

Space News Roundup

Three named to Mission 51-K

A partial list of crewmembers for the Spacelab D-1 mission (STS Flight 51-K) has been released by NASA.

This announcement names three crewmembers of an eventual eight-person crew. Mission specialists for 51-K will be Bonnie Dunbar, Ph.D., a native of Sunnyside, Washington, and Guion S. Bluford, Jr. (Colonel, USAF), of Philadelphia, Pennsylvania. One of the three-member flight deck crew will be Pilot Stephen E. Nagel (Major, USAF), Canton, Illinois. NASA plans to have three-member crews share flight deck responsibilities on future Spacelab-type missions.

NASA will name the 51-K commander and another pilot at a later date, and announcement of the European crewmembers will also be made at a later date.

Spacelab D-1 is a dedicated mission purchased by the Federal Republic of Germany. It will involve significant materials science and life science experiments. This mission, scheduled for launch in September 1985, will be the third flight of the Orbiter *Atlantis* and the fourth flight of Spacelab.

The 51-K mission will be the second for Bluford, who served as mission specialist on STS-8 in August 1983. Nagel has also been selected to fly as a mission specialist on STS Flight 51-A in October 1984.

Both Bluford and Nagel were selected to the astronaut corps in 1978. The mission will be the first for Dunbar, a member of the group of 19 astronauts selected by NASA in May 1980.

MacDac and TRW get Station contracts

NASA has selected McDonnell Douglas Astronautics Co., Huntington Beach, Calif., and TRW, Inc., Space and Technology Group, Redondo Beach, Calif., for negotiations that will lead to two parallel Space Station study contracts.

These contracts will be for the development of functional, performance and technology requirements; the definition of system architecture for the Space Station Data System; and the relationship of that system to the overall NASA end-to-end flight and ground information system.

Each contract will be for a firm fixed-price of approximately \$2 million covering a performance period of approximately 27 months beginning in March.

JSC will negotiate and administer the TRW contract and NASA's Goddard Space Flight Center, Greenbelt, Md. will negotiate and administer the McDonnell Douglas contract.

The studies will define the role of the Space Station Data System

and its relationships and interfaces to the Space Station Information System elements. The relationship of the Space Station Information System and the overall NASA end-to-end data system will be analyzed.

The studies also will define the data system to determine the environment in which both user and facility subsystems interface and operate. They will address all avionics and other electrically automated Space Station functions; develop a clear understanding of system functional, operational and interface requirements; identify major cost items to enable effective management decisions and development control; and define a program plan.

Four other companies submitted proposals for the studies. They are: Boeing Aerospace Co., Seattle; General Electric Co., Philadelphia; Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.; and Rockwell International Corp., Downey, Calif.

JSC forming NMA chapter

JSC is forming a chapter of the National Management Association, a move designed to help maintain and improve the management skills of many JSC employees.

The NMA, with over 225 chapters, is the largest management association in the world and has been in existence since 1925. The goal in forming a chapter at JSC is to give employees an opportunity to enhance their managerial expertise through educational, informational and social activities.

"It will help make available some very good training opportunities," JSC Director Gerald D. Griffin said, "and it can help bring a focus to management as a skill. The NMA recognizes management as a science, as an art in itself, and provides the means and techniques to enhance it."

The chapter is seen as a way to reach people in many types of jobs around the center, said Dan Nebrig, Deputy Director of Administration. "It definitely will not be just for people in administrative jobs," he said. "It's for people in all kinds of supervisory capacities, whether

they manage a few people or many, and it's for those who aspire to be managers, who aspire to improve their supervisory skills."

The constitution of the new chapter lists four major purposes: "to develop a professional spirit and understanding of management as a profession; to provide opportunity for development of leadership and managerial skills through practice; to provide opportunity for exchange of ideas and information on management practices; and to encourage the spirit of unity and cooperation among managers at all levels."

The chapter is structured to be non-political and non-partisan. "The chapter is strictly educational and professional, and is much like the local chapter of the AIAA in that regard," Griffin said.

Senior managers polled by Nebrig are very much in favor of the idea, he said, especially with a major new effort, the Space Station, coming to JSC. Meetings will feature a cross fertilization of

Show and tell for 41-C



It was show and tell day for the upcoming 41-C Solar Max repair flight when members of the news media were briefed on the mission recently. Paul Bailey, a Manned Maneuvering Unit training instructor, seems to be exhorting praise for the device as he briefs the press, above, while below, Carlos Byars of the Houston Chronicle gets a first hand demonstration of the power screwdriver to be used for the Attitude Control System and Main Electronics Box changeouts on the Solar Max during 41-C. (Photos by Otis Imboden)



Space News Briefs

CASTING PIT FIRE INJURES 13

Thirteen Morton Thiokol employees sustained minor injuries during a casting pit fire March 2 at the Westch facility in Utah. The fire started about 5 a.m. CST during the last phase of pouring propellant into a Space Shuttle solid rocket motor (SRM) segment. Two SRM segments and the two casting pits they were in were severely damaged. The Marshall Space Flight Center has appointed an investigation board to assist Thiokol in determining the cause of the blaze. Four SRM segments are needed for each complete solid rocket booster, or eight for each flight set. Thiokol currently has four complete flight sets on hand. There are an additional thirteen casting pits available, and since only about half of these are needed to support the current production rate, officials see no significant impact to the SRM production schedule.

LANDSAT 5 LAUNCH IS SUCCESSFUL

Landsat D' (D-Prime), now Landsat 5, was successfully launched into polar orbit on a Delta 3920 on March 1. Separation of Landsat 5 from the Delta second stage occurred at launch plus 59 minutes. The UOSAT-B spacecraft, a secondary payload on the Delta second stage, also separated successfully. Landsat 5's Multispectral Scanner was activated March 5. Continued systems checkout and orbital adjustment maneuvers are underway and expected to be completed by the end of March. By that time, Landsat 5 should be in its planned 438-mile, circular, sun-synchronous orbit. Transfer of Landsat 5 remote sensing operations to the National Oceanic and Atmospheric Administration is scheduled for April 4.

