

# Space News Roundup

Vol. 26 No. 14

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National Aeronautics and Space Administration

## AC-68 damaged

NASA's last Atlas-Centaur rocket — AC-68 — was damaged July 13 at Kennedy Space Center when a service platform hit the Centaur stage's hydrogen tank, causing the tank to rupture and depressurize. There were no propellants on board.

Four General Dynamics Space Division technicians suffered minor injuries as they left the area, KSC officials said. They were treated at the scene and released.

Early efforts were directed toward stabilizing the Centaur vehicle to preclude damage to its oxygen tank and RL-10 engines or to the Atlas stage. A procedure was being developed to remove the Centaur stage from the gantry at launch

complex 36, but workers were hampered by severe thunderstorms in the days immediately following the accident.

The accident occurred at 10 a.m. CDT as the service platform was being removed in preparation for lifting the Centaur stage to troubleshoot a liquid oxygen leak. The vehicle was stabilized at 4 p.m. by attaching rope slings to each side of the Centaur to hold it into position and by partially remating the Centaur with its interstage adapter bolts.

The hydrogen tank, which is made of 0.014-inch-thick stainless steel and pressurized for structural strength, appeared to be damaged

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## Lockheed, Grumman chosen for two Station contracts

Lockheed Missiles and Space Co. and the Grumman Corp. have been selected by NASA for negotiations leading to the award of two major Space Station contracts.

Lockheed's Astronautics Division, Sunnyvale, Calif., was chosen June 29 for design, development and operation of a Station software production capability called the Software Support Environment. Much of the work will be performed at JSC.

Grumman's Space Station Program Support Division, Bethpage, N.Y., was chosen July 2 for Station systems engineering and integration, as well as management support, for the Station Program Office at NASA Headquarters and several NASA centers, including JSC.

The Lockheed contract, with a basic performance period of six years beginning this month, is a cost-plus-award fee arrangement which will include an additional three-year priced option. The total estimated cost proposed by Lockheed for the nine-year period is approximately \$141 million.

The Software Support Environment is comprised of software production tools and development standards, hardware and system software specifications, documentation, procedures, policy and

training materials. The SSE, when implemented in a computer facility, will provide the support capability to be used by the Space Station program.

In that sense, the SSE will function much as JSC's Software Production Facility now does for the Space Shuttle program.

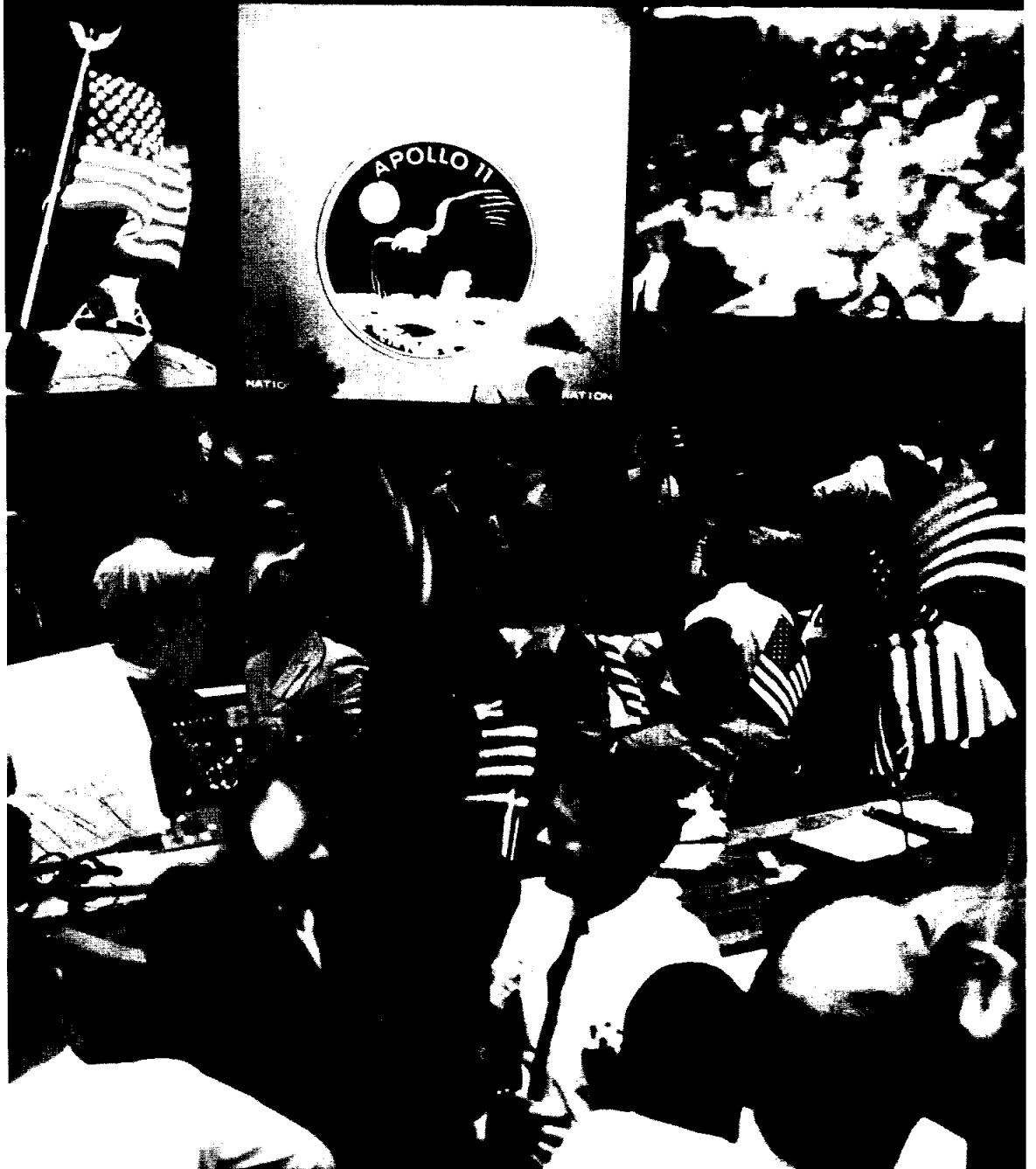
The only other company to submit a proposal was IBM Federal Systems Division of Houston.

