

Space News Roundup

Puddy takes Flight Crew Operations reins

Returns to JSC after finishing Headquarters tasks

By Brian Welch

Donald R. Puddy has been appointed director of the Flight Crew Operations Directorate (FCOD) at JSC, effective immediately.

He will replace George W.S. Abbey, who is being reassigned as special assistant to Director Aaron Cohen.

Puddy has been detailed to NASA Headquarters in Washington, D.C., since January as assistant associate administrator for space flight. He

will report to JSC in the next few weeks after completing several assignments in Washington, Cohen said. In the interim, FCOD Deputy Director Henry W. Hartsfield, Jr. will be acting director.

Puddy joined NASA at JSC in 1964 as a flight controller monitoring Lunar Module systems for the Apollo Program. In 1966, he became head of the Lunar Module Systems Section, Lunar Module Systems Branch. Three years later, he was

appointed assistant chief of the branch and served as the lead controller for all Lunar Module life support and communications systems during the Apollo 9, 10 and 11 missions.

In the early 1970s, he advanced from flight controller to flight director and served as lead for the launch of the unmanned Skylab orbital workshop in 1973 and as flight director for all three manned missions to the laboratory.

In 1974, Puddy became Chief of the Mission Operations Branch and served as a flight director for the Apollo-Soyuz Test Project. In 1976 and 1977, he served as lead flight director for the Approach and Landing Tests with the Shuttle Orbiter Enterprise, and in 1978 was a flight director for STS-1. He also served as a flight director for STS-2.

From 1982 to 1985, Puddy was chief of the Mission Operations

(Continued on page 2)



Donald Puddy



Ken Ayala (foreground), a visitor from the Houston Lighthouse, feels the surface of the Moon with the help of a relief globe. In the background, Audrey Visor handles a SYNCOM satellite model.

Learning center gives 'feel' for space

A new project designed to help people with visual difficulties understand the size and scope of space exploration has opened its doors in JSC's Bldg. 5.

The Learning Center for the Visually Impaired recently welcomed its first guests from the Houston Lighthouse. The visitors handled models of various satellites, manned spacecraft, an Apollo-type space suit and Space Shuttle foods. They also participated in physics demonstrations on gyroscopic stabilization and mass distribution.

The center, conceived by Center Education Programs Officer Jim Poindexter, is staffed by aerospace education specialists under contract from Oklahoma State University. OSU's Bob Mayfield tracked down most of the exhibit materials.

Poindexter said he first became acquainted with

the need for such a project when Astronaut Judy Resnik's sister brought about 100 visually impaired children to JSC a few years ago.

"We want to let them get a realistic idea of the size and scope of some of the hardware and lunar landscapes—let them share some of the things we take for granted," Poindexter said.

Models have scale human figures on their bases to help convey the relative sizes of the objects. One model allows visitors to feel the miniature astronauts strapped into their couches inside the Apollo command module, he said.

Located in Bldg. 5, Rm. 105A, the center may be opened by appointment. For more information, call Poindexter, x38624, or Shirley Herbst, x38619.

NASA selects contractors for Space Station

JSC and McDonnell Douglas Astronautics Co. will begin negotiating one of four cost-plus-award-fee contracts to design, develop, test, evaluate and deliver Space Station components and systems. NASA officials announced Dec. 1.

JSC will manage Work Package 2, one of four packages that contain

unique but interdependent portions of the permanently manned Space Station to be built in low-Earth orbit in the mid-1990s. Each work package is divided into two phases—Phase I covers the approved elements of the Space Station program and Phase II is an option for future enhancement.

"This starts us on the next phase we've been preparing for—to get the contractor on a 'letter contract' to get to work on the higher priority tasks we need to do at the beginning," said Clarke Covington, manager of JSC's Space Station Projects Office.

"An example of those tasks is a critical review of the baseline configuration, the assembly process and assembly sequence so we can establish them and get them approved by the program office as quickly as possible," he said. "Toward the end of January, we will

begin fact finding. Many people will go out to the contractor's plant (in Huntington Beach) to get an understanding of their revised proposal as a major part of our pre-negotiations work-up."

Covington said JSC hopes to have a final contract in place by August or September 1988.

"We've obviously had a very elated day," said Bob Thompson, vice president and general manager of McDonnell Douglas' Space Station Division, from his Huntington Beach office. "I think it's a very interesting and exciting task. We're very much looking forward to it. We feel very confident we can give JSC the kind of support it's looking for."

Boeing Aerospace Co., Huntsville, Ala., was selected for negotiations on Work Package 1, to be managed by Marshall Space Flight Center. General Electric Co.'s Astro-Space Division, Valley Forge, Pa., and East Windsor, N.J., was chosen for negotiations on Work Package 3, to be managed by Goddard Space Flight Center. Rockwell International's Rocketdyne Division, Canoga Park, Calif., was picked for negotiations on Work Package 4, to be managed by Lewis Research Center.

(Continued on page 2)

Winning Teams

Work Package 1

- Boeing Aerospace Co.

Work Package 2

- McDonnell Douglas Astronautics Co.

Work Package 3

- Astro-Space Division, General Electric Co.

Work Package 4

- Rocketdyne Division, Rockwell International

Employees earn honors for contributing to JSC goals

Forty-eight JSC employees received Certificates of Commendation from Director Aaron Cohen at the Dec. 2 JSC Honor Awards Ceremony in the Bldg. 2 auditorium.

"Each awardee's work represents progress that has led to the success of the Johnson Space Center and NASA," Cohen said in presenting the certificates.

"We are making great progress in returning the Shuttle to safe flight and preparing to embark on

the development of Space Station," he said. "The people honored today have added markedly in fulfilling the goals and objectives of JSC."

Deputy Director Paul J. Weitz helped present the awards, which are the highest JSC honorary awards and are granted to government employees who have made significant contributions to the center's mission and operations.

Each framed certificate bore Cohen's signature, a golden seal

"The people honored today have added markedly in fulfilling the goals and objectives of JSC."