EARNEST MONEY REQUIRED FOR EACH PAYLOAD

Under a new NASA policy, each Shuttle launch service request must now be accompanied by a \$100,000 earnest money payment. Past policy allowed customers to schedule multiple payloads in a series for a single \$100,000 payment. "This produced a manifest containing many payloads with low launch probabilities and impaired NASA's ability to accommodate customers with well defined launch requirements," a NASA Headquarters spokesman said. Deposited earnest money will now be applied to the first payment for each payload or will be retained by NASA if a Launch Services Agreement is not signed for each payload.

Bulletin Board

CULBERTSON TO ADDRESS AIAA

NASA Associate Deputy Administrator Philip E. Culbertson will discuss the Space Station project during a dinner meeting of the Houston Section of the American Institute of Aeronautics and Astronautics March 29. Culbertson has been with NASA since 1965 and has also served as Executive Director of the President's Committee on Science and Technology. The reservation deadline for the dinner meeting is noon March 26. The evening's activities begin with a social hour at 6 p.m., dinner at 7 p.m. and the program at 8 p.m. The cost for the social hour and dinner is \$7 for members and spouses and \$8 for non-members. There is no charge for attending the program only. For reservations, call Pat at 333-4150; Joanne at 333-2030, x242; Kathryn at 488-5660, x209; or Annita at x3995 on-site.

USERS GROUP MEETS APRIL 14

The Clear Lake Osborn and CPM Group will hold its next meeting from 9 a.m. to noon April 14 at the Gilruth Recreation Center. The group has a public domain library of over 100 diskettes, and features lectures, educational activities and questions and answer sessions at its regular meetings. The group consists mostly of Osborn owners and has grown from 5 to 89 members in the last year. For more information, call Maynard Huntley at x6441.

AEROVAN TO VISIT JSC IN APRIL

NASA's Aerovan, a large traveling exhibit detailing U.S. aeronautical research, will be at JSC April 6 to 8. The large walk-through trailer features nine exhibits that focus on research in safety, energy efficiency, improvements in passenger comfort and other areas of research. Aerovan lecturer Bill Bough will be on hand to answer questions. The Aerovan is based at the Langley Research Center. For more information, call the Public Services Branch at x4241.

NEXT BLOOD DRIVE IS APRIL 5

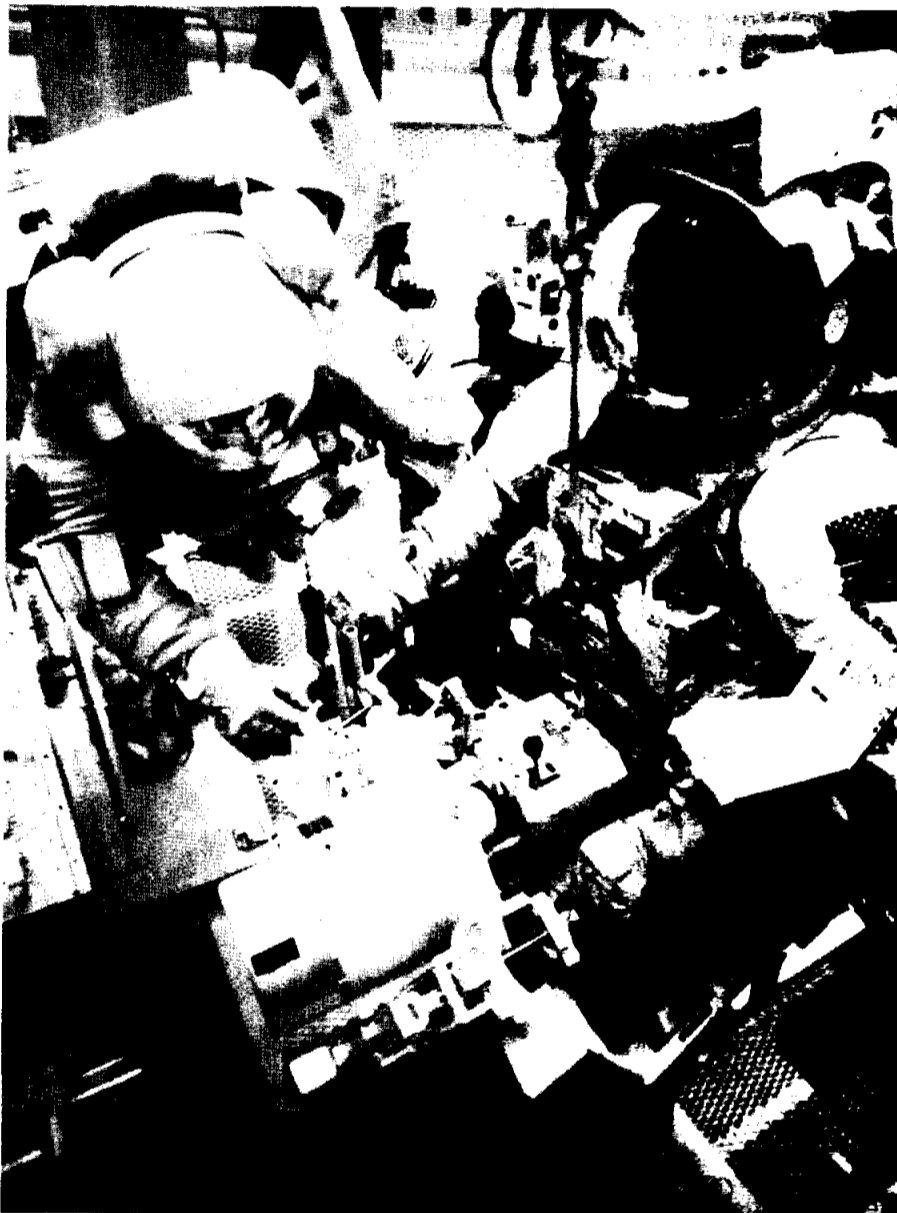
The first JSC blood drive for 1984 will be held from 8:30 a.m. to 4 p.m. April 5 at the Gilruth Recreation Center. For an appointment, call Bob Jones at x6251, Helon Crawford at x5238 or Jim McBride at x6226.

