

State of Texas employs Landsat remote sensing in resource management

NASA and the State of Texas signed an agreement recently that will lead to applied space-age remote sensing technology in the management of Texas' natural resources.

The agreement outlines a 3-year project for the Texas natural resource information system (TNRIS) that uses computer-processed spacecraft data from Landsat. Costs of the project are estimated at \$600,000 for NASA and \$750,000 for the state.

Goal of the project is a day-to-day operation using a mix of manual and computer-assisted remote sensing methods that will monitor natural resources within Texas.

In 1979, the system will be applied to the Texas Coastal Zone, and work has already begun, identifying hardware required. Subsequent phases will concentrate on the forest regions of East Texas, the water resources of the High Plains, the agricultural regions of Central Texas, and the rangelands of West Texas.

Aircraft photographic and electronic data, ground truth measurements, and environmental data from weather stations will supplement the satellite data during the early phases of the project.

JSC and the TNRIS Task Force will jointly design and implement the data system. NASA will provide technical expertise, and the TNRIS will evaluate the usefulness and cost-effectiveness of the space-age methodology.

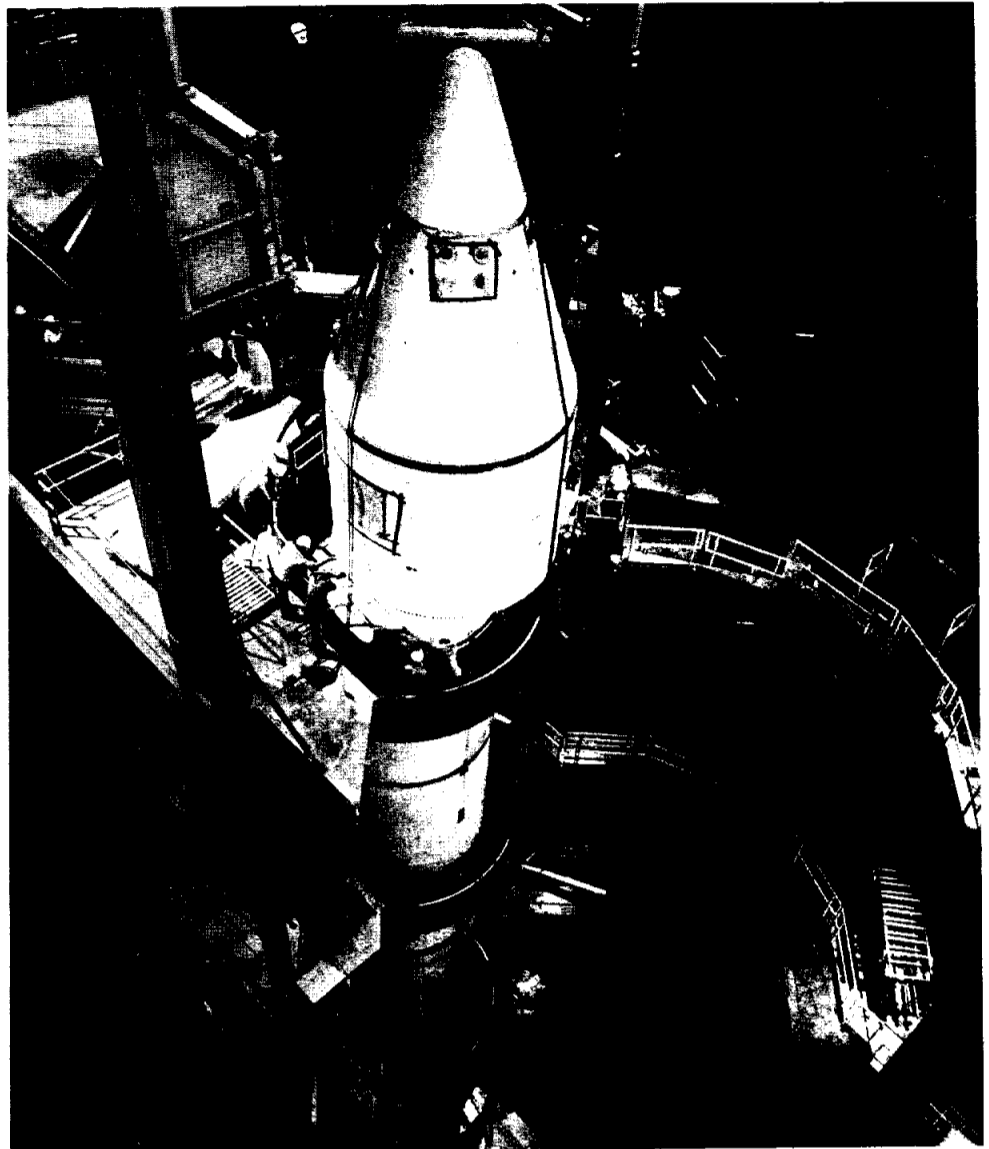
Skylab Update

Skylab rescue efforts will put mission control center on site into 24 hour a day action this week. On Sunday, Oct. 15, the Santiago, Chile, tracking station begins full-time Skylab support, after technicians here and at Goddard have completed preliminary testing.

The Santiago station was recently outfitted to support the Skylab mission.

