

ASTP Groups Meet

Meetings of the five United States-Soviet Union joint working groups involved in the Apollo-Soyuz Test Project began Thursday, March 15, at JSC.

Up to 47 Soviet scientists and engineers will spend approximately two weeks at JSC to continue activities directed toward a cooperative manned mission in earth orbit in July 1975.

The visiting delegation is headed by Prof. Konstantin D. Bushuyev, Soviet technical director of the project, and includes two cosmonauts, Vladimir A. Shatalov and Aleksey S. Yeliseiyev.

The U. S. group will be led by Dr. Glynn S. Lunney, U. S. technical director for ASTP.

Operational aspects of the joint space mission will be emphasized, including inflight experiments, sequence of crew transfer between spacecraft after docking, communications between control centers, and mission personnel training. Documents exchanged since the last meeting will be reviewed.

Joint working groups cover the following five areas: Mission Model and Operational Plans, Control and Guidance, Docking Mechanism, Communications and Tracking, and Life Support Systems and Crew Transfer.

The last meeting of the full delegation was at JSC in July 1972. Several of the individual working groups have met here and in the Soviet Union since that time and the technical directors have maintained regular communications.

Astronauts Thomas P. Stafford, Vance D. Brand and Donald K. Slayton were recently named as the prime U. S. flight crew for the mission. The Soviet Union has not yet announced flight crewmen.

Recreation Center Near Completion

It is contemplated that the JSC Recreation Center, originally scheduled to be completed by March 3, will be ready by May 5, if weather permits.

Delays in construction occurred due to much rainfall and several minor modifications, the main one being the addition of an auxiliary building for the maintenance supervisor.

The recreation facility is being built by the Employees Activities Association (EAA). It will be available for various Center functions.

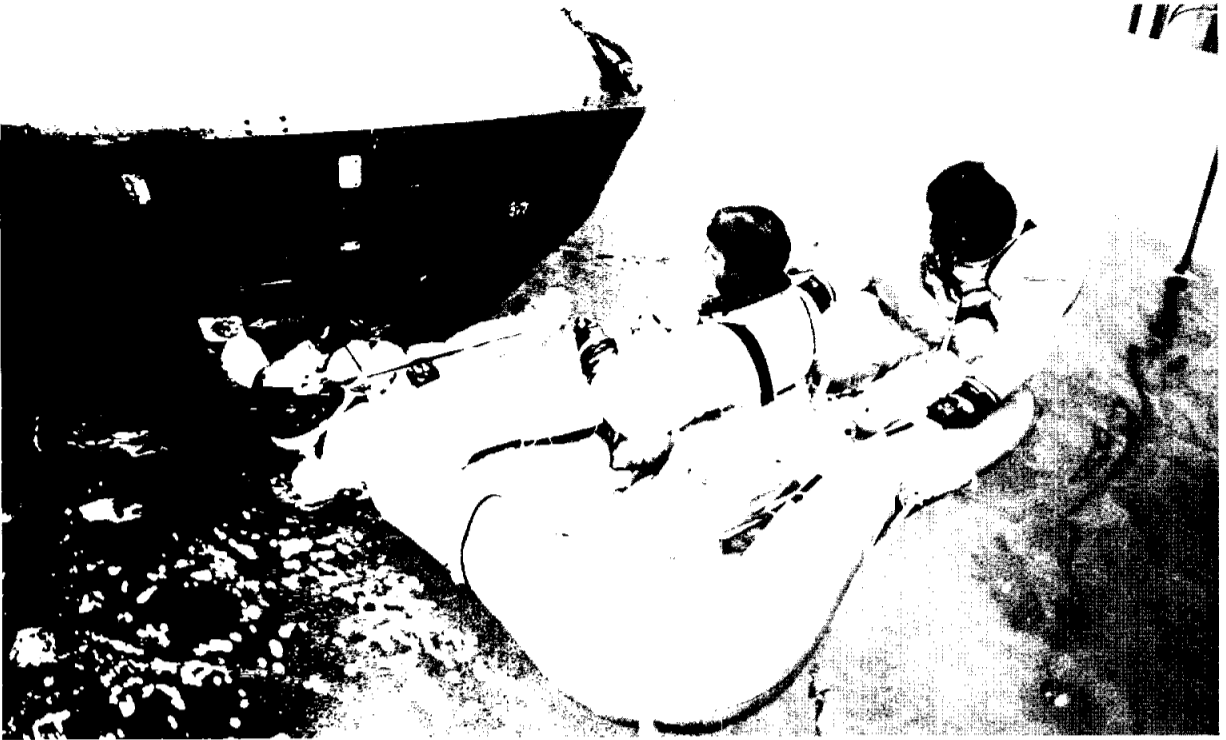
The kitchen will be capable of serving 500 to 600 people and its two major open areas will be able to accommodate easily that many at banquet tables.

