



Green thumbs

JSC's groundkeepers use their green thumbs to boost morale among employees who work indoors most of the day. Story on Page 3.



Still orbiting

After 10 years, Pioneer is still orbiting and exposing the secrets of an inferno called Venus. Story on Page 4.

Space News Roundup

Vol. 27

December 9, 1988

No. 40

For crewmen, welcome was 'incredible'

For the crew of STS-27, the return to Ellington Field at 1 a.m. Wednesday was expected to be uneventful—maybe a smattering of friends and family members, but as Commander Hoot Gibson said later, "...this is incredible."

An estimated crowd of 300-500 employees, friends and well-wishers showed up at Ellington to welcome the five crewmembers home following the successful completion of STS-27. "I can't believe you are all out here at one o'clock in the morning—this is incredible. I really expected we were going to arrive and hop right into the cars and drive home, but thank you very much for coming out to say hi," Gibson told the crowd.

The return to Houston marked the end of the third mission of *Atlantis*—two of which have been dedicated Defense Department missions classified secret. "To the STS-27 crew, it's no secret, we're glad to have you back," JSC Center Director Aaron Cohen said.

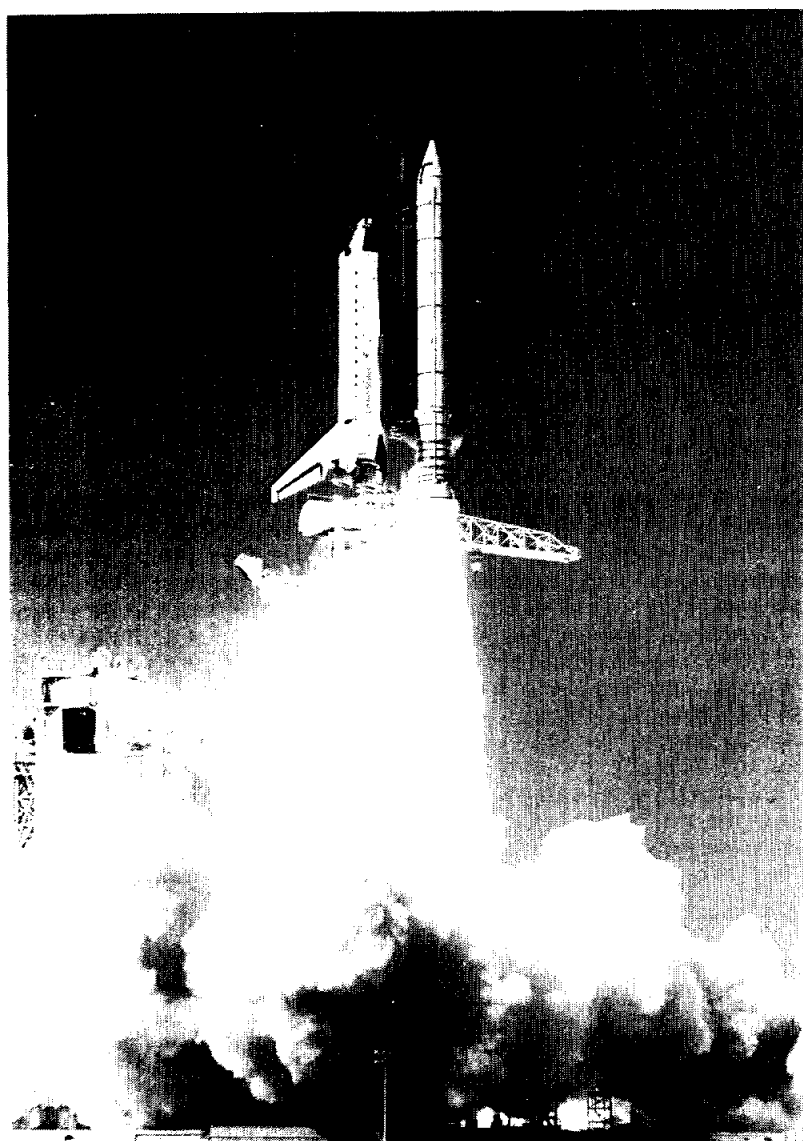
Most of the praise however, came from the crewmembers themselves, who used their time at the microphone to thank the workers who made the flight possible.

"We got to be a very visible, small representation of JSC and the overall NASA effort, and all of us are very much aware of the fact that none of us would have been there ... without the efforts of an awful lot of people," Gibson said.

STS-27 Mission Specialist Mike Mullane echoed Gibson. "Well, you're all going to get tired of hearing the same thing, but I want to thank you from the bottom of my heart for the opportunity to fly on a beautiful rocket ship and, like Hoot says, it wasn't us going out there and doing that, we just had the superb and wonderful privilege of climbing aboard," Mullane said.

Making their first Shuttle flights, pilot Guy Gardner and Mission Specialist Bill Shepherd added their thanks. "I appreciate all the work everybody here has done for us. It was easy with all the fine training and equipment that we had and I think we did a good job for NASA and the space program, and I think we did some good things for our country as well," Gardner said.

