

Space News Roundup

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National Aeronautics and Space Administration

NASA revises policy for specialists

A revised policy expanding opportunities to fly Payload Specialists on the Space Shuttle has been announced by NASA Administrator James M. Beggs.

Until now, flight opportunities for Payload Specialists have been offered to those customers that purchased a half or more of a Shuttle mission or were flying a unique experiment that was judged to require special talents of a particular scientist or engineer.

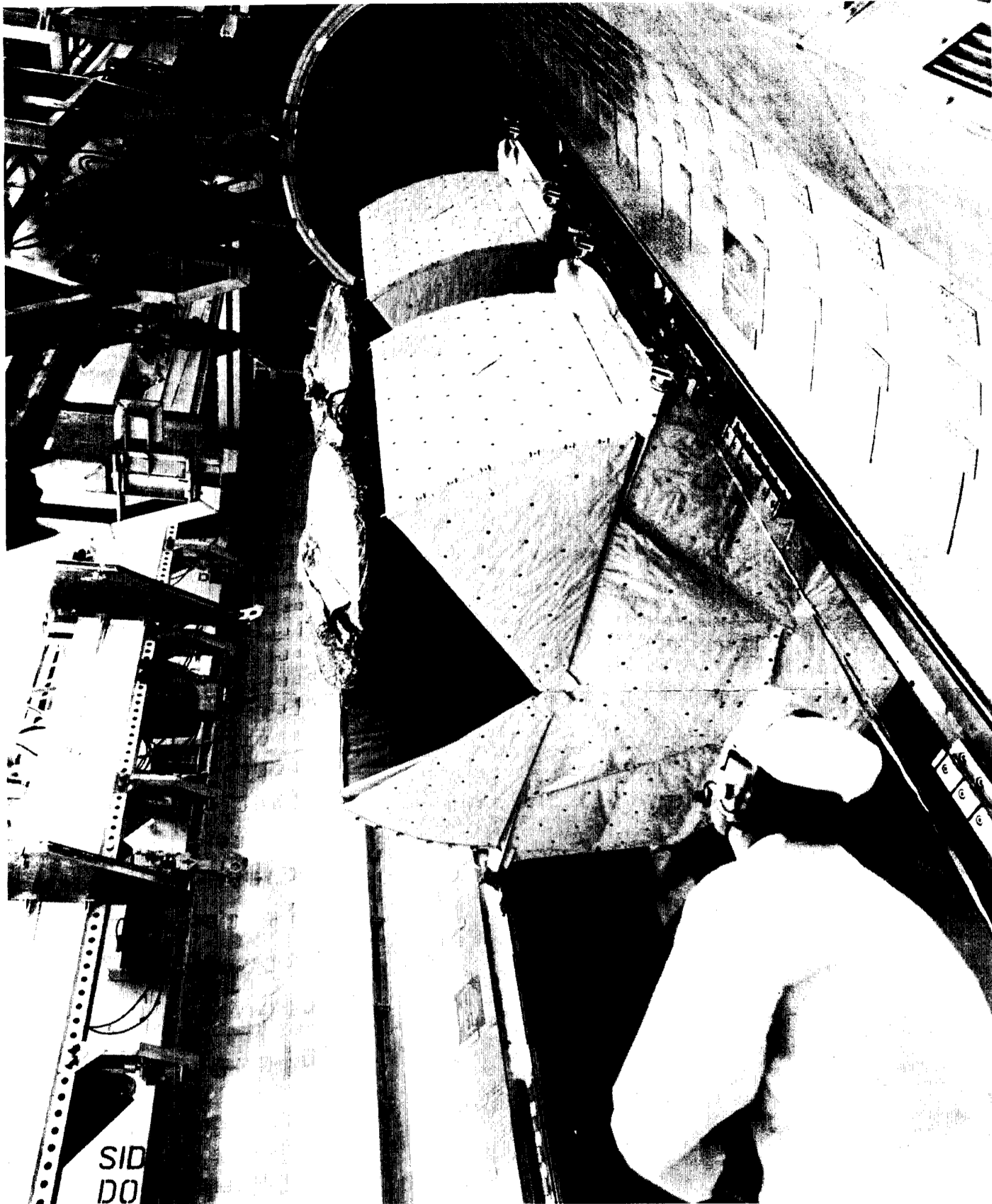
Under the expanded program, set to begin in 1984, the minimum required payload load factor is eliminated. When mission requirements and manifesting permit, flight opportunities for Payload Specialists will be made available on a reimbursable basis to all classes of Space Shuttle major payload customers, including foreign and domestic commercial customers, international cooperative partners, the scientific and applications community and the Department of Defense.

In the future, Mission Specialists, who are experts in extravehicular activity, operation of Remote Manipulator System and payload support systems, will be augmented by Payload Specialists on specific missions. These crew members will be added to selected flights to provide detailed, on-the-spot expertise concerning payloads or scientific experiments to help insure mission success.

Payload Specialists will most often be scientists, with special skills to operate a scientific experiment, or a specialist proposed by a Shuttle customer who is trained in the critical aspects of deploying and operating a satellite from the Space Shuttle or in operations of a unique and critical processing experiment.

Proposed Payload Specialists will undergo a short training program in preparation for space flight. NASA will retain final selection authority to insure that Payload Specialists are fully qualified and can function as part of the flight crew.

This expansion of the Payload Specialist policy proceeds toward an early major objective of the Space Shuttle program — making it possible for more people to go into space, easily and safely, in order to enhance the scientific, commercial and national security objectives there.



No frills, just an energy pill

Pac Mania has pervaded the nation lately, but this is going too far — 160 nautical miles straight up, to be exact. Although they bear an uncanny resemblance to Mr. and Ms. Pac Man gobbling their energy pills, these are actually the payload shrouds which protect the two satellites poised for launch aboard STS-5. SBS-3, top, and Anik C-3 are seen here in their flight positions prior to vertical loading at the pad in the hold of *Columbia* earlier this month.