The two-story activities building includes nine club rooms, the smallest 14 by 16 feet and the largest 30 by 30.

It also contains a 60 by 105 gymnasium to be marked for basketball and for volleyball, and a 50 by 100 assembly area with a suspended projection booth.

Two 510 square-foot locker rooms adjoin the gym, and balcony space overlooking the court provides standing room for 50 to 100 spectators.

The two floors feature a lounge, restrooms and storage space. The assembly area also



WATER EGRESS TRAINING—Preparing for Skylab 1, Astronauts Conrad, Weitz and Kerwin are undergoing a water egress drill. This drill trains the astronauts to protect themselves in the event their bags do not work during the recovery phase of Skylab 1.

Apollo 17 Results Discussed at Lunar Science Conference

The Fourth Annual Lunar Science Conference ended last Thursday. The final day of the conference was devoted to the results from last December's Apollo 17 mission. "Avalanches on the moon" was one of the topics under consideration.

Apollo 17 landed near a large landslide, allowing scientists to examine closeup photographs of the feature and to probe samples picked up at the base of the slide.

Dr. Keith A. Howard of the U. S. Geological Survey office in Menlo Park, California, said, "The lunar avalanches can be compared with large high velocity rock avalanches on Earth, many of these terrestrial avalanches rode out far beyond the base of the slope." This seems to indicate that something has been cutting friction.

"... On the moon, we don't

know what that is," Howard said. The geologist suggested that perhaps on the moon, some gas within the lunar soil is released during the slide, thus cutting the friction.

Or, he added, perhaps rapidly moving rock particles overcome friction by themselves. Howard stated, "We are going to have to decide pretty soon which it is." He said that the Apollo 17 samples will be searched for any evidence of fluids.

Howard stated that he has found about 50 lunar avalanches from photographs taken in lunar orbit by Apollo spaceships. Most of the avalanches are too small to calculate the efficiency with which the material moved downhill.

Many sophisticated instruments were trained at the lunar

surface. One Apollo 17 instrument practically conducted an atom-by-atom search for evidence of a lunar atmosphere. Although the moon has no atmosphere, traces of three gases, argon, neon and helium were found.

Dr. John H. Hoffman, associate professor of physics at the University of Texas at Dallas said that only argon appears to have been generated from the moon's interior.

Apparently, the neon and helium were deposited by the solar wind.

Hoffman estimated that at night, the lunar atmosphere consists of approximately 300,000 molecules of gases in a cube of space a little more than one fourth of an inch.

The same space on Earth, he said, would contain 10 quadrillion molecules. If these molecules were lined up end to end, Hoff-

(Continued on Page 3)

MFA Replaced

The "Manned Space Flight Awareness (MFA) Program" has been replaced by "NASA Aerospace Awareness Program" (NMI 1700. 3A).

Dale D. Myers, Associate Administrator of Manned Space Flight, NASA Headquarters, said, "While MFA is encompassed by the larger scope of the new Aerospace Awareness Program, I am most desirous that its identification and emphasis not be lost and that it continues as a healthy and viable part of Manned Space Flight activities."

MFA activities are being expanded to include the larger scope of the revised NMI. Included are

(Continued on Page 3)

German Med Officer on Tour of Duty

Lt. Col. Edward Burchard, medical officer with the German Air Force, last week began a two-year tour of duty with JSC.

Assigned to JSC's Flight Medicine Section, Dr. Burchard, along with several foreign aerospace doctors, will work with U. S. scientists on Skylab. The doctors' respective countries finance the assignments; there is no charge to NASA.

A graduate of the University of Frankfurt, Dr. Burchard received his doctorate in Medicine in 1961.

Prior to pursuing the field of medicine, he studied Philosophy and ancient language at the Universities of Mainz and Munich (1949-1955).

Dr. Burchard joined the German Air Force in 1962 and was the first German officer to go

into Jet-Pilot-Training. Now on a flying status as Senior Pilot, he has a total flying time of more than 1300 hours.

From 1965-1971, he was on the staff of the GAF Institute of Aviation Medicine and head of the Physiological Training Unit.

In 1971, he was assigned as Flight Surgeon with a flying unit, Fighter Bomber Wing 32, F-104 G for one year.

Dr. Burchard is a member of the Aerospace Medical Association and a member of the "German Association for Aerospace Medicine."

He is author of several publications and has produced filmstrips on hyperbaric oxygenation and spatial disorientation.

