ROUNDUP

Lyndon B. Johnson Space Center

NASA

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Star tracking

Shuttle navigation simulated

One of the Space Shuttle Star Trackers sits mounted on the roof of Building 16 simulating star tracking navigation as it will take place during Space Shuttle missions.

Initial tests with the Star Tracker ran in early March, with the first successful acquisition and tracking of stars on the 17th.

"All the tests until then were in labs with simulated stars," said Andy Saulietis of the Navigation and Control Branch. "Now that we've proven the equipment can track real stars, we can conduct tests to align the Shuttle IMU's in much the same way as it will be done during the actual missions."

From the dome, star tracking data is relayed to the Inertial Systems Laboratory two floors below to align three Shuttle Inertial Measurement Units, which are gyro platforms used to provide the Shuttle navigation system with attitude, acceleration, and velocity data.

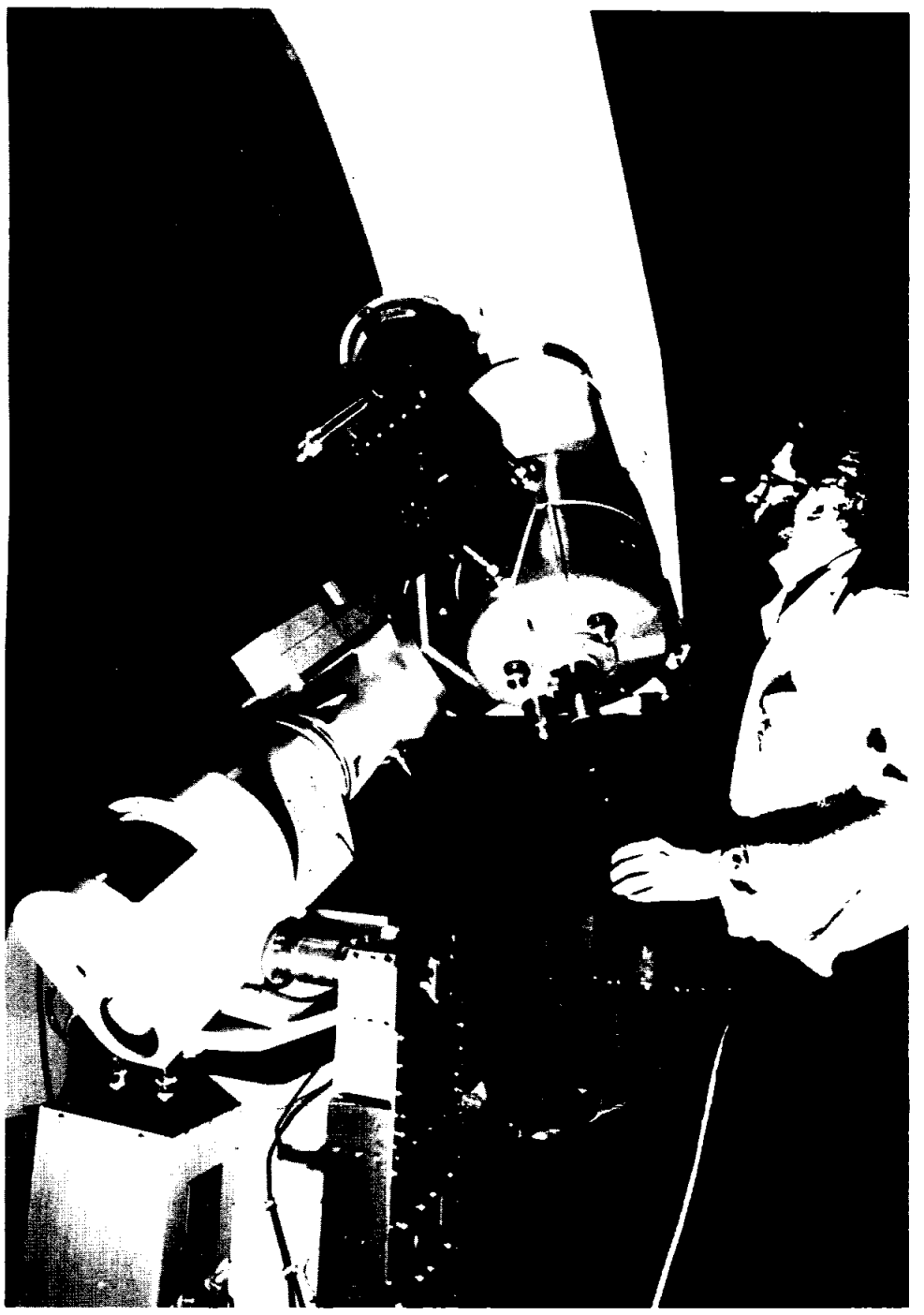
Onboard the Orbiter, navigation system alignment can be automatic or an astronaut can select stars to be used. Onboard computers compare the IMU data, ST data, and the star catalog in memory to update the attitude for inertial reference.