Three student experiments to fly on STS-5

From surface tension to the formation of sponges in micro-g, three student experimenters will be exploring properties of nature when their experiments go into space aboard the Space Shuttle *Columbia* during STS-5 next month.

The three student experiments are part of the Shuttle Student Involvement Project co-sponsored by NASA and the National Science Teachers Association.

The experiments proposed by Aaron K. Gillette of Winter Haven, Fla.; D. Scott Thomas of Johnstown, Pa.; and Michelle A. Issel of

Wallingford, Conn. were chosen from among 1,500 projects suggested by high school students from across the nation.

Gillette, who was a junior at Winter Haven Senior High School when he proposed the experiment, is now a freshman at Western Carolina University in Cullowhee, N.C. He will examine the effects of near-weightlessness on the formation of sponges during the STS-5 flight. Gillette has hypothesized that cells which form sponges will have difficulty doing so if gravity is not present to enable them to bond properly.

Each student has a corporate sponsor, and Gillette's is Martin Marietta Aerospace, Orlando Division, where the experiment will be performed on the ground during the mission to provide control data.

Thomas, now a freshman at Utah State University (which is where the first Shuttle Get Away Special originated), was a junior at Richland Senior High School in Johnstown when he proposed his experiment to study liquid surface tension convection in micro-gravity. Surface tension is what allows insects such as spiders to "skate"

on water. It induces flow patterns (convection) in liquids that are heated. Since gravity affects convection on Earth, it is beneficial to study surface tension induced convection in orbit where gravity effects are minimized. Thomas' corporate sponsor is Thiokol Corp., Wasatch (Utah) Division.

Issel is a freshman at American University. As a junior at Mark T. Sheehan High School, she proposed an experiment to study crystal growth in space. She will attempt to grow a geometrically perfect crystal in micro-g, a feat made difficult if not impossible on

Earth by gravity. The crystals are used in electronics. Issel's corporate sponsor is Hamilton Standard, Windsor Locks, Conn.

The Shuttle Student Involvement Project is designed to stimulate the study of science and technology in secondary schools. The first such experiment, the famous "bug box" of Todd Nelson, flew aboard *Columbia* during the third Shuttle flight in March.

The third project competition is now underway. Entries will be judged at regional and national levels and the winners will fly on future Shuttle missions.

Space News Briefs

STS-6 stacking begins; first main engine for 099 installed

Technicians at the Kennedy Space Center last week began the stacking process for STS-6 with the mating of the external tank to the twin solid rocket boosters. The process took about 16 hours. In a related development, the first main engine for Orbiter Vehicle 099, the *Challenger*, arrived at the Cape last week, and was installed over the weekend. At press time, the second main engine was scheduled to arrive sometime this week from the test facility at the National Space Technology Laboratories in Mississippi. In other work on 099, technicians continued the checkout of the orbiter's TACAN system, the No. 1 water coolant loop and the newly installed Ku-band antenna. The Orbiter was also put on special jacks which allow it to move as if airborne for an exhaustive series of tests on the flight control surface system.

Grumman to build RMS astronaut fixture

JSC has signed a \$1.8 million firm-fixed-price contract with the Grumman Aerospace Corporation for a foot restraint platform which will allow space-walking Shuttle astronauts to be moved about by the Orbiter's remote manipulator system (RMS). Under the non-competitive contract, Grumman will design and build two flight and two training restraints fitted with standard remote arm grapple fixtures similar to those fitted to Shuttle payloads. Called the Interim Manipulator Foot Restraint, the device will enable astronauts to be moved anywhere within the reach of the RMS without an umbilical tether or the need to use the Manned Maneuvering Unit.

Marshall to let OTV aerobraking contracts



An OTV using aerobraking on return to low Earth orbit.

The Marshall Space Flight Center has selected the Boeing Aerospace Co. and General Electric Reentry Systems for negotiations leading to contracts for definition of possible aerobraking Orbital Transfer Vehicles. The study contracts, each valued at approximately \$200,000, will assess future technology needs for such upper stages. An OTV using aerobraking would return from high Earth orbits and economically slow itself into a low parking orbit by using drag from the outer fringes of the planet's atmosphere for braking. Marshall study manager Gene Austin said engineers there believe a two- to five-fold increase in payload capability would be possible through the use of aerobraking. "We think the vehicle would carry about 40,000 to 60,000 pounds of fuel," he said, "and by saving ourselves one burn we can use the extra fuel to transfer a larger amount of payload to a high orbit." Both Boeing and GE will be asked to assess the best designs and technologies needed to enable first operations of such a spacecraft in the 1990s.

Thematic mapper tested for use as toxic waste monitor

NASA is using the latest remote sensing technology — in a phrase, the thematic mapper — to study hazardous waste disposal sites north of San Francisco Bay. The four-year study, a joint research project of the Ames Research Center and Woodward-Clyde Consultants in San Francisco, is designed to test the technology of the thematic mapper (TM) for such uses. The TM data is being tested in assessing hazards from more than 20 waste disposal sites located in the Carquinez Straits of San Pablo Bay, the northern extension of San Francisco Bay. The area, traditionally highly industrial, has a considerable number of waste dumps, some of which have not been regulated. Using TM data, researchers will study the area for water quality, vegetation, land use, soil condition, surface geology and topography. Potential waste hazards will be analyzed and effects of waste on the bay ecology will be identified. Once this process has been completed, NASA and Woodward-Clyde project scientists will move on to study a site in southeastern Utah to assess the techniques used in the Carquinez Straits study. The TM is regarded as a major improvement over previous remote sensing techniques with advantages which are only now beginning to be explored. The TM was first launched into space aboard the new Landsat 4 satellite in July.