"I just can't thank the troops here at JSC enough," Shepherd added.



Atlantis rockets upward in a Friday launch that turned out to be particularly spectacular because of unusually clear skies at Kennedy Space Center's Launch Pad 39B. Atlantis landed safely at Edwards Air Force Base on Tuesday.

Atlantis blazes safely into orbit; flight a success

By James Hartsfield

After a scrub one day earlier due to uncooperative weather, *Atlantis* thundered aloft Friday morning, less than 90 seconds before the end of its designated launch period.

Atlantis lifted off from Kennedy Space Center's Launch Pad 39B at 8:30:34 a.m. CST in what many called one of the most spectacular launches of the Shuttle program to date due to clear, crisp autumn weather.

After four days, nine hours and five minutes in flight, Commander Hoot Gibson made perfect marks as he brought *Atlantis* to a smooth landing at Edwards Air Force Base Tuesday afternoon. Gibson and the rest of the crew—Pilot Guy Gardner and Mission Specialists Mike Mullane, Jerry Ross and Bill Shepherd—were full of emotion as they addressed a crowd at Edwards.

"We've just finished a very exciting mission, only the second one of our Space Shuttle program since our return to flight," Gibson said. "We're very happy that the mission went very nicely and very successfully, and we had a wonderfully good time."

"It was a fantastic voyage for all of us, and we did some great things and

some good for our country," added Gardner, completing his first flight.

Mullane took the opportunity to thank those whose efforts were just as vital to the flight, but whose faces weren't as visible. "What we do on any mission of the Space Shuttle doesn't happen without an awful lot of other people around the country," he said. "And we certainly appreciate

the support we've gotten from all of them. It was a giant team effort."

"Spaceflight is something you can't describe to

other people no matter how hard you try," added Ross. "But I think from the smiles all of us have on our faces, you can get a sense that it was quite an experience."

Shepherd, the first member of the Astronaut Class of 1984 to go into space, was at a loss for words to describe his trip. "I guess the best way I could summarize ... would be only to say that it's really been a privilege to have such a proud bird, a fine crew and a great mission," he said. "Thank you."

The launch countdown proceeded smoothly with only one slight problem cropping up in a liquid hydrogen feed

Please see **PROUD**, Page 4



Launch preparations for Magellan begin

By Pam Alloway

Magellan, NASA's unmanned probe expected to map about 70 percent of Venus' surface despite the planet's dense cloud cover, soon will take its place in space history as the first planetary mission carried into orbit aboard the Space Shuttle.

Scientists have spent the past 10 years planning the 20-ton spacecraft's historic mission, and preparations for its April 28, 1989, launch aboard *Discovery* are continuing at Kennedy Space Center, NASA officials said recently.

"We've been waiting a long time to

get a close up look at Venus," said Dr. Steve Sanders of NASA's Jet Propulsion Laboratory during a Wednesday news conference at Kennedy.

Workers at Kennedy have assembled Magellan on site and are conducting tests to ready the spacecraft for its eventual mating with the Inertial Upper Stage (IUS) and trip into *Discovery's* payload bay. They recently completed the assembly with installation of Magellan's solar panels—honeycomb aluminum webbing that extend on either side of the craft.

A panel of Magellan managers from JPL and Martin Marietta, the Denver-

based company which built the probe, reviewed preparations for the two-year mission during the news conference. Magellan is one of several scientific missions scheduled for launch in 1989, dubbed the "Year of Science at NASA."

"We are truly excited to get back to these scientific missions," said John Conway, Kennedy's director of payload management.

NASA officials said no delays in Magellan's scheduled launch date are anticipated as a result of the Oct. 17 fire that caused about \$87,000 damage to the spacecraft. Investigators

have since determined an electrical short caused the fire.

"We have recovered gracefully and without scars, not counting the scars on our ego," said Charlie Brown, director of the Magellan project for Martin Marietta.

Although experts have described Venus as Earth's closest neighbor both in size and proximity to the Sun, there are significant differences that experts anticipate Magellan's Synthetic Aperture Radar (SAR) will capture and relay to Earth. Scientists particularly are interested in Venus'

Please see **MAGELLAN'S**, Page 4

Astronaut taken out to the old ball game

By James Hartsfield

Astronaut Sonny Carter recently realized a life-long dream thanks to his peers in the Astronaut Office when he attended the Los Angeles Dodgers' sixth annual adult baseball camp.

Carter's fellow astronauts paid for his trip and surprised him with the gift. "It was absolutely fantastic, something I've always wanted to do," Carter said. "The definite high point was meeting and talking with Roy Campanella."

Campanella, a former catcher for the Dodgers now in the Baseball Hall of Fame, has been an idol of Carter's since childhood. Instructors at the Nov. 6-12 camp were all former Dodger greats, and Tom Lasorda, manager of the World Champion Dodgers, served as chief instructor.

The camp was held at Dodger-town, the spring home of the Dodgers, in Vero Beach, Fla. Campers stayed

in the same accommodations Dodgers' players have during spring training.