Dr. Burchard is married and has two daughters, aged two years and three months.



ENJOYING THE SUNSHINE—Dr. Robert Walker, of Washington University at St. Louis (3rd from left) and fellow scientists take advantage of the beautiful weather during the Fourth Annual Science Conference by preparing their presentation on the lawn in front of building 1.

Rock Group Performs At JSC

Captivating an audience of JSC employees and Lunar Science Conference attendees with their enthusiasm, "Up With People" last week presented a kaleidoscope of original music with choreographic staging at the Center's Auditorium 1.

The rock, jazz and country and folk renditions were a preview to the group's performance at Clear Lake High school last Tuesday.

Eugene Cernan, commander of Apollo 17, joined the students on stage at JSC and participated in some of the action. Cernan is on the "Up With People" Board of Directors.

An independent, nonprofit, educational corporation, "Up With People" is designed to combine the best of academics through mobile education and world travel with relevant social involvement.

Musical productions are its principle form of communication, reaching out to people around the globe.

"Up With People" was started in Tucson, Arizona in 1968, by two men who wanted to do some-

thing creative and contemporary with the youth of America and the world. These two men, J. Blanton Belk, President and Donald Birdsall, Executive Vice-President, now oversee an organization with an annual budget of \$2.5 million.

Half of this budget is met through performance revenue; the other half from scholarship gifts and grants.

Since its incorporation in 1968, about 2175 students have participated with the group. Approximately 950 additional students from the U. S. and abroad apply each month.

"Up With People" casts are on the road ten months a year performing in approximately 130 American cities annually. They have performed in all 50 states and at over 900 high schools and colleges.

Three hundred young men and women, 17 to 25 years of age, currently travel in three international casts.

Cast "C", which performed at Clear Lake, will return to Houston to perform at Jones Music Hall, March 28-29.



"UP WITH PEOPLE"—In the above picture, Astronaut Eugene Cernan joins "Up With People" in a routine during their performance here last Tuesday. Anthony Calio, (below), Director of Science and Applications, thanks the group for their appearance.



Support Services Contract Awarded

NASA recently selected the Alpha Building Corporation, Houston, Texas, for negotiation of a contract to provide minor construction and alterations under a support services award at the Johnson Space Center.

The contract will be awarded on a cost-plus-fixed fee basis with provisions for an award fee.

The estimated cost for the service is approximately \$1.8 million for the first year.



ACCEPTING AWARD—Dr. Christopher Kraft, JSC Director is seen accepting an award of appreciation for his participation in Lunar Science Conference. Behind Dr. Kraft is W. R. Muehlberger, U. S. Geological Survey Department, who presented the award. Also receiving awards were Dr. R. Petrone (right) and Anthony Calio (not in photo).

Essay Contest Now Open

The National Space Club has announced the opening of the 1973 Robert H. Goddard Historical Essay Award competition. Open to any U. S. citizen, the prizes include a trophy of the Robert H. Goddard Historical Essay Award, a \$500 Honorarium and a National Space Club Certificate. The rules of the contest are:

1. Essays should not exceed 5,000 words and should be fully documented.

2. Essays will be judged on originality and scholarship by the Committee for the History of Rocketry and Astronautics of the National Space Club, and its decision will be final.

3. Essays should be received by the Chairman, Committee for the History of Rocketry and Astronautics, by November 1, 1973; the winner, if one is selected, will be announced early in 1974.

4. Entries may be submitted by any U. S. citizen, and evidence of citizenship should be included with essays submitted.

5. The name of the competitor

shall not appear on the essay, and each essay must have a motto selected by the author in addition to the title. This motto shall appear in three places: (a) on the title page of the essays, (b) on the outside of a sealed envelope containing identification of the author, and (c) above the name and address of the competitor inside the envelop containing this identification. The envelop identifying the author will not be opened until the Committee has made the winning selection.

6. Essays and identifying envelopes must be postmarked before November 1, 1973, and mailed in a large sealed envelope marked "Goddard Historical Essay Contest."

7. Essays must be typewritten, legible, double-spaced, on paper approximately 8½ x 11, and must be submitted in duplicate, each copy complete in itself.

8. Essays remain the property of the authors, although the National Space Club retains the right to publish and distribute the winning essays.

ROUNDUP

NASA LYNDON B JOHNSON SPACE CENTER

HOUSTON TEXAS



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.

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Photographer: A. "Pat" Patnesky

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

Gibson 335 Guitar w/ case, super reverb amplifier, cost \$1175, sell for \$800. 473-4777.
Bereita, Al-2 12 ga, skeet gun, recoil pad and ivory bead front sight, xlnl cndn, no malfunction, \$165, McPherson, 334-2906.
Ampeg amplifier, professional model, 7 mos old, pd \$516, sacrifice for \$250 or best offer. Ludwig 4-piece drum set, \$50, 585-2219.