Lockheed to study Ring Wing concept for future aircraft

The Lockheed-Georgia Co. will soon begin preliminary wind tunnel tests on an aircraft concept radically different from any design which has gone before. Called the Ring Wing, the design offers the potential for lower drag, lighter structural weight and better performance. While it may look strange, the idea is not new. Former NASA Langley aerodynamicist Richard Whitcomb, who developed the area ruling formula for supersonic aircraft and the winglets now found on several types of business jets, said the idea has been proposed before but has never been feasible because of structural problems. But advances in lightweight composite materials technology may have changed that. In addition, Lockheed senior staff specialist Rollo Smethers believes other problems, such as how to control the flight of such a craft and where to place engines and the landing gear, may also be close to resolution. "This geometric arrangement provides for a structure reacting to chordwise loads, where the two surfaces meet, and incorporation of a top rudder in the swept forward vertical surface to provide roll control," he said. Smethers says the Ring Wing will weigh approximately half of what today's conventional transport wings weigh but will be capable of carrying the same load — up to 125,000 pounds. And even if the unorthodox design does hit a snag or two in the wind tunnel tests, designers will have plenty of time to work them out — Lockheed has the plane on the drawing board for flights after the year 2000.



Lockheed believes the Ring Wing has promise, enough to schedule it for tunnel tests.

RCA to study Mars and lunar geoscience orbiters

RCA Astro-Electronics has received a \$65,000 contract from the Jet Propulsion Laboratory to study the feasibility of modifying an existing spacecraft design for use in Mars and lunar geoscience orbiter missions. The four-month study will be based upon the use of space-proven Atmosphere Explorer, Dynamics Explorer and Tiros satellites. The proposed missions for the spacecraft would involve detailed orbital studies of Mars and the Moon over one-year periods. Both would operate in low polar orbits and would discover water deposits if any are to be found. The Mars Geoscience Orbiter would carry a gamma-ray spectrometer, multi-spectral mapper, magnetometer and a radar altimeter. The Lunar Geoscience Orbiter would carry the same complement of instruments as well as an X-ray spectrometer and an electron reflectometer. The satellites would make detailed studies of the surface and near-surface composition, pinpoint volatile locations and analyze the internal structure of each body. For more on a proposed lunar geoscience orbiter, see the related story on page 3.

NASA assumes control of NSF facility

Since NASA began participating in the U.S. National Climate Program, one of the more important elements of study for the Agency has been to determine how tiny particles called aerosols in the upper atmosphere contribute to the heating and cooling of the planet. These studies became especially useful with the eruption of Mount St. Helens in 1980 as scientists suddenly had a gigantic natural laboratory with which to work. One of the most critical participants in these studies has been the National Science Foundation's Scientific Balloon Facility in Palestine, about 200 miles north of Houston. Effective the first of this month, control of the facility passed from the NSF to NASA. It is the largest and most advanced facility of its type in the world. High altitude balloons are launched into the stratosphere, carrying payloads where most airplanes cannot travel, and contributing important data in atmospheric physics, astronomy and astrophysics. For the past several years, NASA has been the principal user of the facility, one of the major reasons why the station is being transferred to the Agency.



Shown here are the Dudes, winners of the JSC men's Wednesday night B League softball competition. Front row, left to right, are: Jim Pawlowski, Tom Moore, Jim Geisler, Jerry Greif, Jim Porter, John Algermissen, Ned Robinson and Dickey Arndt. On the back row, left to right, are: Ron Epps, Mark Jernigan, Mario Delgado, Ron Lentz and Gerry Bryan. Not pictured are Rick Porter and Fred Cooper. The Dudes were sponsored for the season by Johnston McCown & Ramsey Realtors.

People

Walter Scott Jr. became the second person at JSC to be presented the Distinguished Speaker Award last month during ceremonies in Bldg. 1. The award, initiated by the Center earlier this year, is presented on behalf of the Public Affairs Office to those employees who make 25 or more speeches during a five-year period as scheduled by PAO. Scott, who works in the Mission Planning and Analysis Division, was presented the award by JSC Director Gerald Griffin.

Robert J. Ward of the Engineering Evaluation Analysis Office was recently named to serve on a panel of five judges to select winners of U.S. Navy science awards from over 500 entrants. Ward, a retired U.S. Naval Reservist affiliated with the Office of Naval Research/Naval Research Laboratories Unit 410 in Houston, has previously served as head judge and presenter for science fairs in the city. The awards program has been sponsored by the Office of Naval Research since 1958 to reward scientific achievement among high school students and to promote scientific and technical careers. First and second place winners will receive college scholarships and an expense paid trip to Hawaii.

Three Outstanding Secretaries for July, August and September have been honored recently at JSC for "exceptional contributions to the effective operation of the Center through professional competence and personal dedication."

Betty G. Brown, the July Outstanding Secretary, works in the Mission Integration Office, Space Shuttle Program Office, and is credited with helping establish procedures for MIO during a major reorganization. As lead secretary in the newly established office, she helped set up daily office routines as well as coordinating activities with the four subordinate branch offices. "Ms. Brown has been tireless in her attention to her job," said Leonard S. Nicholson, Manager of

MIO, "and she has maintained a level and quality of exemplary performance far above average for an extended period. Her professional attitude is evident in her dealing with our Space Shuttle customers, and I have received many compliments on her intelligence and pleasing manner from visiting dignitaries."

The August Outstanding Secretary, Jean H. Marks, works in the Astronaut Office, Flight Operations Directorate. She provides stenography, travel arrangements, correspondence and other support for 11 astronauts. "Jeannie Marks is one of the most competent and hard working secretaries at JSC," said Richard H. Truly, Deputy Chief of the Astronaut Office. "Throughout the Space Shuttle Orbital Flight Test program, Jeannie has served the Astronaut Office in a vital role at the Kennedy Space Center before each launch—that of being responsible for all the family and VIP launch guests at KSC. She has done the best job ever at this." Truly said she has also served more than double duty through this period by providing regular support to the Office at the same time, as well as working in the Mission Control complex during flights.