The six-day camp was capped by a game Nov. 11 featuring the campers against the former Dodger players in Holman Stadium.

The gift from his co-workers was a real surprise, Carter said, and it was the perfect present. Although he admitted that he has no future in professional baseball, the camp was an experience he will never forget.

When he learned of his impending trip, Carter said he began warming up with several nights of batting practice at a local batting cage.

As a camper, Carter received official Dodger home and road uniforms featuring his name, 50 baseball cards with his photograph, video taped highlights of his camping experience, a Dodger cap and an official camp photograph and certificate.



Astronaut Sonny Carter slides into third base recently at the Los Angeles Dodgers' adult baseball camp, a trip given to him as a gift from his fellow astronauts.

Nozzle damage forces motor replacement

The Inertial Upper Stage (IUS) first stage motor for STS-29 was damaged Dec. 1 during pre-launch processing at the Air Force's Eastern Launch Site, Cape Canaveral.

A technician working on the vehicle bumped the first stage solid rocket motor nozzle exit cone, cracking it. NASA and the Air Force have decided to replace the first stage motor with a spare motor already available at the launch site.

The IUS will be used to boost the third Tracking and Data Relay Satellite (TDRS) into geosynchronous orbit after TDRS-D is deployed from *Discovery*.

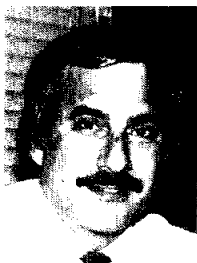
NASA and the Air Force are assessing what impact, if any, the incident might have on the planned Feb. 18, 1989, launch date. Even if there is a brief delay in the launch of STS-29, NASA does not anticipate any effect on the schedule of missions after STS-29.

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People

Visentine gets AIAA award

Jim Visentine, an aerospace engineer in the Structures and Mechanics Division, was honored recently with an Achievement Award presented by the American Institute of Aeronautics and Astronautics (AIAA). Visentine received the award for his contributions as membership chairman for the AIAA Houston section since 1982. As membership chairman, he has helped the Houston section grow



Visentine

from 730 members to more than 1,025. He has personally recruited about 50 new members.

Schmitt bowls perfect game

Leonard Schmitt, a McDonnell Douglas employee, bowled a perfect 300 during NASA Mixed League action Nov. 1. Schmitt chalked up the flawless score at the Alpha Bowl in Webster in his third match of the night on Lanes 31-32.



Schmitt

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays:

General Cinema (valid for one year): \$3 each.

AMC Theater (valid until May 31): \$2.95 each.

Sea World—San Antonio (year):

children, \$13.56; adults, \$15.96.

New Year's Eve Dance (Dec. 31, 7 p.m., Rec Center), includes cold cut buffet before and breakfast after, \$12.50. Tickets go on sale Monday.

The Arkansaw Bear (Feb. 18, 7 p.m., Bayou Theatre, UHCL): \$3.

Pericles, Prince of Tyre (April 22-28, 8 p.m., Satellite Theatre, UHCL): \$4.

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Sale: Houston, Inwood Pines, Northwest, 3-2-2, CA/CH, assume payments. (713) 591-2549.

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Sale: Kemah, 118' x 180' lot, ready for building home, some trees. \$7,500. 334-1883.

Rent: Furnished condo, 1-1.3, studio, color TV, microwave, linens, sheets, swimming, tennis, exercise room, spa, near NASA, \$450. 282-6422 or 488-7038.

Sale: Heritage Park, 3-2-2 custom home, tile entry, walls of windows in living and dining rooms, beautiful custom kitchen, new deck and fence, both baths redone and vanities custom, new paint inside and out, wallpaper, miniblinds, \$58,500. Tony or Lori, 482-5139.

Sale/Lease: Baywind I condo, 2-1.5-2, W/D, suitable for 2 to share, newly painted, \$350/mo. plus elec. and dep., or \$27,000. 333-3992.

Rent: League City, Glen Cove, 4-2-2A tri level, family room/FPL, fans, Jen Aire, W/D, refrig., fenced, sec. lights, CA/H, comm. park and boat ramp, \$650/mo., \$600/dep., no pets. 337-4051.

Sale: Water front lot, all city util., quick access to West Bay, \$9,500. (409) 935-9250.

Sale: 27 acres, 4-3-3 house, 16' x 36' inground pool, barn, pond, fenced, 1 hour East Houston, \$110,000. (409) 262-8216.

Lease/Sale: Brookforest, CLC, 4-2.5-2, 2,500

sq. ft. lovely contemporary, all formals, beautifully landscaped, near schools, 10 min. to NASA, \$1,100/mo. or \$129,900. x37016 or 488-7224.

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Sale: Friendswood/Sun Meadow Estates, wooded lot in established neighborhood, cul-de-sac, bordered by stream and golf course on 2 sides, approx. 245' deep and up to 86' wide, approx 1/3 acre, util. on site, \$31,500. Doug, x32860 or 486-7412.

Cars & Trucks

'80 Buick Regal, 2 dr., \$2,000. Todd, x32580 or 354-6297.