Golf clubs (intermediate, women) xlnl cndn, Spalding D, 3w, 3, 5, 7, 9, p, covers bag, cart, 1 pr shoes, \$40, 471-2419.

Golf clubs (men) xlnl, first flight, D2 reg, from Pro-shop, 4 woods, 9 irons, xlnl, bag/covers, \$325 new (71) approx half price, 471-2419.

Ludwig drum set, complete, li new, \$325, B. Reina, 488-1326.

Portable water purification unit, removes dissolved solids and bacteria from water, operates on water pressure, ideal for boats/campers, 337-2153.

Kodak, M28, Super 8 Movie camera, with zoom lens, \$50, Hal Bishop, 482-2745.

5" Oscilloscope, new Heathkit or Bell & Howell, \$55, T.M. Ward 488-4442.

HOUSEHOLD ARTICLES

Hoover Upright vacuum cleaner with all attachments, \$15, Whitnah, 481-2854.

Livingroom suit, green couch and chair 2 end tables, coffee table, (early American), \$100, dining set, Spanish and wrought iron, i new, \$100, portable b/w tv, \$25, mattress and bx springs, Craig FM/stereo, 8 track radio, new, must sell, Jann Ann, x4623.

Roll-a-way bed, xlnl cndn, \$20, 534-3665.

Fedders central air conditioner, 2 1/2 tons complete, nw compressor, \$150, 643-8944.

Refrigerator, lrg, gd cndn, \$80, 554-7178.

VEHICLES

69 Plymouth, Fury III, 4-dr Sedan, vinyl top, a/c, ps, radio, \$1,195, Richardson, 746-7587.

67 Impala, 2-dr htdp, pwr str, radio, air/heat, runs well, \$750 min offer, 482-7947 aft 6 p.m.

72 Triump, Daytona 500, red, xlnl cndn, Grace, 538-1621 aft 5 p.m.

62 White Dodge Dart sta wgn, radio heater, air, new clutch, brks gd running cndn, \$395 or swap for used camper, Muhly, 471-3762.

67 Buick Skylark, a/c, p/s, AM radio, approx 55000 m, auto trans nds work, \$400, Sueicar, HU 3-5121.

67 Datsun 2000 convertible, 150 hp. (2 Solex carburetors, \$750, 481-3952.

70 Ford XL convert, pwr str, brks, auto, AM/FM stereo, \$1600 Legendre, 333-2976.
72 Olds Custom Cruiser (98) 9 pass, fully equipped, xlnl cndn, Warren, 331-3225.

68 Fiat 850 Spyder, new top, clean, 30 plus mpg, \$700 or bst offer, Gunter, 334-1650.

70 Ford Ranger, 1/2-ton, 360 V-8 engine, air, heavy duty suspension, radio, trailer mirrors, wi or without fiberglass shell, 483-0186.

64 Grand Prix, ar, pwr, gd cndn, \$495, 334-1110.

68 Chev Malibu, 2-dr, nuto, pwr, air, radio, nw tires and shocks, xlnl cndn, \$1050 aft 6 p.m. 471-4760.

62 Plymouth Fury, it runs! best offer, 337-3352.

64 Chevelle 4-dr, air, auto, pwr str, gd cndn, 60,000 mi, \$600, Arnold, 483-6321 or 481-2890.

70 Chev 1/2-ton pkup, V-8, stan tran, fact air, camper shell, xlnl, \$1950, O. L. Jones, 944-2124.

64 Falcon Futura, 4-dr Sedan, air, radio, auto, \$100, Gordon, 944-4742.

66 Mercury Comet 2-dr htdp, pwr, str, air, lw mil, clean, \$600, 334-1881 aft 5 p.m.

72 MGB, radio, heater, mag wheels, 6,000 mi, 495-0585.

69 Suzuki TC 305, rebuilt engine, nw paint, \$400, 334-3471.

71 Chevy Corvette Conv., xlnl cndn, 457 engine, FM/AM, A/C, lug rack, white or black top, 474-2369 aft 5 p.m.

65 Impala Station wagon, clean, tuly equipped, air, pwr seats and windows, \$750 534-4045.

70 Pontiac Catalina 2-dr ht, air auto trans, p/s, clean, \$1795, Hamner, 337-2153.

68 VW, radio, 2-rear wide-track tires, new upholstery, \$575 (firm) B. Reina, 488-1326.

70 Ford Maverick, xlnl gas mileage, gd tires, engine in top cndn, will sell below dealers price, Cornelius, 575-1248.

68 Firebird conv, 350 V-8, air, pwr, s/b /top, Michelin Stezz radials, numerous recent parts, \$1350, Ream 488-0992.

72 Celica, st, ar, mags, 15,000 mi, slitz shifter, xlnl cndn, \$2,475 or best offer, Barry 334-4390.

Winebago, 1971, 22 feet in xlnl cndn, \$8,200, 334-2733 aft 6 p.m.