Ellen Harnage, the September Outstanding Secretary, works in the Simulator Development Branch, Flight Simulation Division. As secretary to the Chief, Simulator Development Branch, she is responsible for all correspondence, reports and briefing material related to the Shuttle Mission Simulator. Her boss, Robert E. Ernull, said, "Through her own initiative and self-study, she has become very proficient in the use of the Lexitron word processing terminal. She has trained other personnel on its usage. She also was helpful in selecting a new word processing system for the whole division through her careful review of the various systems available today." Ernull said she has consistently responded to all tasks with "unmatched proficiency" and in "an outstanding manner."



Betty Brown



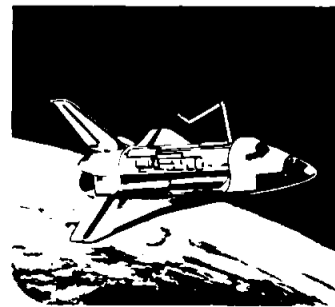
Jean Marks



Ellen Harnage

NASA
Lyndon B. Johnson Space Center

Space News Roundup



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Editor

Brian Welch

Return to the Moon

Dr. Wendell W. Mendell

Geology Branch, Planetary and Earth Sciences Division

A decision must come, the author says, and sooner than you might think

In proposing some months back that the U.S. begin to study concepts for returning to the Moon, Wendell Mendell and Jeffrey Warner struck a responsive chord. Warner has since left JSC, but Mendell and Planetary and Earth Sciences Division Chief Michael Duke have continued the campaign to once again get people thinking about Earth's closest cosmic neighbor. Prospects for the idea are somewhat fuzzy, but the picture is beginning to firm up bit by bit. The next Lunar and Planetary Science Conference in the spring will include a special session to promote discussion along these lines, and planning has begun for a several-day workshop which would follow later next year. Moreover, the Geosciences Branch of the Earth and Planetary Sciences Division at NASA Headquarters is listening, and is expected to allocate enough money to begin a low level assessment program aimed at identifying necessary research over the next two decades to send Americans back to the Moon, this time to stay. What follows is the paper which began all of this activity, the first in our series of articles on various aspects of spaceflight.

Many people believe the American program of planetary exploration has lost momentum. Over the past five years, Administrations have been able to pay lip service to planetary programs while avoiding commitments to new starts. Some planetary scientists foresaw the medium term implications of the dearth of initiatives, but their warnings were lost on politicians and the public during the euphoric response to Viking and Voyager results.

Today, administrative pronouncements take on ominous overtones from the point of view of planetary science. Praise for solar system exploration is perfunctory, and serious consideration is given to dismantling the program "temporarily." Programmatic extinction now is countered by populist pressure from a coalition of scientists, interested citizens, and the media. A stalemate has developed but the final outcome is far from clear.

At JSC we have identified three generic strategies for dealing with this situation.

The first response is determined lobbying of the President and the Congress on the theme that planetary science is intrinsically good for mankind and for the country, and that it should be promoted rather than de-emphasized. This approach is efficient because it places the key arguments directly to the ultimate policy makers. However, in this day and time, an unsympathetic Executive is likely to view the planetophiles as another special interest group looking for exemption from austere policies. Government officials even may be puzzled by cries of a funding crisis because NASA's budget is increasing. In fact, other kinds of science within NASA are growing. Apparently the Administration is supporting the Space Program, whereas the decline in planetary programs is an internal policy decision within the Agency. Even a restoration of funds by a friendly Congress simply may postpone implementation of NASA's administrative will; or, as seems possible currently, restored funds may not be allocated to planetary science within the Agency budget.

The second strategy accepts the back of the bus with an attitude both stoic and ironic. The planetary science community is urged by NASA program managers to

hang tough through the dismal funding for next year while a "new" approach to solar system exploration is sold to the Agency. In the proposed relationship, the Agency will promise a steady, modest level of funding; and in return the planetary exploration program promises to become lean, economical, efficient, and content. Small, minimal spacecraft will visit planets regularly and return modest amounts of data to a diminished but grateful planetary community. As the exploration plan has taken shape, we find that the minimal funding level which has been identified for execution of this plan has not been attained by the planetary program since the mid 1970's. This implies that some salesmanship must be exercised within the unreceptive NASA administrative hierarchy to reverse the present downward trends and to counter the philosophy that planetary exploration has had its day and near-Earth space must be emphasized.

The two strategies outlined above attempt to re-establish planetary exploration as a significant activity. On one hand, Office of Management and Budget and Congressional funding support is solicited; and on the other hand a policy redefinition is sought within the Agency. Both approaches have merit and both should be pursued.

At JSC we have considered the situation carefully and are not sanguine with respect to its resolution by following either strategy. Our concerns have caused us to define and to pursue a third course of action. Our strategy is fundamentally distinct from the other two because we are not trying to rescue the planetary program *per se*. Yet, if we are successful, the planetary program will receive an infusion of activity in the near term. That activity is not designed to replace the planetary program. While the Solar Systems Exploration Division will have a role in our initiative, we fully anticipate that a broadly based planetary program will be active in the Agency as an independent entity.

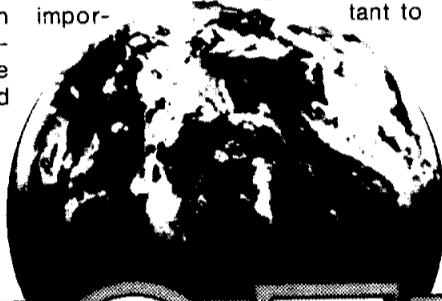
The key to our strategy is the perception that the focus of the Agency as stated by the Deputy Administrator presently lies in near-Earth space. Reflection on that point leads to the conclusion that manned occupation of the Moon, i.e., a Lunar Base, is the inevitable culmination of that activity. From simple considerations of booster performance it is evident that the development of the capability for manned activity in geosynchronous orbit also permits activity in near-Moon space. Any manned objective beyond the Moon (e.g., Mars) requires a different level of effort. An Agency long range goal of a lunar base can become a focus for the entire infrastructure (Shuttle, Space Station, Orbital Transfer Vehicles) of manned capability in space.

