



**COLLIER TROPHY**—Vice President Gerald Ford presents the 1973 Collier Trophy Award for the Skylab Program to Charles Conrad, Jr., Commander of the first manned Skylab mission. The Robert J. Collier Trophy is awarded annually for the greatest achievement in aeronautics or astronautics in America with respect to improving the performance, efficiency, and safety of air or space vehicles, the value of which has been thoroughly demonstrated by actual use during the preceding year.

## Employees Receive New Assignments At JSC

Robert O. Piland has been appointed acting assistant director for advanced planning and design to JSC Director of Engineering and Development Maxime A. Faget. The appointment will be effective July 1.

Since September 1970, Piland has been director of the NASA Earth Resources Laboratory at the Mississippi Test Facility, Bay St. Louis, Mississippi.

Piland previously was deputy manager of the Apollo Spacecraft Program Office, deputy director of Science and Applications and technical assistant to the JSC director. He received the NASA

Outstanding Leadership Medal in October 1973 for his contributions to Earth resources remote sensing technology. Piland joined NASA's predecessor, the National Advisory Committee for Aeronautics (NACA) in 1947 after graduating from William and Mary College.

Piland's replacement as Earth Resources Laboratory director is D. Wayne Mooneyhan who has served as Laboratory assistant director since February 1973.

In another JSC assignment change, Arnold D. Aldrich has been appointed manager of the Skylab Program in addition to his

duties as deputy manager of the Apollo Spacecraft Program. Aldrich will administer close-out of the Skylab contracts and equipment disposition, and oversee preparation of Skylab data reports and documentation.

Also, Commander Thomas K. Mattingly, II has been named Head of the Shuttle Office, Flight Operations Astronaut Office. Commander Mattingly became an astronaut in April 1966. He served as a member of the astronaut support crews for the Apollo 8 and Apollo 11 missions and was the astronaut representative in

*(Continued on Page 4)*

## Officials Report on Status of Shuttle

Speaking at a press conference held recently at JSC, John Young, acting chief of the Astronaut Office said he believes the Space Shuttle orbiter will "revolutionize the United States and the world."

"The Shuttle will open new avenues to science and will stimulate the development of advanced technology in the 1980-1990 time frame," he said.

The purpose of the conference was to present a status report on the Shuttle Program.

According to Robert F. Thompson, Shuttle Program manager, the first manned orbital flight is scheduled to take place by the second quarter of 1979. The system is expected to be completely operational in 1980.

The Space Shuttle is a transportation system which will combine the features of "a large vehicle, an orbiting spacecraft, a reentering spacecraft and an airplane,"

Thompson related.

It is designed to carry out various missions in Earth orbit at a fraction of the cost of present systems.

The primary aspect of the cost reduction in shuttle, Thompson said, is that major parts of its system are reusable. "The orbiter is being designed such that in a period of about two weeks, it can be recycled for another flight," he said.

The shuttle will weigh about 4.4 million pounds at liftoff. The overall height of the system is 184 feet. Maximum payload capability is 65,000 pounds.

Another unique characteristic of the shuttle is that you don't have to be an Astronaut to ride in the machine. Practically any healthy individual will be able to withstand the mild forces of acceleration and deceleration experienced when the shuttle is launched and reenters the atmosphere.

It is anticipated that the shuttle will deliver the first women passengers into space.

Thompson said a large number of short duration missions are being planned to conduct Earth resources experiments, continue activities begun on Skylab and begin other projects to benefit mankind.

The shuttle will be able to send most unmanned applications spacecraft into orbit including communications, weather, navigation, Earth resources observation satellites and military spacecraft.

With the shuttle, men will supervise the launch and placement of the satellites and will be able to service and repair them as needed.

The shuttle represents an investment that can provide uncountable dividends. As Young put it, "When we get this baby working, it will be remarkable."

## Arthur S. Flemming Award Presented To Glynn Lunney

Glynn S. Lunney, Apollo Spacecraft Program Manager, has been selected as one of the ten outstanding young men and women in the federal government.

He received the Arthur S. Flemming Award in a ceremony June 13, at the Mayflower Hotel, Washington, D. C. The award is sponsored by the Downtown Jaycees of Washington, D. C., and is named in honor of Dr. Arthur S. Flemming, a former U. S. Civil Service Commissioner and Secretary of Health, Education and Welfare from 1958-61. Dr. Flemming presently is Chairman of the U. S. Commissions on Civil Rights and Aging.