'80 Toyota Supra, loaded, V-6, 5 spd., new tires, fine cond. \$2,900. 280-2636 or 723-7273.

'77 Pontiac Trans Am, 400 ci, auto, black on black, good cond. \$2,800. 337-3690.

'75 Mercedes Benz 450 SEL, blue, auto, trans., PS/PB, options, new Pirelli tires, newly installed AM/FM stereo w/cass. (4 speakers), newly installed A/C, pwr. sunroof, cruise control, P/W, floor mats, int. very clean, ext and engine in fine cond. \$9,500, OBO. Gary, x30857 or 242-4799.

'76 T-Bird, creme and gold, looks good, engine runs great \$1,100, OBO. Moses, x35847 or 437-6727.

'87 Honda Accord, 5 spd, A/C, AM/FM auto rev. cass. w/equalizer, dk. blue, \$9,000. Lyle, x33302 or 326-3909.

'74 Datsun 260Z, 2+2, runs well but needs body and some int. work, \$750. Stephen, 486-2191.

'82 Cougar XR-7, one owner, 48K mi., \$2,600, good cond. 488-8379.

'83 Toyota Tercel, bronze, 4 dr, hatchback, 41 mpg/hwy., AM/FM stereo radio, power sunroof, 5 spd. standard, good cond., \$3,200. 280-9423.

'85 35' Mallard motor home, loaded, low mi., \$34,000. 337-4051.

'80 Ford F100, ex. cond. \$1,250. 996-1295.

'65 Mustang, original 289-V8 engine/rebuilt, needs final adjustments, some body work, int. stripped down. Trudy, 283-7327.

'88 Olds Cutlass Supreme, red, leather seats, digital instr., A/C, radio, elect. seats and windows, loaded, 2,800 mi., \$13,196. 674-0724.

'78 Mercury Monarch, 302 auto, A/C, ex. body and int., \$2,000 firm or trade for small 4-cyl car; truck of equal value. Herman, x35095 or (409) 389-2461.

'69 Chevy Belair 4 dr. 350 auto., A/C, 34,700 original mi. like new inside and out, \$1,800 or trade. Herman, (409) 283-2885, (Woodville).

'87 Sterling 825SL, luxury and performance automobile, all options, low mi., \$19,500. 486-1404.

'29 Mercedes Replicar, still in kit form, retails for \$7,500, was \$6,500, now \$5,500. 280-4381 or 484-7834.

'87 Ford F-250 Supercab XLT Lariat, 351H.O. V-8 eng., loaded, 24K mi., Gemtop camper shell, \$11,900. 282-4225 or 486-3938.

'67 Ford Mustang Classic, 289, V-8, 3 spd.,

Today

Open season—The Office of Personnel Management (OPM) will continue to hold open season for the Federal Employees Health Benefits Program through January 1. For more information, call x32681.

EAA badges—Dependents and spouses may apply for a photo identification badge from 6:30-10 p.m. Monday through Friday at the Rec Center.

Cafeteria menu—Entrees: meat sauce and spaghetti (special) fried shrimp, liver and onions, baked scrod, seafood gumbo. Vegetables: green beans, buttered broccoli, whipped potatoes.

Monday

Basketball and volleyball—Registration for basketball and volleyball leagues will be Dec. 12-16 at the Rec Center. NASA-badged teams will sign up at 7 a.m. each day, and non-badged teams at 5:30 p.m. The sign-up days for the various leagues are: Dec. 12 and 13, mixed volleyball; Dec. 14, men's B basketball; Dec. 15 men's C basketball; and Dec. 16, mixed volleyball and basketball. For more information, call x30303.

Exercise class—Class meets 5:15-6:15 p.m. Mondays and Wednesdays at the Rec Center for eight weeks. Cost is \$24. Participants may sign up anytime. For more information, call x30303.

Cafeteria menu—Entrees: chopped sirloin, beef chop suey, chow mein, polish sausage with

German potato salad (special), breaded veal cutlet. Vegetables: whipped potatoes, okra and tomatoes, green peas.

Tuesday

Cafeteria menu—Entrees: shrimp creole over rice, Salisbury steak, chopped sirloin (special), fried chicken. Vegetables: whipped potatoes, mixed vegetables, beets.

Wednesday

Cafeteria menu—Entrees: chopped sirloin, fried catfish with hush puppies, braised beef rib, weiners and beans (special), stuffed bell pepper with creole sauce. Vegetables: buttered rice, Italian green beans, corn O'Brien.

Thursday

Call for papers—The American Society of Quality Control (ASQC) is seeking innovative papers written on subjects such as applications in quality and productivity or the use of data systems for improving quality and productivity and competitiveness. The papers will be presented at the second annual South Texas Quality, Productivity and Data Systems Conference, Feb. 23-24 at the University of Houston's Hilton Conference Center. Send a brief abstract and biographical sketch, both less than 300 words each, a one page outline and a photograph to South Texas Q&P Conference, Attn. Eugene Berger, Box 890506, Houston, 77289. For more information, call

Berger, 333-0967.

