NASA Lyndon B. Johnson Space Center Space News Roundup

Vol. 27 No. 7

March 25, 1988

National Aeronautics and Space Administration

STS-26 team primed for 36-hour sim

The crew of the next Space Shuttle flight and the JSC Mission Operations team are scheduled to launch the 36-hour STS-26 Long Duration Simulation on Tuesday an exercise that may eventually be seen by millions of Americans.



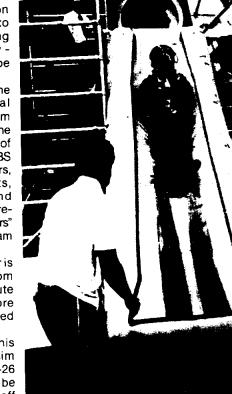
On top of the usual internal scrutiny, this sim will be under the watchful eyes of some 40 to 50 CBS news producers, corresponents, engineers and technicians preparing a "48 Hours" television program on NASA.

The Shuttle Mission Simulator is set to run at 9 a.m. March 29 from the launch-minus 9 (L-9) minute reset point, and end after no more than 36 hours of mission elapsed time (MET).

"Were looking forward to this sim as the next to the last long sim prior to our flight," said STS-26 Commander Rick Hauck. "We'll be looking very closely at the lift-off and post-insertion timelines and are anxious once more to exercise all the interfaces between the Orbiter and the MOCR (Mission Control Center), Sunnyvale and White Sands as we get ready for the flight.

The exercise will include the Management Team, the STS Operations Support Complex at Onizuka Air Force Base and White Sands

(Continued on page 2)



support of a simulated Mission SLIDING HOME-STS-26 Mission Specialist Dave Hilmers slides out of the Orbiter mock-up in Bldg. 9A during a March 11 Crew Station Review. The crew donned new partial pressure suits to evaluate crew equipment and procedures related to emergency egress methods and proposed crew escape options.

Manifest update swaps missions, uses new Orbiter

Chart on Page 3

for Space Shuttle missions and the formal integration process expendable launch vehicles (ELVs) swaps two missions, adds a mission to retrieve the endangered Long Duration Experiment Facility (LDEF) and retains an Aug. 4 return to flight.

Interchanging the STS-29 and STS-28 missions eases the Orbiter processing flow and enables NASA to maintain the required launch windows for two.

interplanetary missions in 1989-Mag-

ellan, a mission to map the planet Venus in April, and study the universe in the ultraviolet Galileo, a cooperative project with Germany to survey Jupiter and its moons, in October.

Another important addition is a mission to retrieve the Long Duration Exposure Facility (LDEF) in July 1989. Launched by the Space Shuttle in April 1984, LDEF originally was scheduled for retrieval in March 1985 and is expected to reenter the Earth's atmosphere by the mid-1990s if not retrieved. The LDEF retrieval mission will replace Astro-1 as the payload for STS-32.

The manifest, announced March 15, is for planning purposes only. It stretches through fiscal year 1993, includes 51 Shuttle missions-from STS-26 to STS-77-and 35 ELV launches, and utilizes OV-105, the replacement Orbiter now under construction. Firm Shuttle payload

NASA's new mixed fleet manifest assignments will be made during about 19 months before launch.

In addition to supporting Department of Defense mission requirements and the Commercial Space Initiative recently announced in conjunction with the new National Space Policy, the mixed fleet manifest continues to reflect the high priority assigned to civil space science and applications payloads, both on the Shuttle

and ELVs.

Astro-1, a Spacelab mission designed to

spectrum is being reconfigured to enhance the study of Supernova 1987A, an event that has drawn the attention of astrophysicists from around the world. The Broad-Band X-Ray Telescope has been added to complement the Astro-1 mission now slated to fly on STS-35 in November 1989. The Hubble Space Telescope maintains its flight assignment date of June 1989.

Two Spacelab payloads have been assigned flights on Columbia in 1990-a Spacelab Life Sciences mission in March and the first of the Atmospheric Laboratory for Applications and Science mission series, ATLAS-1, scheduled for September. The Gamma Ray Observatory, moved forward in the projected schedule, is now slated (Continued on page 2)

Three Space Shuttle crews get nod for 1989 flights

By Jeff Carr

Crews have been chosen for three Space Shuttle missions scheduled to fly in 1989, ending the crew selection activities planned before return to flight.

Shuttle mission STS-29, scheduled for launch January 19, 1989, will be commanded by Navy Capt. Michael L. Coats. Piloting Discovery will be Air Force Col. John E. Blaha, Marine Cols. James F. Buchli and Robert C. Springer, and James P. Bagian, M.D., have been assigned as mission specialists.

be to deploy a third Tracking and Data Relay Satellite (TDRS-D). Based on the new Shuttle flight manifest, STS-29 is scheduled to fly after STS-27 and before STS-28.

A five-member crew also has been chosen for Shuttle mission STS-30, slated for launch April 27, 1989. Commanding the four-day mission aboard Atlantis will be Navy Capt. David M. Walker. The pilot will be Air Force Col. Ronald J. Grabe. Norman E. Thagard, M.D., Mary L. Cleave, Ph.D., and Air Force Maj.

mission specialists.

be to deploy the planetary probe Magellan. Magellan is scheduled to arrive at Venus in mid-1990, and will map the entire surface of Venus for the first time, using specialized radar instruments.

STS-31 will feature deployment of the Hubble Space Telescope and is targeted for launch June 1, 1989. Air Force Col. Loren J. Shriver will command the mission. Piloting Discovery will be Marine Col. Charles He also was mission specialist on

The primary mission objective will Mark C. Lee, have been chosen as F. Bolden. Steven A. Hawley, Ph.D., Navy Capt. Bruce McCandless II, The STS-30 mission objective will and Kathryn D. Sullivan, Ph.D., will fly as mission specialists.

Coats flew as pilot on mission STS 41-D in August 1984.

Blaha will make his first space flight since being selected as an ✓ astronaut in 1980.

Buchli will be making his third Shuttle flight. His first was as a mission specialist aboard Discovery for the first Department of Defense mission, STS 51-C, in January 1985.