It is absolutely certain that the nation will come face to face with a decision to return to the Moon as current visions of the expansion into near-Earth space come to fruition. We predict that the decision point will be reached in about ten years, when a low Earth orbit space station has been established and development of an Or-

bitral Transfer Vehicle (OTV) has begun. That decision may be forced by an event other than simple achievement of capability. It is entirely possible that elements of geopolitics, national security, or mineral resources will trigger the debate. Quantitative prediction of the role of any single need is difficult, but their confluence creates an imperative for national planning.

The lunar data base today is not truly adequate to support the myriad of engineering and scientific decisions necessary to establish a viable base on the Moon. Unless the data base is improved, the lunar decision in the next decade will be made expensively in a crisis atmosphere. If NASA acts now to expand our knowledge of the Moon, the information can be obtained economically with no significant fiscal or programmatic impact on the other Agency thrusts. NASA cannot afford to bypass this opportunity to affect the course of the nation.

The Moon is important to



the Agency for other reasons. The Moon is still the keystone for understanding the terrestrial planets as well as the Earth. Lunar missions are low cost at a time when cost is a critical factor in planning and can serve as a mechanism for maintaining planetary science teams when that particular expertise is an endangered skill. Finally, these modest missions are an entree to a long range programmatic goal, a lunar base.

The program

The JSC Lunar Initiative has three major goals:

- Acquire information required by NASA to make decisions regarding future occupation of the Moon.
- Advance scientific understanding of the Moon as an object of intrinsic interest and as part of the Earth-Moon system.
- Develop manned capability for operation in cislunar space and in the lunar surface environment.

The series

This month a major milestone was passed in the annals of spaceflight: a quarter century of exploration by mankind. In observance of all that has gone before and that which is likely to occur in the future, the Roundup will for the next several months present a series of articles by people here at JSC on various aspects of spaceflight. We will remember, explain, ponder, debate and speculate on a variety of subjects pertaining to space exploration. We invite your ideas for articles and your comments on those which appear in this forum. The views expressed herein are first and foremost those of the authors, and do not necessarily represent the opinions of this publication or JSC and NASA management — Editor.

The goals will be achieved by three more or less serial projects over the next 25 years. Phase One is an exploratory orbital survey of the entire Moon to define available resources and potential sites. Phase Two will be a program aimed at site certification through definition of engineering parameters and detailed scientific surface investigation. Phase Three is the establishment of the lunar base. The orbital survey using an Advanced Lunar Mapping Satellite begins as soon as possible. The decision to proceed to manned presence on the Moon will be made near the completion of Phase One. A FY85 new start for the orbital program will place the decision point at the beginning of the next decade.

Although the missions tend to be the most visible elements of the lunar initiative, an equally critical activity is a stable research and development program in lunar science and engineering. In particular, work on future utilization of lunar materials is practically nonexistent. Serious consideration of a scenario for lunar operations is an immediate concern so that a relevant, focussed research program can be designed.

Phase I: Orbital survey

At the present time the lunar base concept is ill-defined. Does an Antarctic analogy hold, where

lunar activities, requires a more complete cartographic characterization of the Moon than presently exists. It has been pointed out that Mars has been mapped more completely than the Moon. In that context, we propose a lunar cartographic objective, preferably using a film camera. At JSC we have developed an orbital mission concept which includes lunar orbital photography along with the scientific remote sensing payload usually associated with LPO. The JSC Advanced Lunar Mapping Satellite utilizes boosters and spacecraft currently in production and features a return of the entire spacecraft from lunar orbit to Earth orbit for reuse or reconfiguration.

The LPO experiment complement must be re-examined in light of shifted mission emphasis, possible needs for high resolution, and ten years of advance in instrument technology. We propose a FY84 mission study along with funds devoted to instrument development. A FY85 new start should lead to a 1989 launch for the first year-long mission. Note that this schedule allows a lunar base decision point early in the next decade.

Phase II: Intensive site certification and study

Once a data base has been accumulated and a decision has been made to establish a manned facility, candidate sites must be investigated intensively. We prefer a series of unmanned rover missions designed to explore potential sites while also addressing fundamental scientific questions regarding the Moon as a planet and as part of the Earth-Moon system.

The site evaluation function deals with problems of civil engineering. Important questions include depth of regolith, abundance of boulders, presence of habitable lava tubes, and physical properties of the surface material. The instrument complement might include electromagnetic sounding, gravimetric and topographic characterization, surveying, and penetrometers.

The scientific instrument complement should be designed to address specific problems on lunar science. Our experience with the Apollo samples and the extensive orbital data will permit design of experiments which focus on key questions rather than survey measurements. Scientific instruments might include age dating by isotope dilution mass spectrometry, regolith grain analysis with a scanning electron microscope, major element analysis using x-ray fluorescence, or trace element analysis using a pulsed neutron source for activation.

Each rover could be designed to operate for one year on the lunar surface. The rover can be dormant during the lunar night and spend 75 percent of the daylight hours taking measurements and making observations. The remaining 25 percent of daylight will be spent traversing, "driven" by an operator on Earth using twin television cameras for navigation and ranging. In this mode we estimate that the traverse range during a mission will be 2,000 km.

We envision useful activities for approximately five rovers. With these machines we can explore the major geologic units on the front side and do considerable work on the farside, using the halo Orbiter as a communication link. A sixth rover will be outfitted for moving dirt and will test engineering and construction techniques.