Cafeteria menu—Special Christmas Dinner: waldorf salad, turkey with dressing, giblet gravy, cranberry sauce, green beans almondine, candied yams, roll and butter, apple and mince cobbler and beverage.

Dec. 16

Cafeteria menu—Entrees: baked scrod, liver and onions, fried shrimp with french fries, chopped sirloin (special), meat sauce and spaghetti. Vegetables: green beans, buttered broccoli, whipped potatoes.

Dec. 18

Jingle Bell Run—Runners interested in competing on the NASA-JSC teams at the 5-mile Jingle Bell Run through downtown Houston Dec. 18 should call Patrick Chimes, x32397. Entry fee is \$10.

April 27

Space Flight Symposium—The Texas Bay Area Chapter of the Society of Hispanic Professional Engineers (SHPE) will cosponsor "The Challenge of Space Flight: A Space Symposium" to be held April 27-28 at JSC. The joint effort will be aimed at disseminating information to minority groups, educators, technical professionals and managers of EEO programs concerning current and future manned space activities and skills needed by JSC to meet the manpower needs of the 21st century. For more information, call Otilia Sanchez, x39319.

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'69 Chevy Belair 4 dr. 350 auto., A/C, 34,700 original mi. like new inside and out, \$1,800 or trade. Herman, (409) 283-2885, (Woodville).

'87 Sterling 825SL, luxury and performance automobile, all options, low mi., \$19,500. 486-1404.

'29 Mercedes Replicar, still in kit form, retails for \$7,500, was \$6,500, now \$5,500. 280-4381 or 484-7834.

'87 Ford F-250 Supercab XLT Lariat, 351H.O. V-8 eng., loaded, 24K mi., Gemtop camper shell, \$11,900. 282-4225 or 486-3938.

'67 Ford Mustang Classic, 289, V-8, 3 spd.,

new paint, red, A/C, headers, mags, AM/FM stereo, new exhaust, runs great, \$2,995. OBO. Mike, x38169 or 482-8496.

'79 Pontiac Sunbird hatchback, auto. trans, AM/FM/cass., A/C, new tires, belts and die-hard battery, runs, body is rusty and leaks, \$350. Dianna, x34371.

'76 Ford Granada, 4 dr., P/S, P/B, auto air, good work car. Joe, x33609 or 471-4100.

Cycles

'88 Kawasaki Ninja 750, garaged and maintained well, helmets and cover incl., \$4,500. Dave, 282-2742 or 480-9848.



JSC Photo by Sheri Dunnette

Dennis Fowler, a pesticide applicator for JSC groundskeeping contractor Diversified Management Services, hoses down the bottom of the pond just south of Bldg. 8 with the help of Roy Blanchard. Every couple of years, the ponds are drained, slime and algae are washed off the rocks, and cracks on the concrete bottom are repaired.

GREEN THUMB

Groundskeepers work hard to make JSC a pleasant place to work

By Beverly Green

With cooler weather beginning to take hold at JSC, there's a flurry of activity among the center's groundskeepers that belies the verdant work they perform all year.

With its goldfish-filled ponds, shady lawns and flower beds, JSC is a mix of nature and space, a balance well kept by tender loving care.

"We think it's a boost to morale," said Mike Scott, chief of the Special Purpose Maintenance and Services Office that oversees Center Operations' groundskeeping contract with Diversified Management Services, "whether they're looking at the deer or the reflecting pond or whatever."

Attention to detail has become one of the trademarks of the 22 green-thumbed Diversified Management workers headed by husband and wife team Dan and Ivy Alexander.

"I think they're doing pretty well, and the feedback I get is very good," Scott said.

During autumn and cooler weather a great deal of transition occurs in the courtyards and other scenic locations employees favor. "We're changing the shubbery and flowers that are difficult to maintain during cold weather and selecting other plants that may be maintained throughout the season," said Ivy Alexander, Diversified's manager.

JSC Horticulturist Alan Miyamoto, the NASA groundskeeping contract monitor, said bedding plants are swapped out four or five times a year, which means thousands of plants are replaced annually.

"They're mostly seasonal

items, they vary according to the time of the year," said Miyamoto, who is involved in landscaping layout and design, plant selection and oversight of installation. He said JSC's landscaping philosophy is to provide a campus-like atmosphere that combines native plants with uncommon specimens.

"This time of year is really busy for us," said Dan Alexander, Diversified's technical foreman. "We're closely inspecting the landscape and also applying pesticide applicators so these plants remain healthy," he said.

"We really try hard to be aware of people passing by so they remain free of harm or injury while applying pesticides, mowing or trimming hedges," he said.

In addition, Scott said JSC is often one of the first federal installations to use many new insecticides, fungicides and fertilizers designed to do the same job and be less toxic and biodegradable.

During the past year, JSC worked with the Texas Department of Agriculture in studying a new pesticide to combat fire ants. The test was successful, he said, and he hopes to make more extensive use of the new treatment next year.

"That ought to make people happy," he said. "My next job is to find a way to get rid of the mosquitoes at the softball fields." He said he doesn't have much hope of an immediate solution to that problem, but will continue fogging and looking for a new weapon.