There are two star trackers onboard the Shuttle, and either or both can be used to perform the alignment tasks.

In the current tests, branch employees in the dome choose the stars, point the tracker, and relay data to the ISL where lab computers programmed with flight-type software align the IMU's.

Data obtained from the tests will verify the numerous math transformations required to perform the alignments in space, test the capability of the star trackers, and give an idea of accuracies that can be expected.

The entire system should be ready for "end-to-end" confidence tests in May. "We just have to wait for clear skies," Mr. Saulietis said.



Andy Saulietis lines up Star Tracker in Bldg. 16 dome

NASA technology aids industry in management of forest lands

LANDSAT circles the globe, scanning the Earth's resources, and gathers data that may advance management techniques for the American timber industry.

St. Regis Paper Co. signed an agreement with NASA in 1977 to see if LANDSAT satellite data could improve the industry's information base of forest lands. St. Regis wants to use the data to assist in planning their timber harvests, the leasing and purchase of new timber lands, and to monitor over 2.3 million acres across the South on an annual basis.

The project has been a success. Recently, the St. Regis Paper Co. authorized over $300,000 of new capital investment for an independent system—the St. Regis Southern Timberland Division will use LANDSAT data in their general operations.

The paper company will take techniques developed by the project and through their computer facility in Dallas, Texas, process the data as acquired. Information processed at Dallas will interact with an automated data base at the St. Regis divisional remote sensing center in Jacksonville, Florida.

The entire forestry industry stands to gain from the venture, as technology developed by the St. Regis project will be in the public domain. St. Regis and NASA plan to conduct a symposium next year to demonstrate LANDSAT interpretation methods to timber industry managers.

This project establishes a unique relationship between NASA and the private sector. St. Regis is the first private company to act as a user in NASA's Earth Resources Applications Pilot Test Program. The company initiated the project, as opposed to the agency, and St. Regis is sharing in the total cost.

St. Regis owns timberland in Texas, Florida, Georgia, Alabama, Mississippi, and Louisiana. LANDSAT data shows the major types of trees on these lands and other land available for leasing or purchase. LANDSAT data aids the company in estimating timber volume and productivity, and it monitors changes in conditions of the forests.

The project ends in September of 1980. NASA's Johnson Space Center, the Laboratory for Applications of Remote Sensing (LARS) at Purdue University in Layfayette, Indiana, and the St. Regis Paper Co. are conducting the project.

LANDSAT orbits the globe 14 times a day at 960 km (500 mi.) altitude. Its electronic multispectral scanner returns data for visual images and computer tapes. The information characterizes different types of terrain, vegetation, soils, rocks, and other surface features.

Space Shuttle Update

Engine test-firing advances

The Space Shuttle Main Engine operated at 109% of its rated power for six minutes March 31, the first sustained operation of the engine at this full power level.

The engine operated for a total of 10 minutes and 10 seconds. The test reached the objectives attempted in an aborted run last week. No design changes were made; the change in rate of buildup from 100% to 109% of rated thrust was planned.

Engines used in Monday's test had already accumulated more than 10,000 seconds of firing time, equalling the time required for 19 Shuttle flights, including two series of flight certification tests. With at least 13 static firings in each test series, the engine has a total of 5000 seconds of firing time.

In one of the 13 tests the engine operated at 102% of rated power and in another it operated for 823 seconds, simulating an aborted mission.

Three Space Shuttle Main Engines, mounted in a Main Propulsion Test Article at NASA's test facility in Mississippi, were static fired for 535 seconds March 20 in the eighth test of the Shuttle's main propulsion system. The test came just three weeks after a similar test firing of 555 seconds duration.

The early morning test accomplished all objectives, according to officials at Marshall, the center which is responsible for developing and testing the complete propulsion system.

During this test directors gimballed (steered) the engines while inducing a "pogo effect" so that engineers could observe the vehicle's reaction to this com-

Please turn to Page 4

All you want to know about tiles

The following is an information piece about the Shuttle's thermal protection system.

There are four types of materials used in the Shuttle spacecraft's thermal protection system. They cover the entire outer surface to protect the aluminum from entry friction temperatures which will reach as high as 3000 degrees F.

Reinforced Carbon-Carbon (RCC), a hard ceramic-type material, is used on the nosecone of the spacecraft and on the leading edges of the wings. This material protects those areas from temperatures exceeding 2300 degrees F.

