



MARSHALL STAR

Serving the Marshall Space Flight Center Community

May 19, 2005

NASA camera provides new look at corn

by Sheri Bechtel

A plane flies over a corn field in Nebraska taking pictures with a fancy, onboard camera. In just one snapshot, the Environmental Protection Agency is learning things about this vegetable it couldn't see with the naked eye.

This picture-perfect view of corn is all thanks to NASA technology. NASA is helping the EPA tell the difference between traditional corn and bio-engineered corn – where genes have been inserted to make the plant resistant to insects and diseases.

The technology is called hyperspectral imaging. It cuts one snapshot, taken by a special camera, into 120 specific images. Each image shows a unique characteristic, invisible to the human eye. For example, look at a rainbow and you'll see 12 colors. With



hyperspectral imaging, you'll see more than 600 different hues.

The imaging system efficiently distinguishes between the

two types of corn by their unique characteristics, ensuring corn growers are meeting federal regulations that farmers planting bio-engineered corn also plant a percentage of acreage for "real" corn on which insects can feed. Without this balance, insects could become immune to the bio-engineered corn.

The plane used by the EPA has a hole cut in its belly to specially fit the camera – about the size of a loaf of bread – to photograph crops. It typically flies about 8,000 feet above the terrain, photographing the same corn fields every 10 days during growing season. All the images are then entered into a computer, where data-mining techniques are used to extract the information about the corn plants.

"This effort will enhance NASA's understanding of image processing techniques to extract knowledge from hyperspectral data sets," said Brian Mitchell of NASA's Space Partnership Development Program at the Marshall Center. "The research being conducted with the corn plants has the potential to contribute significantly in our ability to grow sustainable and nutritional crops in space for our astronaut crews. This could prove vital for long duration exploration missions."

The hyperspectral technology bolsters NASA's Vision for Space Exploration and long-term spaceflight goals -- a Vision to return Space Shuttles to safe flight to complete the International Space Station, and human and robotic exploration of the Solar System.

The patented, portable hyperspectral camera and its applications were developed by the Institute for Technology Development at NASA's Stennis Space Center in Mississippi.

See NASA camera on page 2

STS-114: Space Shuttle Return To Flight

As Shuttle launch nears, duty calls for Safety's Walker

by Rick Smith

There's rarely a quiet moment in Angelia Walker's office at the Marshall Center. Propulsion engineers stop by to verify data. Supervisors drop in to check on a report. Managers at NASA Headquarters in Washington call for updates.

"Everyone's asking questions, keeping up a constant flow of information," Walker says. "That's the first sign of a positive safety culture and a healthy engineering environment."

For Walker, that's a rewarding thing to see. She manages the Safety, Reliability and Quality Assurance Policy Assessment Depart-

ment, one of the primary offices of the Safety and Mission Assurance Directorate at Marshall.

Walker monitors Center-wide safety policy and adherence to quality assurance requirements for every Marshall-built system being developed, tested and prepared for flight. Her organization partners with program and project offices to ensure every engine and hardware component and system that leaves Marshall -- bound for a test stand at NASA's Stennis Space Center near Bay St. Louis, Miss., or a launch pad at NASA's Kennedy Space Center, Fla. -- is checked out

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Additional work slated for Rideout Road's Gate 9

Motorists entering Redstone Arsenal through Rideout Road's Gate 9 this December may think they are entering a turnpike toll plaza. That's because it will be the first Access Control Point in the Department of Defense to conform to the Army Access Control Points Standard Definitive Design.

"We are going to start the construction on this six-month project May 31," said Keith Cook of the Garrison's Department of Public Works. "Over the Memorial Day weekend we will be setting up the traffic flow pattern that will permit us to begin this construction project, which will, ultimately, produce a brand-new guard house."

The new guard house will have enhanced security features, including 360-degree visibility, canopy-covered islands with booths for guards, as well as traffic control lights for access to the Arsenal. The guard house will also be twice the size of the current one and have emergency power supply capability.