Marshall Space Flight Center puts an estimate for orbit life of Skylab now at April 1980.

The Skylab space station has been in a stable position some 240 miles above Earth for two months.



The forward assembly of a Space Shuttle SRB is lowered into place in the dynamics test stand at Marshall. Following this stacking operation, an External Tank and the Orbiter will be added to complete the Shuttle assembly, on Oct. 5. This will be the first buildup of a complete Shuttle, in preparation for ground vibration testing at the Huntsville center.

Spacelab briefings launched

The two mission specialists for the first Spacelab mission left last week for training sessions with the European scientific investigators.

Robert Parker and Owen K. Garriott left Sat., Oct. 7 for two months of preparation for the SS-10, now scheduled for a June 30, 1981, launch.

Topic of the briefings will be the first Spacelab payload, especially "the sled," a linear accelerator being constructed in Europe to test in-flight causes of space motion sickness.

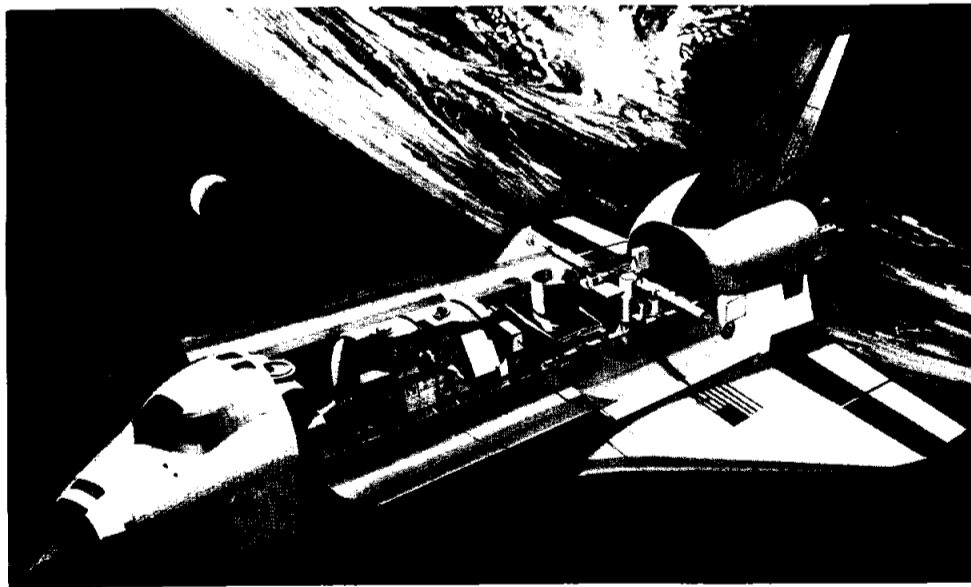
The 7-day SS-10 mission will be "primarily for blood drawing experiments," Parker said in an interview. "And we'll be looking at how the vestibular system works in the zero-g environment."

Parker said overall the mission will be multidisciplinary, with the astronauts conducting experiments in medicine, materials science, astronomy, and earth resources.

The pilot and commander for SS-10 have not yet been picked. Flying with the crew will be two payload specialists, one American and one European, also yet to be named.

Owen Garriott flew on the second manned Skylab mission. For Parker, the Spacelab flight will be his first time in space.

"It was worth waiting for," he said.



Bignier denotes European view

Michel Bignier could not say from which member state the first European astronaut in Spacelab would come. "But he will be a Western European," he said. "There have already been plenty of East Europeans in space."

The Frenchman Bignier spoke at the first meeting of the 1978-79 program of the American Institute of Aeronautics and Astronautics. He is director of Spacelab with the European Space Agency, and a member of AIAA.

Giving a glimpse of life on Spacelab,

Bignier showed a slide of the passage-way from orbiter to module saying, "The module is made for the work, not the life." He added, "The crew and specialists will live in the orbiter and will come 8 to 10 hours a day to the module for working."

Bignier praised NASA for being "always open, since 1962."

"In spite of difficulties, Spacelab is an exciting program," he said. "We are certain we will be successful, with your help at NASA, because you are experienced."

"This foam doesn't burn it chars. . ."

Take a piece of foam—it looks like the stuff they packed your camera in—grip it with two hands. You expect it to crack and crumble easily, it's so lightweight. But this piece of foam won't dent, though you bang it on the table top. It won't burn though you light a match right under it.

Dan Supkis, materials engineer in the Structural Mechanics division, developed the polyimide foam in the past year, in a chemist's search for a product that would withstand the heat of an airline or shuttle engine fire, have the strength to carry a shuttle payload, and still be lightweight enough to be carried into orbit.

"What happened was Solar Turbines International was working on a material because they had a noise pollution problem."

"It was kind of a fluke, cause one day they put the foam out on the turbine and found out it was resilient. It was a long way from what we wanted in our aircraft program, cause we wanted to replace polyurethane in the seats of the aircraft."

Supkis then tells the story of a year and a half of compression tests, and efforts to

(Continued on page 4)

Highlights of Carter's speech Oct. 1 at KSC

"We often speak of progress. But there is nothing in scientific experience to compare with the enormous leaps we have made in the brief span of two decades of the space age. The dreams of a few visionaries have become a part of the everyday lives of hundreds of millions of people.