Another TPS material is coated Nomex felt, which protects the spacecraft from temperatures below 750 degrees F., and is located on the cargo bay doors, the side area of the upper mid-fuselage, and on some portions of the upper wing surfaces.

The TPS "tiles" are a silica fiber-compound which absorbs the heat and forms a thermal barrier to ensure that the spacecraft's aluminum structure is not subjected to temperatures above 350 degrees F.

There are two types of tiles—High Temperature Reusable Surface Insulation tiles (HRSI), which, when coated and cured, are black-colored and are designed to handle surface temperatures up to 2300 degrees F, and Low Temperature Reusable Surface Insulation (LRSI) tiles, which, when coated and cured, are off-white in color. The LRSI tiles are designed to handle surface temperatures up to 1200 degrees F.

The "black tiles" are located on the spacecraft's complete undersurface, some areas of the mid-fuselage and vertical stabilizer, and around the crew com-

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At Gilruth Center

Centerwide competition brewing

Almost Anything Goes: The Gilruth Center is sponsoring an "Almost Anything Goes Contest," with four fun team events. Prior experience is not necessary, and events will not be announced prior to the competition. Teams must have at least six players and may have as many as eight (50% male and 50% female). Teams must be from the same organization or company (to simplify trophy engraving). Cost is $20 per team and the final round and award ceremony is planned for the JSC Picnic, so start organizing now! Spouses and dependents are eligible.

9th NASA Intercenter Running Competition: Here's a chance to represent JSC against all other NASA Installations: enter the 9th NASA Intercenter Run. Racers run over a 10-km and a two-mile course, and can enter both events. Race points are scored for t me as well as percentage of center participation. Races will be April 14 through April 19.

A large trophy will be awarded to the NASA Division as well as the contractor that gets *the highest percentage of its employees* to participate. Spouses and dependents count in the scoring. Call x3594 for more information.

Classes Available for Your Leisure Time: Basic Auto Mechanics, Ballroom Dance, Aerobic Dance, and Ladies' Exercise Class.

NEEDED: TALENTED PERFORMERS: The Gilruth Recreation Facility is forming a Dinner Theatre. If you are interested in performing or assisting in any way, please call x3594. First production will be *The Fantastiks!*

EAA Picnic 1980

Toss or dunk at Shuttle Stomp

The picnic committee has been working frantically to pull together all the loose ends for this year's JSC-EAA Picnic: THE SHUTTLE STOMP! The place and date are set: Camp Manison on May 3 which, if you haven't thought about it, is just four weeks from tomorrow.

The menu is set: bar-b-cue beef and links, potato salad, beans, relishes, bread, desert, and lemonade. In addition there will be popcorn, snow cones, soft drinks and adult beverages (straight from St. Louis).

The events are almost set: for the young group there will be kiddie rides, Zay Wynn the clown, three-legged races, sack races, a penny scramble, and egg toss. For adults there will be the dunk tank, a tennis tournament, an obstacle course, bingo, sack races, an egg toss, and anything goes (anything?).

Special activities will include the Clogg Hoppers, a belly dancer, and a country western dance. Informal activities include horseshoes, swimming, trampolines, softball, football, ping-pong, washer pitching, soccer, volleyball, and hayrides.

If you are worn out from all this activity, you can also just sit under a tree and watch.

So make your plans - Camp Manison, May 3. Tickets on sale at the Building 11 Exchange Store are $3.50 for adults, $3 for children 12 and under.

Last day for sales is April 30.

Robert O. Piland

Acting Director
Space and Life Sciences

What's cookin'

Week of April 7 - 11

Monday: French Onion Soup; Beef Chop Suey; Polish Sausage w/German Potato Salad; Breaded Veal Cutlet (Special); Okra & Tomatoes; Green Peas. Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Split Pea Soup; Shrimp Creole; Salisbury Steak; Fried Chicken (Special); Mixed Vegetables; Beets; Whipped Potatoes.

Wednesday: Clam Chowder; Fried Catfish w/Hush Puppies; Braised Beef Rib; BBQ Plate; Weiners & Beans; Shrimp Salad; Stuffed Bell Pepper (Special); Corn O'Brian; Rice; Italian Green Beans.

Thursday: Chicken Noodle Soup; Beef Stroganoff; Turkey & Dressing; BBQ Smoked Link (Special); Lima Beans; Buttered Squash; Spanish Rice.

Friday: Seafood Gumbo; Broiled Turbot; Liver w/Onions; Seafood Platter; Fried Shrimp; Meat Sauce & Spaghetti (Special); Green Beans; Buttered Broccoli; Whipped Potatoes.