SUMMER DAY CAMPS TO BE HELD

The Jewish Community Center of Houston, in conjunction with the Bay Area Social Service Center, will sponsor summer day camps in two sessions this year, all of which will be held at a newly-opened facility at 17300 Saturn Blvd. Session I will be held from June 18 to July 13. Session II will be held from July 17 to Aug. 10. The camps are for children between the ages of 2 and 11. An open house for information and registration will be held from 7 to 9:30 p.m. March 28 at 16811 El Camino Real, Suite 117, in the Alpha Bldg. For more information, call Jeff Biheller at 486-9682.

EAA SPONSORING VACATION GROUP TRIPS

The JSC Employee Activities Association is planning several vacation packages this year at group rates for JSC and contractor employees. The destinations, tentative dates and approximate costs for each trip are: Las Vegas, May 18-20, \$320; Orlando (Disney World and a Shuttle launch), Aug. 7-12, \$520; Hawaii, Aug. 28-Sept. 4, \$870; Hawaii, Sept. 26-Oct. 3, \$915; and New Orleans (World's Fair bus trip), Oct. 5-6, \$100. The prices are based on per person double occupancy, including transportation. Prices will be lower for children. For more information, call Carol Homan at x4331 or Ron Davis at x5954.



Group portraits of one kind or another seem to precede each Shuttle flight as the folks around JSC get ready for another mission, and 41-C is no exception. In this collection of shots, the portraits range from the formal to the adventuresome to the, well, bizzare. At top left, the members of the 41-C crew pose before the Bldg. 9A MMU and Orbiter mockups in this photo by Otis Imboden. From left to right are Robert Crippen, James Van Hoften, George Nelson, Dick Scobee and Terry Hart, better known as Crip, Ox, Pinky, Scobe and T.J. At left, Nelson and Van Hoften practice docking with the Trunion Pin Attachment Device, or TPAD, in the Weightless Environment Training Facility in Bldg. 29. And then there's the photo below. The members of this grim assemblage, the payload team for Solar Max, suggested a photo caption such as "Marching Through Greenbelt," since the picture was taken while they were at the Goddard Space Flight Center reviewing SMM operations and procedures. From left to right are Allison Farley, T. Bruce, Rob Kelso and James Romig.

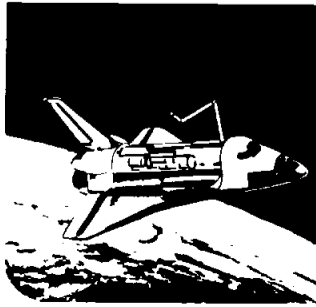


NASA
Lyndon B. Johnson Space Center

Space News Roundup

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Editor: Brian Weir
Asst. Editor: Betty Johnson



Ready to beam up

Bldg. 16 Space Station mockup begins to resemble you-know-what

Somewhere over the mid-Pacific Ocean, America's newly-completed space station floats serenely along at over 17,000 miles per hour. The first of what will be many crews has settled in comfortably, and orbital operations are underway.

The many systems aboard are functioning normally, all save one. In Avionics Bay 1, exhaust temperatures have begun to climb. The space station's internal monitoring system notes the change, and when the temperature climbs too high, alerts the crew with an alarm tone.

Responding to that tone, an astronaut floats through a tunnel into the station's command center, occasionally grasping handholds to direct herself to a row of glowing monitors on her left. An alphanumeric chart with a bargraph on one of the CRTs reflects conditions in the equipment bay, and a single red bar amid the green bars of the chart catches her eye. One glance reveals the exhaust temp in AV Bay 1 is higher than it should be.

The red color alerts her to the abnormal reading, while a yellow bracket on the red bar gives a quick approximation of how far out-of-spec temperatures are in the area of Fan B. A second glance shows her the red-lettered word "OFF" under the heading "FLOW" for Fan B.

She reaches forward and touches the bar on the screen to call up the exact numerical reading of the temperature. She moves to the next screen and, using the keyboard immediately beneath the CRTs, calls up a malfunction checklist procedure. A few more touches to additional diagrams called up on the CRT completes the correction process.

This scenario may or may not be an exact preview of how problems will be detected and remedied on a space station in the 1990s, but it is one possibility. JSC is exploring and evaluating many alternatives for state-of-the-art controls in a mockup of the Space Station Command Center in Bldg. 16. The result could be reductions in the amount of hardware on the spacecraft, the number of bulky manuals carried into orbit and crew training time.

"We will eventually be an integral part of and provide support to the Data Management System advanced technology team," according to Avionics Integration Branch Chief Jon Brown. JSC's head start on Space Station avionics is the result of an enterprising project undertaken in November 1982 by the Simulation and Avionics Integration Division and supported by the Avionics Systems and Man-Systems Divisions of Research and Engineering. The idea was generated by a study project the previous summer.

The Bldg. 16 mockup reproduces portions of two different concepts for the Space Station habitability module known as the Space Station Command Center, or cockpit, and houses some very up-to-date displays and controls. Brown calls it "a starting point for a Space Station systems integration lab." It will

lead to design requirements for the Space Station through development of display formats, evaluation of advanced display and control equipment and support of data management system development, as well as evaluation of the important human factors involved.

Using existing resources and their spare time, Senior Test Director Al Wetterstroem and programmers Jim Duron and Greg Blackburn of the Simulation and Avionics Integration Division have put together the mockup, a composite of portions of designs generated by JSC and Boeing studies.

Just as early designs of the Space Shuttle incorporated the latest electronic controls in place of electromechanical devices built into aircraft of that era, the displays and controls of the Space Station are designed to improve on Space Shuttle counterparts. In place of the needles and gauges customarily utilized in aircraft, the Shuttle relies heavily on alphanumeric displays on monochromatic CRTs for information.