—Aaron Cohen

and a description of the specific achievement for which the individual was being recognized. Recipients were:

Robert G. Alexander, Larry E. Bell, Daniel A. Bland, Donald D.

Bogard, Jeri W. Brown, William C. Brown, John T. Cox, Thomas L. Davies, Ronald D. Dittmore, William D. Drastata, Robert E. Easley, Donald S. Eggers and James S. Evans.

Betty Sue Feddersen, Richard W. Fox, William H. Gerstenmaier, James L. Gooding, Winston D. Goodrich, Sandra G. Griffin, Yolanda Guillen-Burris, Malcolm J. Himel, Jr., Philip C. Johnson, Jr., Kumar Krishen, Richard A. Kuhn,

Martin A. Lewis, Richard V. Lopez, Freda Marks and J. Leroy Luchini.

Sharon J. Martin, David L. Mumme, John E. McIver, William C. Phinney, Barry A. Plante, James H. Ragan, Jose F. Rangel, Mark D. Schmalz, Richard D. Snyder, Robert H. Steele, Diane Trahan, James P. Vincent, Gerard E. Weingartner, David J. Westfall, John F. Whiteley, Richard D. Whitlock, James D. Wilcox, J.D. Williams, Virginia K. Willis and Donald L. Young.

Space News Briefs

Wallops boasts 25 consecutive successes

From launch sites in Greenland, Norway, New Mexico and Virginia, NASA's Wallops Flight Facility has built a "25 for 25" record of successful suborbital rocket launches. The string began March 21 in Greenland with the flight of a Taurus-Tomahawk sounding rocket carrying a plasma physics research payload for Clemson University. The most recent launches were from Norway as part of the Middle Atmosphere Cooperation International Science Program.

Carbon dioxide outflow measured

NASA geochemist David Des Marais of Ames Research Center has made the first accurate measurement of the amount of carbon dioxide flowing from the Earth's interior, a finding that provides insight into climate, plate tectonics and the evolution of life. Des Marais measured about 30 to 35 million tons of carbon coming up from volcanic vents in the ocean, which is more than 90 percent of the global carbon outflow from the earth's mantle. The research supports theories that Earth had a hot climate when life began. Des Marais developed a new method of purifying and analyzing carbon to achieve the most accurate measurements in 40 years of research.

Advanced recovery system studied

Second-phase studies of an advanced recovery system for future launch vehicles will be performed under a \$3 million contract to Pioneer Systems Inc. of Manchester, Conn. and Melbourne, Fla. The studies will evaluate a new system to provide precision touchdown for large, expensive, reusable propulsion and avionics modules. Applications may be extended to orbiting payloads and Space Station logistics. The land-based recovery system would eliminate salt-water corrosion damage and simplify return to launch site. The contract was awarded by Marshall Space Flight Center.

Integrated aircraft test facility to be built

A \$16 million fixed-price contract is being negotiated for construction of an Integrated Test Facility at Ames-Dryden Flight Research Facility to support testing of advanced aircraft and their complex interdependent systems. Negotiations for the facility, which will allow NASA to significantly reduce aircraft systems checkout time and costs, are with Continental Construction Corp. of Las Vegas. The facility will include aircraft test bays, laboratories, office space and associated work space.

Three firms chosen to work on aero-space plane

NASA and the Department of Defense have selected three firms to continue the vehicle technology development portion of the National Aero-Space Plane (NASP) program. Awarded 36-month, fixed-price contracts valued at \$25.5 million each were General Dynamics Corp., Fort Worth Division; McDonnell Douglas Corp., McDonnell Aircraft Co., St. Louis; and Rockwell International Corp., North American Aircraft Operations, Los Angeles. The selection marks the end of the 18-month conceptual design portion of the NASP program, and the beginning of ground testing of large-scale engines and selected aircraft components.

Bulletin Board

Two nights of Christmas dancing planned

The Nick Navarro Orchestra and Sunshine festival will provide music for the JSC Employee Activities Association's annual Christmas Dance on Dec. 11 and 12 in the Gilruth Recreation Center. Social hour begins at 7 p.m., dinner at 8 p.m. and dancing at 9 p.m. Tickets for the Dec. 11 dance and roast beef dinner are \$12.50 a person. Tickets for Dec. 12, which features a prime rib dinner, are \$17.50 a person. A limited number of tickets are available at the Bldg. 3 cafeteria, and each person may buy up to eight. Ticket sales end at 2 p.m. Dec. 8.

Christmas concert features Nutcracker selections

The Clear Lake Chamber Music Society will perform selections from "The Nutcracker" in a free Christmas concert at 11:30 a.m. Dec. 10 in the Bldg. 2 auditorium. Performers will be Steven Wiggs, cello; Beatrice Stanley, violin; Susan Dahlberg, piano; and Dale Gan, vocals.

NASA marathon team seeks runners

NASA and Air Force runners interested in joining the NASA team for the Houston Tenneco Marathon on Jan. 17, 1988, should call Pat Chimes at x32397 to request an entry form and corporate team sign-up information. Volunteers to help at aid stations along the race course also are being sought. An awards dinner and party are planned.

Three new self-study courses offered

The U.S. Office of Personnel Management's National Independent Study Center has introduced three new self-study courses. Course titles are "How to Run a Small Project," "Developing a Budget for a Unit," and "Program Planning and Analysis." Training hours and costs vary. For enrollment information call Freda Marks, x33076.

Conference to address Earth's origin

The origin of the Earth will be considered at a conference being planned for Nov. 30 through Dec. 3, 1988, by the Lunar and Planetary Institute. The Earth's differentiation into physical and chemical reservoirs also will be discussed. Both the geological and planetary science communities are encouraged to attend. The location of the conference probably will be Napa Valley, Calif. For more information, call John Jones, x35319.

Gilruth Center News

Call x30304 for more information

EAA badges—Dependents and spouses may apply for photo identification badges between 6:30 and 8:30 p.m. Dec. 1, 16 and 29.

Weight safety—This is a required course for those employees wishing to use the Rec Center weight room. The class will be Dec. 9 and 22.