Week of April 14 - 18

Monday: Beef & Barley Soup; Beef Chop Suey; Breaded Veal Cutlet w/Cream Gravy; Grilled Ham Steak; Weiners w/Baked Beans (Special); Whipped Potatoes; Brussels Sprouts; Buttered Rice. Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Celery Soup; Fried Shrimp; Turkey a la King; Pork Chop w/Applesauce; Chinese Pepper Steak (Special); Au Gratin Potatoes; Breaded Squash; Buttered Spinach.

Wednesday: Clam Chowder; Fried Catfish w/Hush Puppies; Braised Beef Ribs; Mexican Dinner (Special); Spanish Rice; Ranch Beans; Buttered Peas.

Thursday: Green Split Pea Soup; Corned Beef w/Cabbage & New Potatoes; Chicken & Dumplings; Tamales w/Chili; Hamburger Steak w/Onion Gravy (Special); Navy Beans; Buttered Cabbage; Green Beans.

Friday: Seafood Gumbo; Deviled Crabs; Broiled Halibut; Liver & Onions; BBQ Link (Special); Buttered Corn; Green Beans; New Potatoes.

Bulletin Board

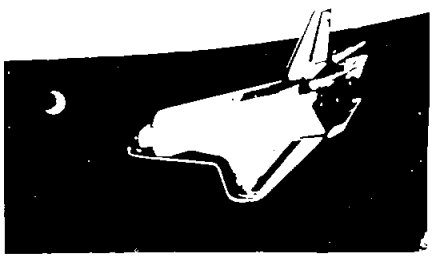
Planetary Scientists To Meet in Hawaii

More than 200 planetary scientists will attend the International Colloquium on the Satellites of Jupiter May 12 - 16, in Kailua-Kona, Hawaii. Papers will include latest results from data returned by Voyagers One and Two, coordinated with ground-based observations since the Voyager encounters. David Morrison of the University of Hawaii is chair of the colloquium organizing committee. For further information contact the Office of Public Information at JPL, 213/354-5011.

New Graduate Program Combines Psychology, Management, and Communications

The Human Factors/Cognitive Psychology Doctorate Program at UHCLC combines the recent advances in Cognitive Science with the widespread development of information processing technology in industry and government. The program prepares students for careers in industry, emphasizing the interface between psychology, industrial needs, human factors, training, and communication. There are additional courses in industrial-organizational topics. For applications forms or further information, write to Kenneth Laughery or Roy Lachman, Department of Psychology, University of Houston, Houston, Texas, 77004. Deadline for fall 1980 is late spring.

Roundup deadline is the first Wednesday after publication.



The *Roundup* is an official publication of the National Aeronautics and Space Administration Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all Space Center employees.

Editor ..... Kay Ebeling

L-5 Meeting to Cover Advances in Space Medicine

Charles A. Berry, M.D. will lead a discussion on "Advances in Space Medicine" at the April 18 meeting of the L-5 Society. Dr. Berry, who is a former NASA employee, is president of the National Foundation for the Prevention of Disease. The meeting is in Room 117, Science and Research Building One, U of H Main Campus. Public is invited. For information call 682-3378 or 334-1664.

Lunar Planetary Institute Seminar Series Continues

Wednesday April 9, Paul Morgan of New Mexico State University speaks on "Continental Rift Valleys: Active or Passive? New Evidence from the Red Sea"; Friday April 11, JSC's John Minear will speak on

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THE LAST PARABOLA—Don Griggs, upside-down center, flies last parabolic arc of his career. He flew the first KC-135 parabola in 1959, and doing zero-g tests for NASA, flew over 65,000 arcs before retiring February 29. Reached at home, Mr. Griggs remarked, "Guess my head'll quit shaking soon."

Golfers

1st tourney a hit

Leaning into the 40 m.p.h. wind that arrived with the Second Flight golfers at Goose Creek Country Club on March 15, Harold Epps was heard to remark, "This breeze will be a factor."

The winner of this first competitive tournament in the JSC Golf Association schedule, **Tom Dennis**, must have kept the wind to his back as he carded a great score of 62 net. **Al Ligrani** made a repeat trip to the winners' circle (he was a winner in the opening fun tournament) with a fine net 66. **James Kell** and **Leo Langston** both carded net 70's, with Kell taking third place by virtue of the tie breaker starting with the 15th hole score.