During the construction process, four inbound and three outbound lanes will be available during work-week hours. But motorists are urged to drive slowly and use extreme caution in the gate construction area, as lane changes will be necessary to permit various phases of the project to



Work in and around Rideout Road's Gate 9 will continue into the fall.

proceed as planned.

"When we begin on May 31, all visitors will be inspected and processed in an area near the new visitor control center," Cook said. "We will install signs directing visitors to the new location. Additionally, anyone escorting a visitor will have to meet that visitor in the area near the new center."

The new visitor center is set to open this fall.

When completed the Rideout Road Gate 9 entrance will have six inbound and three outbound lanes. Redstone Road, Gate 3 and Patton Road, Gate 10 are slated for similar construction to meet the requirements of the new standard.

NASA camera

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"This knowledge is vital to future Mars missions," said George May, director of The Institute for Technology Development at NASA's Stennis Space Center in Mississippi. "When we go to Mars, we'll have to grow our own food source. This technology enables early detection of stresses in plants, such as nutrient problems, so that corrective action can be taken to maintain the food supply."

Hyperspectral imaging also can be used in treating any astronaut wounds in space. The Institute for Technology Development is working on a portable, handheld camera that an astronaut could use to capture an image of a wound site. Using that image to identify wound severity or progress in healing would allow doctors to decide the best treatment for the wound. This imaging could save precious time in diagnosing a problem and reduce healing time by applying the appropriate treatment.

In addition, hyperspectral imaging will be able to detect mold and toxins in spacecraft -- a needed tool in long-duration missions to ensure the astronauts have a clean, healthy environment.

In the meantime, the imaging will help the EPA improve its crop monitoring capability as NASA expands its knowledge of hyperspectral technology.

The camera and its applications were developed by the Institute for Technology Development, a NASA Research Partnership Center managed by the Marshall Center and is part of the Exploration Systems Mission Directorate, Innovative Partnerships Program. The hyperspectral imaging system™ is patented under U.S. Patent No. 6,166,373 issued Dec. 26, 2000, and is only available from the Institute for Technology Development, or under license.

The writer, an ASRI employee, supports the Public Affairs Office.

**Marshall Public Inquires Office is now open
9 a.m.-noon and 2-4 p.m., Monday-Friday**

**Marshall Center celebrates Asian Pacific
American Heritage Month during May**

Safety

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Photo by Doug Stoffer/Marshall Center

Walker

and ready to safely go to space.

This spring, Walker's chief focus, like so many of her coworkers, has been STS-114: Space Shuttle Return to Flight. And she's never been more proud to be part of the NASA team.

"We do an exhaustive amount of checking and rechecking to ensure we're as safe as we can possibly be," Walker says. "When it comes to propulsion systems for Shuttle Discovery, we're there. We're ready. Let's fly."

Those systems are a key responsibility of the Marshall Center. Engineers in the Space Shuttle Propulsion Office at Marshall, supported by NASA and industry all over the country, prepare the Main Engine, External Tank and Solid Rocket Boosters for each Shuttle flight. At full throttle, each of the three Main Engines, mounted in the Orbiter's aft fuselage, generates more than 375,000 pounds of thrust -- four times that of the largest commercial jet engine. The External Tank is the 154-foot-long "backbone" of the Shuttle, delivering fuel and oxidizer, and absorbing the 7.3 million pounds of thrust generated during launch.

The two, 149-foot-tall Solid Rocket Boosters generate the majority of the thrust needed to lift the Shuttle from the launch pad, before separating and dropping into the sea two minutes into the flight.

Walker's organization partners with project teams and makes independent assessments to help ensure all Shuttle propulsion components are ready for launch. And nothing -- not cost, not schedule, not an ideal launch window -- overrides safety as the final "go-no go," she says.