Exercise class—Eight-week class meets Mondays and Wednesdays from 5:15 to 6:15 p.m. Dec. 7 through Feb. 1. Cost is \$24.

Aerobic dance—Four week class will meet Tuesdays and Thursdays from 5:15 to 6:15 p.m. beginning Jan. 5. Cost is \$12.

Defensive driving—Course is offered Dec. 19 and Jan. 21 from 8 a.m. to 5 p.m. and costs \$20.

Ballroom dance—Professional instruction in beginner, intermediate and advanced ballroom dancing begins Jan. 7 and runs for eight weeks. Classes meet Thursdays. Cost is \$60 per couple.

Physical fitness—Twelve-week program will be Jan. 4 to March 25 from 11 a.m. to noon or 4 to 5 p.m. All employees and dependents are eligible upon completion of physical exam and maximal treadmill stress test. Call x30302 for more information.

Agency hiring freeze in effect

JSC's authority to hire civil servants has been suspended until further notice due to a sequestration of fiscal year 1988 funds under the Gramm-Rudman-Hollings deficit reduction act.

"We are uncertain as to how long the freeze might last," said Human Resources Director Jack Lister.

To help minimize the impact, JSC Director Aaron Cohen has directed that all announcements and reassignments between directorates and program offices be temporarily put on hold except for

those that are absolutely essential, Lister said. Any requests for exceptions should be sent to Lister.

A memo from NASA Administrator James C. Fletcher stated that: "Implementation of Gramm-Rudman-Hollings will sequester a significant part of NASA's planned FY 88 budget; specifically \$132 million in R&PM (Research and Program Management)..."

"The full impact of the sequestration/deficit reduction actions on NASA programs has not been

determined," Fletcher's memo continued. "Our intent is to minimize any adverse impacts and you should continue to pursue ongoing programs as currently planned and you should continue to accord priority to preparation for the June launch of STS-26."

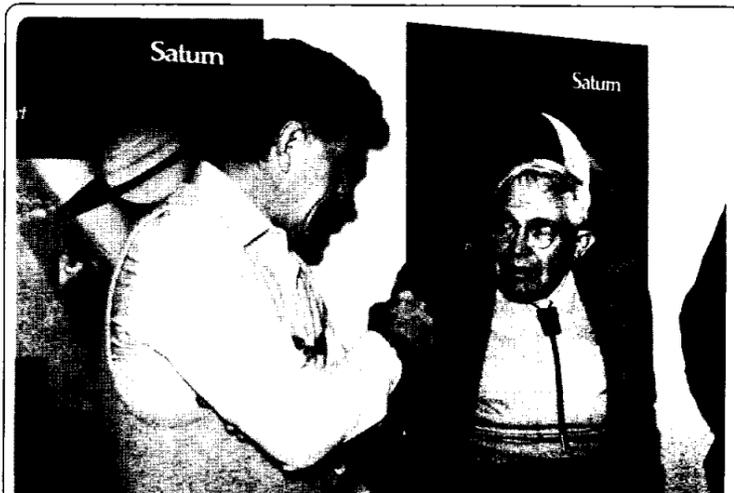
When the freeze took effect Nov. 23, JSC had 39 written hiring commitments, Lister said. Thirteen December commitments will be honored, but 26 January commitments and the new co-op hires are still being reviewed by Headquarters.

Employees give \$228,000 through Federal Campaign

JSC employees contributed a total of \$228,075.24 in the 1987 Combined Federal Campaign, achieving 77 percent participation and 86 percent of the center's \$265,000 goal.

"While we failed to meet our goals, we did have strong participation in a number of offices," said Richard Wright, JSC campaign chairman. "I'm hopeful that the added security of our return to flight and expansion of Space Station work will help us exceed our goals in 1988."

JSC had set a goal that was 10 percent higher than the \$238,830 contributed in 1986. The total number of employees contributing this year was 2,545.



Clyde Tombaugh, discoverer of the planet Pluto, talks to Karl Henize (left) in Bldg. 31. Tombaugh visited JSC recently while in Houston for a benefit speech at the Houston Museum of Natural Science.

Puddy new Flight Crew Operations chief

(Continued from page 1)

Systems Division, responsible for the preparation and conduct of all Space Shuttle systems and systems-related experiments. From 1985 to 1986, he was assistant director for systems in the Mission Operations

Directorate.

Puddy was selected as acting deputy director of the Ames Research Center in 1986 before being detailed to NASA Headquarters.

He earned his bachelor of science in mechanical engineering from the University of Oklahoma in 1960

and a master of business administration from the University of Houston-Clear Lake in 1978. Puddy's numerous honors and awards include the Presidential Medal of Freedom for his work on Apollo 13, and three NASA Exceptional Service Medals.

Space Station means 1,000 area jobs

(Continued from page 1)

"The best minds in the nation went to work on this competition and all of the proposals that we received for work packages were outstanding," said NASA Administrator James C. Fletcher. "We expected the best, and in all aspects—engineering expertise, creativity, solid design philosophy, cost effectiveness—I'm sure we have the best."

Total cost proposed by the four companies is about \$5 billion for Phase I and \$1.5 billion for Phase II. All selected contractors had technically superior proposals and proposed the lowest cost for their work package.

The Work Package 2, Phase I, contract to be managed by JSC calls for McDonnell Douglas to provide the integrated truss structure, mobile servicing system transporter, airlock outfitting, resource node outfitting, hardware and software for the data management system, communications and tracking system, the guidance, navigation and control system, extravehicular activity systems, propulsion system, thermal control system and external attachment systems. JSC also will provide technical direction for the man-systems work being performed by Grumman Corp. for Marshall under Work Package 1. Covington said.

"We have a key part of the work to do," Covington said. "We have all the key subsystems except environmental control and power. We're responsible for putting together the design and what we call outfitting of the resource nodes, which is another name for the command and control element where the crew will work to run the Station."

McDonnell Douglas' proposed cost for Phase I is about \$1.9 billion. Its proposed cost for the Phase II priced option is about \$140 million. Proposed costs do not include fees or program reserves.