STS 61-A (Spacelab D-1) in October 1985.

Springer also selected by NASA in 1980, will make his first space flight

Bagian will make his first space flight since his selection in 1981. He was born February 22, 1952, in Philadelphia.

Walker flew as pilot aboard Discovery on mission STS 51-A in November 1984

Grabe will make his second space flight also. He flew as pilot on STS (Continued on page 2)

Small business

Scientists hear about future's bottom line

Key technological developments in NÁSA's science program can mark an appropriate pathway for manned exploration of our solar system, but legislative decisions made this year will determine whether we follow that path, according to NASA officials speakat JSC.

The Bldg. 2 auditorium special session on robotic and human exploration initiatives highlighted the week-long conference hosted by JSC and the Lunar and Planetary Institute. About 690 scientists gathered here March 14 through 18 to discuss topics ranging from cosmic dust to planetary atmospheres.

"The decisions that the Congress is being asked to make this year are decisions of historical proportions," said Dr. Lennard Fisk, NASA's associate administrator for Space Science and Applications. "They will be looked back upon by future generations of Americans as deciing at a special session of the 19th sions which preserved our position Lunar and Planetary Conference of leadership in space or allowed that mantle of leadership to pass from us."

"Let us hope there are still visionaries out there who will not get mired down in the nation's shortterm budget problems, and who will recognize that this nation's future lies in space and will ensure that the future is protected," Fisk said. 'We have been living off the (Continued on page 2)



Dr. Bevan French of the NASA Headquarters Solar System Exploration Division presents a plaque commemorating the American discovery of the Martion moon Phobos' to Dr. Lev Mukhin of the Soviet Space Research Institute. The Soviet government has agreed to place the plaque on either the spacecraft or the lander expected to reach Photos in the spring of 1989. The aluminum plaque is a transfer of U.S. Naval Observatory astronomer Asaph Hall's telescope log of his August 17, 1887 discovery, with both Russian and English inscriptions.

researchers to sign contracts

By Beverly Green JSC's Small Business Innovation Research (SBIR) Office will manage contracts to be awarded next month to 12 companies that will build prototypes of potential hardware for upcoming space projects.

Specifically, we were looking for companies that presented ideas that NASA hadn't already invented or for innovative approaches that could solve an existing problem," said Milton Goodhart, JSC SBIR officer.

Follow-on contracts in the amount of approximately \$500,000 will be awarded in April to each of the 12 companies whose innovations have proven to have merit during the research and evaluation of SBIR Program Phase I. The projects selected for Phase II (Continued on page 2)

People



Nisbet

Secretaries recognized Angela Hess and Victoria Nisbet recently received Marilyn Bockting Secretarial Excellence Awards. Hess, secretary to the Space and Center Operations Procurement Office chief, has established an excellent filing system and handles administrative tasks. As the senior/ lead clerical person for the division, Hess manages to keep work

Hess

flowing smoothly with minimal disruption. Nisbet, personnel clerk to a Personnel Management Specialists section, provides a full range of personnel management services to about one half of JSC. Nisbet has gained experience and knowledge of personnel functions that enable her to respond to a high percentage of inquiries that normally would be referred to the professional staff.

Three new flight directors appointed By Brian Welch Three new flight directors have been named within the Mission Operations Directorate at the Johnson Space Center.

The three, all of whom are former flight operations controllers, are Robert E. Castle, Jr., N. Wayne Hale, Jr., and Robert M. Kelso.

Mission Operations Director Eugene F. Kranz also announced that Michele A. Brekke, a flight director since 1985, has accepted a position as a payload integration manager in the National Space Transportation System Integration and Operations Office.

During Space Shuttle missions, flight directors lead the large cadre

of operators within the Mission Control Center who are responsible for monitoring spacecraft systems and operations. Flight directors have overall responsibility for the conduct of the mission and for real-time decision making as mission events unfold.

Castle, head of the Communications Section, Systems Division, has served as Instrumentation Communications Systems Officer, or INCO, for several Shuttle missions. He began his career at JSC in June 1976 as a summer intern and is the recipient of numerous group achievement and performance awards.

Hale, Head of the Propulsion

Systems Section, Systems Division, has also served as head of the Communications Section and as a senior propulsion systems flight controller on Shuttle missions. He began his career at JSC in June 1978 and has received numerous group achievement and performance awards.

Kelso, head of the Payload Support Planning Section, Operations Division, has served as a payloads flight controller on several Shuttle missions. He began his NASA career at JSC in May 1973 as a cooperative education student and summer aide. He is the recipient of numerous group achievement and performance awards.

Team ready for sim

(Continued from page 1)

Ground Terminal. Real-time Shuttle Mission Simulator (SMS), Weightless Environment Training Facility (WETF) and Manipulator Development Facility (MDF) support will be available if required.

Larry Bourgeois will be lead Flight Director. Other flight directors will be Gary Coen, ascent and entry; Milt Heflin, orbit 1; Chuck Shaw, orbit 2 and payload deployment; and Bourgeois, planning.

Lead Sim Sup will be Stokes McMillan. SMS Training Team leader will be Rick Bush.

Apollo investment requires renewal

(Continued from page 1)

interest of the Apollo era of technology investment and it is now time to replenish our technology reservoir," agreed John Aaron, assistant administrator for the Office of Exploration.

This pathway should be balanced, using robotic missions to lead the way for human exploration of the solar system and establishment of a lunar base, Aaron said.

The Mars Observer Mission now scheduled for 1992 launch will be an important precursor to further exploration of the "crown jewel of planetary exploration," Aaron said. Likewise, the proposed Mars Rover Sample Return will pave the way through technology and science return and have profound implications to eventual human exploration.

"The thrust of our human Mars exploration work will be on the rationale for such undertaking to concentrate on the science objectives, leveraging our resources and the exploitation of potential spinoffs," said Aaron. "It is an ambitious goal and one we're anxious to tackle. However we overlook infrastructure investments that must take

Bulletin Board

Digital signal processing seminar March 30

The IEEE Education Committee is sponsoring a free vendor seminar at 9 a.m. March 30 at the Lockheed Plaza 1 Bldg. The topic will be "Digital Signal Processing." To preregister, call Eddie Robinson, 333-7029.