"The first great era of the space age is over. The second is about to begin. It will come into its own with the Space Shuttle.

Like the sea, the land, and the air, space will become an environment in which human beings can live and work

for the welfare of their species. Paradoxically, the most exciting thing about the Space Shuttle is that it will make our use of space routine.

"We have invested some one hundred billion dollars over the history of our space programs. It is now time for us to capitalize on our investment."

NEBA

Benefits get even better

Watch your mailbox.

NEBA will be sending group life insurance modifications to all members in the next few weeks, reflecting changes effective Oct. 1.

Nonmembers, take note. Quarterly premiums have reduced 10 percent, from 88 cents to 80 cents per thousand, making NEBA's low cost group life insurance even lower.

Other revisions are a change in coverage to equal 1.5 times the annual salary, except salaries over \$35,000, and a 100 percent increase in the child conversion limitation, from \$5,000 to \$10,000.

For example, an employee who makes \$8 to \$10,000 per year will pay a quarterly premium of \$12.00, down \$1.20, for \$15,000 worth of coverage. One who makes \$20 to \$22,000 pays \$26.40 quarterly, down \$1.10, for \$33,000 coverage.

Remember NEBA also offers travel accident life insurance for employees and spouses. Membership in Group Travel Accident Life Insurance takes only filling in an enrollment card, selecting the coverage, and paying the annual or pro-rata premium.

All employees with appointments of twelve months or longer and all reimbursable detailees are eligible for NEBA group insurance plans.

To become a member of Group Life Insurance an employee completes an enrollment card and health statement. The adult health statement has 18 questions, the statement for children up to age 19 has eleven. These are yes or no questions, with a yes answer requiring an explanation.

For more information, contact Personnel, x2681, or the NEBA office, x5410.

Her skills save money and time in Orbiter office

Lois D. Walker works up a Technical Status Review each week as part of her job as secretary to the manager of the Engineering Office, Orbiter Project. To make sure these reviews, conducted by phone, run smoothly, she contacts other secretaries at Rockwell-Space Division, Kennedy Space Center, NASA Headquarters, and other involved organizations, negotiating agenda items and fitting them into the time available.

Her organizational ability is of particular value, says Ronald Kubicki, manager of the Engineering Office. That along with her ability to work well under pressure and her warm and friendly manner through it all have won her the Outstanding Secretary Award for September.

The Orbiter Project is a co-assigned organization, and Walker has established excellent rapport with personnel at all levels, Kubicki said. "She has an excellent understanding of the critical program decisions to be made, including their importance to program costs and schedules," he said. "And she can make independent decisions."

Kubicki said that because of Lois Walker's suggestions, the series of preliminary design reviews for orbiters 101 and 102 were conducted more efficiently and at a lower cost.

"Mrs. Walker has an excellent understanding of NASA and JSC policies, and she passes along instructions pleasantly to other secretaries in the office," Kubicki said. "Mrs. Walker's superior secretarial skills, initiative, and sound judgment have made her a valuable member of the Engineering Office."

Setting it straight

In the anniversary highlights, page 4 of the Sept. 27 issue, we listed the date of the first Lunar landing as July 16, 1969. The correct date is July 20, 1969, and *Roundup* regrets the error.

Date of launch was July 16.

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 JSC employees.

Editor: Kay Ebeling
Photographer: A. "Pat" Patnesky

"She is deserving of the Outstanding Secretary Award," he said.



Lois D. Walker



"The Universe"

Sculptor Masaru Takeguchi says infinity, the ebb and flow of the universe, and the Moebius strip, among other things inspire his work, on display through Nov. 10 at UH/CLC Bayou Bldg.

EAA Attractions

CLUBS

All center employee club presidents, please call Donna Tarpey at x2051.

JOGGING TRACK, ANYONE?

Joggers, would you be interested in a pine bark jogging track winding through the woods around the rec center? If so, call or write Jim Smith, ES3, x3676, or Rick Barton, EX3, x5181.

ATTENTION, KICKERS

Time's about to run out if you haven't bought your tickets to the Fall Country Western Dance. It's next Friday, Oct. 20, at the Gilruth Rec Center. There will be a prize for the best dressed cowboy and cowgirl. Doors and beverage counters open at 7 p.m.; dinner will be served from 8 to 9; and the band—Bobby Heiman & High Country—will play good C&W music from 9 to 1. All for only \$7.50 per person. If you can beat that anywhere, let us know, we'd like to go. Tickets on sale at the Bldg 11 store.

DEAN GOSS DINNER THEATRE

The Theatre is changing its format from local talent to movie and TV personality

leads. Along with the stars is an increase in ticket price, now \$10 per person. Tickets are good Fri., Sat., and holidays. Regular prices are now \$12.50 for Sun. and weeknights, and \$14.50 on Fri., Sat., and holidays.