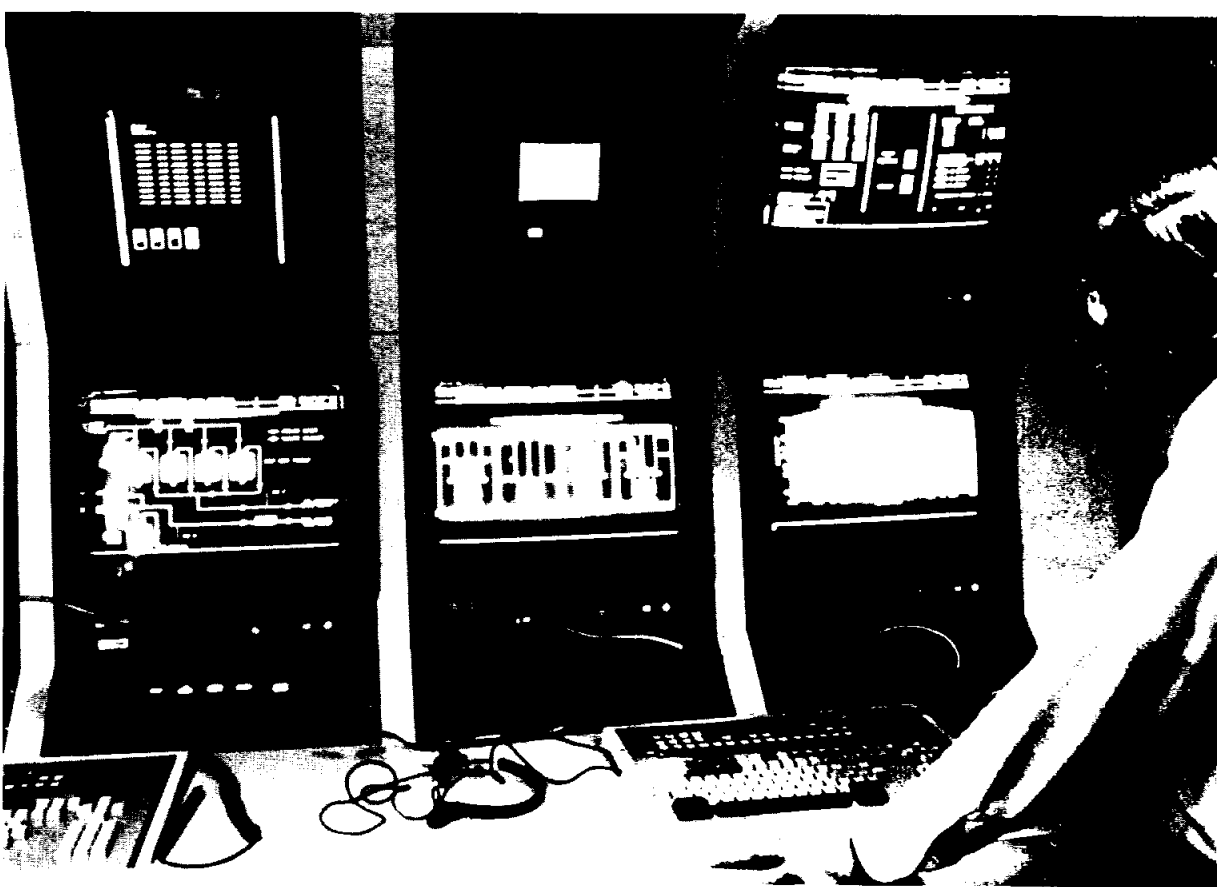
But the Shuttle has 97 panels and hundreds of switches. The next step in display technology, planners believe, is to reduce the number of switches hardwired to control panels by putting them "inside" the electronic displays. Instead of a bank of toggle switches devoted to some specific function, such as controlling an avionics bay, the displays of the future would allow those switches to be called up electronically on a CRT. Activation of a certain switch would be done by touching the CRT itself with a light-pen or even with a finger. The concept is being tested for aircraft as well as spacecraft.

At the Langley Research Center, for example, the latest cockpit simulator for a transport aircraft has no needles and gauges. Instead, the futuristic simulator incorporates graphic representations of those analog indicators—pictures of needles and gauges.

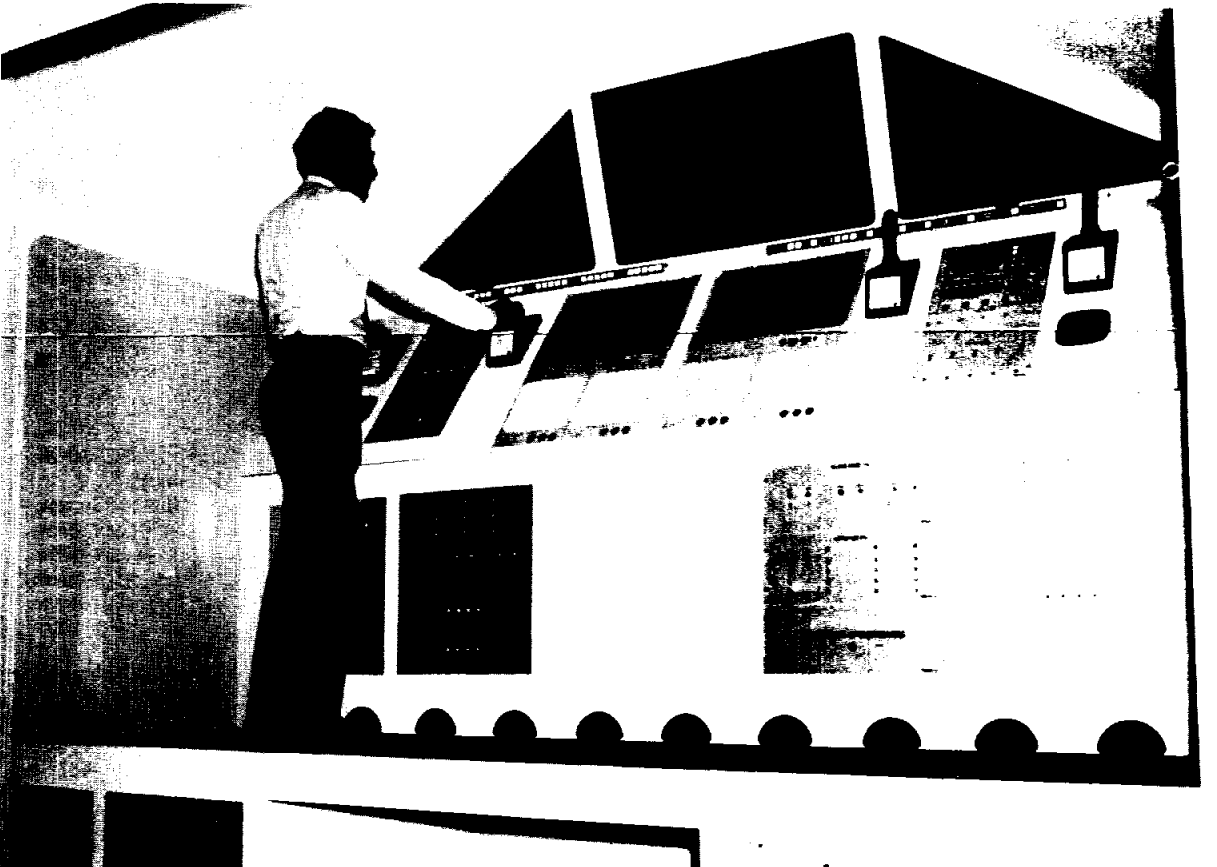
"Analog displays, although they don't provide the exactness of alphanumeric digital displays, are needed to convey at a glance a feeling that everything is running well," Brown said.