Dr. Lunney's selection was based on his work as Technical Director of the Apollo Soyuz Test Project, which will culminate in a joint U. S.-U.S.S.R. manned orbital spaceflight scheduled for July 1975. His leadership and technical ability are cited as important elements in the outstanding cooperation and progress achieved on the project by the two countries.

The Arthur S. Flemming Award is presented annually to five government employees under 40 years of age in each of two

categories, administrative and scientific. Dr. Lunney will receive one of the scientific awards.

The award was established 26 years ago to recognize those who



**GLYNN S. LUNNEY**

have performed outstanding and meritorious work for the federal government; to attract outstanding persons to federal service; and to enhance appreciation of our form of government and the opportunities and responsibilities that it presents.

Previous Arthur S. Flemming Award winners from JSC are Maxime A. Faget, George M. Low, Christopher C. Kraft, Wesley L. Hjernevik, Joseph F. Shea, John D. Hodge, Neil A. Armstrong, Eugene F. Kranz, Lynwood C. Dunseith, and Harrison H. Schmitt.

## Astronauts To Train In USSR; TV, Photo Coverage Tested

Eight astronauts will begin three weeks of training in the Soviet Union Monday, June 24, in connection with the Apollo Soyuz Test Project mission scheduled for July, 1975.

They include the prime crew, Astronauts Thomas P. Stafford, Vance D. Brand and Donald K. Slayton; the backup crew, Astronauts Alan L. Bean, Ronald E. Evans and Jack R. Lousma; and two support crewmen, Astronauts Robert F. Overmyer and Karol K. Boko.

A ninth astronaut, Eugene A. Cernan, will take part in the first two weeks of the activities, representing the Apollo Spacecraft Program Office.

The training will be conducted at Star City, the cosmonaut training center near Moscow. It will end July 12.

In addition to continuing their studies of Soyuz Spacecraft systems, the astronauts are scheduled to train in simulators and mockups with the Soviet flight crews. They also will continue planning procedures and checklists for joint operations.

U.S.S.R. cosmonauts will start a 3-week training period at the Johnson Space Center on September 9. Joint crew training is planned in each country next spring, also.

A nine man NASA delegation last week traveled to Moscow for two weeks of joint tests with Soviet representatives on television and photo coverage of the

Apollo Soyuz Test Project (ASTP).

The U.S. delegation is headed by Armistead Dennett of JSC. Also included in the U.S. group are Olin L. Graham, L. Kenneth Land, C. Ragan Edmiston and James H. Ragan, all of JSC; Robert J. Shafer of NASA Headquarters; Larkin Niember of Westinghouse; and Alex Semtovsky of Rockwell who will act as interpreter.

The purpose of the visit, according to Dennett, is to evaluate lighting and facilities available for television and photography in the Soyuz spacecraft. Tests will be conducted in a mockup of the Soyuz which closely resembles the actual spacecraft.

During the tests, the functions of the astronauts and the cosmonauts will be performed by technicians wearing flight clothing to simulate actual conditions of the mission.

Combinations of lights, lens openings, and filters will then be tested for optimal reproduction as well as to establish the vantage points, electrical power availability and the positioning of equipment installation brackets within the spacecraft, Dennett said.

ASTP, a test docking mission between the U.S. and the Soviet Union is scheduled to take place in July, 1975 and will include television coverage from both spacecraft transmitted simultaneously to both countries.



ANALYZING DATA—Jeri Brown, Engineering Technology Branch, Spacecraft Design Division analyses data accumulated from Skylab. Analyzing this data will help improve man's environment in future missions. Jeri is assigned to the Man Machine Section.

## Nineteen Receive Environmental Merit Award

Nineteen students from the Clear Lake area last week received the President's Environmental Merit Awards in ceremonies held at JSC's Mission Control Center.

The awards were in recognition of their efforts in carrying out the Clear Creek Basin Water Study Quality Study last summer.

The project is sponsored by the Earth Awareness Foundation, a non-profit, educational and advisory organization founded by astronauts and other members of the aerospace community in 1970.

The students directed and managed the study which is designed to continue each year. They used high school equip-

ment to test more than 500 water samples taken by them over a 10-week period from more than 40 different sample stations in the local basin. Other biological tests were made and the students wrote an extensive report of their scientific findings.

Kenneth S. Kleinknecht, Director of Flight Operations at JSC presented the awards on behalf of the Earth Awareness Foundation. "We in NASA share with these young people an intense interest in tomorrow," he said, "We are deeply involved in studies leading to better understanding of how the earth works."