Born in Phenix City, Ala., Walker was one of seven children of Jimmie and Lilly Goodwin. Taught early by her parents to stay focused on school and her career goals, she graduated from Tuskegee University in Tuskegee, Ala., in 1986 with a bachelor's degree in electrical engineering. She went straight to work as an electrical engineer supporting design and maintenance of manufacturing equipment for the Polaroid Film Division in Waltham, Mass. A year later, she returned home to Alabama. "I won't lie," she laughs. "It was cold up there!"

Walker also wanted to be closer to her then-fiancé, who today is her husband, Sam Walker, senior pastor of the Saint Luke African Methodist Episcopal Church in Birmingham, Ala. She joined the Marshall Center in 1987 as a quality engineer supporting the Solid Rocket Booster Project Office. At the time, NASA was preparing to return to flight following the loss of Shuttle Challenger, and Walker recalls the determination she saw among her co-workers.

"It was a good time to learn," she recalls. "I was probably a little naïve at the time, and it helped me realize you need tough skin in this business. You can't hesitate

when you see an issue worth bringing to light. Lives depend on us. America's future in space depends on us." Today at NASA, she says, that attitude is universal. "Personnel at every level are quicker to interact, quicker to challenge traditional procedures in order to make them better and safer."

That broad devotion to safety makes it easier for Walker to turn over her duties to others this fall. She was selected in early 2005 to become a NASA Harvard Fellow -- a follow-up to the leadership program she completed in 2002 at the Federal Executive Institute in Charlottesville, Va. Nominated annually by NASA supervisors and selected by a panel of education administrators at NASA Headquarters, Harvard Fellows spend a semester at the Harvard Graduate School of Business in Cambridge, Mass. Walker will complete the Harvard Program for Management Development program this fall, returning to Marshall in early 2006 to continue her service to the Safety and Mission Assurance Directorate.

"Being selected to attend Harvard is a tremendous opportunity, and a privilege," Walker says. "Leadership is crucial in every organization. I was taught that you cannot lead where you do not go, so my personal philosophy is to model the behavior I would like to see."

And it's a good thing -- her phone rings again, and there's a fresh knot of chart-carrying engineers gathering outside her office. Walker's charismatic smile is back. "Duty calls," she says, and then gets back to work.

The writer, an ASRI employee, supports the Public Affairs Office.

Obituaries

Angelo M. Nowlin, 68, of Huntsville died May 12. He was an engineer in the Cargo Assurance Department of the Safety and Mission Assurance Directorate.

Mr. Nowlin worked 38 years for NASA and was retired from the U.S. Army.

Survivors include his wife, Linda J. Nowlin.

Douglas T. Thomas, 72, of Arab, died March 10. Mr. Thomas retired from the Marshall Center in 1995 after working as a math-

ematician and computer analyst.

Survivors include his wife, Hilda Gibbs Thomas; his children, Kathy Spruiell and Dr. Gary Douglas Thomas, both of Winfield, and Milford Earl Thomas of Atlanta; a brother, Fred Thomas of Scottsboro; and a sister, Mary Thomas Hooper of Paducah, Ky.

Richard A. Thompson, 66, of Madison, died March 2. Mr. Thompson retired from the Marshall Center in 1994 after working as an engineer.

Survivors include his wife, Eunice L. Thompson.

Discovery to return to Vehicle Assembly Building

From Kennedy Space Center news release

Work continues at Launch Pad 39B in preparation for an External Tank tanking test scheduled for no earlier than Thursday for the STS-114 mission to the International Space Station. Engineers and technicians are adding instrumentation to the tank to help troubleshoot two issues that arose during a tanking test on April 14.

The instrumentation will provide data to analyze the liquid hydrogen sensors that gave intermittent readings and the liquid hydrogen pressurization relief valve that cycled more times than standard during last month's test.

The tanking test involves the ground operations team at Kennedy Space Center filling the External Tank with liquid oxygen

and liquid hydrogen fuel.