"One of our more recent projects is planning the landscape design north of Bldg. 45 and south of Bldg. 46," said Miya-

moto. "The Central Computing Facility is almost coming to completion and we're laying down turf and getting ready to start planting trees," he said.

Visitors and on-site workers may be able to identify a favorite innovation or favored landscape at JSC today, however, it may be difficult for some to imagine how the site looked twenty years ago. Jesse Olivas doesn't have to imagine, he was there.

"When I first planted oleanders (an evergreen with magenta flowers near the west end of the Visitor's Center area) there weren't many other plants here. I was working with a guy who owned a nursery near the Center and have continued this work because I really enjoy it," said Miyamoto, a Diversified employee who has helped replant and cultivate the site's landscape for close to two decades.

"Oak trees are really my favorite trees. If I notice worms trying to get the best of them, I know it's time to do something about that problem," said Olivas. "I guess I sort of give these trees a little extra attention," he said.

"Some employees become somewhat protective of their favorite tree or flowers," said Dan Alexander. Alyssm, a delicate plant with tiny white flowers, mildly perfumes several areas on site and is favored by folks because of its cascades.

"Rose and white colored panies were popular at one time however we had to book other flowers to replace them because deer loved them and would eat them up," said Ivy.

"Broad variety in color, texture and shape makes it difficult to select plants and flowers. We're constantly looking for different

plants because we get bored with what we see every year, but we always receive compliments on roses," said Dan.

While some employees become attached to favorite plant arrangements, others enjoy the eyecatcher that has glided through the ponds between water lillies for years. JSC's three ponds are stocked with Koi, an oriental goldfish variety with a decorative fantail.

"Keeping the ponds clean for our wildlife is no easy task," said Paul Spoor, a labor foreman for the team. "This can be a messy job but our boots and goggles are our shield," he said. "The Texas Pistasche, the trees with red tinted leaves add more color to our ponds and they do well year round," he added.

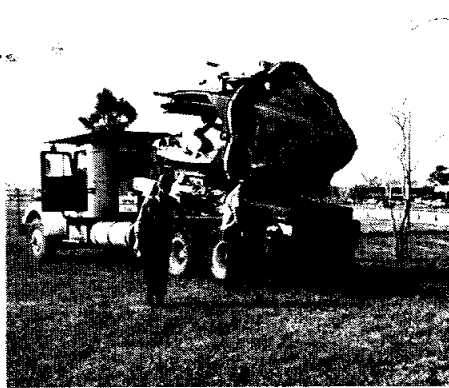
"Some folk that work on site enjoy adding their own touch to the landscapes," said Dan. "While we're inspecting the grounds we may find a bug raid or corn sprouting. Some folk have even tried to plant water-melons," he said.

Although many of the crew members really enjoy caring for the site's horticulture and the surprises they find, safety for themselves and the people around them is another aspect of their job they take seriously. Special training has been required for the good understanding of the equipment, pesticide applications and other tools necessary for our health and the good looks of the landscape.

"When I was going to school, I never thought opportunities like this existed," said Miyamoto, a graduate of Texas A&M. "It's a real challenge, but I find it very rewarding. There are not many like it in the horticulture industry."



Janie Olivas and Jimmy Jackson shovel dirt into a Cushman cart as they remodel one of the planter beds near Bldg. 3.



Ivy Alexander inspects the hole left on the site of Bldg. 46 after a large pine tree was transplanted to make room for the new building. A large tree shovel was used to move the tree to its new location near Bldg. 37.

Pioneer marks 10 years in orbit around Venus

The Pioneer orbiter spacecraft marked its 10th year circling the cloud-draped planet Venus on Dec. 5. Pioneer has continuously returned pictures of the planet and much other data and is still going strong.

Today is the 10th anniversary that Pioneer Venus 2, Pioneer's companion spacecraft, entered Venus' atmosphere and released four hard-impact probes. The five probes measured the atmosphere from top to bottom on the planet's day and night sides and in its northern and southern hemispheres.

Scientists, engineers and other Pioneer team members celebrated the interplanetary probes' successes Monday at Ames Research Center.

Though other spacecraft have visited Venus, Pioneer's completion of 3,652 24-hour-long orbits of Venus represents the first and most thorough

survey of the planet yet made. Work on the mass of Pioneer data, from both probes and orbiter, still continues to define the searing-hot planet and the mysteries of its behavior. Pioneer's study may be the most intensive made of the atmosphere and weather of another planet.

Pioneer's study of Venus has major implications for Earth. Though Venus is Earth's twin in many respects, the two planets differ in ways that are almost frightening. For both its differences and similarities, Venus provides important insights. Long-term environmental effects, atmospheric processes, plate tectonics, vulcanism and planetary magnetism, all are better understood because of Pioneer's studies. From the dramatic differences between the planets comes a better understanding of the origins and evolution of both and what

direction each may go.