Senator Lloyd Bentsen of Texas sent his congratulations to the students, "This particular

program is a testament to what our society can accomplish in the area of environmental protection if people are only willing to put forth the effort," he said.

Philip Naeker, project manager; John Crane and Robert Sjoberg, project directors; and Michael Johnston, a student researcher, were given Awards of Excellence during the ceremonies.

Receiving Certificates of Merit were Debbie Bergeron, Lydia Biegert, David Bilodeau, Jody Elliott, Jeff Franklin, William Gilmer, Becky Heider, Robert Jennings, Walter Kemmerer, Patrick Lewis, Joy Lothrop, Peggy Mitchell, Elizabeth Nash, Charles Newell and Kathy Epperly.

## JSC Students Participate In Intern Program

A number of graduate and undergraduate students this summer are participating in an Aerospace Internship Program at JSC.

Assigned to various directorates at the Center, these students will have an opportunity to broaden their backgrounds in space engineering and administrative activities through a combination of academically-related work experiences and a specially designed lecture/seminar series. The program began June 10 and is scheduled to end August 16.

Participants in the Aerospace Intern Program include Kent A. Thomas, JL, University of Houston; Hays Jenkins, AM, Texas Southern University; George Collins, EA, and Alta Sharon Walker, TF, Rice University; Jack Madison, AH, Texas Tech University; David Johnson, BL, Texas A&I University; Willie Minor, AH, Attus La Vonne Baker, BJ, Richard J. Boatwright, BA and Darrell Simmons, BT, Prairie View A&M University.

Also participating are Alan Mueller, FM and Robert Doucet,

FM, University of Texas; Barbara Davis, BR, Dillard University; Barbara Green, BC, Byron Wing, BB, and Adam Lemieux, BA, Xavier University; Edcar Johnson, AH, Texas A&M University; Nancy Thornton, AP, Robert Leake, BA, David Yeary, JN and Bruce Goodman, JF, University of Colorado.

Summer interns are also working at organizations contracted by JSC including Boeing, G.E., IBM, Lockheed, Northrop, Pan American, Philco-Ford, Rockwell, Sperry Univac, TRW.

## JSC Personality Profile : Jeri Brown

Jeri Brown never even considers the possibility that she may not be accepted as an engineer because she's a woman.

"The only factor is how well I do my job," she says. Radiating this positive attitude, Jeri might be taken for a women's Lib-er. "But that couldn't be further from the truth, Jeri says, "I thoroughly enjoy the responsibilities of a wife and mother.

Jeri is employed in JSC's Engineering Technology Branch, Spacecraft Design Division. She is assigned to the Man-Machine Engineering Section. Currently her section is determining how man perceives his environment or habitability in space.

Jeri says she spends a great deal of time analyzing data accumulated from Skylab. "Hopefully, planners and designers will be able to use the analyses to improve man's environment in the Space Shuttle," she says.

Jeri came to JSC last February when her husband, Nelson Brown was transferred here from Huntsville, Alabama. Nelson is employed by URS/Matrix, NASA contractor. He is also involved in human factors engineering. The Browns live in Timber Cove and have one son, Stacey, five, who will "either be an engineer or won't have anything to do with the field", Jeri jokingly says.

Jeri began her career with NASA in 1966 through a Co-op program at Marshall Space Flight Center. She received a B. S. degree from Florida State University and began a permanent assignment at MSFC in 1969.

While employed at Marshall, Jeri designed a piece of hardware called a "fecal collector seat and urinal" to be used in reduced gravity or in one-g testing.

Following the suggestion of several co-workers, Jeri sought and received a patent on the device.

Jeri finds her work as an engineer interesting and unique, "Working with man in the loop is quite challenging," she says. "Each man is different and his ideas have to be taken into consideration."

Jeri says she enjoys going to "different places and seeing different things." The Browns own a small two-seat airplane and often fly around in the area. They sometimes fly during their vacation instead of driving. "Nelson

is the pilot in the family," Jeri says.

Another enjoyable pastime for Jeri is listening to music. During her high school years, she played the cello in a youth orchestra.

She also enjoys motorcycle riding and stamp collecting. Her collector's hoard includes stamps from within the United States.

Engineer, wife, mother, "How do you handle it all?" Jeri is often asked.

"My philosophy is develop a sense of humor and use it when things go wrong. Laughter shrinks catastrophe and takes the sting out of irritation," she said.