Major McDonnell Douglas subcontractors are IBM, Houston and Owego, N.Y.; Lockheed Missiles and Space Co., Houston and Sunnyvale, Calif.; RCA Corp., Camden, N.J.; Honeywell, Clearwater, Fla.; and Astro, Carpinteria, Calif.

The unsuccessful bidder for Work Package 2 was Rockwell International, with major subcontractors Grumman Corp., Bethpage, N.Y. and Houston; TRW, Redondo Beach, Calif.; Intermetrics, Huntington Beach, Calif.; Sperry Corp., Phoenix, Ariz.; Harris, Melbourne, Fla.; and UTC, Arlington, Va.

"I feel like we were in sort of a win-win situation at JSC," Covington said. "We had two contractor teams bidding on this, both of which are very capable and experienced. Either one would do a credible job of doing the development work."

More than 2,000 contract employees will be working on Work Package 2 when the program peaks in two to three years, said Thompson, who was Space Shuttle program manager at JSC before joining McDonnell Douglas. Between 400 and 500 McDonnell Douglas employees and about 600 IBM, Lockheed, Honeywell and RCA employees will be located in Clear Lake, Thompson said. People from other programs will be added to the McDonnell Douglas personnel already here, and the rest will be new hires brought in for Space Station.

"A good percentage are new jobs to the area," Thompson said.

Roughly 1,000 people will work on detailed design and fabrication in Huntington Beach, he said.

Work Package 1, Phase I, calls for the Boeing contractor team to provide the U.S. laboratory and habitation modules, logistics elements, resource node structures, environmental control and life support (ECLS) system, ECLS common airlock systems, internal thermal, audio and video systems and associated software.

Overall management, systems engineering and integration, and operations and logistics support of these elements also will be performed by the Boeing team.

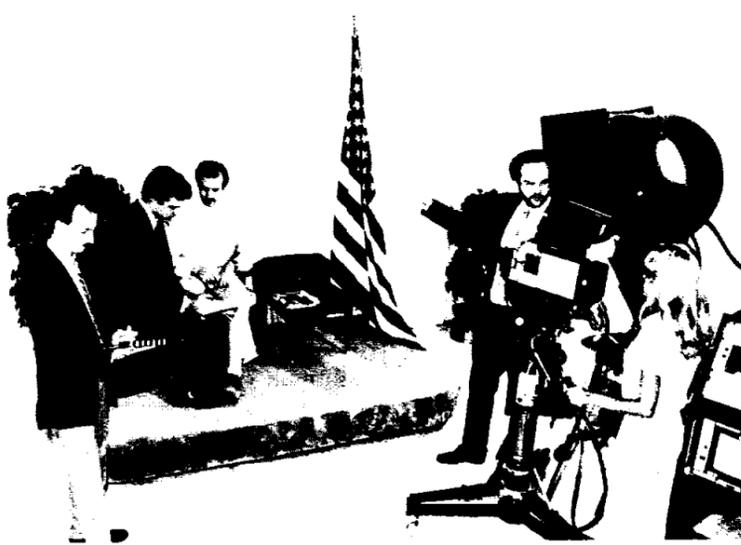
Work Package 3, Phase I, calls for General Electric (GE) to provide a free-flying, unmanned, polar-orbiting platform which will carry scientific experiments in sun-synchronous or other near-polar inclination orbits, and two attach points, including a pointing system, for accommodating scientific instruments on the manned base.

GE also is responsible for integration of the flight telerobotic servicer to the Space Station, appropriate Space Station information system activities, associated software and for planning NASA's role in satellite servicing. Additionally, GE is responsible for defining requirements and interfaces for a satellite servicing facility.

Work Package 4, Phase I, calls for the Rocketdyne team to design and fabricate the Space Station electric power system, including power generation and storage, management and distribution of electrical power and associated software.

In Phase I, Rocketdyne also is responsible for providing solar arrays, battery assemblies and common power management and distribution components for the polar platform and for performing a proof-of-concept test for a possible future solar dynamic power system utilizing the Brayton cycle system.

Each firm was selected after an exhaustive review of its technical and cost proposals received in response to the four Space Station requests for proposals. Approximately 300 people participated in each work package review. Contractors will work together closely under the direction of the Space Station program office in designing, building and integrating the Space Station.



Left: Gordon Andrews works with camera operator Pam Peters to get the proper camera angle for a training video shot. Above: Setting the stage are (left to right) Robert Ibanez, Andrews, Emmett Durham, John Pembroke and Peters.

VIDEO TRAINING

Teaching tool exploits medium's power to make things interesting

By Kelly Humphries

The Space Age and the Video Age have grown up together, and one offshoot of that relationship is a powerful instruction and motivation tool—video training.

Today, video training is coming of age at JSC as the Mission Operations Directorate begins to utilize the medium's most valuable quality

"For such a long time, we used video as a training tool but we didn't capitalize on its most crucial capability, the capability to make things visually interesting," says Gordon Andrews, the lead video producer in MOD's Training Section.

Andrews says the prevailing attitude at JSC used to be that if people couldn't learn what they needed to out of a workbook they weren't up to par. But children of the Video Age who grew up watching television daily learn better when information is presented in visual form, he says, and that will become increasingly important as young new hires join the ranks of flight controllers and astronauts.

"Visually oriented people are what we train now," he explains. "If you teach visually it usually has more impact in their learning."

Visual presentations also allow students to study the movement of equipment that is hidden from view during daily operations. For example, one new training tape will give astronauts their first look at how the air data probe deploys from the Shuttle's nose during re-entry, Andrews says. A complete curriculum of video tapes designed to introduce new hires to space flight and how things operate at JSC is planned.

Creativity is the key to making training interesting, he says, and it's up to him and the section's two other producers, John Pembroke and Robert Ibanez, to come up with visual ways to convey concepts, theories and their applications in space flight technology. That's a change from video training of the past that relied primarily on lectures from "talking heads."

Most experts are not professional communicators, so the producers use full-color art boards, film clips, still photographs and professional announcers to help the

experts get their messages across.