65 Pontiac, Star Chief, gd 2nd car, \$295, 334-2206.

Honda 70 trailbike, gd cndn, \$175, 334-2206.

72 Honda CB 500, 2,000 mi, wi helmet,

Ed Gibson, 483-2311 or 333-3912.
70 Rupp Scrambler, xlnl ndn, 12" spoke wheels, front/rear suspension, \$75, 643-8944.

72 CZ-JAWA, 175 cc, xlnl cndn, set up for trail or dirt, original street equipment in box \$375, 643-8944.

WANTED

Spanish or contemp, 4x2 1/2x2, Oakbrook West or equiv, Bullock, 774-6602.

Used trailer or camper in \$500 range, no pop ups, also used utility trailer in \$100 range.

69 Camaro, trashed out or burned, John Hendrickson, 944-5226.

Need ride to and from JSC, work from 8:30 - 5:00, live near U of M, Richardson, x 6156 or 921-7565 evenings.

Electric guitar for beginners, Mayhew, 333-3291.

PROPERTY AND RENTALS

Blue bonnet country-large golf course lot, long term financing available by owner, \$13,500, 482-3989 aft 5 p.m.

4 bdrm, 2 baths, c/a/h, built-ins, draped, fully carpeted, fireplace, fenced, 488-4451 after 5 p.m.

Metrotec stereo graphic equalizer, factory wired, warranty, prfct, \$75, 488-3966.

CLC-Oakbrook 3-2-2, 6% loan, Oakbrook 202 plan, paneled family room, carpeted all over, 2100 ft, freshly painted, \$34,900, Doherty, 488-0182.

Seabrook, Miramar, emaculate, 4-2-2 Brick, must sell, make offer, Newman, 474-3497.

Beach House, W. Galveston Island, 2-2-2, cent air, private dock, cmpltly furnished, reasonable rent, Harvey, 621-5311.

Nassau Bay, 3-2-2 1/2, new carpet and interior paint, fireplace, blt-ins, living, dining and family rooms, detached garage w/ utilit room, wooded lot, 474-4329.

League City (Pecan Forest) 3-2-2 electric, 1600 sq ft, fenced yd, no lease required, (rent) 488-3353, 333-2880 evenings and wkends.

Nassau Bay, Spanish, 4-2 1/2-2, 2500 sq ft, court yd, screened back patio, fenced bk yd, 7 yrs old, 488-3353 days, 333-2880 evenings, wkends.

Lot on Lake, Conroe in Lake Conroe forest, gd for investment or permanent resident, \$8500, Joan, 626-0487 aft 6 p.m.

Custom home in pines, private park, bayou access, fenced carpeted, built-ins, 2 patios, a/h, shop area, easy access to freeway top cndn, 534-3665.

6 unit apartment complex, all rented, gd income, lw dwn pymt, 337-3259 or MI 9-5737.

PETS

Free puppies, 1 male, 3 females, mutt varieties (terrier); 2 fuzzy-wuzzies, 2 slick hair, Ext 4241 or 332-1815 aft 5 p.m.

7 yr-old reg quarter horse and gear, guaranteed sound, not a child's horse, \$350, 585-6895.

8-week-old pups, \$5, 3 males, 1 female, mother Dachshund and beagle, 488-2150.

LSC

(Continued From Page 1)

man indicated, they would more than stretch from Earth to Moon and back.

Northrop Employee Avoids Injury

All hats are off to Jesse Garcia, Northrop-Houston employee, for reading and heeding the safety warning label attached to a can of paint remover before opening the can.

The label stated the usual Federal Stock nomenclature and included a sentence advising the user to wear adequate safety equipment while using the material.