## JSC Requests 31 Proposals

JSC has asked thirty-one firms for proposals for a computer complex for the Shuttle Mission Simulator (SMS) to be located in the Building Five training facility. Request for proposals for a Shuttle Mission Simulator had gone out earlier.

Equipment for the complex will consist of a digital computer processing system, local peripheral units, two remote batch stations, interactive display terminals, data channels for interfacing with the simulation equipment, and the related system software package.

The computer complex will be an integral part of the SMS and will be used for the training of crewmen and ground personnel for operating the Space Shuttle systems.

The simulator will include, but not necessarily be limited to, simulation of the Orbiter vehicle, main engines, solid rocket motors, external tanks, support equipment, and activities required to fulfill the Space Shuttle objectives.

Contractor for the Shuttle Mission Simulator complex (SMSCC) will be required to design, fabricate, deliver, install and check-out the computer system and the associated system software package. The SMSCC will then be turned over to the contractor selected to manufacture the SMS.

Awarding of the contract is scheduled for October, 1974 calling for acceptance of the computer complex January 15, 1976.

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AEROSPACE INTERNS—Pictured above are the University students who are participating in the Aerospace Intern Program at JSC. The program began June 10th and will end August 16th.

## ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON TEXAS



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Editor: Janet Wrather Photographer: A. "Pat" Patnesky

## Employees Discover The RECON

"I didn't know this was here!" is a statement heard quite frequently in the JSC Technical Library as Center employees discover the RECON.

Formed from the words "remote console", the RECON is a system which allows its users to rapidly obtain specialized information stored in a computer at the NASA Scientific and Technical Information Facility, College Park, MD.

The Technical Information Facility has collected numerous reports and journal articles on sig-

nificant findings of government, industrial and academic researchers, that are of interest to the aerospace community. As such literature is required, it is summarized and extensively indexed in two abstract journals: STAR: (Scientific and Technical Aerospace Research Reports) and IAA (International Aerospace Abstracts).

By merely pushing buttons, users of the RECON may obtain the title, date, author, accession and contract numbers, and notation of content of any document

described in these journals. The documents range from those that have just entered the system to some that pre-date the NASA collection begun in 1962.

Printed or microfiche copies of these documents are usually available at the Technical Library. However, if a particular item is not on hand, it may be ordered from the central files in Maryland.

Persons interested in using JSC's RECON should telephone the Technical Library at X-4047.



RECON—Robert L. Phelts, Technical Information Specialist, demonstrates use of the RECON, a computerized system designed to assist its users in obtaining information as quickly as possible.

## Roundup Swap-Shop

Swap Shop advertising is available to JSC and on-site contractor personnel. Articles or services must be offered as advertised, without regard to race, religion, sex or national origin. Ads should be 20 words or less, including home telephone number. Name and office code must accompany, but need not be included in ad copy. Typed or printed copy must be received (AP3 Attn: Roundup) by Thursday of the week before publication.

### MISCELLANEOUS

Vivitar 70-210 mm macro zoom lens for Konica new, full guarantee, G. E. magicubes, 3 per packs for \$5, Handley, 482-7041.

Ham radio equipment, Hallicrafters HT-37, \$150, Heath kw linear, \$125, Lindsey, 488-0517.

Jogging/striding treadmill, li nw, \$65, 488-5421 aft 6.

Weight lifting set, Barbell/Dumbbell (215 lb) adjustable weight, Bench, \$35, 334-1370.

Baby things, all xint cndn, stroller, \$10, carseat, \$7, diaper pail, \$1, table seat \$3, Smith, 488-3238.

Le Blanc B flat clarinet, gd gndn, \$75, 482-7073 aft 5.

Walnut spinet piano, almost nw, \$350, Balinas, 946-3907.

Hiking boots (Dunham) sz 7 N, li nw, \$15, Heathway swim fins, sz 5-7, \$5, Welch, 474-2654.

New surge brake trailer assembly, \$32, Ross 481-2121.

Ludwig drums in xint cndn, including bass drum w/ pedal, tomtom, crash cymbal, snare, 334-3058.

6" Craftsman metal turning lathe w/ accessories, li nw, \$400 value for \$250, 334-1869 aft 6.

Amateur radio mini-beam antenna w/ stub tower for roof mounting, nw in orig carton, \$85, Lindsey, 488-0517.

Ludwig drums in xint cndn, incl bass drum w/ pedal, tomtom, crash cymbals, snare, 483-5176.