Retaining alphanumeric exactness, the Space Station Command Center mockup adds analog displays for quick-look information. Color is used extensively to attract the eye to important information on the screen—as in our example of color bars that turn red for out-of-spec readings. The relative effectiveness of one color over another for letters, numbers, backgrounds and outlines is part of the study. But color is just one method for triggering attention, depending on the severity of a situation. Audible as well as visual alarms will be evaluated in the mockup.

Various types of controls, some activated by voice-command or light-pen, as well as touch panel, keyboard, joystick, track-ball and multifunction programmable dis-



Photos of the two command posts in the Space Station Command Center mockup illustrate how systems and operations may be monitored and controlled. Above, Avionics Integration Branch Chief Jon Brown at the multi-function control board shows how onboard systems status will be reflected in colored displays and controlled by several methods from the same station. Below, Senior Test Director Albert Wetterstroem at the proximity operations control center demonstrates docking controls for free-flyers. (Photos by Andrew Patnesky)



play keys are being studied and evaluated.

To the left of the entrance into the Space Station Command Center Mockup is a wall of screens. Above the row of four CRTs are two other screens, an electropasma panel and an electroluminescent panel which will accommodate, among other things, a ground tracking chart. Numerous displays, menus and diagrams can be called up on the CRTs to determine the status of a system or combination of systems. A series of formats utilizing eight colors in two different intensities provides virtually unlimited sets of information, and eliminates the need for bulky manuals. According to Dick Snyder in Flight Activities, a typical Shuttle mission requires 23 different flight data file books, not counting duplicates and additional manuals for specific purposes, depending on the nature of the mission. Flight 41-C, for example, will carry into orbit 53 different books and 75 to 80 cue cards.

Bulky printed material is not the only thing which can be eliminated from the spacecraft of the future. Instead of switches, which are fixed and cannot be moved out of the way when not needed, graphic representations of switches on a screen serve the same purpose, and one control function can be

replaced by another, as needed. This will greatly reduce the required amount of panel space.

Graphic representations of water levels in storage tanks, for example, could be done with diagrams to indicate open or closed valves. Touching the "picture" of the proper valve on the diagram, using a light pen, speaking, or entering a keyboard command could close or open the valve electronically. Deciding which method is best is the function of the evaluation in progress in the mockup.

Currently, training for rookie astronauts requires 48 weeks of formal training, not including preparation time, and involves study of over 90 workbook lessons, according to Training Division Chief Jim Bilodeau. In addition, each astronaut candidate must familiarize himself or herself with 28 Shuttle Flight Operations Manuals used for reference.

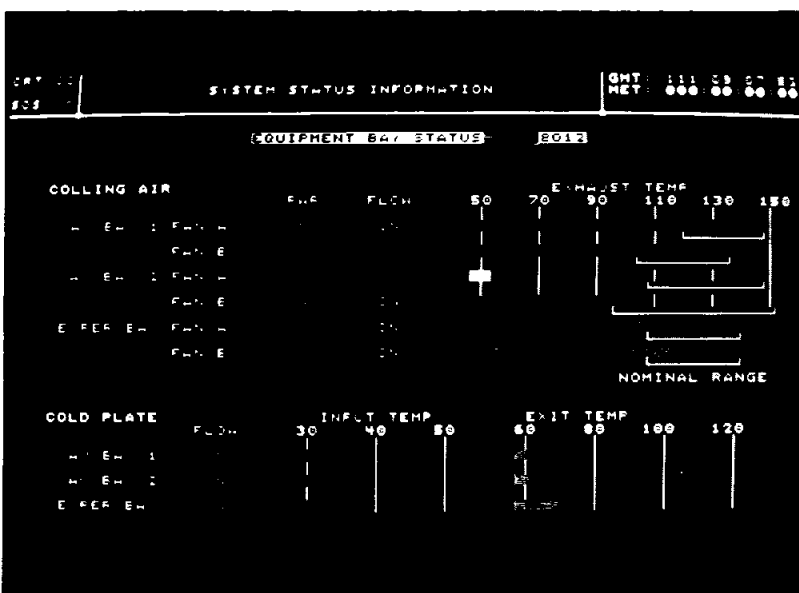
The other section of the mockup has windows facing what is called the External or Proximity Operations Control Station. The view of the remote manipulator system from this slightly elevated two-station post is much the same as the view from the Shuttle's aft windows. A striking difference between the Command Center mockup and the Orbiter's aft station is what seems

to be missing, because no elaborate system of dials, switches or circuit-breakers is needed in the streamlined Space Station Command Center. CRT screens illustrate trajectories for docking with incoming Orbiters and other free flyers such as the Orbital Maneuvering Vehicle. Reprogrammable CRT's with infrared overlay touch panels take the place of several typical Shuttle panels with rotary switches, toggle switches, status lights and barberpole talk-backs.

Much remains to be done, of course. Wetterstroem points out that time, manpower and money are needed at this point for many tasks—for example, working out math models, enhancing displays, improving cursor controls and the voice synthesizer, touch panel and light pen. "We have just scratched the surface," Wetterstroem says. An effort to involve the private sector in an information exchange is underway with various corporations like Grumman, Rockwell, Intergraph and McDonnell Douglas, as well as the University of Houston-Clear Lake.

Wetterstroem will present a paper on advanced display and control activities to the AIAA Annual Technical Symposium on April 26 at the Gilruth Recreation Facility.

—Betty Johnson



One example of possible displays aboard the Space Station is this CRT readout of conditions in the avionics and experiments bays.