"I've had to do enough bad programs to know that you're not doing anyone any favors by putting another dog on the shelf," says Andrews, who came to JSC six years ago after earning a bachelor's degree in radio, television and film at Sam Houston State University, interning at Channel 11 and working as a part-time freelance director.

The producers put together training tapes in three basic formats: the visualized lecture format, which uses a taped lecture augmented by visual aids; the fully scripted format, which uses all visual aids and professional announcer Jeff Heitzman's voice-over; and the demonstration format, in which the camera follows an expert's demonstration.

"The majority of the time, the subject matter dictates what format you use," Andrews says.

At other times, however, the ability of an instructor to hold students' interest is a key factor in deciding what format to use. That's why most prospective lecturers go through a screen test for the producer before a format is chosen.

"Working with non-professional talent is probably one of the greatest challenges I have as a video producer," he says.

All video production work is performed by the on-site video production facility in Bldg. 8.

"They are real video professionals over there and they help us get the job done right," Andrews says.

Production changes are being accompanied by distribution changes, Andrews adds. Now, students can schedule and use one of two viewing areas in the MOD Video Training Resource Room in Bldg. 4, or they may take as many as five tapes home after checking them out through Tammy Henderson, MOD's document librarian.

Andrews says most students use their home VCRs to play the tapes, but that the library also has two portable VHS players that may be checked out for a week at a time.

New playback techniques coupled with a computer will soon make video training interactive—students will be able to practice operating their consoles and literally see what happens each time they flip a switch.

Employee motivation is another area in

which MOD is putting video technology to use.

Michelle Brekke, a flight director who recently did a tour of duty in the MOD director's office, has begun developing a series of motivational minutes that recall key events in NASA history.

She and Don Pickard, a veteran film editor in the Media Services Branch, have produced 4 programs—ranging in length from three to 10 minutes—and are working on two more. The first lunar landing and the first steps on the moon (Apollo 11), the first satellite repair in space (STS 41-C) and the first shuttle landing (STS-1) were early subjects.

"The overall plan was to fill in down time when you're over there doing a sim (in Mission Control) and the computer crumbles," she says. But use of the tapes already has spread to the visitors program and the Public Affairs Video Distribution Library.

MOD is not the only JSC organization using the video medium for employee development. The commonality of safety training courses that must be provided for 10,000 workers spurred the Safety, Reliability and Quality Assurance Directorate to fast forward into the Video Age about three years ago.

Richard Holzapfel, chief of the Test Operations and Institutional Safety Branch, says economics and scheduling constraints were largely responsible for establishing the Learning Center in Bldg. 226. The center was developed with the help of Personnel's Employee Development Branch.

He says the Learning Center is designed to combine the information capabilities of personal computers with the entertainment capabilities of video. Most of the taped lessons are safety oriented, although some involve technical subjects.

In contrast to MOD's more intimate Video Training Resource Room, the Learning Center's classroom is designed to accommodate 35 people at a time.

"I think we have offered a lot of information in a very timely manner in that facility," Holzapfel says.

Efforts to improve the Learning Center are continuing, he says, and plans call for adding new classes and combining videotapes and computers for interactive training courses.



Above: Tammy Henderson loans out several of the MOD Training Division's tapes for weekend home viewing. Right: Several viewers watch one of the more popular tapes, "Welcome to Mission Operations Directorate" featuring Gene Kranz, in the Video Training Resource Room.



Photos by Benny Benavides

Roundup Swap Shop

All Swap Shop ads must be submitted on a JSC Form 1452. The forms may be obtained from the Forms Office. Deadline for submitting ads is 5 p.m. the first Wednesday after the date of publication. Send ads to Roundup, AP3, or deliver them to the Newsroom, Bldg. 2 Annex, Room 147. No phone in ads will be taken.

Property & Rentals

Sale: Friendswood repossessed large wooded lot, cul-de-sac, utilities, near shopping, schools, \$16,900 or \$225/mo. 488-3224.

Sale: Friendswood/Sun Meadow Estates, wooded lot, established, well-maintained neighborhood, cul-de-sac, bordered by stream, golf course, 210' deep. Doug, x32860 or 486-7412.

Sale: '84 Celebration mobile home, 14' x 70', 2BR, 2 bath, large kitchen, all appliances, assumption, x31165 or 409-925-7878.

Rent: Mobile home lot, 920 Baker, Bacliff, \$50 deposit, \$85/mo. 488-1758.

Sale: Shelby Co., TX, 2000-ft. brick house, 30-plus acres, near lake, Nagodoches, extras, 488-6169.

Sale: Orem/Roandale Dr. area, 3-1.5, living room, new carpet, brick, fan, new stove, built-in oven, \$27,000, 8.5% assumption, \$317/mo., \$4,000 down, 733-7529.

Sale: League City/Kemah area country house, 1.33 acres, 3BR, 2 baths, large garage/carpport, all electric, deep well, high effi. AC, 334-1883.

Sale: Kemah house lot, 180' x 111', some trees, quiet area, 334-1883.

Lease: Seabrook 3-2-2, appliances, near stores, banks, schools, park, 10 min. from NASA, Chuck, x32163 or 470-8377.

Lease: Friendswood 2-story duplex, 3-2-5-2 W/D, refrig., stove, microwave, garage door opener, fans, custom drapes, carpet, FPL, no yard work, \$700/mo., utilities, bills, 482-6860 or 482-2030.

Lease: Tranquility Lake condo, 1BR, 1 bath, fan, FPL, W/D, all appliances, security gates, pools, jogging trail, fishing, \$350/mo. 486-4466.

Lease: 3-1.5-2 townhouse, corner, fenced, covered parking, quiet neighborhood, near pool, basketball, tennis, playground, avail. mid-Dec., \$475/mo. 486-4466.

Rent: Pinedock Apts., 696 Pinedock Dr. #417, W/D, fan, free cable, dishwasher, microwave, security alarm, fenced patio, big kitchen, storage, walk-in closet, near NASA, UHCLC, Baybrook Mall, grocery, Janet, x39277 or 462-6215.