Antique milk can, \$12, antique crockery jug, \$10, 554-3866.

### HOUSEHOLD ARTICLES

21" bw tv, \$50, Magnovox record player in cab, \$50, baby car seat, \$5, Senter, 482-7835.

Playpen, li nw, \$25, stroller, walker, jumper, \$7, Russell, 477-6393 aft 5.

7000 BTU Westinghouse, nearly new, \$100, 488-2716. 12000 BTU Hotpoint, nearly nw \$195, 488-2716.

Pink Westinghouse elec range, auto oven cntrls, xint cndn, \$75, 471-3598.

Walnut spinet, Mellogrand, xint cndn, tone, Balinas, 946-3907.

### VEHICLES

67 Cougar, xint cndn, air, radio, steel belted radial tires, pwr steer, pwr brk, \$650, Pierce, 331-4627 aft 5.

72 Honda minitrail 70, prfct cndn, \$225, Mike, 946-0275.

71 Comet, 6 cyl, 4-d, air, radio, clean, 3 spd man, \$1200, Hunter, 334-3316.

Camper 8 1/2 ft w/ stove, sink, water tank, ice box, toilet, 5' foam mattresses, closet, cupboards, attached lifting jacks, Cree 481-1158.

57 Chevy-4 dr, nw b/c paint job, nds interior work, Corvette 283 engine, hooker headers 4 spd trans, rear mags, hijacker air shocks, \$500, Johnny, 534-2476.

63 Plymouth Valiant Signet 100, 141 slant 6 engine, nw clutch, 4 mag whs, hijacker air shocks, looks sharp, Johnny, 534-2476.

68 Olds 98 loaded, 75,000 mi, vry clean, \$600, T. Edwards, 2868, 331-4764.

66 MGB GT, new radial, new exhaust, new batteries, xint cndn, 488-2754.

70 Ford Ranger pickup LWB, 31000 mi, auto trans, ps, v8, still in warranty, gd cndn, \$1750, Thomas, 534-2409.

72 Toyota Corolla, 1600 Coupe Deluxe, am/fm stereo, AC, Ziebart-treated, \$2100 firm, 471-2925.

Repo autos, Credit Union will accept sealed bids on 72 Vega Hatchback from June 25-June 27, shown by appointment. Sattelmair, 2066 or 2067.

### PETS

Standard poodle pups, champion-sired, stud service. 946-2806.

### PROPERTY AND RENTALS

El Lago beautiful 4-2 1/2 Spanish house, 2,250 s.f. features large fam. rm. w/ firepl, formal liv, din, rm, covered patio, gas grille, 334-3040.

1300 acre deer lease, 20 mi North huncion, doe permit, feeders, stands, 10 members, incl fam, 488-2182.

Owner wants to trade equity in 3-2-2 in Nassau Bay for small Waterfront house or Waterfront lot plus cash evenings and weekends, 488-1081.

### BOATS

Dolphin 17 sailboat, trailer, other xtras, xint, \$1995, 488-3966.

16' fiberglass ski boat, 40 hp electric start Evinrude OB, bg w/ tilt trailer, extras, vry gd cndn, \$850, Edwards, 331-4764.

IFR equipped Bonanzas for rent, \$20/hr wet, 180 mph cruise; Kelley, 481-3089.

### WANTED

9.8 hp to 14hp outboard motor w/ tank, also 50 hp to 65 hp outboard motor w/ tanj, must be in gd running cndn, 332-1763.

Crewberth on sailboat, available wkends, evenings, experienced, Cox, 5409.

Carpool to JSC from Northline Shopping Center or Northwest Shopping Center or FM 149, Carol, x 4731.

## Bacteria Might Survive On One Of Outer Planets

The likelihood that some forms of life exist on other planets received impetus with the discovery of an Earth organism which can survive and grow in an environment resembling that of the

outer planets of the solar system. NASA biologists at Ames Research Center discovered the rod-shaped bacteria—nameless as yet—in an alkaline spring in northern California

In their research, the biologists—Paul Deal and Kenneth A. Souza—immersed the bacteria in a sodium hydroxide solution 10 times more alkaline than the previous maximum level believed reasonable for growth of living organisms. The bacteria not only survived but are swimming, growing and reproducing in the solution.

Atmospheres of Jupiter, Saturn and Uranus are believed by some scientists to be highly alkaline, although they probably contain ammonium hydroxide rather than sodium hydroxide. Ammonium hydroxide is the main ingredient in household ammonia while sodium hydroxide is the main constituent of caustic soda or lye.