TEXAS HUNTERS SAFETY COURSE

The EAA, in cooperation with the Texas Parks and Wildlife Commission and National Rifle Association, is offering the Texas Hunters Safety Course at the rec center Nov. 6 - 9, 6:30 to 9:30 p.m. The course is designed to teach basic hunter safety, firearms responsibility, game conservation principles, etc. Fee is \$1 to cover materials, and the class is limited to 45. To register, contact Jerry Kilpatrick, x4626 or Jim McBride, x2541.

SOUL GETDOWN

Don't forget, the Soul Getdown at the Gilruth Rec Center with music by the Down to Earth Dimension, has been rescheduled for Nov. 4. Everything's the same except the date, so boogie on over to the Bldg. 11 Exchange Store and get your tickets—\$8 per person.



Suggestion, Tech Brief, and Invention Awards for September went to (left to right) 1st row: Richard Sinderson, Louis McFadin, Carl Romero. 2nd row: Anibal daSilva, Norman Belasco, Wayland Rippstein, William Cowart, James Akkerman. 3rd row: Stuart Bergman, William Bland, Leroy Underwood, Lubert Legar, and Hershel Larue. Congratulations to you all.

More employees honored

The 1978 Margaret E. Fairbairn Award has gone to **Shirley K. Price** of the Equal Opportunities Programs office. Price has been handicap co-ordinator for the past five years. She developed the

selective placement program, where specific jobs are found for handicapped persons, and other special programs for the handicapped such as part-time jobs and unpaid work experience.

The award is presented by the National Rehabilitation Association, Job Placement Division. Price traveled Sept. 24-27 to the association's convention in Salt Lake City to receive the award, and she said the trip was "beautiful."

This year, of 23 Fellows elected by the AIAA (American Institute of Aeronautics and Astronautics), two space center employees, **Robert F. Thompson** and **Aaron Cohen**, received the honor.

As the AIAA Constitution reads, Fellows are persons of distinction in aeronautics or astronautics who have made notable contributions to the state of the art. One fellow is elected for every thousand voting members.

Thompson is manager of the Space Shuttle Program and Cohen is manager of the Orbiter Project Office.

And more honors. The highest award granted by the AIAA was given to **Maxime A. Faget**, director of Engineering and Development. Honoring Robert H. Goddard, rocket visionary, the Goddard Astronautics Award is presented at the Annual Meeting of the AIAA to that person who has made the most notable achievement in the entire field of astronautics.

Faget, a member of the original Space Task Group in 1958, has made singular and progressive contributions to the design and development of aircraft, missiles, and spacecraft since the beginning of supersonic flight.

As the 1979 recipient, Faget sits among such notables as Wernher von Braun (1961 recipient), and Robert R. Gilruth (1962).

At Gilruth Center

Basketball:

Sign-up deadline is 5 p.m. Thurs. Oct. 19. Roster forms are available at the recreation facility. Entry fees are: EAA teams - \$50.00, Non-EAA teams - \$100.00.

Running:

The 6th NASA Intercenter Running Competition will be held the week of Oct. 22. Eligibility is the same as last two meets, that is NASA employees (includes retirees), regular contractors, co-op students at work, University affiliates, etc. There will be two events, 2 mile & 10 KM. Runners may run in either or both events. Participation ribbons go to all runners; trophies to the top three in each age group, plus bonus points for participation. Everyone should run to help JSC. There will be a number of heats for each distance at varying times and locations, and all past

participants will be mailed details. If you have changed your mail code, or are new to this event, please call the recreation facility, x3594 to be put on the mailing list.

Fishing Contest:

The National Industrial Recreation Association Annual Employees Fishing Contest is still in progress. Entry forms are available at the recreation facility.

CLASSES

Oil Painting:

Classes will meet on Thursday nights, 6 - 8 p.m., Room 209, Oct. 19, 26, Nov. 2, 9, 16, and 30. A maximum of 15 people can sign up for each class. There is still room, but hurry. Cost is \$37.50; students furnish their own supplies. Sign-up deadline is Oct. 17.

Center sports whack 'em & wow 'em

Outstanding at the JSC Tennis Club member-guest doubles tennis tournament were two local teenagers, Patrick Rea and Jackie Williams. They upset Number 1 seeds club pro Jim Nerran and D. Somogyi in the championship division finals.

The tournament took place Sept. 30 and Oct. 1 at Bay Area Racket Club.

Two more teens, Stewart Spule and Mike Madera, were the class of the "B" intermediates as they eliminated everyone in straight sets, including tournament director Gresh Downs and partner Webb Draughan as well as Number 1 seeds Bill Warden and D. Haines in the finals.

Ann Williams continued her winning play in teaming with Barbara Fleming to sweep the women's championship round-robin.

Next tournament is planned as a singles event Oct. 27-29. For information on the Tennis Club or upcoming events, contact Carolyn Thompson, x5987, Jim Walker, x3551, or Gresh Downs, 486-1297.

Bob Blount, with crew of John Blount and Paul Eley, won the Gulf Coast 20 5-race National Championship Regatta, hosted by Seabrook Sailing Club and



sailed on Galveston Bay Sept. 30 and Oct. 1.

Blount got off to a good start by winning the first race and carrying a 2 1/4 point lead at the end of Saturday's three races. Sunday John Strader and Earl Gerloff made strong bids but neither was able to overtake the lead established by Blount.