Disney's World on Ice to be at Summit April 2

Tickets are now available at Bldg. 11 for Walt Disney's "World on Ice" starring Snow White and the Seven Dwarfs. The show will be at noon April 2 in the Summit. NASA price is \$6 and employees are limted to six tickets. For more information call x35350.

Lunar bases and space activities symposium April 5-7

A second symposium on Lunar Bases and Space Activites of the 21st Century, sponsored by NASA, AIAA, American Society of Civil Engineers, American Geophysical Union and the Lunar and Planetary Institute will be held April 5-7 at the Westin Galleria Hotel in Houston. Symposium General Chairman is JSC Director Aaron Cohen. Speakers will discuss general areas of science, technology and policy, and technical sessions will consider contributed papers. On-site registration will cost \$85. Copies of the symposium program are now available from the Syposia Office, Lunar and Planetary Institute. For more information, call 486-2150

Clear Lake SIGAda meeting scheduled April 7

The next Clear Lake area SIGAda meeting will be at 5:30 p.m., April 7 at the Gilruth Center. Dennis Cornhill will talk about "Hard Real-Time Scheduling and Its Implications on Ada." Dinner, which begins at 6:30 p.m., costs \$7.50 for CLAS members and \$8.50 for others. Reservations deadline in April 1. For more information call Charlie Randall, 488-8806.

Astrononautical Society holds Houston symposium

The Southwest section of the American Astronautical Society will host James E. Oberg and other aerospace guest speakers from 1 p.m. to 5:30 p.m. on April 7 in the Bldg. 2 auditorium. The topic will be "Space: Recharting the Past, Exploring the Future"

NASA night at Astroworld will be April 8

Tickets are now available for a JSC Employee Activities Association NASA night at Astroworld from 6 p.m. to midnight on April 8. Employees may purchase up to eight tickets for \$7 each at the Bldg. 11 exchange store from 10 a.m. to 2 p.m., Monday through Friday. After the first 5,000 tickets are sold the price will go up to \$8.95.

Parent-child relationships symposium is April 9

The Employee Assistance Program is co-sponsoring a symposium, "Mother/Daughter and Father/Son: A Day of Sharing and Learning," from 8:30 a.m. to 2:15 p.m. April 9 at the Gilruth Center. Topics include parent-child relationships, self-esteem, "your Bodymachine," and sexually transmitted diseases. Registration is \$10, and includes lunch; deadline is April 1. For more information, call the EAP at x36130.

ABWA scholarship program benefit on April 9

The Clear Lake area chapter of the American Business Women's Association (ABWA) will hold its annual flea market from 9 a.m. to 5 p.m. April 9 at the Galveston County Park (Walter Hall Park) in League City. Flea market items include apparel, shoes, toys, games, books, household items, plants and baked goods. For more information call Gail Anderson, x30294.

Automation and robotics workshop is April 14

The JSC Systems Development and Simulation Division and the Houston section of American Institute of Aeronautics and Astronauts are sponsoring a one-day workshop on automation and robotics on April 14 at Gilruth Center. Highlights of the workshop will include a luncheon presentation on "Perspectives of Robotics in Space" by Dr. Del Tesar of the University of Texas and a special afternoon panel on autonomous robotics operation issues. Luncheon cost is \$7; the workshop is free if registration is made before April 8. After April 8 the workshop cost is \$3.00. For reservations call Sharon Lactson, x31525. For more information call Andre Sylvester, x31537.

Manifest supports new space policy (Continued from page 1)

for March 1990 and the Ulysses mission to study the Sun and its as a fully reimbursable payload. environment, remains in its projected October 1990 launch date.

The manifest supports the commercial space initiative announced with the National Space Policy, February 11, 1988, as follows:

(ISF) is manifested as a fully reimbursable payload under an existing Space Shuttle.

agreement.

★ The Spacehab is manifested

★ The Commercially Developed Space Facility (CDSF) will be manifested when the government's lease arrangements are complete.

The mixed fleet manifest continues to reflect NASA's plans to ★ The Industrial Space Facility use ELVs for those payloads that do not need the capabilities of the

Three Space Shuttle crews get nod

(Continued from page 1)

51-J, a DOD mission. Grabe was born June 13, 1945, in New York, N.Y.

Thagard makes his third space flight after serving as mission specialist on STS-7 in June 1983 and on STS 51-B in April 1985.

Cleave flew previously as mission specialist on STS 61-B in November 1985

Lee makes his first flight in space since his selection in 1984. Shriver flew as pilot on DOD

Bolden was pilot on STS 61-C in January 1986, and makes his second space flight.

Hawley makes his third flight after serving as mission specialist on STS 41-D in August 1984 and again on STS 61-C in January 1986.

McCandless flew as mission specialist on STS 41-B in February 1984

Sullivan served as mission specialist on STS 41-G in October 1984, and makes her second space flight. place.'

Small businesses researchers to innovate

(Continued from page 1)

The selected companies include Eltron nical monitor. Research Inc. based in Aurora, III., which will investigate a process to extract oxygen from lunar soils for life support on a lunar base or awards are diversified, with annual

Creare, Inc., Hanover, N.H., will build and test a prototype high performance condenser for operation in a gravity-free environment

mission STS 51-C in January 1985.



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Gilruth Center News

Call x30304 for more information

EAA badges - Dependents and spouses may apply for pictured I.D. badge on April 4 or April 12 between 6:30 and 8:30 p.m.

Defensive driving - Course is offered April 16 from 8 a.m. to 5 p.m. and costs \$20

Weight safety — This is a required course for those employees wishing to use the Rec Center weight room. The class will be on April 6 or April 20. The cost is \$4.

Physical Fitness — The next 12-week course of the JSC Physical Fitness Program will be held April 4 to June 24 from 11 a.m. to noon or from 4 to 5 p.m. All NASA and contractor employees and dependents are eligible upon completion of an acceptable physical exam and a maximal treadmill stress test. For more information call x30301.