One reason researchers believe that life is possible beyond Earth is that Earth life is incredibly hardy. Algae live in salt pools at 59 degrees Fahrenheit below zero. Bacteria grow near the boiling point in hot springs, the coolant fluid of nuclear reactors and in deep ocean trenches at pressures of thousands of pounds per square inch.



PRESENTING PLAQUE—Astronaut Alan Bean presents Texas Governor Dolph Briscoe a plaque containing a fragment of a rock from the Taurus Littrow Valley of the Moon and a Texas Flag which was carried to the Moon aboard spacecraft America during Apollo XV11. The presentation took place at the Hyatt Regency during the Governor's recent visit to Houston.

## EAA Attractions . . .

### ALLEY THEATRE

The deadline to order Alley Theatre season tickets has been changed to July 15. (The Roundup inadvertently printed April 30 as the deadline in the last issue).

Season tickets for next year's six performances may be purchased for \$19.98.

Checks or charge plans should be mailed with order forms to Harry St. John, EG3 (X2566).

### ABC DISCOUNTS

ABC Interstate Theatre discount tickets will be available in the Bldg 11 exchange store through December 31. The tickets are \$1 (reg \$2-\$3) and will be honored through May 31, 1975. (The only exceptions are when "Road Show" prices are in effect at a theatre).

ABC theatres include Clear Lake, River Oaks, Villiage, Alabama, Shepherd Tower, Parkview, Garden Oaks, and Northshore in Houston; and Broadway, Martini and State in Galveston.

### SOFTBALL STANDINGS

Monday: Blazers 7-0, Stokers 6-1, Keg Tappers 5-2, Mets 5-2, Nerds 4-3, Serv-Air 3-4, TRW 2-5, Base Lions, 1-6, Simulators 1-6, Angles, 0-7.

Tuesday: Marvels 7-1, Chugs 6-2, Grounders, 6-2, Grumman 3-5, McDonnel, 0-8.

Wednesday: Nads 8-0, Bombs 6-2; Dynamos 5-3, Heros 5-3, Philco 4-4, Boas 4-4, Klate-Holt 4-4, Boeing 3-5, Hombres 1-7, Rockwell 1-7.

Thursday: Field 1, Easy Riders 6-1, Vagabonds 6-1, Bandits 5-2, Taft Vits 2-5, Old Timers 1-6, Oreos 1-6.

Thursday: Field 3, Rats 6-1, SoPac 5-2, Streakers 4-3, Disasters 3-4, SB's 2-5, Wizzards 1-6.

Men's Softball Tournament will be held July 12-13.

### WOMENS' SOFTBALL

Tuesdays: Blazers 8-0, NASA #2, 6-2, Lec #1, 5-3, Singers 3-5; Lec #2, 1-7, Philco, 1-7.

The women's Softball Softball Tournament will be held July 9 and July 11.

### TENNIS

The first JSC tennis tournament was held May 4-5 at the recreation area tennis courts. The results were: Men, first place, Gid Weber, second place, Tim Elsea; Consolation, Ken Westerfield; Women, first place, Marilyn Grayson; second place, Wanda Voss, consolation, Cheryl Bouillion.

### TICKET CORNER

Sea-Arama, May-June, adults \$3, children \$2.

Astros, any game, \$2.50, \$3.50. Astroworkd, all season, adults, \$4.25, children \$3.25.

Six flags, all season, adults, \$5.60, children \$2.20.

Lion Country Safari, all season, adults \$3, children \$2.45.

ABC Interstate Theatres until June 30, 1975, \$1.

Disney Magic Kingdom club, free.

### RECREATION CENTER

#### SCHEDULE

June 24-July 7

Softball Leagues, Mon-Thurs, 5:30-8:30 p.m., Karate Club Mon, 6:30-9, Thurs, 5:30-7:30, gym, Judo Club, Mon-Wedn, 5-6:30, rm 204, Bridge Club, Thur, rm 204, 7-10:45, Table tennis Club, Tues, 6:30-9:45, rms 204-206, Ballroom Dance Class, Wedn, 7:45-9:45, rm 206, Men's Volleyball Club, Mon, 8-9:45 gym.

Rec facility will be closed Thurs, July 4.

### MIXED VOLLEYBALL

An organizational meeting for this year's mixed volleyball league will be held June 27, 5:15 p.m. in the Gilruth recreation Center, room 214.