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP 3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Property & Rentals

For sale/lease: El Dorado Trace 2-2-2P condo, W/D, fireplace, 5 mi. from JSC, avail. immediately, \$495/mo. plus deposit or \$2,000 down. Call John Lo, x4107 or 482-8457 after 7 p.m.

For sale/lease: Baybrook 1-1 Condo, all Whirlpool appliances, W/D, ready April 15, \$325/mo. or sell for \$34,500. Call 474-3839.

For sale: Beachfront lot, 58'x85', Bolivar Peninsula near Crystal Beach, no restrictions, utilities avail., \$3,500. Call Dave, x6196 or 345-4597.

For sale: 10 wooded acres in hill country of Burnet County, no money down, 12% on 20 year note. Call Steve, x2001 or 482-1832.

For rent: New Braunfels/Comal River 3 BR riverfront condo, completely furnished, 2 days to 1 mo., pre-season rates. Call George, x2285 or 488-4236 after 5 p.m.

For rent: Galveston waterfront condo, fully equipped, pool, tennis, hot tubs, low rates. Call Dale Nussman, 488-7762.

For lease: League City 4-plex, 2 BR, all appliances, security systems, storage, carport, picnic area, \$460/mo. plus \$200 deposit.

For lease: Sterling Knoll 3-2-2, very clean, large fenced yard, avail. immediately, \$525/mo. plus deposit. Call 331-3034 after 6 p.m.

For sale: Sagemont Park 4-2-5-2, new roof, paint and fence, mid-80s, flexible owner financing avail. Call 474-3319 after 4 p.m.

For lease: CLC Baywind II condo, 1 BR, fireplace, W/D connection, new paint, near pool and tennis, \$330/mo. plus deposit, \$100 off first month. Call Richard, 488-8576.

For lease: University Green 3-2-5-2 executive townhome, loft and storage room, vaulted ceilings, fireplace, decked patio, microwave, workshop area. Call C. Price, x2851 or 488-3685.

For lease: Scarsdale/Woodmeadow area 3-2-2 house, covered patio, covered carport, on cul-de-sac, 1,600 sq. ft., nice neighborhood, \$525/mo. Call 280-4241 or 481-9335 evenings.

For rent: New Orleans French Quarter condo, Jazz Festival week April 27-May 4, sleeps four. Call Faye, x2488 or 332-3386.

For sale: 30 acres with 2 BR house, south of Lake Livingston, wooded, spring-fed creek, fenced, house has large den and fireplace, \$85,000. Call 488-4915.

For sale: Austin 2 BR condo on UT bus route, pool, balcony, ceiling fan, all kitchen appliances, \$51,500. Call 482-7910 after 5:30 p.m.

For lease: Forest Bend 2-1.5 townhouse, ceiling fans, 2-story, patio, \$450/mo. Call Betty Craig, x4031 or 1-420-2936.

For lease: 2-2-2 condo near Clear Lake, 1,070 sq. ft., fireplace, vaulted ceilings, appliances incl. W/D, pool, tennis, \$460/mo. on 6-mo. lease or \$435/mo. for 1 yr. Call Linda, x4086 or 480-3771.

For sale: Quaker's Landing/Friendswood 4-2-2.5, fenced, quiet street, excellent condition, attractively priced, 8.5% VA. Call Bob, x6196 or 482-7041.

For sale: 1-week interval ownership on 1 BR condo, Walden on Lake Conroe, worldwide exchange privileges, \$1,500 equity, assume notes of \$154.94/mo. Call Nita, x5081.

For rent/lease: Friendswood 3-2-1, fenced, drapes, fireplace, near schools, immaculate, \$480/mo. plus deposit. Call 482-7546.

For sale: Mobile home, 28'x50', 5 mos. old, refinance balance (\$25,000) and move it. Call Jeanne, x5171.

For lease: El Dorado Trace 2-1 condo, all appliances, security system, pool/clubhouse, covered parking, \$375/mo. Call 937-7606 after 6 p.m.

For sale: 101.44-acre farm, Waco area, fruit, pecan and oak trees, bass ponds, tractor, farm equipment, house, buildings, utilities, \$1,050/acre. Call Don, x4606.

Cars & Trucks

1980 Chevy Monza, 43,000 miles, AC, PS, PB, AM/FM/cassette, excellent condition, \$2,900. Call 488-5877.

1980 Volvo DL, AC, cruise, rear window defrost, power locks, AM/FM stereo, 47,000 miles, \$7,250 or best offer. Call 486-4556.

1974 Olds Delta 88, reliable transport, sound engine, asking \$600. Call Kimbra, 488-2082 evenings.

1976 Ford Granada, 2 dr., 302 cu. in., V8, PS, PB, AC, runs well, looks good, \$1,275. Call 334-3370.

1981 Pontiac T1000, must sell, \$1,800. Call Craig, x3977, 422-0639 or 671-2406.

1979 Mustang Cobra, PS, PB, stereo cassette, sunroof, 39,000 miles. Asking \$3,700. Call 480-7413 after 5 p.m.

1973 Camaro, auto, air, cassette, rebuilt engine, in excellent condition, \$2,150. Call 482-6660.

1978 Thunderbird, 15,000 miles on new engine, AM/FM, AC, PB, PS, PL, \$2,000 firm. Call Kathleen, 481-8271.

1973 VW Super Beetle, new engine, excellent condition, new tires and clutch. Call Leon, x6455 or 331-3369 after 6 p.m.

1974 TR-6, beautiful condition, excellent rubber, AM/FM radio. Call 333-2974.

1982 Ford Bronco, 4WD, loaded, good condition, AC, pick up \$362/mo. payment. Call Winnie, x3471 or Wing, 879-1333.

1981 Mercury Lynx SW, 4 cyl., std. trans., AM/FM/cassette, cruise, AC. Call Virgil, x2156.

1950 Chevy 4-door, 97,000 miles, 3rd owner, refurbished and in excellent driving condition. Need to sell. Call Smith, x4571 or 471-2419.

1981 Plymouth Reliant SE, 2 dr., 2.8 litre, PS, PB, AT, AC, AM/FM/cassette, 47,000 miles. Call Doug, x5975 or 486-0641 evenings.

