few, if any, boundaries. "Cool!"

was the one-word summary most often given during and after the flight.

The students were participants in the Fly High Program, JSC's pilot project to fly high school researchers on the KC-135 research aircraft. Students flew experiments examining microgravity measuring devices, global positioning systems, blood pressure, coatings inside microcapsules, magnetic fields and EVA construction activities. Teachers accompanied their students and participated in the experiments.

"NASA is always looking for ways to use its mission to encourage young people to study science and technology," said Donn Sickorez, NASA university affairs officer. "This program seemed like a logical outgrowth of our undergraduate student flight program."

In that program, teams of undergraduate students were competitively selected to fly their experiments on the KC-135 in the Spring of 1997. NASA's Education and Information Services Branch, in partnership with the Texas Space Grant Consortium, which administers both programs, worked with science coordinators from Clear creek, Houston and Austin independent school districts.

The teams reported their mentors—Coy Kouba, Dennis Morrison, John Charles, Kevin Hames, Russell Carpenter, Susan Gomez, Chad Rowe, Linda Godwin, Mary Flores, Alan Currie and Loretta Hidalgo—were a valuable resource in terms of technical help and inspiration.

"The best part of working with the students was seeing talented high school students get a chance to see

a unique environment in which real work is done for the space program," Godwin said. "I feel it is extremely important to bring the 'real world' into high school classes. There, it is often difficult to visualize 'what you want to do when you grow up' because the educational environment is mostly classroom-related."

Another strongly positive outcome was that students generally surprise themselves, and learn more than the required technical facts. Michael Cox, a junior from LBJ High School in Austin said, "I think that dealing with the politics and red tape that surrounded this entire project (at least locally) was an education in and of itself. Realizing just how important politics and human interaction are gives new light to the complexity of the real world."



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