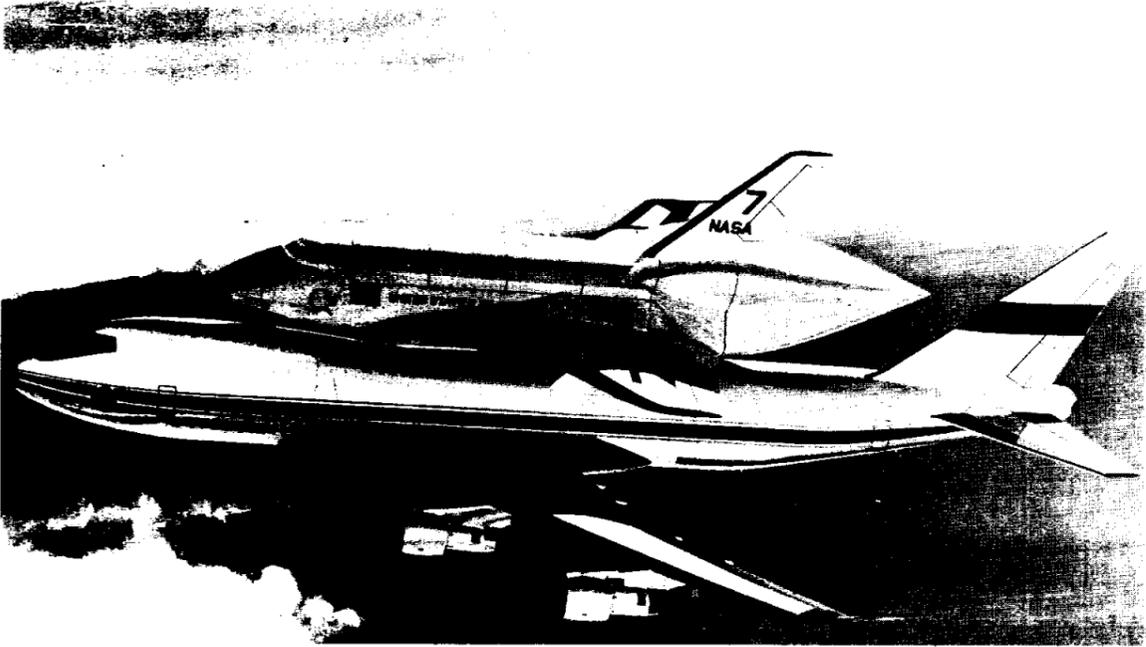
The mixed league will begin July 15 and will run through August.

Employees interested in forming teams should contact Tim Kinkaid Code AW, X-3594 before the organizational meeting.



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ORBITER/747 FERRY—An artist's concept illustrating the 747 Space Shuttle Orbiter carrier ferry mode. Feasibility studies have been made to determine structural modifications needed for the huge 747 aircraft to transport the Orbiter piggyback. This mode will be used by NASA for transporting the Orbiter from the West Coast to the Kennedy Space Center, and for carrying the Orbiter up for horizontal flight tests.

## Materials Processing In Space Beneficial

"In my opinion it is no longer a matter of speculation that materials processing in space presents one of the greatest opportunities ever afforded to benefit mankind," a Skylab principal investigator told members of Congress recently.

Harry C. Gatos, Professor in the Department of Metallurgy and Materials Science at the Massachusetts Institute of Technology, was reporting to the Subcommittee on Manned Space Flight of the Committee on Science and Astronautics, U. S. House of Representatives. Gatos reported on preliminary results of the experiment concerning materials processing in outer space which was conducted on the second Skylab mission flown July 29-September 25, 1973.

Gatos noted that gravity is a major interference in achieving control of materials structures and composition. He noted that most solids are prepared from liquids or melted materials. When these are prepared under the influences of gravity, contamination from containers, tem-

perature differences present as the melted being mixed often lead to undesirable and unpredictable structures and composition of materials.

"Outer space is a truly revolutionary platform for materials processing since all of the adverse effects of gravity are absent," Gatos said.

He cited as an example the growth of silicon crystals used in electronics equipment. Gravity induced convection currents in the crystal melt and other problems of this nature "prevent us, for example, from utilizing effectively silicon and other semi-conductors for solar energy conversion."

"Presently, silicon solar cells are used only to power space missions, including Skylab, with a conversion efficiency of only 10 to 11 percent. Yet their potential efficiency is nearly 25 percent," Gatos said. At 25 percent conversion efficiency in these cells, solar energy could become competitive with energy sources; and with no trace of pollutants, he added.