Garcia donned safety goggles and removed the cap from the can exposing the inner seal. A few seconds later, the inner seal blew out with enough force to strike Garcia on the knuckles of his right hand, giving him small

JIMMY WARREN BOWLING LEAGUE 3-8-73

Team Standing	W	L
Ascenders	51	41
Spoilers	52	40
Jokers	56	36
Hexes	54	38
Ball Busters	53	39
Strikeouts	51	41
Pin Pounders	50	42
Clowns	45 1/2	46 1/2
Chokers	43 1/2	44 1/2
Mixers	41	51
Team No. 9	37	51
Fabricators	36 1/2	55 1/2
Alley Oops	36	56
Hertz	33 1/2	58 1/2

INDIVIDUAL SCRATCH HIGHS

Games	Name	Set
226-278	Larry Keyser	673
203-235-215	Ron Durkee	653
266	Dan Kennedy	621
225-203	Don Gross	617
234	John Sargent	603
235	Ron Tunnicliff	600
234	Mike Bankey	
206-233	Henry Kaupp	592
231	Pete Petersen	-
225	John Belan	-

MFA

(Continued From Page 1)

the expansion in the Shuttle Statement of Work and initiation of a pilot program for in-house operations at MSFC in the Quality and Reliability Assurance Laboratory and in the Product Engineering and Process Technology Laboratory.

Both cost and effectiveness of the expanded implementation are being considered, Myers said.

Upon completion of the pilot program (around May 1), the results will be presented to the Manned Space Flight Management Council and consideration will be given to further implementation within Manned Space Flight.

"If further implementation proves warranted," Myers stated, "it is my intention to initiate a NMI to specifically cover the MFA Program and its relation-Program."

"In the meantime, let us continue the good work we have going in the MFA with full recognition and identification of the program through decals, badges and individual awards."

JSC-LSI Sponsor "Mars" Seminar

JSC and the Lunar Science Institute will jointly sponsor a seminar—"Mars: The view from Mariner 9" which will be conducted by Dr. Carl Sagan, March 24, 1973 from 8:00-9:30 p.m. in the Center's Building 1 auditorium.

Dr. Sagan was actively involved in the scientific mission planning of the U. S. project to orbit a satellite (Mariner 9) about Mars. He is also actively pursuing the scientific implications of the photographic and remote sensing data obtained from the Martian missions.

These implications include: transient rivers and dense atmospheres; possibilities of Martian life, growth and decay of the Martian dust storms; and Martian weather observations as an aid to understanding the earth's weather.

Dr. Sagan's lectures will be free to the public. However, since auditorium 1 accomodates only about 600 people, eating must be on a first-come basis. Reservations are not possible.

Photography Group To Meet

The Society of Photographic Scientists and Engineers will meet March 21, 1973, at 7:30 p.m. in the Southwestern Saving and Loan Building, 10814 Nassau Bay Drive at NASA Road 1.

The guest speaker will be Dr. Thornton Page who will present slides of many far-ultraviolet photographs taken from the moon in April, 1972. The slides describe the operation of the Apollo 16 Spectroscopic Camera, and the results of the analysis to date.

Tournaments Held By Chess Club

The JSC Chess Club recently held two tournaments: the Apollo XVII Victory Tourney and the February Open Tornado.

The Apollo XVII Victory Tourney attracted 26 club members. Curtis Erk won the Rated Section of this tournament with a score of 3-0; the Movie Section ended in a tie between Rich Warkentin and David Whetzell (3-0 each).

The February Open Tornado attracted 42 Houston area players. First place in the rated Open Section went to Billy Patteson whose score was 4-0. First place in the rated Booster Section was tied between Joe Garrantano and Jerry Holder with 3 1/2-1/2 each. The novice section was won by Robert Richie with a score of 4-0.

JSCCC is a nonprofit organization sponsored by NASA-JSC and has about 80 members.



FIRE SAFETY DEVICES—Suzette Backus (l) and Marva Mosley (r) learn about the new smoke detector and portable fire extinguisher from Mary Kotanchik (center). These devices are available in the NASA-JSC Exchange store.

I suggest that the theme for the 1973 JSC picnic be-----

Additional remarks: -----

Code and Signature

Mail to PA/Carol Schrader prior to March 30, 1973.

Space to Become Accessible to Non-Astronauts

By the end of this decade, the monopoly that astronauts now have on space flights will come to an end. The Space Shuttle will make it possible for scientists and engineers, men or women, to take their equipment into orbit, conduct experiments, and return to Earth with the collected data.

To do this, NASA envisions a simple pressurized laboratory module carried in the Space Shuttle cargo bay. Called the space lab, it would allow space experimenters to directly participate in missions ranging from seven to 30 days.

BASED ON AIRBORNE PROGRAM

The space lab concept is based on NASA's continuing Airborne Research Program. This program, conducted aboard a Corvair 990 transport and a Lear jet allows scientists to conduct Earth and celestial observations from airplanes with a minimum of cost and red tape.

In some cases, the experimenters have their own instruments installed aboard the airplane and in other cases they use existing instruments to make observations of particular interest to them.