After trailing midway through the race, Blount made a comeback in the fifth and

United Fund advancing fast

The space center's Combined Federal Campaign (CFC) is off to a good start, reaching 29 percent of its goal with 26 percent of JSC's employees giving the first week.

During the first report meeting on Wednesday, Oct. 4, \$61,298.43 was turned over to Lou Baldwin of the National Labor Relations Board. Baldwin is

chairing this year's CFC campaign for the Houston Area Federal Executive Board.

Like last year, the space center is well ahead of the Postal Service, but behind the FAA, HUD, and the VA. Roy Aldridge, head of the center's campaign, indicated he is confident JSC will repeat its performance of last year and overtake them as the campaign gets into high gear.

Center people going places

The space center says "Welcome Aboard" to **Frank Austin, M.D.** who arrived Fri., Oct. 6 to begin work as Assistant Director of Medical Operations. Coming from a career as a medical officer, Naval flight surgeon, Naval aviator, and test pilot, Austin lists among his specialties preventive medicine applied to the airman and his environment, safety programs and accident investigation, and program management of Aircrew Life Support systems.

In his new job, Austin will develop a medical program for manned spaceflight—setting medical mission rules, training flight and ground crews, and acting as the focal point for all contacts with the astronauts concerning medicine before, during, and after spaceflight.

Above all, Austin brings his personal dynamism to the space program, and his co-workers all say, "Welcome aboard."

"Large Structures in Space" will be the subject of a talk by **Allen J. Louviere**, Chief of the Spacecraft Design Division. Louviere has applied his skills to the development of manned spacecraft since Gemini, and has developed advanced concepts in zero-g space stations, large structures, and solar power satellites.

Louviere will speak at a meeting of the Houston L-5 Society of Fri., Oct. 20, 7:30 p.m. at the Houston Museum of Natural Science in Hermann Park.

Elsie M. Easley, chief of the Property Branch, was one of two women participating in the eighth session of the NASA Middle Management Education Program at Wallops Flight Center in Virginia. The program purveyed one week's training in managerial practices and a second week in briefing with key NASA administrators, among them Robert Frosch and Alan Lovelace.

Deadline for registration for the American Astronautical Society conference is Oct. 16. The sessions take place at Stouffer's Greenway Plaza Hotel Oct. 30 through Nov. 2. Topic of the conference is "The Future United States Space Program."

Roundup Swap Shop

Cars & Trucks

'65 Valiant wagon, dependable and useful car. \$365. Booker, 488-3668.

'72 Chevy 9-passenger wagon w/AC, Stereo, air shocks, runs well. \$775. Lousma, 482-2360.

'67 Plymouth Fury II and '68 T-Bird, both above average condition. Good paint, engine, transmission, tires, brakes, etc. 333-2468.

'73 Bk. Monte Carlo, new trans, AM/8-Track, needs some body work, bucket seats, good work car. \$1500 or best offer. 534-3785 after 5:30.

'15 ft. travel trailer. Sleeps family of 5. Ice box, L.P. stove & oven. Very good condition. \$1800. 482-7073.

'74 Toyota 5-5, AC, PB, AM/FM tape, 5 speed, steel belted radials, very economical, exc. cond., 49,000 miles, \$1995. 482-5393 after 5.

'76 Oldsmobile Delta 88 Royale, 4-dr., air, PS/PB, AM/FM, rust-proofed. \$3800 or trade equity for economy car. Judy, 488-0066.

'77 Datsun 810, PS, PB, AC, AM/FM stereo, CB, cassette player, cruise control, low mileage, extended transferable warranty, exc. cond., many other extras, Jones, 488-8115.

'74 Mazda RX 4, 4 speed, air cond., good cond. \$1295. 529-1136 Nights & Weekends.

'72 Chevelle Station Wagon, Air, AM/FM, new tires & brakes. Right rear fender dented. 99K miles. Good running cond. \$625. Smith, 486-0462.

Boats & Planes

CAL-25 Sailboat, fully equipped for racing or cruising, working 150 and 120 genoas, spinaker, dodger, codepit awning, 6 hr. Evinrude & more. \$7500. T. Sampsel, 334-1278.

18' Glastron with 115 HP Evinrude, power trim, depth finder and shoreline trailer. \$3500. 334-5080 after 5.

Sailboat, AMF "Alcott Minifish," seldom used, including Dolley. \$575. 334-1925 after 5.

Cycles

'76 Honda GL-1000, full dress, 333-3064 after 5.

'69 Honda 70, clean, good cond., new tire, battery, bumper racks, new small helmet. \$150. Thomas, 554-6091.

'76 Honda XL-175, good cond., low mileage. 482-1061 after 6.

Men's 10 speed bicycle, excellent cond., \$50. Faber, 482-7877.

Property & Rentals

Sale: Home in South Park, 3-2-2 detached, den, utility rm., combo living/dining area, nice size fenced yard, good buy. 741-2706 after 6.

Restaurant in downtown Pensacola, FL, established business, 40 plus yrs., seats 150. Art Bond, 944-6059.

2-rm. unfurn. garage apt. on Taylor Lake w/swimming pool, 2 nights/week babysitting plus \$200/mo. inc. utilities. 538-1643.