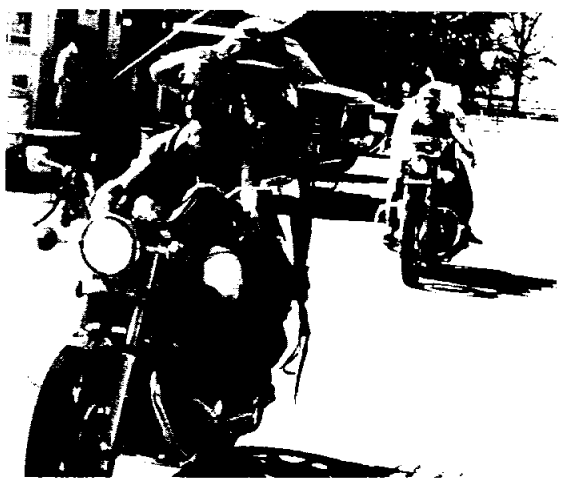
The next tournament is April 12 at Tejas with all three flights of the JSCGA participating.

Stiff Competition

2nd Annual FOD Chili Cookoff

A Serious Diversion

Trophy Winning Cook



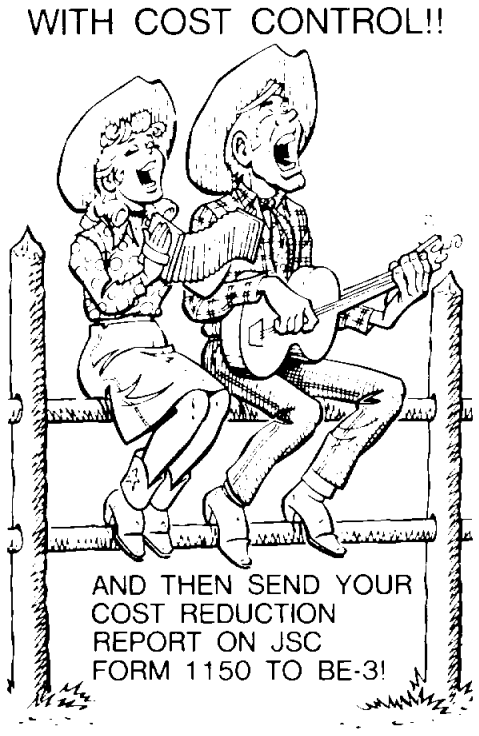
Arrival of Bell's Angels

A ContraBand Blower

Showdown in the Parking Lot

Showmanship Winner

LET'S ALL HARMONIZE
AND ECONOMIZE
WITH COST CONTROL!!



Cartoon by Russ Byther

Women's Week

Theme: 'Men & Women working Together'

The Federal Women's Program week of activities takes place May 13 -16. Prior themes have highlighted women's awareness of career opportunities and the exploration of potential advancement.

The theme for the 1980 program is Discovery—concentrating on men and women working together.

A luncheon will launch this year's observance May 13 at the Gilruth Center at 11:30 a.m. Price of the luncheon is $4.

One of the first-day speakers is Venita Van Caspel, president of Van Caspel & Co. Watch future *Roundups* for more details on speakers.

Tickets will be available for sale through May 7, and their numbers are limited. So contact one of the following individuals for ticket information:

Sharon Hardy, Bldg. 15, x2330
Joy Mingle, Bldg. 1, x3358
Sharon Cordes, Bldg. 45, x2731
Lydia Moreno, Bldg. 30, x2151
Beth Meyer, Bldg. 9, x5827
Maureen Smith, Bldg. 4, x3721
Charlotte Ober, EAFB, x7226
Marge Griffin, Bldg. 1, x4025
Martha Speller, Bldg. 416, x2926

or any member of the Federal Women's Program Committee.

Bulletin Board, cont'd

"A New Model of Core Formation"; Friday April 18, JSC's M. B. Blanchard and U.S. Clanton will speak on the "The Penetrator—A Viable Concept for Future Planetary Missions".

On Sale at the JSC Exchange Store
(Store hours 10 a.m. to 2 p.m.)
Dean Goss tickets: $10 single, $20 couple (regular $14.50)
ABC Theatre Tickets: $2 ea.
General Cinema Tickets:$2.40 ea.
Astroworld Tickets: $8 (regular $9.95)
Six Flags Over Texas Tickets: $8 for one day (reg. $9.95) and $9.95 for two days (reg. $14.95)
Magic Kingdom Cards: Free

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP3 *Roundup*, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Property & Rentals

70 Embassy mobile home, 12 x 50, 2 bedrooms, 1-1/2 bath, washer/dryer, AC, good cond, $5000. Susan x5913

Rent: Jamaica Beach cottage, $210/wk, two bedrooms, one bath. Make reservations now for summer season. 334-1640 after 6

Lease: CLC Condo, 1 br, 1 bth, $280 + deposit, washer/dryer. Utilities not included. Rick 333-4210 or 486-8216 after 5.