The team evaluates how the tank, orbiter, Solid Rocket Boosters and ground systems perform under "cryo-load," when the tank is filled with the two ultra-low temperature fuels. The tank filling and draining portion of the test will take about 11 hours and includes a simulated countdown through the T minus 31 second hold. However, the total length of the test operations at KSC will take approximately 48 hours.

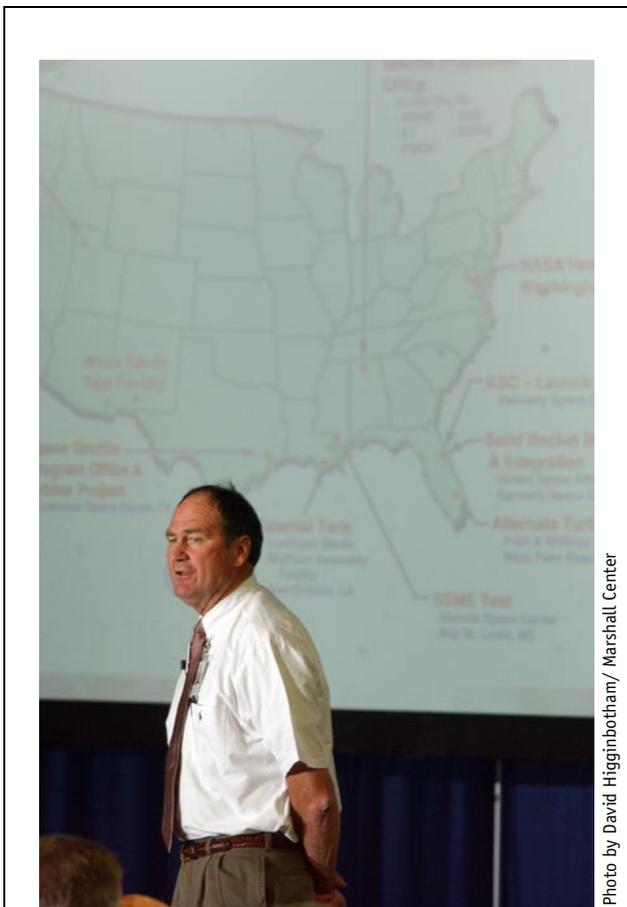
Following the tanking test, technicians will begin preparations for rolling back Space Shuttle Discovery to the Vehicle Assembly Building by the end of the month. Once there, orbiter Discovery will be destacked (removed) from its External Tank

and lowered into the transfer aisle.

In the Vehicle Assembly Building, preparations of ET-121 are currently taking place in the checkout cell. Final checkout of the vent valve assembly is complete. The change-out of the liquid oxygen and liquid hydrogen diffusers is complete. Following mating of the External Tank and Solid Rocket Boosters review next week, the tank will be moved from the checkout cell and attached to the Solid Rocket Boosters in the integration cell.

Once in the integration cell, a new heater will be added to the feedline bellows to minimize the potential for ice and frost buildup.

It will take about 24 days to perform the modification.



Marshall's journey to Return to Flight

Michael Rudolphi, Shuttle Propulsion Office manager, spoke May 10 at the Marshall Association luncheon. Rudolphi discussed the Marshall Center's journey from the loss of Columbia to Return to Flight.

Star reveals its hot nature

For the first time an X-ray image of a pair of interacting stars has been made by NASA's Chandra X-ray Observatory.

The ability to distinguish between the interacting stars -- one a highly evolved giant star and the other likely a white dwarf -- allowed a team of scientists to observe an X-ray outburst from the giant star and find evidence that a bridge of hot matter is streaming between the two stars.

"Before this observation it was assumed that all the X-rays came from a hot disk surrounding a white dwarf, so the detection of an X-ray outburst from the giant star came as a surprise," said Margarita Karovska of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass., and lead author article in the latest *Astrophysical Journal Letters* describing this work. An ultraviolet image made by the Hubble Space Telescope was a key to identifying the location of the X-ray outburst with the giant star.