Space lab operations will be much like this. A single set of experimental equipment, meeting adequate but not extreme safety and reliability standards, would be developed in the experimenter's laboratory, installed in the space lab or on an unpressurized pallet attached to the lab, and flown within a short period of time.

2 MODES OF OPERATION

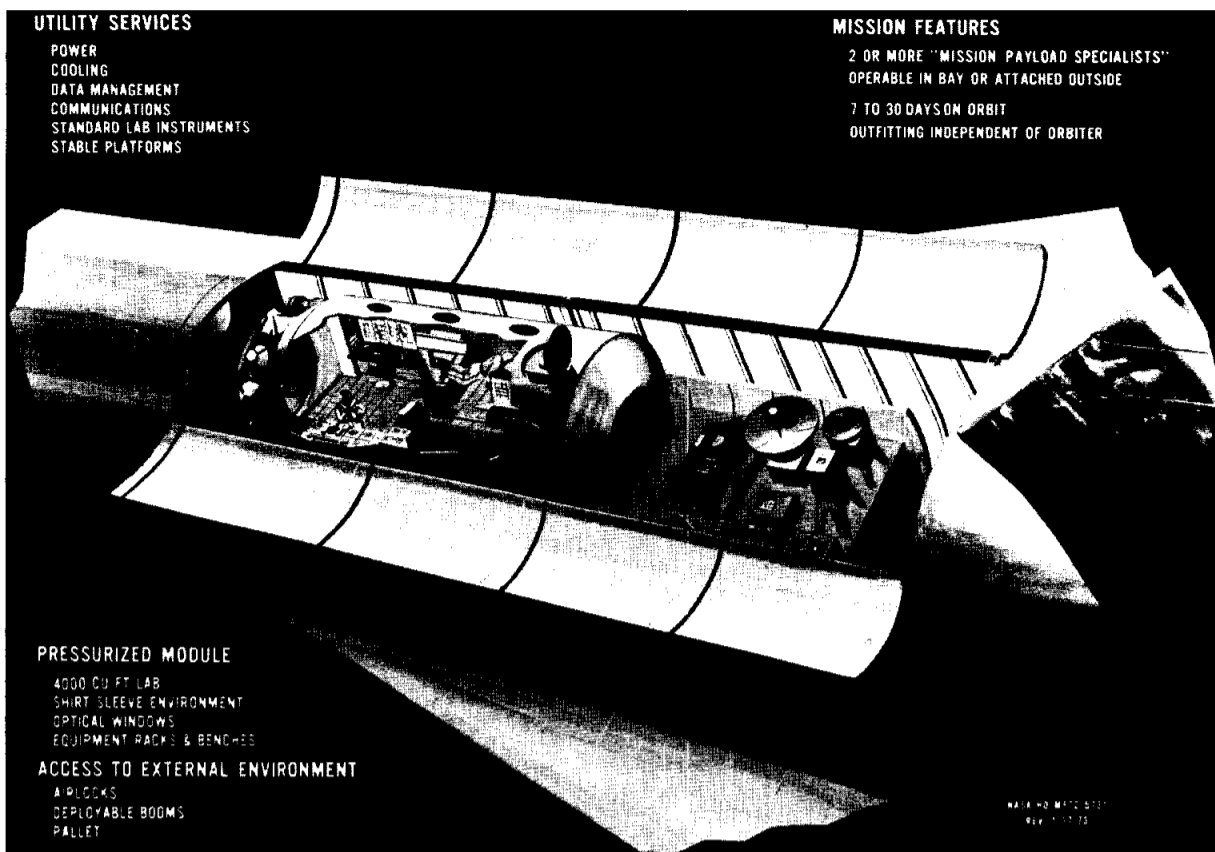
Two modes of operation are conceived. In one mode, the space lab would be outfitted as a general laboratory with the equipment needed to support a broad range of disciplines. The onboard experiments would be changed extensively between flights.

In the other mode, larger, more complex instruments such as telescopes or material processing equipment might be permanently installed in a laboratory module or on a pallet and would be used repeatedly with little or no modification.

The basic space lab will be a cylinder approximately 26 feet long and 14 feet in diameter. It will have a total volume of approximately 113 cubic meters. A 14.7 pounds per square inch atmosphere of oxygen and nitrogen will provide a shirtsleeve environment and will minimize the fire proofing requirements formerly imposed by the pure oxygen atmosphere of earlier spacecraft.