Rent: New 4-bdrm waterfront house on Lake Livingston, Westwood Shores, golf, pools, marina, daily or weekly rates. 534-3800

Lease: CLC Baywind II condo, 2-2-2, W/D conn, F'Place, $375/mo + elec. $100 dep. Ray x2651 or 486-4341

Rent: Lake Livingston, Cape Royale, compl furn home, 3-2-1, Fishing, hunting, tennis, golf, etc. Reserve early. wk/mo/yr rates. 488-4487

Galveston. West End. 2 bdrm, By-the-Sea condo, furn, $210/wk off, $300/wk in season. Clements 474-2622

Sale: Lot at Waterwood on Lake Livingston, golf, tennis, water sports, etc. Owner will finance. Bill x6136 or 488-1410

Surprise your favorite secretary with a T-shirt for Secretary's Day, April 23. The NSA (National Secretaries Association), NASA-Clear Lake Chapter has these shirts. Call 483-4464, Jackie.

Cars & Trucks

78 Chev window van, dual AC, power, tilt, cruise, 17K miles, $5400. 332-4882 after 5

76 Buick LeSabre, 4-dr sedan, 46000 miles, exc cond,, AM/FM 8 trk, AC, PS, PB< CB, $2250. Bennett x4140 or 488-0448

78 Camaro LT, maroon, one owner, power brakes, steering, A/C, auto, good cond, bargain at $4700. Peacock x2208 or 486-0159

73 Capri, good mileage, AC, $995. x2693 or 488-7807

77 Silverado pickup, AC, FM cassette, power, automatic, $2900. x2693 or 488-7807

74 Maverick - AT - PS - AC, 6 cyl 75K miles, good cond, $1500. Scarlett x3271 or 332-1396

76 Datsun 280 Z, auto, AC, AM/FM, sun shade, exc cond. Ed x4507 or 474-5074

71 Mercury Wagon, A/C, stereo, power, regular gas, good shape, $500. Kranz x3628 or 337-5173

70 VW bug, good cond, $950 cash or trade for station wagon. Gail x4952

71 Ford LTD, one owner, air power steering, automatic, exc cond, $975. John Boyd x4041 or 862-4365 evenings

68 Chevy Impala convertible, 327 V-8, A/C, pwr windows, AM, new paint, etc, one owner. Bill x6136 or 488-1410

70 Galaxie, 2-dr., good transportation, $450. Jack x2591 or 485-6013 evenings

Household Articles

Year-old Sears best microwave oven, complete w/probe and books, $350. Smith 482-2575 after 5

Air conditioner, 18,000 BTU, General Electric Superthrust. Used 2 months. Asking $300. Barbara x4952 or 332-2613 after 5

Upright Gibson freezer, 21 cubic ft. 70 3/8" x 32". 8 months old, $415 or make offer. Renee x5907 or 482-4292

Wanted

Female to share apartment Clear Lake City area. Lynn 645-8082 after 4

Factory manual for early model Chevrolet Vega, R. Sauer x2759

Boats & Planes

15' Invader tri-hull, 65 hp Evinrude drive-on trailer, two tanks, fathometer, $1350. 643-8170

16' fiberglass Falcon, deep V, 75 hp Chrysler, trailer and accessories, $2000. Scarlett x3271 or 332-1396

Beautiful sleek 16-foot sailboat with trailer, exc cond, Ms. Polk 658-8286 x75 or 538-1191 after 6:30

Sailboat - 14' Dolphin, includes trailer, boatcover, and 4 ski belts, exc cond. Earl Rubenstein x3116 or 334-2354

75 IFR equipped Skyhawk Club, P.P. w/100 hr minimum, $100 initial fee, $35/month dues, $17/hr dry, based LaPorte. Bill Pruett x4491 or 487-3857 after 5

22' Thompson F/G, 170 Volvo I/O, top, 8-track stereo, depth finder w/audio, tandem trlr w/pwr winch, $4000 firm. C. Martin x4981 or 333-3926 eves

Foam core fiberflass sailboat. Hull and deck. Ready for home completion. 27' LOA, 6800# displacement, $5250. 334-1983 evenings, weekends.