Almost Anything Goes — Six coed teams are needed Saturday, May 7. Teams consist of 3 men and 3 women. The entry fee is \$10. Entry deadline is April 29. Every team member will receive a T-shirt.

activities totaling approximately \$7.5 million dollars.

Since the program's inception in 1983 close to 40 small businesses have received Phase II SBIR award contracts managed at JSC. "We've been screening a series of innovations of small companies for best potential contractors for Space Station or other JSC advanced programs. Many of the small businesses will be competitive in commercial industry as well," said Goodhart.

Research was recently completed for the first four companies that received follow-on contracts in 1985. Bend Research, a company that developed a reverse osmosis spacecraft water purification system, and Thermacore, a company that developed flexible heat pipes, are now prime contenders for roles in Space Station subcontracts.

Twenty-three other Phase II activities are ongoing at JSC. Companies recently selected for Phase II follow-on awards are scheduled to begin their two-year studies in April.

as propellant oxidizer for rockets, said David McKay, technical monitor

Wilton Industries Inc., Danbury, Ct., is developing hardware that may allow up to 24 crew members to use a wireless optical communication system. Expanding capabilities of wireless telemetry may provide for a full-scale high speed digital hardware development program in physiological data monitoring -or robotics, said Joe Prather, technical monitor.

Netrologic of San Diego, Calif., is integrating the capabilities of artificial intelligence and neural networks into mission planning, a process that will extract features from data through automatic pattern recognition, said James Villareal, technical monitor.

Speech Systems Inc., based in Tarzana, Calif., will be developing a program designed to reduce the amount of time it takes a computer to respond to the inquiries of natural speech. Presently, it takes about 15 seconds for one to receive an answer, said Villareal.

E-Tek Dynamics, Inc., of Melborne, Fla. will develop a tunable laser diode and incorporate this package into an optical phase locked loop that will control a more precise wavelength output of the light source, said Kent Dekome, technical monitor

Umpqua Research Co., based in Myrtle Creek, Ore., will design, fabricate and test a filtering system to remove soap, detergent and debris from the waste water of the Space Station laundry and shower. The filtering system is designed to help extend the life of the equipment, said Raphael Garcia, tech-

that may serve as a condenser or heat exchanger for Space Station. The JSC technical monitor is Russ Long.

Foster-Miller Inc., of Waltham, Mass., will develop a continuous fiber manufacturing process for aluminum graphite Space Station truss joints and end fittings out of continuous fibers, said Tom Dunn, technical monitor.

Transition Research of Bethel, Conn., will develop a proximity operation using log polar coordinate transformation. This method will allow lighter hardware for image computations in space and reduce the time necessary to identify correct attitude and range of an object or scene in space.

Photo-Catalytics Inc., based in Boulder, Colo., will develop a process utilizing ultraviolet light to purify and disinfect reclaimed spacecraft water.

Sensor Frame Inc., based in Pittsburgh will refine the hardware capabilities of an optic-based computer input device that should allow operators to manipulate objects or soft control panels using a computer screen and multiple simultaneous finger gestures, said JSC techincal monitor Linda Orr, manager of Graphic Analysis Facility.

Infrared Fiber Systems, Inc., of Silver Springs, Md., will develop the technology base for infrared fiber optic temperature measurement and spectroscopic systems that may be utilized in radiative thermometry in confined or harsh environments such as aircraft or spacecraft propulsion systems, high velocity wind tunnels or spacecraft and aircraft fire detection systems, said Steve Koontz, technical monitor

Expendables

FLEET AN IFEST

Space Shuttle

-	Date/	Inclination/ Altitude	Crew/ Duration	Primary Payload	Carrier	Date Lau	unch Vehicle	Orbit	Launch Site	Payload
light	Orbiter	28.5°	5	TDRS-C	IUS	3/88 Sco	out S-206C	LEO	SMR	San Marco-DL
26	8/4/88 Discovery	28.5° 160	5 4			4/88 Sco	out S-211C	LEO	WSMC	SOOS-III
	10/27/88	_	5	DOD		5/88* Atla	as 63E	SS	WSMC	NOAA-H
27	Altantis	-				6/88 Sco	out S-213C	LEO	WSMC	NOVA-II
						8/88 De	lta 183	LEO	ESMC	DOD-3
29	1/19/89 Discovery	28.5° 160	5 4	TDRS-D	IUS	8/88 Sc	out S-214C	LEO	WSMC	\$00\$-IV
28	3/2/89 Columbia	-	5 —	DOD		2/89 De		SS	WSMC	COBE
	4/27/89	28.9°	5	Magellan	IUS		las 50E	SS	WSMC	NOAA-D
30	Altantis	160	4			9/89* Atl	las Centaur 68	GSO	ESMC	FLTSACOM-F8
31	6/1/89 Discovery	28.5° 320	5 5	HST	Unique	11/89 Sc	cout S-215C**	LEO	WFF	CRRES-1
32	7/13/89	28.5° 220	5 5	LDEF RETR SYNCOM IV-5	Unique Unique		elta	LEO	ESMC	ROSAT
	Columbia 8/24/89		_	DOD			cout S-218C	LEO	WSMC	TRANSIT-27
33	Altantis		_				las Centaur	GSO	ESMC	GOES-I
27	10/8/89	34.3°	5	Galileo	IUS-2 STA		las Centaur**	GTO	ESMC	CRRES
34	Discovery	160 00.5%	4 7	ASTRO-1	IG+2 PAL	•/	cout S-210C	LEO	WSMC	TRANSIT-28
35	11/16/89 Columbia	28.5° 190	9	BBXRT	Unique		llas 34E	SS	WSMC	NOAA-I
36	12/14/89 Altantis	_	_	DOD		12/90 At	llas Centaur	GSO	ESMC	GOES-J
						3/91 Sc	cout S-217C**	LEO	WFF	CRRES-2
37	2/1/90	55.0°	7 7	CIRRIS (DOD) IBSS (DOD)	Pallet SPAS		tan IV** /IUS	EO	ESMC	Planetary Alt.
JI	Discovery	140	1	Teal Ruby (DOD)	Unique		BD**	LEO	TBD	NASA-1**
	3/5/90	TBD	7	SLS-1	LM		itan III** IUS	GSO	ESMC	TDRS Callup***
			TBD					LEO	ESMC	EUVE
38	Columbia	160	100			8/91 D	ena			
	Columbia 3/29/90	28.5°	5	GRO	Unique		ena BD**	LEO	TBD	NASA-2**
39	Columbia 3/29/90 Altantis	28.5° TBD			Unique	9/91 TI			TBD WSMC	NASA-2** NOAA-J
	Columbia 3/29/90	28.5°	5 4	GRO DOD		9/91 TI 12/91 A	BD** tlas 45E	LEO SS		NOAA-J
39	Columbia 3/29/90 Altantis 5/10/90	28.5° TBD —	5 4	DOD STARLAB (DOD)	LM+1 PAL	9/91 TI 12/91 At	BD** tlas 45E fore this date.	LEO SS	WSMC	NOAA-J
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band radio, 1950s, original, manuals, ex.