Phase III: Moon Lab

The Moon Lab project will be (Continued on page 4)

a base is maintained for scientific and strategic reasons? Or should the lunar presence be viewed as a colony with a goal of economic self-sufficiency? The latter situation is probably preferable, but the achievement of economic independence will depend on the mass of critical imports from Earth as well as on the future space economy. Our understanding of the economic equation is rudimentary, but it is clear that hydrogen or, equivalently, water will be a crucial resource. The discovery of a source of water on the lunar surface would dominate the siting and planning of a manned base. Concentrations of other elements (e.g., aluminum, iron, titanium) also will affect the decision process. These missing pieces of information epitomize the pressing need for an orbital survey mission to precede any firm decisions.

The Lunar Polar Orbiter (LPO) was proposed by JSC ten years ago and has been on and off of NASA's list of candidate new starts since then. JSC, the Goddard Space Flight Center and the Jet Propulsion Laboratory have studied the mission in various forms. Its scientific value is not questioned and its relatively low cost is well known. One easily could argue that the scientific return per unit cost is higher than any other potential new start. Now this scientifically valuable mission becomes the requisite precursor to the major thrust of the Agency for the next three decades.

This new importance for the lunar orbit mission has caused us to shift our perspective of the mission somewhat. While low cost will remain a principal feature of the project, its overriding considerations must be displaced by the assurance of a thorough definition of the lunar surface. In particular, the role to be played by national security needs in manned

Gilruth Center News

Call X3944 for more information

Basic photography — This course includes basic principles and skills, operation of cameras, exposure, films, flash units, composition and more. The class meets from 7 to 9 p.m. beginning Nov. 4. The cost is \$30 per person.

Race — It's time again for the Gulf Athletics Congress Race. This is a 25 K race held at 8 a.m. Nov. 13. The cost is \$6 for pre-registration. For more information, call the Rec Center at x3594.

Ladies exercise — This class meets Tuesdays and Thursdays from 5:15 to 6:15 p.m. at a cost of \$12 per month.

Karate — This class meets Mondays and Wednesdays from 5:30 to 7 p.m. at a cost of \$20 per person.

Defensive driving — Learn to drive safely and qualify for a 10% reduction in your auto insurance for the next three years. The class meets from 8 a.m. to 5 p.m. Saturdays. The course cost is \$18 per person and space is limited. Call the Rec Center for details.

Women's USVBA — If you are interested in playing USVBA-sanctioned volleyball for JSC, contact Helen Munk at the Rec Center, x3594.

Theme contest — The Employee Activities Association committee is sponsoring a theme contest for the 1983 picnic, to be held on-site next May at the Gilruth Center. The winning suggestion will be worth a \$50 savings bond to the suggestor. The deadline for entries is close of business Oct. 29. Each entry must be submitted in a sealed envelope to Joan Baker, Code CA12. All entries will be date stamped; in the event of tie, the earliest submittal wins. The suggested theme must be explained sufficiently so it can be implemented, and the entry must be typed or clearly printed and must include the person's name, office phone, organization and mail code.

Cookin' in the Cafeteria

November 1 - 5, 1982

Tomatoes, Buttered Broccoli, Carrots in Cream Sauce.

Week of November 8 - 12, 1982

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 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: Holiday.

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

Monday: French Onion Soup; BBQ Sliced Beef, Parmesan Steak, Spare Rib w/Kraut, Chili & Macaroni (Special); Ranch Style Beans, English Peas, Mustard Greens. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

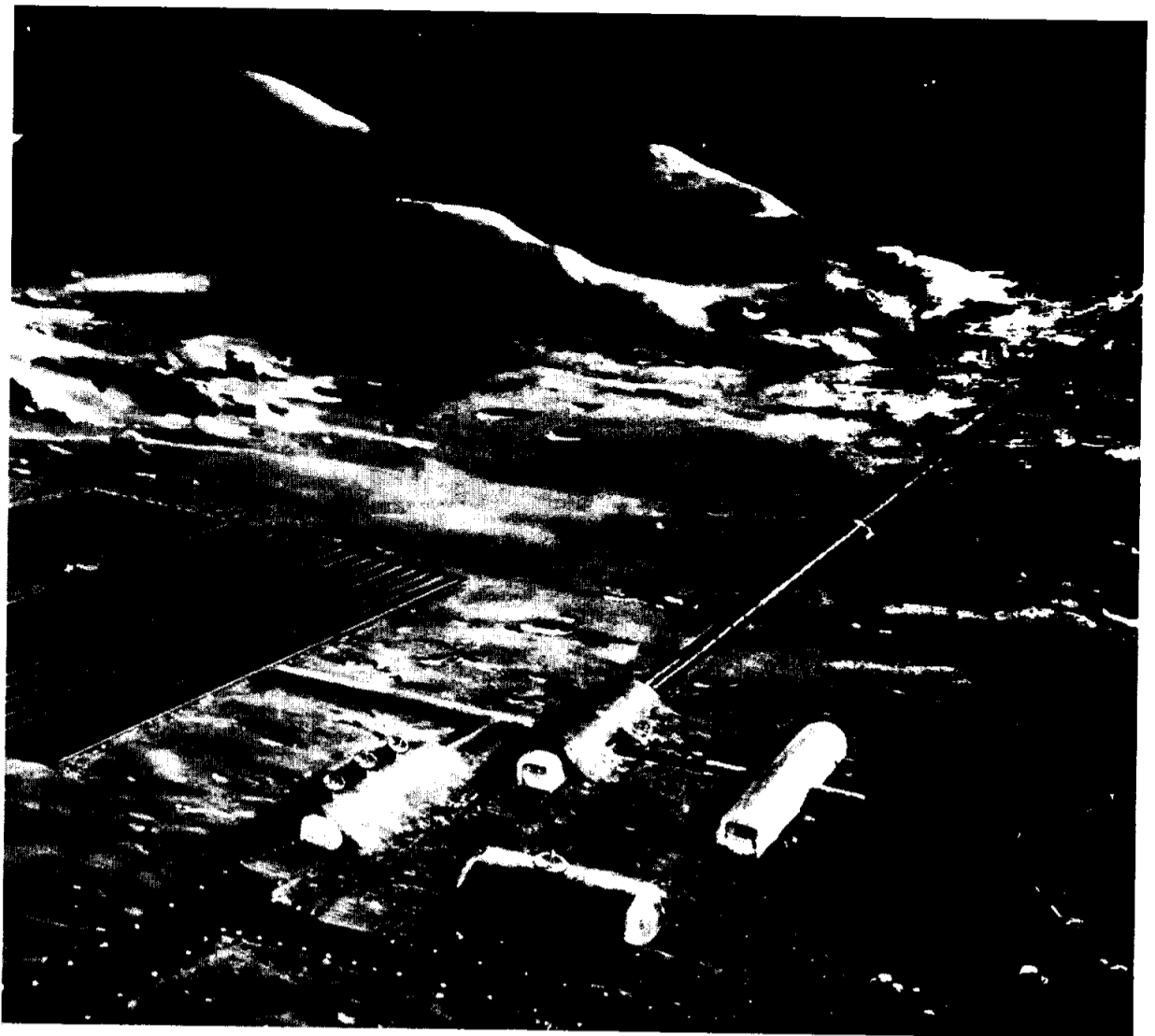
Tuesday: Split Pea Soup; Meatballs & Spaghetti, Liver & Onions, Baked Ham w/Sauce, Corned Beef Hash (Special); Buttered Cabbage, Cream Style Corn, Whipped Potatoes.