Miscellaneous

Ski equipment, 3 pair children's skis, 2 pair boots, assorted poles. 474-2060 after 6

Automatic answer phone device, adjustable rings, remote playback Phonemate Model, $125. 474-3507

Marlin x22 automatic w/scope; RG x22 Western Revolver w/mag. cyl; H&R x32 revolver, each $85. - Excam x 380 automatic, $125. 457-1859

Mercedes accessories, 2 new front bumper guards for 69 and later, 3 each chrome hub caps and wheel covers. Make offer. Malcolm Jones x2394 or 471-3303

Tires - 3 L78x15 Mohawks, 4-ply poly, w/w, less than 1,000 miles. $25 each, all three for $65. Jim x2406 or 777-7678 after 6

Lawnmower: 4 hp, 22 inch cut, grass catcher, good quality, $45 or trade for edger. 481-0095

New 5-foot by 10-foot kennel run (dog pen), four feet high with gate and dog house, $30. Will help you move. Hammack x3126 or 334-2986

B&D 18" rotary electric mower with grass catcher, $50. Bauch 333-3382

Roofing! Good work, negotiable prices! We perform minor repairs or massive overhauls on roofs. Will x 2141 or Doug 484-1036

Picnic table, almost new. Metal frame, 6-ft. long. $20. 334-2317 after 4:30. Glover.

Carpools

Riders needed for carpool from Seabrook to NASA. Hours 8:30-5. Prefer non-smoker. Avis x2091

Wish to join/form non-smoking carpool from Galveston (Bayou Vista/Omega Bay) to NASA 8:30-5. Shirley Hamel x4857, Bldg 1

Want to join non-smoking carpool from Sun Valley/Freeway Manor area. Have four seat Pinto. Bill Roberts x4768

Need to form or join a carpool from Montrose area. 8-4:30 shift. Robert Searle x4247 or 523-7175

Want to join/form carpool from Alief to NASA, 8-4:45 (adjustable). Han 486-8153

Wanted: Housing or bedroom accommodations for summer ASEE faculty fellows. Mid-June through August. Call Nancy Robertson, x4724.

Cycles

77 Suzuki RM 250, exc cond, adult owned, never raced, new teraflex, 5.10 x 18", $795. 944-6513

76 Kawasaki KH500. 3200 miles, runs great, extras, 332-8219 or 488-8996

Personals

Visiting scientist needs summer housing. Will house-sit or sublease. Call Susan Brand or Trudy Thompson x2693, for Dr. Larry Neal, Tennessee Tech Univ.

Ballroom dancing your thing? We would like to get to know you. Send name/code to Richard Heetderks/FD6 x5547

Musical Instruments

Martin 12-string guitar & case, exc. cond $500. Aspen 6-string guitar & case, exc. cond. $125. Haines 941-2495 or 483-5451

Stereos & Cameras

Graphic 4"x5", 3 lenses 90, 135, 210 mm, Polaroid back, tripod, $350. 643-8170

Tiles

Continued from Page 1

partment windows which, ironically, gives a "raccoon lock" to the spacecraft. The "white tiles" are located on the mid-fuselage, vertical stabilizer, OMS pod, and the upper wing surfaces.

The tiles are bonded to the spacecraft with Room Temperature Vulcanizer (RTV), an excellent bonding agent which has been used on many spacecraft.

The fibrous tiles are bonded to a felt material known as the Strain Isolater Pad (SIP). The SIP, in turn, is bonded to the aluminum surface of the spacecraft. Testing discovered that due to stress concentrations in the SIP material, the tile/SIP system fails at approximately half the stress at which it should fail.

NASA and a Rockwell Space Systems Group developed a process of densifying the back surface of the tile. Using a DuPont material called Ludox AS—which is an ammonia-stabilized binder—and mixing it with silica slip particles, it becomes a "wet cement" slurry which dries to a finished hard surface.

The slurry is brushed onto the tile surface in several coatings. This penetrates about .11 inches into the tile. It is open air-dried and then given a heat treatment. The strength of the tile SIP system is increased by a factor of two with the densification.

There is also another Rockwell-developed repair process of inserting into the tile with a hypodermic needle a material which will then harden.

Once NASA and Rockwell have completed—and as of mid-February they were 90% completed—the various tests to establish the expected maximum loads facing the spacecraft during ascent and descent, the application and verification of densified tiles to the spacecraft surface is just a matter of time. Rockwell's estimate is that the tiles may be completely applied by the end of June if no unforeseen problems occur, and by July 30 at the latest.

Engine tests

Continued from Page 1

bination. Pogo is a phenomenon of cyclic propellant system pressures that has occurred under some conditions in earlier launch vehicles. The test is to demonstrate the engine accumulator system's capability to prevent pogo during flight.

Two periods of throttling two engines to 70% of rated power level with the third at 100% verified the main propulsion system performance at differential throttling that is necessary during the early seconds of a Shuttle launch.

Another successful "first" in this test was a thrust Vector Control failure simulation to test whether redundant systems would perform properly in the event of such a failure during launch.

The test was planned for early morning in order to allow engineers to observe ice and frost conditions on the External Tank when filled with supercold propellants during nighttime hours (in the absence of heat from the Sun).