Eleven different solidification experiments were performed on Skylab. Each was designed to explore specific characteristics as affected by the absence of gravitational forces.

The investigation of space grown crystals is still in its very early stages. "However," Gatos

The investigation of space grown crystals is still in its very early stages. "However," Gatos said, "even the preliminary results are far more exciting than we expected in view of the uncertainties and limitations associated with every 'first experiment'."

In view of the inherent complexities associated with materials processing and understanding, there has been not the slightest doubt in my mind and in the minds of many of my colleagues across the nation that outer space would add a new dimension to materials science and engineering. The Skylab mission has certainly marked a sound starting point," Gatos stated.

## 747 Selected For Shuttle Orbiter Ferry Flights

NASA plans to use a Boeing 747 to transport the Space Shuttle Orbiter and related Shuttle hardware cross country. The 747 also will be used in the planned approach and landing tests of the reusable Orbiter.

This new concept replaces earlier plans to install six airbreathing engines on the delta-winged Orbiter for flight testing and for ferry flights from the west coast to the Kennedy Space Center, Florida, launch site.

A used 747-100 type aircraft will be acquired from American Airlines. Cost of the aircraft is estimated at \$16 million.

The 747 will be modified and equipped with permanent fittings permitting quick installation of an Orbiter or other Shuttle hardware atop the aircraft. Studies have also determined the feasibility of ferrying the 153-foot long liquid propellant external tank atop the 747 aircraft.

Flight profile tests will start immediately on the 747 and continue through November 1974 after which modifications will begin. Ground and flight tests of

the modified 747 will commence in late 1976.

Takeoff weight complete with Orbiter and added fittings is estimated to be 775,000 pounds.

The 747 will have an estimated range of 2,320 nautical miles, sufficient for cross country transport flights carrying either the Orbiter vehicle or other Shuttle hardware.

Becoming operational in 1980, the Space Shuttle Orbiter will be launched vertically from Kennedy Space Center, Florida, on a large expendable liquid propellant tank and two recoverable and reusable solid propellant rocket boosters.



## Assignments

(Continued From Page 1)

development and testing of the Apollo spacesuit and backpack (EMU). Commander Mattingly served as command module pilot of Apollo 16, April 16-27, 1972.

## Criminals May Have Harder Time Now

Criminals who try to destroy serial numbers on stolen goods may have a more difficult time in the future because of a new method developed by a NASA scientist to restore the numbers.

Stanley G. Young of Lewis Research Center has applied a cavitation process to clean out metal which has been smeared into the grooves of a serial number by grinding or filing.

Cavitation occurs when tiny vacuum-like cavities are formed by uneven pressure in a liquid. Cavitation is usually a problem for engineers, since it can destroy the propeller blades of a ship or the pumps of a space power system.

For serial number restoration, an ultrasonic vibrator generates very high frequency vibrations in water, creating millions of microscopic bubbles.

These cavitation bubbles strike the metal surface on which serial

numbers have been obliterated, at thousands of pounds of pressure per square inch. The particles fill the serial number grooves, which are weaker than the surrounding metal and are broken away.

Conventional methods of restoring serial numbers involve chemical or mechanical treatment such as grinding, polishing or etching. Sometimes these methods obliterate remaining traces of the numbers.

No prior treatment of the metal surface is required with the ultrasonic cleaning method. The high frequency vibrations themselves, through the cavitation process, etch out the metal in the grooves.

"The feasibility of this technique as a low cost tool for crime laboratories has been clearly demonstrated," Young said. A machine to generate ultrasonic vibrations can be purchased commercially for less than \$1,500.

## NSA Chooses Secretary Of Year

JSC employee Carol Jean Smith has been selected as Secretary of the Year by the Clear Lake Chapter of the National Secretaries Association (NSA).

The criteria for selection of Secretary of the Year includes educational background, business experience, NSA activities, poise, personality, and human relations.

Carol has 18 years of secretarial experience with the government. Prior to joining JSC in 1968, she was secretary to Brigadier General John Kenney, Assistant Commandant, U. S. Army Artillery and Missile School, Fort Sill,



CAROL SMITH

Oklahoma. Since that time, she has been secretary to Phillip C. Glynn, Chief, Structures Branch, JSC.



POND CLEANING TIME—In the photo above, employees are busy cleaning one of the ponds at JSC. The ponds contribute significantly to the attractiveness of the Center.