Wednesday: Seafood Gumbo; Cheese Enchiladas, Roast Pork w/Dressing, BBQ Link (Special); Pinto Beans, Spanish Rice, Turnip Greens.

Thursday: Beef & Barley Soup; Roast Beef w/Dressing, Fried Perch, Lasagne w/Meat, Chopped Sirloin, Chicken Fried Steak (Special); Whipped Potatoes, Peas & Carrots, Buttered Squash.

Friday: Seafood Gumbo; Fried Shrimp, Baked Fish, Beef Stroganoff, Fried Chicken (Special); Okra &

Return



One concept for a possible future lunar base.

(Continued from page 3)

Summary

the major Agency activity at the turn of the century. We anticipate its establishment near the end of the first decade of the 21st Century. Habitats will be assembled at low Earth orbit and orbital transfer vehicles will take them to lunar orbit. The infrastructure of near-Earth space, developed over two decades, will be utilized. At first a scientific research station, Moon Lab will grow to be a strategic and economic extension of the nation.

The Lunar Initiative is a broadly based program which involves every part of NASA. In particular, an extensive Space Transportation System is needed to support a manned lunar base. Requirements now are being formulated for the second element of the system, a low Earth orbit space station. Since the Earth orbit node will play an important role in the Earth-Moon transportation system, it is not too soon to consider concepts for lunar activities.

We believe the time is right to begin laying the foundation for a major Agency thrust culminating in an operating research facility on the surface of the Moon. The adoption of a long range goal or vision unifies the entire gamut of activity planned in near-Earth space. Capabilities developed as part of this program will affect every space activity, including a revitalized planetary program. The Lunar Initiative, as a programmatic theme, can enhance the integration of NASA's scientific and engineering responsibilities.

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 AP3 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 lease: Sunmeadow 3-2-2, split bedroom, fpl., fenced, near golf/tennis, \$685/mo. Call George, x3987 or 474-5267.

Ski Lake Tahoe, pick a week after Jan. 1, condo for up to 6 people, \$1,400. Call Gerlach, x2368 or 482-5825.

For sale or rent: University Trace 2 BR condo, refrig. W/D, 1,200 sq. ft. Call 482-1228.

For rent: Galveston By-The-Sea condo, 2 BR, furnished apartment for rent by days (2 min.) week or month. Call Clements, 474-2622.

For sale: 1 BR condo, The Landing on Clear Lake, gorgeous, luxury, on the water, pool, tennis, clubhouse, sauna. Call 538-2087.

For sale or rent: 1 BR waterfront condo, luxurious, all utilities and amenities, must see, \$450/mo. Call Jeff, 488-5660, x449, days, or 538-2087 evenings.

For sale: League City 3-1 1/2-2, like new, fenced, energy efficient, 50's, assume 9.75%, \$367/mo., refinance 12.1%, 5% down, immediate occupancy, 612 David. Call 554-6200.

For sale or rent: League City 3-1 1/2-2, fenced, 50's, \$2,300 total move-in, 12.5%, \$571/mo. Pl, 703 Reynolds. Call 554-6200.

Cars & Trucks

1981 Toyota Supra, excellent condition, loaded, \$9,000. Call Steve, 482-0640 after 5 p.m.

1978 280Z, 5 spd., air, AM/FM, mags. Call 332-6939 after 5:30 p.m.

1970 Plymouth Duster, needs body work. Call Welch, 474-2654 after 5 p.m.

1964 Ford 2000 Tractor, excellent condition, low engine hours, new paint, \$3,000. Call E. Bullock, 482-6401.

1976 Cadillac convertible, all power, loaded, leather interior, beautiful, \$8,500. Call Jim Bone, x2741 or 471-3528 after 5 p.m.

1979 Pinto, 3 dr., PS, PB, AC,

AM/FM/cassette, auto, new radial tires, clean, \$2,500. Call L. Walker, 479-7815 after 5 p.m.

1975 Plymouth Valiant Brougham, V-8, 4 dr., auto, AC, AM/FM/tape, clean, low miles, \$1,100 or best offer. Call 488-0491 after 5 p.m.

1980 VW Rabbit, 4 dr., 4 spd., AC, gas engine, AM/FM/cassette, excellent condition, \$3,995. Call 538-1597.

1975 Pontiac Le Mans, single owner, California registration, \$1,625. Call Larry Hamel, x5435 or 480-7917.

1971 Monte Carlo, brown, PS, PB, good tires, dependable transport, \$900. Call Vic, x6154 or 482-4120 after 6 p.m.

1980 Coleman Valley Forge pop-up camper, perfect, always stored in garage, \$2,795. Call Jack, x2891 or 538-3055 after 5 p.m.