Rent: Lakeside vacation retreat at Cape Royale on Lk. Livingston. New 3-bdrm. waterfront home compl. furn. Facil incl tennis, pool, golf, boat launch. Three day min. 488-3746.

Vacation Lake Livingston Cape Royale, a beautiful resort community with all amenities. Enjoy charming custom 3-2-1, compl. furn. home nestled among trees by the water. Rent wk/mo/yr. 488-4487.

Galveston-West Beach-Sea Isle, 3 br. house on Bay with fantastic view. \$230/Wk in season. Cassetti, 474-2923.

Household Articles

Large couch & overstuffed chair, Early American style. \$200 for both; Office furniture 1 large executive desk, 1 credenza, 5-drawer filing cabinet. 474-2138.

Swap Shop advertising is open to JSC federal and on-site contractor employees. Goods or services must be offered as advertised, without regard to race, religion, sex or national origin. Non-commercial personal ads should be about 20 words and include home phone number. Typed or printed ad copy must be received by AP3/Roundup by Wednesday of the week prior to publication.

Solid walnut king-size bed (complete) triple dresser, chest, 2 bedside tables, perfect condition. Brubaker, 554-6034.

Light green carpet, 110 yds., \$250; refig/freezer, \$100 after 5. 486-8119.

Washer, avocado, Norge hvy duty, \$125. Coppertone Frigidaire 17 Cu. ft. refig, Imperial frost proof w/freezer section. \$225. 23" color TV Zenith Mediterranean console, \$250. Magnavox stereo console all records and diamond needle, \$175. 4-piece sectional sofa, (green flower, beige background), \$200. Fireplace screen, tools & andirons, \$40. 1 brown leather-like footstool (new), \$15. 3-way shower pulsor massage, \$12. 6 different TV electronic game set (new), \$40. Lady Remington shaver, electric, \$12. Sam, 483-2553.

Stereos and Cameras

Rolleicord Camera & case, 7 Rollei filters, Rollei lens shade, exposure meter, flash attachment. \$95. 946-8825 after 5:30.

Delco AM/FM Stereo, \$35, Auto Stereo Cassette Player, \$35, Delco AM Radio, \$10. McBryar, 534-3076.

Altec Voice-of-the-Theater speakers, A7-500's 15-inch woofer. 500 H7 horn in decorator cabinet for home \$700 for both. 481-5227.

Musical Instruments

Wurlitzer spinet piano, \$450. 333-4669.

Reel to reel tape recorder. Good condition, \$35. Bundy Flute, new \$130 (cost \$220). Hansen X4801.

Pets

Free small Terrier, 2 yrs. old, female. Tex Ward, 488-5445.

Free to good home, 2 white kittens. Sandy Burdsal, 482-2873.

Miscellaneous

Tennis membership in the Bay Area Racquet Club. \$260. 488-5210.

Saddle w/black & white roughout seat, custom made by B & S Saddlery. Some silver trim, good cond. \$175. 471-4589.

Floor model belt reducing vibrator. Very good condition. \$50. 482-7073.

Smith Corona manual portable typewriter & case. 12-inch carriage, 12-inch type. Like new. \$60. 946-8825 after 5:30.

Weaver K 4 Scope \$29.95. Tex Ward, 488-5445.

Beautiful antique china cabinet, curver glass front & sides has bonnet top with mirror, also mirror in back of top shelf, claw feet. \$850. 488-5564.

Lost & Found

Lost: Gold chain necklace with small gold ball somewhere in Bldg. 4 or between Bldg. 4 and the parking lot back of cafeteria, Building 3. Sandy Burdsal X3511 or 482-2873.

Wanted

Ride wanted from Shaver-Spencer area in Pasadena. Will pay gas. Please call Michael Richardson. 944-9786.

Need a ride to Boeing Company at 1300 Bay Area Blvd., live in Houston. 486-1369. 8 a.m. to 4:30 p.m.

Single girl working on site, looking for same to share expenses and rent on 2 bedroom apartment in/or around the NASA area. Expenses include: 1/2 rent, telephone, PSBL groceries. If interested please call Bebi at 643-4853.

Shuttle food supplies tested, prepared, and packaged at JSC Orbiter crews to dine on home cooking

That occasional aroma of food cooking drifting across the JSC campus may not come from the two cafeterias but from the new "kitchen" in the Bldg 37 Life Sciences Laboratory. The new facility is in the same area where returning Apollo 11, 12, and 14 crews were quarantined when the building was called the Lunar Receiving Laboratory.

"We plan to go operational with the kitchen in the Spring of next year, probably April," said Shuttle Food System manager Dick Sauer. "Our final-packaging clean booth will be certified fairly soon, and everyone will have to 'smock' in and out of the area."

More than half of the food to be carried aboard Shuttle Orbiter missions will be cooked, packaged, and tested in the food lab, but unlike earlier Apollo and Skylab menus, the Orbiter menu will standardize on a six-day cycle instead of the traditional crew preference menu.