Lease: Piper's Meadow 3-2-2, FPL, fenced, patio, new paint, drapes, gas utility, \$550/mo. 482-6609.

Lease: Scarsdale, brick 3-1.5-2, fenced, drapes, fans, ex. cond., \$450/mo. 482-1582.

Lease: Baywind II 2-2.5, large 2-story, new kitchen floor, fresh paint, FPL, W/D, fans, pool, tennis, \$470/mo. x30715 or 280-8608.

Sale: League City landscaped 3-2-2, cul-de-sac, fenced, new paint, extras, ex. cond., assume FHA fixed \$738/mo., low equity, will finance, David, x35464.

Lease: West Galveston beach house, 3BR, 2 bath, central A/H, day/week, Ed Shumiak, x37686 or 482-7723.

Sale: League City The Landing 3-1.5-1, vinyl siding, fenced, 554-4122.

Sale: 1-acre lot at Bar-X Ranch near Angleton, access to ranch amenities, assumable loan, flexible terms on balance, Darrell, x38515 or 332-1614.

Sale: League City, Newport subdivision, 4BR, 2 bath, formal living/dining, informal den/dining, 2 car garage, gas, electric, corner lot, was \$63,500, now \$59,000, Cathy, 332-4666.

Lease: Galveston beach house, 2BR, 2 bath, beach 110 yds., boat landing 4 blks., marina w/pool, \$500/wk., weekends rates avail. Fendell, 481-0679.

Sale: 3-2-2, 1.5-story house on 2 acres, many large trees, unrestricted, 15 min. from CLC, low \$60s, 337-6172.

Lease: 2-1-2 condo, W/D conn., ice maker, fans, miniblinds, cable TV, storage room, no pets, near NASA, 488-0719.

Lease: Baywind II condo, 1 BR, upstairs, drapes, new carpet, FPL, appliances, W/D, tennis, pool, \$295/mo. Chuck, x35402 or 488-5019 eve.

Sale: 13.5 acres, gently rolling wooded East TX land, front county blacktop, near Tyler and Henderson, assumable low cost TX, Vet. loan, McLeaish, 480-7445.

Cars & Trucks

'77 original short wheelbase step side GMC, totally rebuilt, no smog 454, black, red int. Gary, 482-4636.

'86 Cadillac Fleetwood D'Elegance, fewer than 14K mi., loaded, ex. cond., 335-6483 or 488-3292.

'87 Hyundai Excel GLS, 3-dr. hatchback, AC, AM-FM-tape, power sunroof, 7.6K mi., \$6,895, 282-4109 or 554-5148.

'84 Ford Tempo, 2 dr., auto., PS, PB, cruise, AC, new tires, battery, brown/tan, 37K mi., \$4,800, x38004 or 554-2209.

'81 Pontiac Bonneville station wagon, loaded, new paint, tires, 65K mi., clean, \$2,475, Johnson, x36580 or 339-1402.

'68 Dodge Dart, slant 6, 3-sp. column, \$350, Johnson, 339-1402 or x36580.

'80 Toyota pickup, camper, new tires, \$750 OBO, Roy, 486-0910.

'83 Toyota Corolla, 4 spd., AC, AM/FM, Goodyear Vector radials, ex. cond. Daniel Stour, x30075 or 996-9463.

'82 Mercury Capri, 6 cyl., auto., PS, PB, AC, AM-FM-cassette, cloth interior, 44K mi., ex. cond., \$3,550, Bob, x39079 or 488-5881.

'82 Subaru GLE, 2 dr. hardtop, silver gray, AC, AM-FM-cassette, ex. cond., 5 spd., manual, 35 mpg, \$3,200, Bob, x39079 or 488-5881.

'84 Ford van, auto., 4 captain's chairs, fold-down bed, 67K mi., \$4,300 OBO, 480-0184.

'72 Volvo, mint green, 2 dr., 4 spd., Pioneer FM stereo, good tires, runs well, \$1,000, x32479 or 280-8386.

'68 Pontiac GTO, classic, needs motor, good trans., rear end, brakes, body, \$1,500, Mike, 333-2335.

'79 BMW 320i, sunroof, loaded, \$3,800, Glen, x36541 or 486-0462.

'81 Datsun 280 ZX Turbo, T-top, ex. cond., \$3,900, Glen, x36541 or 486-0462.

'66 Mustang red, V8 auto, new tires, many new parts, stereo cassette, needs interior work, \$2,800 OBO, 332-8188 or 488-9323.

'85 Z28, T-top, AC, PS, auto., AM-FM-cassette, loaded, ex. cond., \$9,500, Rainey, x39650 or 358-6612.

'78 Mercury Monarch, \$2,000, new paint, undercoating, rebuilt trans., tinted glass, 4 dr., vinyl top, AM-FM-cassette, ex. interior, 66K mi., Brenda, x37747 or 409-948-1672.

'68 Plymouth Fury III, 318 auto., PS, PB, AC, good cond., \$75K mi., \$1,000, 554-5346.

'82 VW Scirocco, good cond., 48K mi., \$3,800, Lu, 282-5500.

Boats & Planes

25' Annapolis, sleeps 4, icebox, depth finder, \$5,200 or trade for sports car, Glen, x36541 or 486-0462.

36' Windward Ketch (80), Kenyon spars, stove, AC, knot, depth, VHF, dinghy w/davits and OB, diesel aux., \$75,000, Bill, 333-2516.

'78 MacGregor 25, sleeps 4, jib, genoa, main, 7.5hp Honda OB, extras, BO over \$4,500, Sally, 480-8190 or 326-1608.

21' sailboat, \$2,000, 334-1637.

Mistral Maui sailboat, 6.0m bi-radial sail, 4.3 sail, more, like new, \$850 OBO, Scott, 482-6291.

Cycles

'83 Harley Davidson Super Glide, ex. cond., \$3,800, Lu, 282-5500.

Head Super Tryke, 3 wheeler, roll bar, speedometer, tow bar, 8hp, B&S motor, \$275, x38592 or 482-6291.