1981 Trans Am, special edition, loaded, best offer. Call 484-5907 or come see at 950 FM 1959, Windjammer Apts. #702.

1981 Camaro, V-8, blue metalflake, T-tops, all power, rear defogger, rally wheels, 13,500 miles, excellent condition, \$7,800. Call 488-2269 after 4 p.m.

1978 Ford Bronco, 351 Cleveland V-8, headers, 4.5 inch lift kit, new wheels and tires, extras, 46K miles, \$8,500. Call 488-2269.

1973 Ford Galaxy station wagon, AC, PB, PS, auto, \$750. Call Ted, x5865 or 482-8827.

1976 MGB convertible, AM/FM, new steel radial tires, new top, good condition, \$2,695. Call 486-0462 after 6 p.m.

1978 Chevy Caprice Classic, AM/FM/Cassette/CB, PS, PB, AC, AT, vinyl top, original owner, \$2,795. Call 486-0462 after 6 p.m.

Cycles

Honda CB 360T, luggage rack, backrest, crash bars, excellent condition, \$595. Call 332-6046 evenings.

1980 Yamaha IT 175, very low miles, excellent condition, \$800 or best offer.

Call Bob, x6226 or 488-3314 after 5 p.m.

1980 Yamaha YZ 250, good condition, \$750. Call Randy, 481-3821 between 6 and 8 p.m. only.

Boats & Planes

Piper Lance for rent, AC, club

Note to advertisers

Commencing with the next issue of the **Roundup**, a more exacting set of rules will govern the placement of ads in the Swap Shop. Hereafter, all ads **must**: be submitted on 8 x 10" bond or memo paper (the type of paper is not important, the size is); be legibly printed or typed; be submitted along with the name, mail code, home telephone, office extension and signature of the initiator. Advertisements which fail to meet any of these guidelines will neither be published nor returned. No commercial ads will be accepted. No phone-in ads will be taken. The deadline for Swap Shop will remain the first Wednesday after the date of publication of the previous issue. Remember, the Swap Shop, which can provide advertisers a relatively high rate of success, is a free service. Your help in assuring a smooth flow of inputs to the **Roundup** office is greatly appreciated.

seating, \$75 hr. wet. Call L. Damewood, 482-5572.

19' 1977 Bayliner with easyload trailer, 130 Volvo inboard/outboard engine, \$3,000 negotiable. Call Elaine, x5814 or 338-1087 after 5 p.m.

Household

For sale: upright deep freeze, 22 cu. ft., Sears, \$200. Call Burton, x5536 or 471-0778.

Contemporary China Hutch and base, walnut veneer, \$275; GE refrig. side by side, 23.7 cu. ft., white, \$400. Call 334-1648 or 334-5559.

Dinette set, 42" round smoke class on chrome pedestal base, four swivel chairs, \$100 or best offer. Call 534-4315.

GE 15.6 cu. ft. yellow frostless refrigerator, top freezer, good trouble free condition, \$100. Call 479-2979 after 6 p.m.

Antique marble top oak occasional table, \$75; antique rocker, \$125; new 4 drawer oak chest, \$125; blue love seat, \$100. Call 481-4837 after 5 p.m.

Sears built-in dishwasher, \$25; floor polisher/scrubber, \$25, king-size bed spread, \$30; 10' round rug, \$35. Call 482-7073.

Photography

GAF model ST/602 movie camera w/case, super 8, zoom lens slow motion; Bell & Howell multi-motion movie camera and projector in excellent condition, both \$110. Call Weldon, x4971 or 482-1461.

Wanted

Roommate to share 3 BR home in Middlebrook. Call Wayne, x6226 or 486-7141.

Want cheap used printer for Apple II computer. Call Phil, 333-2476 after 5 p.m.

Want female housemate to share 3-2-2 in Middlebrook area, no pets or children, \$250/mo. plus half utilities.

Call 946-7793 or 488-7891 after 5 p.m.

Need non-smoker for carpool from Garden Villas/Glenbrook Valley/Hobby airport area, 7:30 or 8 a.m. to 4:30 shift. Call Bill, x5156.

Want to join carpool from Alvin to NASA, 7:30 a.m. to 4 p.m. shift. Call Wesselsk, x2276 or 331-5748.

Want rebound exerciser, bounce away or jogging tramp and old down quilt. Call 554-6200.

Pets

Lab pups, AKC, 5 blacks and 2 yellows, born Sept. 11. Call 534-2488 after 5 p.m.

Miscellaneous

Norge window AC, 18,000 BTU; 100ft. heavy duty 220 electrical cable, rubber coated. Call 332-4981 evenings.

Horse pasture for rent, 4 acres in Friendswood. Call Weldon, x4971 or 482-1461.

Atlas horizontal milling machine, w/ Bridgeport vertical heal, \$1,200. Call 331-5748.

Ampeg SVT Bass Head, Shure PE54-D microphone, Sunn 115 BH speaker and cabinet, MXR xlranger, excellent condition. Call 849-5194.

Holley 2bbl. "Economaster" carb for 1977 Chev. 305 cu. in. V-8, like new, \$50. Call Roger, x3458 or 481-6928.

Wedding dress, off-white, floor length, w/veil, size 9, \$175; gold couch, excellent condition, \$75. Call 480-2560 after 4 p.m.

Minnesota Fats slate pool table, 3.5 X 7, all accessories, \$325. Call Campbell 488-8421 after 5:30 p.m.

RCA Voltomst VTVM, \$65; HV probe for same, \$25; 15 amp 6V battery charger, \$15; Hewlett-Packard signal generator model TS-510, 20 to 420 Mhz., complete with case and manuals. Call 921-7212.

ASTP commemorative stampsheets, original post office price \$2.40, now only \$2.95. Call Jeff, x7429.