cond., \$115 OBO; 6 gal. boat gas tank

and anchor, BO. Pat. x39375 or 333-4214.

4 drawer, oak student desk plus chair,

\$100 OBO. John, x36615.

white TV. 280-9720.

26. Frederic, x31515.

OBO. Walt, x35939.

x36101 or 554-6685.

4750 or 488-7113.

cars, \$65. 331-6260.

or 488-1044

474-5610

534-3837.

488-5564

488-5564.

Blanche, x34220.

\$90 OBO. 488-0719.

cartridges, \$100, 332-2318.

483-4542

Large 6 drawer metal desk, \$75 OBO;

Transmission from '82 Toyota Celica,

MCS stereo system, AM/FM, turntable,

speakers, 12' color TV; 5' black and

8' slide in camper for LWB pickup,

Moving sale, dresser, refrigerator,

dryer, color TV with new remote control,

VCR, tennis racket, 10 speed bike,

cassette player, tools. Sell before March

import truck, black tubular type, \$55

Rear sport bumper for Nissan or Toyota

Utility trailer, 15" wheels, heavy duty,

approx. 4' x 7' x 3' with tarp cover, low

bed/drop axle, similar to U-haul. \$390.

complete, good cond., \$20. Roundtree,

microwave and oven safe, service for 8,

Magic garden pattern. \$15. Jody, 282-

2 tires, brand new, 13" for compact

Spa, 310 gal, 5 seats & recliner, 1.5hp

pump, air compressor, gas pool heater

(250 BTU), \$2,000. x36607 or 481-2854.

leather belt quiver, 15 special made

arrows and hunting heads, \$200. x38497

Compound crossbow, 200 lbs. pull,

South Park Cemetery Lots, Sec. J. Lot

39, perpetual care, MV, \$495 ea., sell

\$395 ea. or 3/1K. Cookie, x34888 or

watts, 120/240 VAC, 15 gal. aux. gas

good cond., \$200. Audra, x39174 or

Rowing machine, ex. cond., \$175.

Pistol, 9 mm auto, Manurin, holster,

10' x 17' trampoline, needs some repair,

Muskin swimming pool, 15' x 30' x 4'

oval, exc. cond., filtering system with

inline chlorination, chemicals and pool

Smith Corona Coronamatic 2200

Antique golden oak library table, \$250;

Grandfathers 7-1/2 antique clock, \$2,500;

large table lamp, 4.5", \$25; complete

antique French BR suite, (twin beds,

vanity, bench, nite stand), \$2,200.

heavy duty microwave or computer

printer stand with storage underneath,

\$20; new campstove, \$22.50; 2-straight

chairs, \$20; small mahogany bookcase,

\$25; fluorescent desk lamp, \$12.50; fern-

stand, \$12.50; Apple II external drive ,

\$125; Star computer printer, \$125.

Lawn tractor, Ford II hp, 42" mower,

Radial tire, used approx. 5000 miles,

15" 235/60 series, raised white letters,

grabber model, \$30 OBO. Bob Adams,

good cond., \$250. 337-5018.

x32567 or 488-3314.

TV cart on rollers, \$12.50; hand-built

typewriter, electric, portable w/extra

tools, \$700. Bob, x36939 or 550-3312.

tank, \$775. Richard, 481-1518.

extra clip, \$275 OBO. 482-1582.

McCulloch portable generator, 3500

Toyota truck camper and bed liner,

Front bumper for 75-79 Camaro,

Lenox Temperware dinnerware set.

manual, 5 spd., overdrive, exc. cond.,

\$75. Wayne, x32435 or 337-3766.

Property & Rentals

²age 4

Lease: League City, duplex, 3-2.5-1, W/D, refrig., fans, fenced pool, tennis court, \$595/mo. Joni, 480-3377

Lease: League City, duplex, 2-2.5-1, W/D, refrig., fans, fenced pool, tennis court, \$495/mo. Joni, 480-3377

Sale: Lake Livingston waterfront, new subdivision, new bulkhead, 110' on water, 50' on road. 527-9760 or B70-4152

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

Lease: Baywind II, 1 BR, FPL, W/D conn., pools, clubhouse w/exercise & party rooms available. \$295/mo. John Mason, 333-4144 or 333-4114

Sale: Highland Meadows, Scarsdale, 2-1-1. \$36,000. Mary, x37104.

Lease: Nassau Bay townhome, 2-2.5, microwave, fans, W/D connections, carport, pool, \$600/mo., deposit, available May 1. x32864 or 335-1695.

Lease: NASA 1 & El Camino, 2-2.5-1, two-story duplex, FPL., 1,500 sq. ft., garage w/opener, pool, \$495/mo. x37008 or 452-3361.

Sale: Pagosa Springs, CO, interval ownership, 2 BR house, 20 min. to Wolf Creek ski, national forest, RCI and VAX exchange incl., \$7,500. Scott, x34437 or 334-2278.

Lease: Lake Livingston waterfront, 3-2, furnished, pier, fishing, skiing, swimming, weekend and weekly rates. 482-1582.

Lease: Bacliff, mobile home lot, \$85/mo., \$50 dep. 488-1758.