1982 Datsun King Cab with camper shell, AC, AM/FM, 5 spd., maint. log, excellent cond. Call 479-3566 after 8 p.m.

1978 Subaru, 2 door, 5 spd., full tinted windows, good condition, 49,000 miles. Call 482-6272.

1980 Toyota Celica Supra, 2-door liftback, automatic, leather seats, loaded, immaculate, \$6,500. Call 432-1766 after 6 p.m.

1977 Pontiac Firebird, loaded, excellent condition, \$3,200. Call 482-7546.

1978 Honda Accord, AC, cruise, cassette, 5 spd., \$2,600. Call John Donachy, 486-9500 or 556-6312.

1971 Plymouth Duster, good 225 slant 6 engine, new tires and master cylinder, clean, 2nd owner, \$1,050.

1972 VW Super Beetle, new AM/FM/cassette, new front upholstery, runs well, \$1,500. Call 488-9005, x215 or 488-2733.

1977 Chevrolet Monte Carlo, 305-V8, good condition, new tires, \$1,950. Call 482-1535 evenings and weekends.

1976 Plymouth Volare Premier, 59,000 miles, auto, AC, AM/FM, cloth interior, \$1,550. Call Lori, x2258 or 486-4160.

1980 Mustang Ghia turbo, black leather, auto, PS, PB, AC, cruise, tilt, AM/FM/cassette, sunroof, louvers, alloy wheels, \$5,000. Call 480-4162 after 5 p.m.

Boats & Planes

1980 Pearson 26, 5 sails including spinnaker, 10HP elec. start OB, Bimini, dinghy, many extras, perfect shape, \$21,000. Call John Donachy, 486-9500 or 556-6312.

Ski boat, 14-foot, with motor and trailer, elec. start 65 HP Mercury, adult and child skis, life preservers, ladder, ropes, etc., \$900. Also 20-foot sport shrimp net, with boards and lines, good shape, \$100. Call Speier, 333-2263.

Fly with the Aero Club: The JSC Aero Club flies a fully instrumented Archer II at \$30/hr. wet and a Cessna 152 at \$25/hr. wet. Call Bernie at x2901 or Joe at x6108 for information.

Piper Warrior PA-28-161, IFR, for rent at \$38/hr. wet; Cessna 150 at \$27/hr. wet. Both based at Houston Gulf. Call 946-1750 after 2 p.m. for details.

Q2 experimental aircraft for sale, 100 TT, 140-160 cruise, \$19,500. Call Wood, x2267 or 333-2373.

Cycles

1979 Yamaha YZ100 dirt bike, looks and runs great, many extras, \$400. Call Keith, 474-3507.

1982 Honda 650 Nighthawk, 7 mo. old, \$1,800 or offer. Call 280-0454 after 6 p.m.

1979 Suzuki GS 750. Call 332-8618 after 5:30 p.m.

1979 Yamaha 750, windshield, crash bar, custom seat/backrest, shaft drive, nice, \$1,400 or best offer. Call Frank, x5425 or 332-7383.

1980 Honda 400 custom, like new, 4,000 miles, crash bar, \$900 or best offer. Call Frank, x5425 or 332-7383.

1981 Honda CB900C, Interstate fairing, Krauser luggage rack, burglar alarm, 29,000 miles, excellent condition. Call B. Thompson, 554-6689 before 3 p.m. or x2805 after 4 p.m.

Raleigh 24" bicycle, good condition, \$40; Sears unicycle, needs tube, \$25. Call 474-4574.

Girl's 10-speed bicycle, like new, \$60. Call Ben, x5226 or 649-7715.

Computers

Timex-Sinclair 1000 computer, 16K memory, 3 software programs, manual, first \$50 takes all. Call Bob White, x2759 or 482-7529.

IBM Selectric I/O typer for computer hobbyist, \$50. Call 488-5877.

TI 99/4 JSC User's Group meets at Gilruth Recreation Center at 7:30 p.m., third Wednesday of each month. New TI 99/4 users are welcome. Call 554-2844 for information.

Ten 5.25 inch SS/DD soft sector diskettes, new \$18. For most PCs. Call Lee, x3431 or 486-0385.

VIC computer with tape drive, programmer's guide, FORTH, assembly language monitor, 8K RAM expansion, five games and joystick, \$400. Call Steve, x4395.

Timex-Sinclair ZX81, 16K, full-sized keyboard, 2040 printer, Exetron wafer-tape drive, extra tapes, \$200. Call Kent, 482-1562 after 4 p.m.

Photography

Darkroom equipment: Kindermann tank, reels, leaders, trays, safe-lite, 35-mm slide, mounts, etc., \$25. Call 481-1518.

Canon standard 8mm movie camera, zoom with auxiliary lenses, excellent, \$25. Also Baia 8mm movie editor, \$7.50. Call 488-3966.

Household

Rocking chair, brown wood with seat pad, \$50. Call Steve, x4395.

Two 12'x12' tan carpets, \$50 each; tan rocking chair, \$25; dark brown insulated drapes, \$25. Call 334-4894.

Leopard sofa and chair, large mirror, sofa table, velvet bedspreads, dresser, picture frames, desk, etc. Call Jerry, 474-4310 after 5 p.m.

White canopy bed frame with accessories, \$50. Call 482-2847.

Beautiful 10'x13' braided rug, Indian browns, reversible, used 8 months, \$200 or best offer. Call J. R. Smith, x4571 or 471-2419.

Twin bed, complete, \$40; coffee table, \$10, chest of drawers, \$30. Call 996-9628.

Oval table, 42", with 18" leaf, chrome base with four padded chairs, \$50. Call Lori, x2258 or 486-4160.

Wanted

Want to buy in-dash AM/FM radio for Toyota Celica. Call Wayne, x3601 or 538-4600.

Carpool member wanted from West University/Med. Ctr. area to JSC, non-smoker, 7:50 a.m. to 4:20 p.m. Call Mike, x2688 or Charles, x2504.

Want to buy one used bar stool. Call 482-1910 after 6 p.m.

Want to buy TI programmable handheld calculator, prefer the old LED style. Call Tom, x4645 or 482-9172.

Want to join/form carpool from Pasadena to NASA, 8 a.m. to 5 p.m. Call Marilyn, x3041.