X-ray studies of this system, called Mira AB, may also provide better understanding of interactions between other binary systems consisting of a "normal" star and a collapsed star such as a white dwarf, black hole or a neutron star, where the individual stellar objects and gas flow cannot be distinguished in an image.

The separation of the X-rays from the giant star and the white dwarf was made possible by the superb angular resolution of Chandra, and the relative proximity of the star system at about 420 light years from Earth. The stars in Mira AB are about 6.5 billion miles apart, or almost twice the distance of Pluto from the Sun.

Mira A was named "The Wonderful" star in the 17th century because its brightness was observed to wax and wane over a period of about 330 days.

NASA's Marshall Center manages the Chandra program for NASA's Science Mission Directorate, Washington.

Announcements

New guidelines for company-owned vehicle passes

The Marshall Center Badging office will now issue all company-owned vehicles an extended vehicle pass for a specific period of time. Normally, that period will be one year or less, depending on the expiration date of the subject's contract. The passes will be issued at the Badging and Vehicle Registration Office, Bldg. 4312, Digney Road. Companies with vehicles that have a permanent Department of Defense decal will be contacted and scheduled to have their extended vehicle passes issued. DOD decals already issued to commercial vehicles will be withdrawn and must be turned in. For additional information, contact the MSFC Badging Office at 544-2090.

Historical data sought on Razdow Telescope

Historic photos, illustrations, or any material pertaining to the Razdow Telescope previously located in the Solar Magnetograph Facility, Bldg. 4347, are being sought. Contact Tom Fleming at 544-3962 or Mike Wright at 544-6840 for more information.

Management Operations Retirees to meet for breakfast

The Management Operations Retirees will meet at 10 a.m., May 26 at the Cracker Barrel in Madison. Call 539-0042 for more information.

Mandatory training for lengthy overseas traveling set

The U.S. Department of State has mandated that all travelers on government business who are TDY outside the United States for more than a cumulative total of 30 days in a calendar year must complete the "Serving Abroad for Families and Employees (SAFE)" training course. This 16-hour course will be held at 8:30 a.m. June 15-16 in the Training Facility in Bldg. 4627. It is open to both Marshall Center contract and civil service travelers. The next session is scheduled for October. This class cannot be scheduled on an individual basis; therefore, attendance is recommended for any employee who has a possibility of approaching 30 days of official overseas travel this year. Team members will be certified for five years following completion of the training. For more information or to register, call Aimee Fluitt at 544-8517 or aimee.fluitt@msfc.nasa.gov.

Shuttle Buddies to meet Monday

The Shuttle Buddies will meet at 9 a.m. Monday at Mullins Restaurant on Andrew Jackson Way. For more information, call Deemer Self at 881-7757.

Workplace violence presentation set for Wednesday

The Protective Services Community Resources Office will hold a presentation on workplace violence on Wednesday from 9-10 a.m. in Bldg. 4200, Room G13-C. Information will be provided on workplace violence statistics, early warning signs, offender profile and prevention techniques. For more information, call Shawn Jayne at 544-1961.

Marshall joins in 'National Bike to Work Day' Friday

Marshall Center team members are gearing up for "National Bike to Work Day" on Friday. Participating bikers will meet at the parking lot near Becky Pierce Municipal Golf Course on Airport Road for a nine-mile ride to the Center. For more information, call Janie Miernik at 544-6534.

Construction work begins for Redstone Credit Union

Modifications have begun on the Redstone Federal Credit Union branch office in Bldg. 4202. The work should last until June 20. The credit union will remain open during this time, but Marshall Center team members are urged to use caution inside the branch during the scheduled construction. Call Bill Mayo at 544-7564 for more information.