Sale: Friendswood/Sun Meadow estates, wooded lot, cul-de-sac, bordered by stream, golf course, 210' deep, gas/elect. on site. Doug, x32860 or 486-7412

Lease: El Dorado, furnished condo, 1 BR, study, 1-1/3 baths, W/D, TV, appliances, linens, dishes, pools, jacuzzi, exercise room, tennis, security system, 282-6422 or 488-7038

Lease: New Orleans, French Quarter, furnished, antiques, top level penthouse, private sundeck, rooftop skyline/river view, Jazz Festival Week, April 22-29. 282-6422 or 486-7038.

Sale: League City, 3-2-2, pool, fans, garage door opener, dog kennel, brick dog house, \$79,500. Rich, x36900 or 554-7134.

Lease: 2-1 condo, 950 sq. ft., W/D, pools, near day care, low deposit, \$330/mo. 280-9822

Sale: Camino South, 3-2-2, remodeled kitchen, microwave, self cleaning oven, fans, stain-master carpet, patio, gas grill, porch swing, \$66,000. x30020 or 488-5390

Lease: Galveston, restored Victorian 3-1-1.5, 2 car garage, two-story, \$775/ mo. Carodyne Holliday, (409) 763-8030. Lease: Ellington, 2 BR, pool, day care, \$335/mo. Eric, 483-8420 or

484-9179. Lease: Seabrook, 2-2-2, FPL, W/D, new paint, carpet, no pets, \$390/mo. 532-1182 or 534-4369

Lease: Ellington, 2 BR, pool, day care, \$355/mo. Herb, 483-8161 or 481-1253

Lease: University Place townhouse 3-2.5-1, refrig., microwave, W/D, FPL, fans, miniblinds. David, 483-2791 or 488-9768

Sale: Seabrook, 3-2-2, 1,399 sq. ft., new carpet, oven, vinyl siding, fenced, access to boat dock, tennis courts, \$51,000 OBO, Susan, 280-8006

Lease: University Trace, 1 BR, study. om, pool, \$385/mo., \$300 deposit. Barbara, 480-1746

'81 Ford E-250 Maxi-Van, 351-V8, dual air, 71K mi., AM/FM, 4 captains chairs, rear bench converts to bed, trailering package, ex. cond., \$7,500. x33124 or 482-1348.

'85 Wilderness Travel Trailer, 25' style N, sleeps 5, ex. cond., \$7,800. x33124 or 482-1348.

'81 Camaro, V6, 61K mi., new shocks, brakes, ex. cond., \$2,695. 484-5149 or x32103.

'84 Honda Accord LX, 48K mi., ex. cond. \$5,750. 483-4542.

'67 Mustang, 3 spd., 289-V8, new paint, AM/FM, AC, good tires, airshocks, headers, mags, good cond., \$2,995. Mike, x38169 or 482-8496.

'86 Cavalier, 4 dr. dark red, PS, PB, cruise, auto, AC, AM/FM, low miles, pad lock, \$7,000. Sandi, x30086.

'86 Ford Escort GT, red, gray interior, AC, cruise control, AM/FM, PS, PB, new tires, 30K mi., ex. cond., \$6,000 OBO. Matt, x31933 or 333-2635.

'84 Nissan Sentra, 2 dr, SR5, AC, PB, new tires, AM/FM, \$3,800 OBO. 282-3494 or 484-3683.

'64 Chrysler New Yorker, 413 c.i. engine, good cond., auto; AM/FM, \$600. Peter, x38856 or 480-7917.

'86 Ford Bronco II XLT, 4 X 4, loaded, auto. trans., 26K mi., \$10,500. x34427 or 482-0626.

'68 Chevy 1/2 ton, V8, needs body work, have parts, \$800. Joan, x34618 or 486-1058.

'85 35' Mailard motor home, loaded, low mileage, \$37,000. D. Long, 337-4051. '83 Mercury Cougar, 6 cyl., tinted

windows, PW, AC, AM/FM, cream color, 56K mi., \$3,995. Kay, x34845. '79 280ZX, 5 spd., sunroof, tinted

windows, louvers, AM/FM, AC, new clutch, brakes, will supply new fender, \$68K mi., \$3,295. Kay, x34845.

'87 Bronco II, Eddie Bauer edition, ex. cond., loaded, \$13,900. Joy, 282-4919 or 409-935-6496.

'85 Buick Somerset, limited ed., blue, 2 dr, 2.6L engine, loaded, AM/FM, orig. owner, new tires, battery, brakes, plush interior, \$5,900. Alan, x31497 or 532-2038.

'85 S-10 Chevrolet Blazer, Tahoe package, red/black, ex. cond., \$7,900. Linda, 280-1500, ext. 3428.

'87 RX-7, sports model, white, maroon interior, AM/FM, 23K mi., ex. cond., \$11,995. Jeff, x31493 or 996-7097.

'76 Mercedes 450 SL, both tops w/new soft top, tire, seats, exhaust system, garage kept, records, \$18,450. Angela, 282-3963 or 486-4466.

73 Dodge Maxivan, windows, 3 spd., AC, PS, AM/FM, 360 V8, tires, good mechanical cond., rusty body, \$600 OBO. Walt, x35939.

'76 Cutlass, 2 dr, tan, PS, PB, AC, new tires, 110K mi., 350, 4 bl, \$800 OBO. Frederic, x31515.

'67 RS Camaro, A/T, PS, AC, new interior, 75% restored, 327 engine, \$2,700. Craig, 644-0315.

'83 Nissan Pulsar, PS, PB, AC, 30 mpg., 5 spd., sunroof, new clutch, AM/FM, 49K mi., equalizer, brown, \$4,000. Jason, x35376.

'74 Plymouth Duster, needs engine work, \$125 OBO. x34679. '71 Volkswagen bus, \$500. Rene,

X35121 or 488-7909.

'86 Plymouth Voyager SE Minivan, PS, AC, auto, AM/FM, extras, \$11,000. 483-8282 or 481-6501

'80 Toyota Corolla, 2 dr. navy, 108K mi., AM/FM, AC, auto, new paint, \$1,500. x32662 or 334-1867

'85 Chevy C-20 conversion van, PS, PB, auto, AC, cruise, 4 captains chairs, bench seat/bed, AM/FM, 26K mi., \$12,000. x34290 or 538-1015.