Want roommate to share resort apartment, 2-2, fireplace, on lake, pool, 20 min. from NASA, \$350/mo. plus half utilities. Call Fred, x6226 or 484-5272.

Want roommate to share Piper's Meadow 3-2-2, available May 1, \$300 plus half utilities. Call Nick, 476-6302 days or 486-4164 evenings.

Found

Found 1 pair prescription sunglasses in parking lot between Bldgs. 45 and 32. Call Koki, x3406.

Pets

Lab. pups, 8 weeks, black or yellow, shots and wormed, \$100 each. Call Robin, 946-2805.

AKC registered female Yorkshire Terrier, 3 mos. with all shots, adorable and attentive.

English springer spaniel pups, AKC, liver and white, shots, wormed. Call Mary, x2782.

Dutch rabbits, black/white, pettigraded, 1 buck, 2 does, \$20. Call Bob, x6196 or 482-7041.

Miscellaneous

Toddler's car seat, \$20. Call Ben, x5226 or 649-7715.

Colt CAR-15, semi-auto, mags in box, complete reloading equipment, 3,000 rounds brass, \$600. Call Dave, x6196 or 345-4597.

200 foot coaxial cable, never used, original box, \$20. Call 334-3370.

Tanning lamp, 400 watts, auto timer/shutoff, lamp and stand, \$50. Call 480-6797.

Hand-painted room divider, solid wood construction, flower/bird design, \$95. Call 474-2660.

Recently reconditioned cornet, looks new, case included, \$125. Call 474-2660.

Burglar alarm, 2 infrared scanners, control panel, battery, siren and instruction, 8 mos. old, \$500, neg. Call 480-3612.

Five-piece Max drum set, \$250. Call Bill, x4119.

Gilruth Center News

Call x3594 for more information

Shuttle Marathon — The fourth annual Space Shuttle Marathon begins at 8 a.m. March 31. Check-in begins at 7 a.m. and T-shirts will go to the first 500 who sign up. The cost is \$5 per person or \$8 for late registration. Call the Rec Center for details.

Almost anything goes — Teams may now sign up for this contest, the finals of which will be held during the JSC Picnic May 5. Teams consisting of four males and four females compete in this fun and often bizarre series of contests. The number of teams will determine the starting date of the preliminaries. The cost is \$10 per team and T-shirts will be available. The deadline for entries is April 25. Call the Rec Center for details.

Calligraphy — Learn the art of beautiful lettering in this class which runs from 7 to 9 p.m. for four weeks beginning April 4. Supplies should be brought to class. Cost of the course is \$24 per person.

Lawn and garden care — Improving your green thumb is the idea behind this class, which meets from 7 to 8 p.m. for four weeks beginning April 4. Learn how to control insects, how to select plants and how to drain your lawn and maintain landscaping. The cost is \$10 per person.

Needlepoint — This sampler consists of 11 canvaswork stitches done in Persian wool No. 14 mono canvas. The course is designed for the beginner or those who would like to refresh their skills in basic canvaswork. The class meets from 7 to 9 p.m. beginning April 2 at a cost of \$15 per person.

Ballroom dance — Open to singles or couples, this class covers such steps as the rumba, the foxtrot, the cha cha and the waltz. Beginners will dance from 7:30 to 8:30 p.m., while intermediates will meet from 8:30 to 9:30 p.m., all beginning April 4. The cost is \$12 per person.

Aerobic Dancing — This eight-week session begins March 26 and 27, with sessions meeting from 4:15 to 5:15 p.m. or from 7 to 8 a.m., respectively. The cost is \$55 per person.

Summer volleyball — Registration is now underway for the Rec Center's Friday night and Saturday afternoon mixed leagues. There will also be a Wednesday night mixed league. Registration concludes April 4, with play beginning April 16.

Basketball registration — Summer league basketball registration is now underway through April 6. Tuesday and Thursday play begins April 16.

Game night — By popular demand, the Rec Center will open Friday nights for people to play cards, dominos and other games. Call the Rec Center for details.

Cookin' in the Cafeteria

Week of March 26-30, 1984

Monday: Cream of Potato Soup; Franks & Sauerkraut, Stuffed Pork Chop, Potato Baked Chicken, Meat Sauce & Spaghetti (Special); French Beans, Buttered 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 & Onions, Shrimp Creole, Smothered Steak w/Dressing (Special); Corn, Rice, Cabbage, Peas.

Wednesday: Seafood Gumbo; Roast Beef, Baked Perch, Chicken Pan Pie, Salmon Croquette (Special); Mustard Greens, Italian Green Beans, Sliced Beets.

Thursday: Beef & Barley Soup; Beef Tacos, Diced Ham w/Lima Beans, Stuffed Cabbage (Special); Ranch Style Beans, Brussel Sprouts, Cream Style Corn.

Friday: Seafood Gumbo; Fried Shrimp, Dressed Crabs, Ham Steak, Salisbury Steak (Special); Buttered Carrots, Green Beans, June Peas.

Week of April 2-6, 1984

Monday: Cream of Chicken Soup; Beef Burgundy over Noodles, Fried Fish, BBQ Sausage Link, Hamburger Steak (Special); Buttered Corn, Carrots, Green Beans. 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 & Onions, BBQ Spare Ribs, Turkey & Dressing (Special); Corn, Rice, Broccoli, Buttered Squash.

Wednesday: Seafood Gumbo; Broiled Fish, Tamales w/Chili, Spanish Macaroni (Special); Ranch Beans, Beets, Parsley Potatoes.

Thursday: Navy Bean Soup; Beef Pot Roast, Shrimp Chop Suey, Pork Chop, Chicken Fried Steak (Special); Carrots, Cabbage, Green Beans.

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

NMA

(Continued from page 1)

ideas, Griffin said, not only within the JSC community but from other industries in the Houston area. "We can see how other sectors manage large programs, and hopefully this will provide a broader insight into management as a skill. "Too often in the technical business," Griffin said, "management is a kind of reward put on people who do a good technical job. We need to train people in management just as they were trained for their technical degrees, and this will be one good way to do that." To get the chapter started, a short initial information session will be held beginning at 5 p.m. April 19 in the Bldg. 2 Auditorium and will last no more than one hour.