Classified Ads

Miscellaneous

Pennsylvania House video cabinet, cherry, up to 30" tv, vcr/dvd, \$750. 931-427-2059

Schwinn Airdyne exercise bicycle, \$175. 656-2951

Goose down-filled stuffed sofa, light green, 8', \$150. 880-3737

Small Samsung cell phone, leather case, car charger, 1.5 yrs. old, \$25. 414-403-7676

Tuxedo w/shirt. 881-6040

Antique Queen Anne round table, cherry, 72", 4-chairs, china cabinet; couch, 3-chairs, Braggs. 881-4418

Two horses, together or separate, gentle, kid broke. 506-6026

External CD-RW drive, Iomega ext. CDRW, \$80; HP Photosmart 1115, \$80. 776-6998

ProForm treadmill, extra wide base, \$200. 325-5930

Girl's white day bed, \$85. 931-433-0975

Set of 4 Firestone Affinity LH 30 tires, 105/55-16, \$175. 256-498-6568

Sectional couch, \$225; matching set (3), sofa, end, & cocktail tables, whitewashed oak, \$150. 426-8001

Mikasa Antique Lace china, new \$700; Yamazaki Cara Gold Accent flatware, new \$250. 651-8507

Baby swing, 6-speed, \$40; Avent sterilizer, \$10; Safety First bottle warmer, \$10. 519-6353

Telescope, 6" Orion reflector/equatorial mount, extras, \$350. 420-6650

Square antique oak table, 6-chairs, \$490; NordicTrack ski-machine, \$50; girl's vanity table & bench, \$30. 830-5039

Dockers pleated & cuffed stain defender pants, charcoal color, 30x30, new w/tags, \$30. 533-5942

Radio Shack gift card, value \$118. 461-8369

Brass white rattan hanging lamp, \$25. 883-2948

Portable air conditioner & dehumidifier w/wireless remote, 10,000 BTU, purchased 06/2004, \$250. 256-864-0237

Shell for short S-10, \$125; Sunn Model-T guitar amp, \$500; dual 15" bass cabinet, \$150. 851-8085

Ping Hooper 3 golf bag, blue/white patterned, \$70; Easton Stealth Senior league 28/19 baseball bat, \$125. 656-0461

Modular chain link dog kennel/run, 15 panels w/hardware, \$500; Two wrought iron chaises, \$35 each. 777-2027

Computer desk w/2 open storage bins & pull-out tray for keyboard, \$50. 885-2005

Two bowling balls, 15 lbs. each, \$20 each. 837-1774

Motegi racing rims, 5-lug, 16"x7", flat black color, chrome lugs, \$400. 457-3670/Racheal

Rattan wicker pedestal square corner-rounded table w/4 chairs, blush white, \$300. 772-7262

MTD Yard Machines riding lawn mower, 14HP, 38" cut w/bagger attachment, 2 yrs. old, \$600. 520-3083

King Hickory sofa, \$300; Graco swing, \$40; Graco metrolite stroller, \$30; toddler bed, \$30. 721-1579

Pine kitchen hutch/buffet, \$150; tv/vcr combo, 13", \$50; formal brass chandelier, \$40. 829-1296

Four Jeep Grand Cherokee factory aluminum wheels & tires, 225/75/R16, Goodyear Wrangler ST, \$500. 325-1961

Electric 2-wheel red scooter w/battery charger, \$100. 828-0756

Desk w/matching file cabinet, solid oak, \$360; matching chairs, blue, burgundy upholstery, \$300. 536-8414

Bridgestone Dueler A/T tires, 14", mounted/balanced on Ford Ranger steel rims, used little. 931-993-6894

Thomas the Train, deluxe Round House w/Island of Sodor Table, extras, Make offer. 256-302-2956

Schwinn Mesa Mountain bike, red, 26", \$150. 883-1003

Sears electronic exercise equipment, \$150; Power Rider, \$40; Boy's 16 inch bicycle, \$25. 256-722-8570