The orbiter, its five sister probe craft, the 26 scientific instruments they carried and the more than 100 scientists and over 200 project people making up the Pioneer team have mapped 93 percent of the planet, finding high mountains, plains and deep canyons.

They found that almost-rotationless Venus, with a day 8 months long, has no magnetic field. This seems to show that to have an interior "dynamo mechanism" and resulting magnetic field, a planet must have the centrifugal force provided by rapid rotation acting on its molten interior.

The Pioneer team also has outlined the general pattern of terrain and gravity relationships needed to assess questions of Venusian plate tectonics—relative movements of crust and mantle and its vulcanism.

They sketched-in the patterns of Venus' "weather," that is, the exotic circulation processes of its massive atmosphere. They found immediately that Venus' cloud-top motions are real winds, not a kind of standing wave phenomenon, and defined winds in the atmosphere below the clouds.

They verified and quantified the "runaway greenhouse" effect that makes the planet somewhat hell-like, hotter on the surface than the melting points of lead and zinc (900 degrees Fahrenheit). They identified the three major layers of Venusian clouds and the 9-mile-thick layer of "smog" piled atop the clouds. They found that the planet was incredibly dry and found that Venus lost all of its water when the hydrogen blew away into space, and the oxygen was absorbed by carbon dioxide gas in the atmosphere and crustal rocks.

A number of questions remain about the cloud-shrouded planet. Scientists differ, in some cases strongly, on these issues. Portions of the vast amount of Pioneer data are still being analyzed and bear on these mysteries.

Pioneer's orbit around Venus is changing slowly as solar gravity moves Pioneer's orbital low point closer to the planet. The spacecraft's orbit will continue changing until late August 1992, when Pioneer will enter Venus' dense lower atmosphere and burn up. During its last 6 months, the spacecraft will be only about 90 miles from the planet, and scientists will be looking for such things as visible evidence of Venusian lightning.

The Pioneer Project is managed by Ames Research Center. The spacecraft were built by Hughes Aircraft Co., El Segundo, Calif.



JSC Photo by Jack Jacob

STS-27 Commander "Hoot" Gibson hugs his son, Paul, and walks down the red carpet with wife, Rhea Seddon, after landing at Ellington Field. JSC Director Aaron Cohen is with them. In the background, Mission Specialist Jerry Ross kisses daughter, Amy, and gets a pat on the back from his wife, Karen.

'Proud bird' makes successful flight

(Continued from Page 1)

line used to fill the external tank. Technicians solved the problem and completed the tanking in the wee hours Friday. Weather remained a problem for the second launch attempt, with strong winds at high altitudes dictating a touch-and-go situation as the launch period progressed from its 5:32 a.m. CST start.

Atlantis' mission was dedicated to the Department of Defense (DOD), and the exact launch time of 8:30:34 CST was not announced until the countdown was disclosed to the public at T-minus 9 minutes. From that point, the mission went without a hitch except for a few seconds delay at T-minus 31 seconds for a final weather check.

The Shuttle's ride to orbit was picture perfect with all milestones, solid rocket booster separation, main engine cutoff and successful achievement of orbital insertion, occurring by the numbers. Since the 27th Shuttle flight was dedicated to DOD, details of the mission on orbit and all air-to-ground communica-

tions were not released to protect national security.

Atlantis performed a deorbit burn at 4:29 CST Tuesday and began plunging through the atmosphere about 30 minutes later. Entry interface, where atmospheric pressure on the Orbiter becomes strong enough to allow some use of its airplane-like surfaces for steering, began at 5:04 p.m. as it descended past 387,000 feet.

Weather was good at Edwards with unrestricted visibility as *Atlantis* performed a 315-degree bank during her final approach. Gibson scored a bullseye on Runway 17, a dry lake bed. The spacecraft touched Earth at 5:36:10 p.m. CST. Forty-three seconds later, during which the crew performed successful tests of the brakes and nose gear steering, two modified systems aboard *Atlantis*, the Orbiter rolled to a stop.

One minor problem discovered on the vehicle prior to launch, a slow leak in the main landing gear's left inside tire, acted exactly as predicted and posed no concern during the

flight. In fact, due to the way gases expand when heated, pressure in the tire may actually have been higher at landing than at liftoff.

Following landing, as the crew and NASA officials, including Administrator Dr. James C. Fletcher and Associate Administrator for Space Flight Richard Truly, made a walk around inspection of *Atlantis*, some thermal tile damage was the only apparent imperfection on the craft.

In ceremonies at Edwards, Fletcher said the flight went well. "It shows we can serve our DOD customers as we have in the past," he said.

"Like all the Shuttle landings I've seen, this one was just beautiful," added Truly. "I'm delighted that, barely two months after STS-26, we've landed the second mission of the new era of the Shuttle program."

Atlantis now will be returned to Kennedy by the Shuttle Carrier Aircraft to be processed for its next flight, which will boost the Venus radar mapper Magellan into orbit, a flight now slated for April 28, 1989.

Magellan's radar to penetrate Venus cloud cover

(Continued from Page 1)

evolution and when it began to differ from the Earth's.