'80 Chevy Malibu-Classic, new battery, brakes, shocks, tires, high mileage, good cond, \$1,000. Bill, x37750.

Murray 3-speed bicycle, good cond., \$35. x34116 or 482-8827.

Women's 10 spd. bicycle, exc. cond., \$50; women's 3 spd. bicycle, \$30. Jody, 282-4750 or 488-7113.

Boats & Planes

'78 Wellcraft, 19', 170 hp, Mercruiser I/O, S/S prop. 32 gal. tank, stereo, galvanized trailer, good cond., \$4,500. x35178 or 944-2391

'77 19' Invader, 165 Mercruiser, heavy duty tandem galvanized trailer, rarely used, 90 total hours, \$4,500. Anderson, x37178.

15' Chrysler Mutineer Daysailor, good cond., ready to sail, trailer, \$1,050. 333-6356

'85 19' Webbcraft, 200 Mercruiser, walk-thru windshield, AM/FM, platform, tandem trailer, pleasure ski boat. 483-7536

23' Gulf Coast Wingkeel, trailer, main, 4 jibs plus spinnaker, 6hp Johnson. \$4,500 OBO. Kyle, 333-1500.

14' McKee Craft, 50hp Mercury canopy, instruments, vinyl cover, galvanized trailer, \$2,500. 326-1278.

'74 Tri-Hull I/O boat, 140hp Mercruiser w/trailer, new tires, \$2,800. Brenda J., x37752 or 996-9738.

18' Catamaran AMF track sailboat with trailer, extras, like new, \$3,200. 333-3056

'84 Nacra 5.8 Catamaran, 19', \$3,500. Wayne, x32435 or 337-3766.

Kayak, whitewater "playboat", 13' w/flotation bags, skirt and cockpit cover, \$200. Samouce, x35053 or 482-0702.

15' Chrysler Mutineer sailboat, trailer, \$1,200 OBO, will trade for restorable sports car of equal value. Steve, x38651 or 480-9715.

Household

Kenmore sewing machine, extras, \$200; small wood drafting table, new top, \$75 OBO. Sandi, x30086.

Two unused 23K/24K gold plated flatware, 70 piece service for twelve; finest chrome nickel steel, storage case, was \$1,200 now \$350 OBO. Cliff, x38166 or 486-8810.

King-size mattress and box spring, 7 yrs. old, \$50. Scott, x36244.

Solid oak bunk beds, mattresses, bunkie boards, ex. cond., \$396. Kim, x34824 or 554-2030.

Single bed, frame, spring, mattress, \$40; rocking chair, matching velour ottoman \$25; plastic corner bookshelf, \$10. Ronnie, x32539.

FPL screen w/andirons, standard size, \$35. x37937 or 482-1317

King-sized bed, \$75. Debbie, x32403 or 326-1415.

Breakfast table, 42" octagon, dark wood, 4 brown leather breuer chairs,

ex. cond., \$150. 482-1429. White formal sofa; TV stand; cherry

wood coffee table; typewriter; bookshelf. 280-9720.

Queen-sized waterbed w/full motion mattress, side pads, set of sheets and pillow cases, headboard w/mirrors, \$115. x34832.

Pets & Livestock Whirlpool Microwave oven, new. \$150 BO. Susan, 280-8006.

4 bar stools, heavy molded plastic, brown w/avocado backs, \$45. Cookie, x34888 or 474-5610.

Audiovisuals

Video camera (JVC GX-N7U), portable VCR, GE 4020 w/625 tuner, extras, \$1400; video camera, GE 6038E, portable VCR, GE 4020 w/625 tuner, extras, \$1,800. Rees, x32291 or 326-1303 Ham radio tower, tri-ex in-51, 51' when extended, galvanized x37022. Sony linear tracking turntable w/cartridge, \$89. Chuck, 282-3012 or 486-6762. AT&T 6300+ w/80286 & IMB RAM, 1.2MB FD, 360KB FD, 20MB HD, 2MB Ast RAM card, 300/12008 Hayes modem, AT&T high res. RGB monitor, AT style keyboard, AT&T simultask, MS-DOS and Unix, operating system, AST's Crosstalk IV, GN Basic. Sell separate, BO. Peter, x30850 or 334-2081.

Apple II C, disk drive, monitor, NLP printer, AppleWork software, educational games, \$900. 488-5860.

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,

> Tandy color computer II, 64K RAM, printer, recorder, \$200. Jose, 280-2053. Commodore 128 w/disk drive, monochrome monitor, daisywheel printer, 60 programs, \$750 OBO. John, x36615.

Wanted

Room 147. No phone in ads will be taken.

Want Ham HF transceiver for mobile installation, pay up to \$350. Chuck, x34241 or 487-2978.

pop up top, sleeps 4, gas range, ice Want roommate to share 3-2-2 house box, table, sink, \$350. Roundtree, x36101 in CLC, non-smoker only, \$300, plus 1/2 or 554-6685. utilities, 488-8029.

Want used World Book or Britannica Encyclopedia. Gordon, x30518 or 486-4403.

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

Want roommate to share 5 BR Friendswood home, male or female, includes utilities, W/D, microwave, cable, \$225/ mo. Rowena, x31670 or 996-9249.

Want Mistral superlight or Bermuda windsurfer board, Bob, x35939.

Need sound engineer for newly formed rock bank, must have own equipment, P.A, mixer, etc. Alan, 282-3968 or 482-2957.

Want to buy Corvette parts, '80-'82 tail light lenses, 84-88 wheels and tires, 86-88 700R-4 4 spd. auto transmission. BeeJay, x30668 or 486-8156.

Will pay \$20 for copy of Mercury history, "This New Ocean", from private collection. Terry White, x35111.

Want VW Super Beetle, any condition considered. Dave, x38311 or 488-5259. Want roommate to share 4-2-2 in League City, Meadowbend, W/D, microwave, household privileges, non smoker, no pets, bed available, \$175/mo., plus 1/3 utilities. Peter, x30850 or 334-2081.