Yamaha tenor saxophone, used 3 months, \$950. 256-509-4453

Hayward sand filter for in-ground or above-ground pool, 18", used one season, \$200. 508-4503

Washer/dryer, working condition, \$200. 256-230-9259

Power Wheels Harley Davidson motorcycle, pin & purple, \$75; Barbie Sunjammer jeep, \$60. 214-0110

2000 Kawasaki KDX200 dirt bike, shop manual, \$1,700. 256-353-6635

1974 Karmann Ghia hardtop, burgundy, restored, \$2,800; 1977 Yamaha XS750-2D maroon motorcycle, \$1,000. 256-233-4680

1997 Ford F150 Lariat Supercab, step-side w/sprayed liner, tonneau cover, auto, 5.4L, \$8,900. 679-3342

1989 KDX 200 trail bike, \$950. 256-348-4899

SeaRay Sorrento cabin cruiser, 25', V-berth, mid-berth, many extras, \$13,500. 468-0854

1989 Jayco Designer Series motorhome, 26', Class C, 460 cid engine, 36k miles, \$16,500. 256-503-8040

1994 Lexus ES300, emerald green/tan leather, new belts & hoses, garage kept, \$5,000. 520-3083

2000 Chrysler Sebring convertible, v6 automatic, 51k miles, white, black top, leather, \$9,000. 256-971-1723

1985 Suzuki LT50 4-wheeler, custom airbrushed flames, needs rear brakes & cable, \$300. 340-9450

2003 Ford Focus ZX3, 54k miles, w/100,000 mile transferable warranty, 32mpg. 776-1230

2000 Corvette coupe, metallic magnetic red, 6-speed, loaded, 40k miles, \$26,000. 256-874-7773

1987 Dodge Ram D150, 318/v8, one-owner, recently rebuilt transmission, \$2,500. 882-7350

1977 Procraft Fish-n-Ski, 115 Mercury, \$2,500. 714-3769

Vehicles

2000 Toyota Tundra, V8, SR5/4x2, extended cab, 74k miles, gray w/gray interior, many extras, \$16,250. 256-509-5340

1998 BMW 740iL, hunter green/tan leather interior, 103k miles, new tires, \$16,000. 682-0888

1987 Dodge D100 truck, one-owner, 139k miles, maintenance records available, \$2,500. 895-9520

1997 Ford F150 truck, 4x4, maroon, 79k miles, 3-doors, short-bed, new tires, \$9,000. 651-2429

1999 Ford Expedition XLT, 100,300 miles, \$8,400. 830-8100 after 5 p.m.

2000 Chevy S10 ZR2, 4x4, extended cab, loaded, red, 92k miles, \$11,200. 256-572-3574

2003 Nissan Pathfinder, V6, 2wd, automatic, 4-door, 23k miles, leather, cd, tow, silver, \$23,500. 880-3337

2000 Volvo V70 wagon, 5-cyl, auto, moonstnd w/tan leather, all-power, sunroof, 72k miles. 351-1754

1975 Honda CB 500T vintage motorcycle, 2,500 miles, \$1,995. 508-4379 after 5 p.m.

2001 Ford Focus, 4-door, black, 87k miles, V6, \$4,500. 256-289-3905

1985 Toyota SR5 4x4 XTRACab, needs engine rework/new engine, \$1,500. 881-4701

Wanted

Vertical shaft gas engine for tractor type riding lawn mower, 12HP or larger. 881-6040

Used Electrolux vacuum cleaner, upright, working or not. 881-0883

Used motorized treadmill. 464-5685

Quart and pint canning jars. 256-656-2965

1985 Chevy S10 project, must have good title & body, LWB preferred, not mandatory. 508-1558

Free

Kittens. 828-3181

Black Lab, female, 1 yr. old, fixed & all shots. 721-6572

Found

Gold necklace, Bldg. 4203 Cafeteria on May 10, 2005. Call 544-2070 to claim/identify

MARSHALL STAR

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