WORK FACILITIES

The lab will be equipped with racks to hold electronic equip-



UTILITY SERVICES

POWER
COOLING
DATA MANAGEMENT
COMMUNICATIONS
STANDARD LAB INSTRUMENTS
STABLE PLATFORMS

MISSION FEATURES

2 OR MORE "MISSION PAYLOAD SPECIALISTS"
OPERABLE IN BAY OR ATTACHED OUTSIDE
7 TO 30 DAYS ON ORBIT
OUTFITTING INDEPENDENT OF ORBITER

PRESSURIZED MODULE

4000 CU FT LAB
SHIRT-SLEEVE ENVIRONMENT
OPTICAL WINDOWS
EQUIPMENT RACKS & BENCHES

ACCESS TO EXTERNAL ENVIRONMENT

AIRLOCKS
DEPLOYABLE BOOMS
PALLET

SPACE LABORATORY—The Space Shuttle will make it possible for scientists and engineers to take their equipment into orbit, conduct experiments and return to Earth with the data. To do this, NASA envisions a simple pressurized lab module carried in the Space Shuttle cargo bay.

JSC Employee Selected as "Operator of the Year"

Mrs. Helen Ragsdale, JSC chief telephone operator, was honored Friday evening, March 9, 1973, as Operator of the Year. The award, presented by the PBX Club of Houston at its annual Boss Night Banquet, is based on personal characteristics, contributions to the club, and participation in club activities. The selection is made by club members and constitutes peer recognition.

Mrs. Ragsdale has been the chief operator for JSC since transferring from the Veteran's Administration in 1962. She has been a PBX operator for 19 years and was also a service assistant for Southwestern Bell Telephone Company for 14 years.

In 1968, Mrs. Ragsdale was chosen Woman of the Year by the Space City Chapter of the American Business Women's Association, an organization of which she is past president.

Mrs. Ragsdale is currently president of the Texas Zeta Nu Parliamentarians, and is a lecturer with the National Association of Parliamentarians, and is a lecturer for the Weight Watchers of South Texas.

ATTENTION!

A meeting for the purpose of organizing the 1973 Women's Softball League is scheduled for March 22, 1973, 5:00 p.m., in building 13, room 108. All teams interested in this league should have a team representative present at this meeting with the authority to vote on rules and schedules.

Recreation

(Continued From Page 1)

has room at one end to serve future theatrical clubs. Both the carpeted assembly area and the epoxy-plastic floored gymnasium double as banquet rooms.

Outdoor portions of the project include a triple tennis court with fencing and lighting, lighting of three presently existing baseball diamonds, and a 5,000 square foot lighted parking lot.

The J. M. Monk Building Co. Inc. of Houston was the successful bidder on the \$488,500 construction package.



MRS. HELEN RAGSDALE



SPECIAL AWARD—The Golden Camera Award, the West German Television award for excellence, was presented recently to Edward I. Fendell for his role in operating the television camera on the moon during Apollo 15-17. The award to Fendell was one of seven presented by Horuz TV Magazine in ceremonies at Springer House in Berlin, West Germany, Fendell is head of the Communication system section of JSC's Flight Control Division.

ment for the experiments. Work facilities, similar to Earth workbenches but designed for zero gravity, will be installed.

Airlocks for exposure of specimens or sensors to space will be provided which on some missions may be replaced with high quality optical windows for Earth or celestial observation. Data recording and limited data processing equipment will be installed as part of the basic laboratory.

Some space missions will require sensors which are too large for the space lab module or which require direct vacuum exposure. These sensors, such as radio astronomy antennas, visible, infrared and ultraviolet telescopes and passive microwave antenna, would be mounted externally on a rigid structure such as a pallet or on the space lab aft bulkhead.

EXTERNAL PAYLOAD

If these external payloads require access, several methods may be available. The simplest method is to extend the sensors through an air-lock in the space lab to make observations and then retract them for maintenance data retrieval or adjustment.

A second method of access is with remote manipulator arms observed and controlled with closed circuit stereo TV. A third method, and most complex, is to leave the lab in a space suit.

On orbital expeditions which do not require the space lab to house monitoring and controlling stations, the pallet can be used directly attached to the Shuttle cargo bay forward bulkhead. If the pallet is designed in modular sections, it could extend the entire length of the cargo bay (18.3 meters, 60 feet) when fully assembled.

The space lab is being designed for a staff of up to four scientists/engineers. For research programs requiring continuous operations, the experimenters will work in shifts.

The crew, including the scientific investigators, will ride in the Shuttle orbiter forward compartment during launch, reentry and landing. Once in orbit, the investigators will enter the space module through an access tunnel at the front end of the cargo bay. They will normally work in the space lab but their living quarters with bunks, laboratory, and galley facilities will be located in the orbiter forward compartment.

On particular missions, it may be desirable to deploy the space lab out of the cargo bay to obtain a more complete field of view or for greater heat radiation. However, in any case, the space lab remains attached to the Shuttle orbiter.