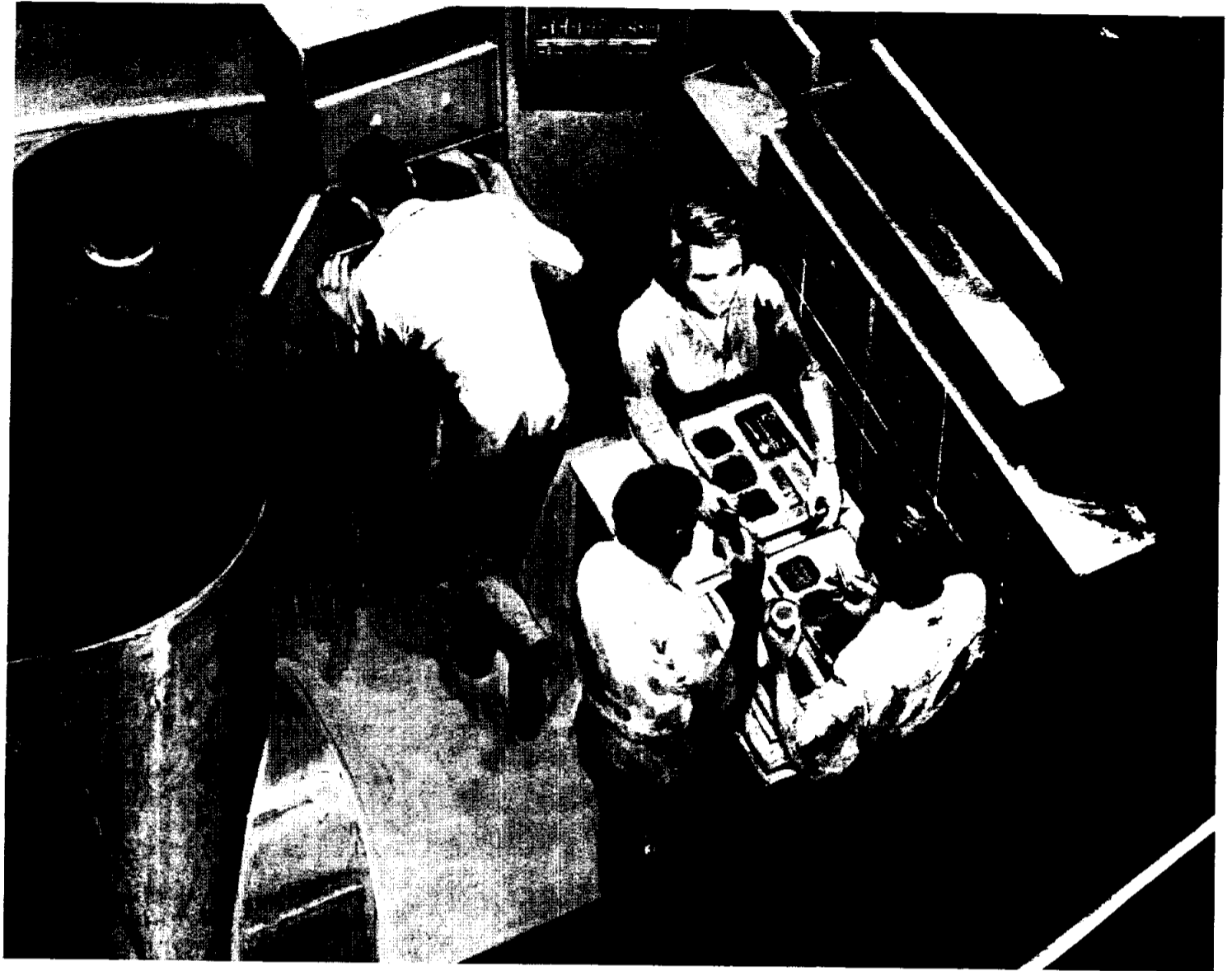
Orbiter's lower deck will be fitted out with a galley having an oven, serving trays, water dispensers, and other serving equipment. A pantry section contains non-menu food items to satisfy crewmembers' sweet-tooth and between meal hungers.

Space food for earlier programs was produced by firms in the food industry under JSC contracts and by the U.S. Army Natick Research and Development Command in Massachusetts. As the new JSC food kitchen goes operational, about 15 percent of the Shuttle food will still be supplied by the Natick lab—mainly flex-packs and thermostabilized food items. Another 20 percent will be off-the-shelf items—from chewing gum and snap-top puddings to peanut butter.

The remaining 65 percent of the Orbiter menus will be cooked and packed in the JSC food lab. A daily three-meal menu for each crewmember will provide an average 3000 calories.

When the Orbiter galley is installed and operational, about mission SS-7, the crewmember whose turn it is to cook will spend about five minutes rehydrating dehydrated food items and loading meal trays and placing them in the galley oven an hour before meal time. The trays and silverware will be cleaned and sterilized for reuse at the next meal. A carry-on food warmer is envisioned for orbital test flights.

JSC is currently negotiating with General Electric Space Division of Valley



Forge, Pa., toward a contract for producing the Orbiter galley.

JSC nutritionist Rita Rapp has watched space food technology evolve from the bland squeeze-tube paste foods carried aboard Mercury spacecraft to the electrically-heated food trays in the Skylab wardroom that moved closer to home cooking.