Magellan's launch period extends from a five-minute window on April 28 to a 1 1/2 hour window midway through the launch period that ends May 23. Mission planners also have provided a four-day contingency allowance at the end of the launch period.

Once in the proximity of the most brilliant planet in the solar system, Magellan will orbit Venus every three hours and nine minutes, using radar to map its terrain and transmit enough data to keep scientists busy for decades, Sanders said.

Regardless of the specific launch date between April 28 and May 23, Magellan is expected to arrive at its rendezvous point with its planned planetary orbit on Aug. 10, 1990, said JPL's Dr. Sam Dallas.

Magellan then will complete its nominal mission on April 28, 1991 and begin an extended mission, completing as many orbits as its supply of propellant will allow. Each of Venus' revolutions takes 243 Earth days to complete. Scientists hope Magellan will complete an additional four or five orbits of Venus before exhausting its hydrazine supply. Scientists will lose contact with Magellan when it exhausts its fuel.

Previous Soviet exploratory missions to Venus only mapped about one-fourth of the planet and transmitted maps that were 10 times poorer than what scientists expect Magellan to transmit, Sanders said.

Workers built Magellan with equipment originally intended as spare parts for Galileo, a Jupiter probe now slated for an Aug. 10 launch date. Magellan's bust, its two antennae and rocket engines all are from previous projects, said Brown.

"I don't think we've compromised anything in putting together what we believe is a class A spacecraft for a class A mission," Brown said, responding to a query on quality.

Moser named deputy for space station

Thomas L. Moser, Houston native and former JSC engineer and manager, has been selected as NASA deputy associate administrator for space station, one of several personnel changes recently announced at Headquarters.

Moser succeeds Dr. Franklin D. Martin, who has been appointed assistant administrator for exploration. Moser's appointment by James B. Odom, head of the Space Station Office, became effective Dec. 1.

Moser had been director of the space station program in Reston, Va., since October 1986. Deputy Director James M. Sisson will be acting program director until a successor to Moser is selected.

Moser began his career in 1963 as a mechanical systems design and analysis engineer at JSC, and was instrumental in the Apollo command module and Space Shuttle programs. He was a technical assistant to the JSC Director in 1981, deputy man-

ager of the Orbiter Project Office in 1982, and became director of engineering in 1983.

In another action, Jerry Hlass, currently director of Stennis Space Center, was named assistant for engineering and technology to the deputy administrator at Headquarters. Stennis Deputy Director Roy S. Estess will succeed Hlass. The appointments become effective Jan. 23.

Kenneth S. Pedersen has been appointed associate administrator for external relations. Pedersen, who has been deputy associate administrator since September 1986, succeeds H. Hollister Cantus. Cantus retired to return to the private sector.

Margaret G. Finarelli has been appointed deputy associate administrator for external relations, effective Monday. Finarelli, who joined NASA in 1981, was NASA chief negotiator for the space station international memoranda of understanding.

New manual, awareness help contain asbestos

A team of JSC health and safety experts has completed an Asbestos Control Manual designed to establish standard procedures for dealing with the potential health hazard.

The 403-page manual, JSCM 8800, was prepared by the Environmental Services Office, Occupational Health Officers and the Institutional and Occupational Safety Branch, said John Herrmann, asbestos program manager.

When many of JSC's buildings were built in the 1960s, fire regulations required the use of asbestos-containing materials such as insulation in construction, Herrmann said. The Environmental Protection Agency (EPA) banned its use in construction when it was determined that airborne fibers could be harmful to human lungs after long exposure.

"It's everywhere; it's part of life and we have to deal with it," said Herrmann, explaining that asbestos fibers only become airborne when they are stirred up by activity. "If you follow the program, then it's not going to be a hazard to anybody."

Strict EPA and Occupational Health and Safety Administration (OSHA) regulations have been established to help protect people from asbestos. The JSC management program is designed to prevent airborne asbestos levels in any JSC building from reaching the danger levels prescribed by the EPA and OSHA, Herrmann said.

The manual, now being distributed, and JSC Management Directive 1710.11 detail how those regulations will be implemented at JSC. The asbestos program contains sections on routine air monitoring to ensure that the amount of airborne fibers does not reach hazardous levels, procedures to protect both workers and workers whose offices may be affected by their work, and procedures for asbestos abatement.

A 7-minute film entitled "Asbestos Awareness" will be shown center-wide on Channel 6 of the NASA Select television system Dec. 12 through 16. It will air at 9 a.m., noon and 3 p.m. each day.

AIAA plans Thursday director's reception

The local chapter of the American Institute of Aeronautics and Astronautics (AIAA) will hold its annual JSC Director's Reception at the Gilruth Rec Center on Thursday.

JSC Director Aaron Cohen will speak, and reservations for the event must be made by Monday. The AIAA associate fellows, numbering about 15 this year, also will be recognized.

The event will begin with a cash bar opening at 5:30 p.m. Dinner will be served at 6:30 p.m. and the program will begin at 7:30 p.m. The meeting will remember the Apollo 8 Lunar orbital mission.

For reservations, call 333-6064.

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