The first full power level test (at 109% of rated power level) of one Space Shuttle Main Engine was successfully conducted March 13, a significant milestone in the development of the engine and a major step towards certification of the engine for full power level abort capability.

The total test time was 125 seconds with 10 seconds at full power level and a total of 26 seconds above 100% rated power level. The test was conducted at NASA's National Space Technology Laboratories in Mississippi.

Space station to be studied

JSC has selected the Boeing Aerospace Company, Seattle, Washington, for award of a contract for system analysis study of a Space Operations Center which would operate in low Earth orbit.

The 12-month study calls for Boeing to analyze the operations center concept, including systems needed for construction of large space structures and flight support of manned and unmanned orbit transfer vehicles.

The Space Operations Center would provide a space-based facility for construction and checkout of large orbiting systems in space; on-orbit assembly; launch, recovery, and servicing of space vehicles; and satellite servicing. The center could eventually provide a permanent manned facility in space with reduced dependence on Earth for control and resupply.

The Space Shuttle would be the prime vehicle for launch and implementation of the operations center.

The study contract will conclude with a final report 12 months after the start of the initial studies. NASA expects this contract to cost approximately $400,000.

FOD secretary shows aptitude and sharp mind

Janet Pacek is a secretary who does more work than her job title requires, and it is this ambition and competence that helped to earn her the Outstanding Secretary award for January 1980.

In addition to her duties as a secretary in Flight Operations, she has acted as an aide supporting Congressional testimony, a vital source of information for inter-center management, a protocol professional during FOD's interactions with the Nuclear Regulatory Commission, and a knowledgeable assistant in administrative functions of the Directorate such as preparing manpower reports.

"She has moved into areas that approach those of a technical aide," says Eugene Kranz, Deputy Director of FOD.

As secretary to Mr. Kranz, Ms. Pacek maintains technical notes, records, and action items during meetings concerning the STS-1 mission. "This requires a high level of familiarity with the space vehicle systems, Mission Control Center capabilities, and training systems," Mr. Kranz says.

He also cites her willingness to take on new work as a challenge, to sharpen her skills, and to work long and irregular hours while still keeping up with the secretarial responsibilities of the office.

Of special note is her intelligence.

Janet Pacek

Outstanding Secretary

During the Skylab reactivation, she had to relay instructions "of a highly technical nature," Mr. Kranz says. "Mrs. Pacek was very perceptive in recognizing significant issues and bringing them to the attention of the proper console operator."

In all, Janet Pacek has the sharp mind and aptitude that are the traits of outstanding NASA personnel.

1979 Honor Awards

Over 100 JSC personnel received recognition at the NASA Honor Awards Ceremony March 25 in the Visitor Center Auditorium.

Outstanding Leadership Medals went to **Richard Colonna** for his achievements in spacecraft problem resolution; **Charles Harlan** for his direction of the Skylab flight control team; **Joseph Piland** for exceptional accomplishments in supporting the JSC facility; and **David Pippen** for leadership in developing state-of-the-art test methods for spacecraft materials at White Sands.

The NASA Exceptional Scientific Achievement Medal went to **Robert MacDonald** for his scientific and managerial leadership in the Large Area Crop Inventory Experiment.

Exceptional Service Medals went to **Henry Clements** for his work in operations of JSC; to **James Saultz** for his training and leadership of the Skylab flight control team; to **Harold Stall** for his development of an effective public affairs program at JSC; and to **Kenneth Young** for his technical expertise in conceiving the drag modulation concept used for Skylab entry control.

The NASA Equal Employment Opportunity Medal went to **Kenneth Gilbreath** for his work with the affirmative action program at the center.

NASA Group Achievement Awards went to the Interactive Financial Systems Development Team, the JSC Data Processing Services Team, the Phase I Shuttle Procedures Simulator Project Team, the Shuttle Single Systems Trainer Development Team, and the Skylab Reentry Team.

JSC Certificates of Commendation went to 29 employees; JSC Superior Achievement Awards went to 37 employees; and seven organizations received JSC Group Achievement Awards.

An early 550-second main engine cluster firing February 28 at the NASA National Space Technology Labs in Mississippi. The engines are part of a Main Propulsion Test Article with a simulated midbody (boilerplate) and a flight-weight aft fuselage. Propellants—liquid oxygen and liquid hydrogen—feed the engines from a flight-type External Tank. The tests take place on a 407-foot stand used in past years to test the Saturn V moon rocket booster. NSTL evaluates the propulsion system under a static fire environment and supports engine verifications for the first manned Shuttle flight now on a March 30 working launch date schedule.

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