"We try to present foods in a normal way, more like people are accustomed to eating on Earth," said Rapp. "Operational experience allowed us to add new food items—wider selection and better packaging—as we learned the weightlessness did not cause the problems everyone anticipated."

She was involved in preparing the Christmas turkey and trimmings that were

in thermostabilized flex-foil pouches. Prepared then by the Army Natick lab, these sneaked aboard the Apollo 8 spacecraft. The crew did not know the Yule meals were aboard until CapCom told them to look into a remote storage bin of the command module.

The Christmas dinner, eaten while coasting back toward Earth from the Moon, brought a comment from Apollo 8 commander Frank Borman: "It appears that we did a great injustice to the food people. Santa Claus just brought us a dinner each, and it was delicious . . . turkey and gravy, cranberry sauce, grape punch . . . outstanding!"

Borman, Jim Lovell, and Bill Anders were the first to eat space food packaged

pouches were to become standard in later Apollo missions. Food was of a thick consistency that allowed eating with a spoon without fear of the food drifting out of the containers.

The availability of hot water in the Apollo command module served also to make food more palatable, and space station Skylab's heated food trays were yet another giant leap toward home cooking in space.

Fresh vegetables, frozen filet mignons to broil, baked potatoes? Not yet. But when space food advances to that stage, Sauer and Rapp are ready to tackle the problems.

Terry White

What's cookin' in the JSC cafeteria

WEEK OF OCTOBER 16 - 20

MONDAY: Cream of Potato Soup; Weiners & Sauerkraut; Stuffed Pork Chops; Baked Chicken; Meat Sauce & Spaghetti (Special); French Beans; Squash; Buttered Beans. Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin; Selection of Salads, Sandwiches and Pies.

TUESDAY: Navy Bean Soup; Beef Stew; Liver w/Onions, Shrimp Creole; Smothered Steak (Special); Cabbage; Corn; Peas.

WEDNESDAY: Clam Chowder; Roast Beef; Baked Perch; Chicken Pan Pie; Salmon Croquette (Special); Mustard Greens; Italian Beans; Sliced Beets.

THURSDAY: Beef & Barley Soup; Beef Tacos; Diced Ham w/Lima Beans; Stuffed Cabbage (Special); Ranch Beans; Brussel Sprouts; Lima Beans.

FRIDAY: Seafood Gumbo; Fried Shrimp; Devilled Crabs; Ham Steak; Salisbury Steak (Special); Carrots; Green Beans; June Peas.

WEEK OF OCTOBER 23 - 27

MONDAY: Cream of Chicken Soup; Beef Burgandy over Noodles; T-Bone Steak; BBQ Sausage Link; Chinese Pepper Steak; (Special); Whipped Potatoes; Buttered Carrots; Green Beans; Italian Vegetables; Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin; Selection of Salads, Sandwiches and Pies.

TUESDAY: Beef Noodle Soup; Baked Meatloaf; Liver w/Onions; BBQ Spare Ribs; T-Bone Steak; Fried Chicken (Special); Whipped Potatoes; Broccoli Normandy; Buttered Squash; Harvard Beets.

WEDNESDAY: Clam Chowder; Baked Halibut; T-Bone Steak; Grilled Ham Steak; Chopped Sirloin; BBQ Link w/Spanish Rice (Special); Buttered Cabbage; Italian Vegetables; Whole New Potatoes; Spanish Rice.

THURSDAY: Navy Bean Soup; Beef Pot Roast; Shrimp Chop Suey; Pork Chops; Chicken Fired Steak (Special); Carrots; Cabbage; Green Beans.

FRIDAY: Seafood Gumbo; Broiled Flounder; Fried Shrimp; Baked Ham; Tuna & Noodle Casserole (Special); Corn; Turnip Greens; Stewed Tomatoes.

Polyimide foam findings

(Continued from page 1)

bring the weight of the material down. Speaking enthusiastically with a thick New York accent, Supkis paces his office, opening cabinets to bring out samples in different densities—a sample coating fiberglass that stood through 1800 - 2000 degrees in an oil burner for ten minutes, a sample of an airline floorboard that won't be punctured by high spiked heels.

"I got a lot of faith in the stuff, I think it's gonna go," Supkis said.

After the launch pad fire of 1967, Supkis was put to work on Crew Systems developing nonflammable items, "boot soles, lamp shades, approximately 33 nonflammable items." That grew into development of materials for the outside walls, and the work he is doing today.

"In the space program, the biggest value of the foam is not only can we make it resilient, but we can make it semi-rigid, and we can make it rigid. We can use it on floorboards, wall boards . . ."

The foam will be on the louvers of the communications satellite, Tiros-N, to be launched in March. A United Airlines 747 is running now with a floorboard made of the foam. "It's got an excess of a thousand hours and it's still in perfect conditions," Supkis said.

"This is the same floorboard we could fly in subsequent shuttles. It's not in the shuttle now cause we didn't develop it in time. But there definitely is the potential.

"This material doesn't burn, it chars. It's cured at 600 degrees. You don't have to worry about toxicity. You won't get any outgassing; it's a fire barrier; and also you can make it any weight you want.

"The foam also has potential for large space structures in the future. It can be fabricated in space, but that's way down the line."