'78 Honda 400 motorcycle for parts, windbreaker, motor seat, doesn't run, \$100, 280-7413 or 474-7935.

Audiovisual & Computers

Commodore 128, drive, monitor, modem, \$700; Lt. Kernal 20 meg drive, \$700, all 3 mo. old, 475-1442.

MPI dot matrix printer, 100 cps, 1K buffer, parallel and serial interfaces, ex. cond., \$100, Williams, x32770 or 488-8048.

Hayes 1200 baud internal modem, \$75; IBM monochrome/printer card, \$45; IBM color graphics card, \$45, Robert, x39260.

RGB monitor, Zenith 19" for IBM or compatible, composite video, green switch, \$150; Dead Tandon 20-meg drive w/controller, needs work, BO, Allen, x38999 or 486-6681.

RAMKO mixer DC5MS, broadcast quality, touch pad switching, solid state, warranty, schematics, was \$8,000, now \$3,000; QRK turntable, GE tonearm, mounted in 3 drawer desk, \$250; Teac 350 stereo cassette deck, dolby, \$125; Electravoice microphone, stand, \$100; Eopfhorer headphones, \$50; Scotch reel-to-reel tapes, new case, BO, MS, 480-7226.

RCA 26-in. color TV monitor, remote control, \$275, 482-9621.

Realistic Optimus 503-way speakers, 12" woofer, mid and tweeter, walnut veneer, ex. cond., \$95/pr. 488-3966.

Osborne portable computer, Zenith external monitor, Wordstar, Supercalc, misc. software, Nuevo 80-col. display upgrade, \$175, Musgrove, x38318 or 488-3966.

Sony 72" Colorvideo projection TV, ex. cond., \$955 OBO, Marian, x34547.

Apple II-plus, 2 drives, monitor, paddles, Koala pad, software, \$500, Clarence, x34644 or 333-4381.

Commodore 64 system, CPU, disk drive, monitor, fastload, joystick, much software, \$400, Steve Gorman, x35272 or 280-3181.

Commodore 64 software, games,

spreadsheet, database, copy utilities, VT100 emulation (1200 baud, 80 col.), Steve, x35272 or 280-8181.

Commodore 64, color monitor, 1541 disk drive, Commodore MPS 801 dot matrix printer, software inc. Paper Clip, Oracle, some games, \$475, x34210.

Household

3-pc. Early American furniture set, 2 end tables, coffee table, ex. cond., \$300, 337-6394.

Swivel single sofa, \$35/pr., \$50/pr.; chest, \$25; small dining table, \$15; single dresser, \$25, 482-6609.

10-pc. living room or den modular furniture, off white, good cond., was \$1,500, now \$500, Mike, 333-2335.

Upholstered recliner chair, good cond., \$40, 488-8273.

Antique French bedroom group, twin beds, nightstand, bussel chair has tall folding mirror w/marble-top drawers, \$2,500; 2 large carved unusual chairs, \$500; antique grandfather clock, 7.5' tall, Westminster chimes, \$2,500; 5 antique paintings from Europe, \$1,500 for all, 488-5564.

Hand-built microwave or TV stand, \$25; 2 straight chairs, \$22.50; antique small school desk, \$25, 488-5564.

Traditional sleeper sofa, ex. cond., beige, \$200 OBO, 485-5686.

Sturdy oak bunk beds, ex. cond., \$325; king-sized water bed mattress, accessories, \$25, Billie, x38334 or 482-4365.

King-sized bed, bookcase headboard, good cond., 996-1730.

Solid oak bunk beds, bunkie boards, mattresses, ex. cond., were \$650, now \$400, Kim, x34824 or 332-0875.

Tan 3-cushion sofa, oak trim, good cond., 2 yrs. old, \$125; polished wood TV cabinet, holds up to 25", good cond., \$30, Angie, x36616.

King-sized water bed frame, headboard, pedestal, good cond., \$25, Lee Phillips, 335-8527 or 480-4548.

Frostless refrig.-freezer, almond, 16.4 cu. ft., ex. cond., 2 yrs. old, auto. ice maker hookup, doors reversible, under warranty, \$375 OBO, Marie or Ken, 333-2783.

Camel tent, 2 person, good cond., \$25 OBO, Marie or Ken, 333-2783.

Apt.-size washer, dryer, 9 lbs., Sears Best, \$150 ea. OBO, 930-1509.

Credenza, black metal, like new, woodgrained top, sturdy, \$95, 280-0909.

Stacked W/D, almond, 4 yrs old, ex. cond., \$250; canvas tent 8' x 10', 10 yrs. old., \$10; girls headboard/footboard, \$15; twin headboard, \$5; new light fixtures, 1 hanging, \$10; 2 ceiling, \$5 ea., Marie, x38875 or 480-4507.

Contemporary oak finish tables, smoked glass inlays; coffee table, \$135; end table, \$112, ex. cond. Pierre, x32773 or 532-3515.

Formal living room furniture, couch, 2 ea. wing-backed chairs, 2 ea. lamps, sell all or part, Joe, x39235 or 474-3424.

33-pc. Franciscan dinnerware, apple pattern, \$200, 2-story doll house, \$40; desk, dresser, hutch, \$175, Beverly, x33151.

GE gas dryer, heavy duty, ex. cond., \$150 OBO, Beth Ann, 333-6191.

Antique Duncan Phyfe dining table, 6 chairs, buffet, good cond., John, x34490 or 481-6372.

All-wood executive desk, credenza, Myron, x32694 or 482-4778.

13" color TV, \$75; dinette table, 4 chairs, \$50; queen-sized bedroom suite, \$200; 600 watt microwave, \$75, Tammy, x38322 or 280-9720.

Unused 23K/24K gold plated flatware, 70-pc. service for 12, chrome nickel steel, padded storage case, was \$1,200, now \$350, Cliff, x38166 or 486-8810.

Panasonic Genius microwave, top of line, 4 yrs. old, rotating turntable, auto. sensor, was \$500, now \$150, 480-8280.