Peavey, XM-6 powered mixer, 6-chan-

Kay 5 string banjo, case, book, \$65.

Lowery C-500 electronic organ, ex.

Fender Stratocaster, KOA wood body

brass hardware w/tremoto, built in MXR

"Distortion +" w/hard shell case, cords,

strap w/straplocks, ex. cond., \$350 OBO.

Hammond full size organ, 2 keyboard,

hythm section, all instrument sounds,

Minolta XG-1, 35mm camera, F/1.450

1000 millimeter telephoto lens, two

mm lens, carry case, X20 flash, 135 mm

lens, wide angle lens, polarizing filter,

lens for spotting scope, can adapt to any

camera or can be a telescope, metal

suitcase, was \$450 now \$200. x38497 or

Calico kitten, 1 yr. old female, free.

White housecat, 1 yr. old. Ronnie,

Black kitten, male, 12 weeks, free to

Free puppies, mother is Belgian

good home. Joan, x34618 or 486-1058.

Sheepdog, father unknown, male/female,

med-large, gray, Benji looking, 5 months.

nels, 150 watts, like new, \$300. Joe,

Musical Instruments

Steve, x38651 or 480-9715.

Pat, x39375 or 333-4214.

\$600 OBO. 337-5018.

\$200. Jose, 280-2053.

488-1044

x32539.

Photographic

cond., \$6,000. D. Long, 337-4051.

x33559 or 996-1667.

Sale: Angleton, Tow/Holiday Lakes, corner lot, \$750. Brenda J., x37752 or 996-9738.

Sale: 3-2-2, remodeled, new carpet, garage doors, painted inside and out, owner finance with 10K down and assume 8-1/2 FHA. Bal. \$25,400., \$390/mo. or new loan \$49,500. x35590. Lease/Sale: Austin/UT condo, 1-1, assume loan, no equity. B. Craig, x34158 or 420-2936.

Lease: 1 BR, 1 bath condo on lake, \$350/mo. Angela, 282-3963 or 486-4466.

Cars and Trucks

'77 Ford Granada Ghia, 4 dr., 6 cyl., 4 spd., PS, AC, AM/FM, 100K mi., good cond., good tires, service manual, orig. owner, \$1,800. Allen, x35538 or 486-5740.

'69 Mercury Cougar, 351 Windsor V8, good cond., many new parts, no A/C, \$600. Gene, x39115.

'78 Volvo 244 DL, beige w/brown interior, 4 spd., sunroof, good cond., one owner, \$3,150. x39307 or 480-8329.

78 Pontiac Bonneville Brougham, 4 dr., PW, cruise, AC, AM/FM, new tires, ex. cond., \$1,250. 996-8797.

Cycles

'85 Big red 3-wheeler, loading ramps, adult owner, ex. cond., \$1,250.554-2627. '85 Suzuki FA-50 moped, 350 mi., ex. cond., \$300. Greg, 280-7341

'81 Yamaha Seca 550, uncrated in '86, like new, Nava and Fulmer helmets, alarm, low mileage, \$1,400 OBO. Joe, x36894 or 480-4775

83 Honda Shadow 500, 5,800K mi., tinted windshield, helmet and cover, good cond., \$1,500 OBO. Moses, X31765 or 437-6727.

'82 Honda 1103-wheeler, needs chain, \$375. 482-1602.

'87/'88 mopeds, new, ex. cond., \$260/ea. 484-5149 or 483-2103.

'85 Honda 700 Sabre, Honda line fairing, cover, 12K mi., \$2,100. 480-4434. Honda GL650 silverwing motorcycle, 4,800 mi., \$2,200 OBO. 335-8539.

'85 Yamaha Maxim, 700 cc shaft drive, good cond., low mileage, \$1,000. 480-1271.

Panasonic DX1000, 12 spd., bicycle, light action shifting, \$225. Cherie Guillory, 488-2652.

Sony MLV-1000 multichannel TV sound adapter, decodes MTS format stereo and SAP broadcasts, built-in amplifier, input and output jacks, new, warranty cord, was \$175, now \$75 OBO. Mike, x38169 or 482-8496.

Apple II C, monitor, stand, extra disk drive, Apple printer and programs, \$700. Ken, 280-2404 or 473-2602.

Televideo TS-802 CPM system, 2 disk drive, 64K memory w/CPM system disk, MBASIC, Wordstar, \$300; Transtar daisy wheel printer, wide carriage w/tractor feed or single sheet feed, letter quality, \$350 ea. or both for \$525, 282-3799.

AT&T 6300 PC w/640K, 2 drives, Epson printer, monitor and software, 2 yrs. old, \$975. x33213.

Aston Tate's Dbase for Macintosh, \$200 OBO. Susan, 280-8006.

Registered Appaloosa Gelding, hands, x30122.

Sharon, x39121 or 489-1701

x37937 or 482-1317.

South American, gray faced, common boa, four years old, 4' long, \$50, tank \$20, Cherie Guillory, 488-2652.

Lop-earred bunnies, born 3-4-88, will be ready for new homes by Easter, \$20 ea. Tamela. x36159 or 472-6323. Cocker spaniel. Jody, 282-4750 or

488-7113.

Miscellaneous

30 gal. aquarium w/stand, hood w/light and aquology power one pump/filter, \$60 OBO, 488-3644.

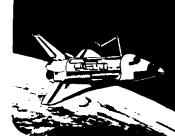
Sears steel belted tire on wheel, 5 lugs, BR-13. Dave, X39579 or 482-6187. BMW rims for 318 or 325, \$110 a piece, Scott, x36244.

Car stereo speakers, 5-1/4 50 watt, \$40, 6 x 9 100 watt, \$60. John, x39007 or 480-4918

10 years worth of Texas Parks and Wildlife magazine, free. 532-2082.

Toro self propelled rear-bagging lawn S.W. radio, Zenith trans-oceanic multi mower, \$75. Steve, 282-8935 or 326-1540.





The Roundup is an official publication of the National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees Roundup deadline is the first Wednesday after publication

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