Wanted

Want wooden dresser for child's room, Kellie, 480-3377.

Want Cannon FT-b camera body, Michael, 333-0990.

Want universal parallel printer interface cable for Apple III computer, McMillan, x32549.

Want 5 or 6 paraquets to observe for science fair project, "Instinct or Personality," will be well treated, temporary or permanent loans, inexpensive purchase, Becky, 486-1788.

Want ride to and from work, Almeda Mall-Kirkwood area to Bldg. 8, 7:30 a.m. to 4 p.m. for about one month, Jack Surles, x37714.

Want roommate(s) to share 3BR-2 bath home in Friendswood, W/D, cable, microwave, household privileges, non-smokers, \$245/mo., all bills paid, Michael, x38169 or 482-8496.

Want photographic studio equipment, lights, stands, umbrellas, backgrounds, tripods, cameras, props, etc. Michael,

x38169 or 482-8496.

Want to buy electric trains, Don, x37832 or 996-1425.

Want to buy small chest of drawers, pecan color, bamboo or rattan looking, Beth, 480-2817.

Want early RCA and Mercury stereo LPs from 1958-1964, also any movie soundtracks, Mitch, x35481 or 486-0958.

Want roommate to share 3-2-2 house in CLC, non-smoker only, \$300 and half utilities, 4 mins. from JSC, 488-8029.

Want Honda Spree frame, 1985 or newer, good shape, reasonable, C. Turner, 479-7437.

Want Little girl's size 5-6 clothes, prefer winter, Verna, x32209 or 480-5629.

Want photographic equipment, umbrella lights, backgrounds, filters, film belts, lenses for Olympus, Minolta or Yashica, any 60-300 zoom lens, none over 3 yrs. old, flash arm for Yashica, 488-1044.

Musical Instruments

Ludwig drum set, \$1,300; Magic Chef microwave, \$75, Lea Anne, x31506 or 486-6762.

Antique player piano, \$1,500; antique record player, \$200; Kimball Swinger 400 organ, 2 keyboards, \$700; Lowrey Teenie Genie organ, \$400, 485-4995.

Pets & Livestock

AKC cocker spaniel puppies, 2 female, 2 males, \$125 ea., deposit hold for Christmas, Tamely, x36159 or 480-8980 after 8:30 p.m.

Cocker spaniel puppies, AKC, born Oct. 8, blonde and buff, females, \$150, Steve, x33380 or 554-2783.

3 free 2-mo.-old black kittens, Julie, x35774 or 332-3683.

2 free cats, 4 yrs. old, tabbies, all shots, neutered males, eat only dry food, love children, 480-8280.

Lost & Found

Found: Full-face black Bell motorcycle helmet lost in Nov. 16 storm, Larry, x38004.

Lost: Louver from rear window of car during Nov. 16 storm, Sheila, x30246.

Found: Tie tack w/Greek fraternity insignia in Bldg. 45 parking lot, describe to claim, Thelma, x33373.

Personal

Retirement party for Fred Stockum, 36-year veteran, Dec. 17, Mike, x31894 or Vickie, x31892.

Miscellaneous

Weaving loom, 2 harness, 36" wide, maple, \$250, Joyce, 488-3988.

Litton 500 microwave, full-sized, probe, rack, books, ex. cond., \$200 OBO; Sears Best child car seat, ex. cond., \$35 OBO, Marjie, x39421 or 426-4401.

'59 Mercedes Benz 220S, \$2,700, JVC stereo tape deck, \$125; 4 case bar refrig., \$50; 40-ch. CB radio, \$40, David, x35464.

Smith-Corona Electra XT portable electric typewriter, case, black and white

correctable ribbon, \$80, Rick, x35480.

'87 U.S. proof sets, penny through half dollar, \$15/set, Chuck, x31701.

Third seat for suburban, gray, like new, \$150, Janice, x34067.

Rear bumper for '83 Ford van, \$75, 4 wire hubcaps for '77 Olds 88, 15" wheels, \$50; mounted tire, Goodyear Arriva 225 R75 15 on mag, \$75, Myron, x37194 or 729-9793.

Exercise cycle, adjustable, good cond., \$50, Blanche, x34220.

Two large chair cushions, open into single bed, dark brown, \$25 ea. Blanche, x34220.

Old NCR 2-drawer electric cash register, ex. cond. heavy, does not compute sales tax, \$35, Frank, x34752.

Old Schlitz beer sign, lighted globe, clock, pictures, 8 long, ex. cond., works \$200, Frank, x34752.

Sears 3hp go-cart, repainted, tuned, runs well, \$205, 333-2808.

Swift Tecnar microscope, good quality, 4x, 10x, 20x slide prep kit, 50 professional biology, zoology slides, \$50, 333-2808.

Weight bench, weights, used once, was \$105, now \$70, Chuck, 326-4387.

Remington model 788 rifle, 7mm-08-caliber, scope, sling, extra ammunition, \$200, Bernhard, x30394 or 333-2968.

Weekend in New Orleans, Dec. 11-14, accommodations for 4, 4 tickets to Oilers vs. Saints Dec. 13, Avenue Plaza Hotel on historic St. Charles Ave., transportation not included, \$375, Myron, x37194.

Wilson golf club set, bag, x31 woods Nos. 1, 3, 4, 5, Shotmaker irons, Nos. 2-9, 2 putters, BO, Wendy, 480-4023.

Marcy EM-1, EM-2, EM-3 weight system, free standing bench press, leg curl, butterfly, ex. cond., \$550, Cyndi, x39021 or 996-9058.

'84 Celebrity shop manual, \$25 OBO, Fred, x37290.

Weber carburetor set up for Triumph TR-6, \$225, Bob Crow, x32350.

Fresh honey, golden color from corn, milder, \$10 gal., smaller quantities avail, Clarence Blume, x38820 or 554-2911.

Formal dresses, petite sizes, used once, \$40 ea. OBO, 554-2911.

Wars Vacationer tent, travel trailer, sleeps 4 adults, cover 4' x 7' boat w/oars, \$500, Sears 7.5hp motor