The period of performance of the Grumman contract will extend through completion of assembly of the Station in orbit plus one year, or, as now envisioned, about 11 years. Grumman's proposed cost (in real year dollars) for the currently planned performance period is \$841 million, with a price option for additional support of \$406 million.

The Program Support Contract will provide support to the Program Office in Reston, Va., in the areas of Systems engineering and integration; program control and management; information systems; operations; program requirements and assessment; utilization; safety, reliability and quality assurance; and international integration.

TRW, Space Station Services Division, Redondo Beach, Calif., was the only other company to submit a proposal.

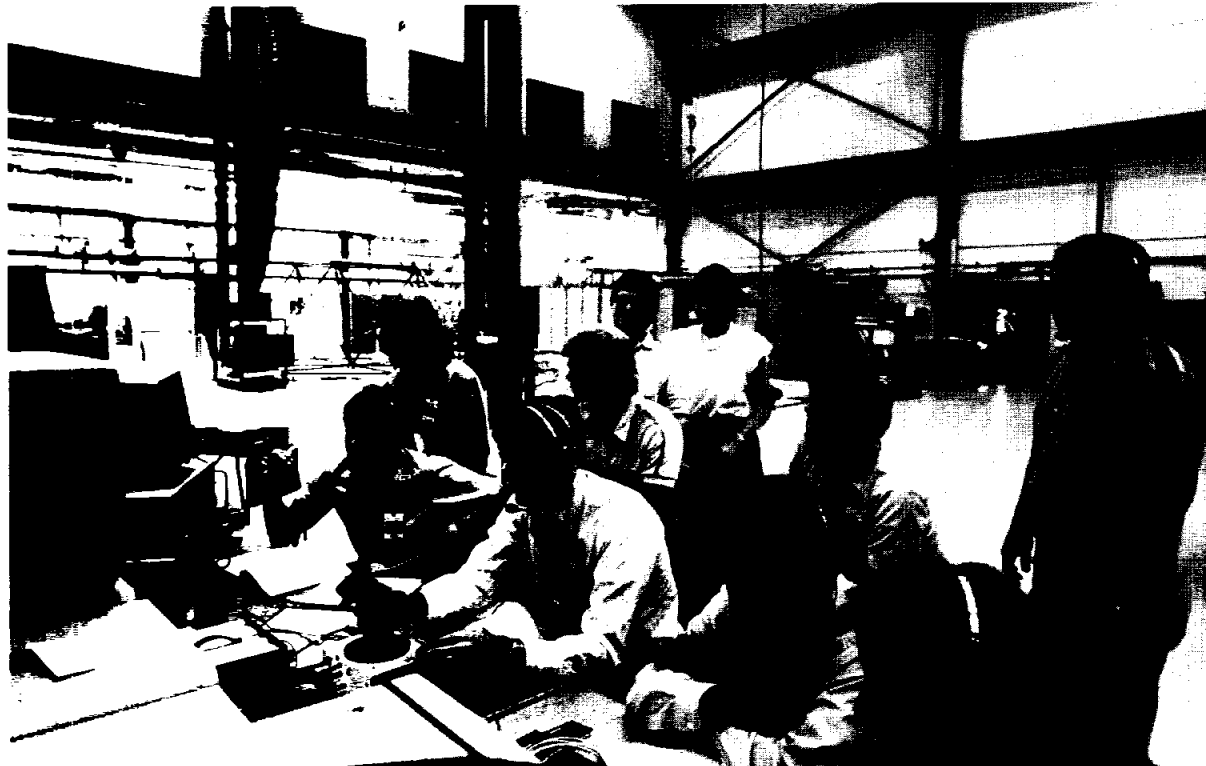
## July 1969: Task accomplished



The cigars were lit, the flags were waving and euphoria gripped these members of the Apollo 11 flight control team July 24, 1969, at the successful conclusion of the most celebrated voyage of exploration in history. A series of splashdown parties commenced at such places as the Hofbrau Garden in Dickinson and the Singing Wheel in Webster and lasted for several days up and down NASA Road One. For many, Apollo remains the high point of their careers. "Apollo," wrote former Director Christopher C. Kraft Jr., "was like an intoxicating wine, and certainly the last of the vintage."

## Testing underway on telerobotic device

By Kyle Herring



Among those monitoring a recent test of the telerobotic simulator in Bldg. 13 are front row, left to right, data monitor George Palmer, operator Phil Sheridan and robotic test conductor LaBarian Stokes. Looking over Palmer's shoulder is test director Anita Rosenbalm, and at far right is docking test conductor Don Wilbanks.

The Structures and Mechanics Division has begun a two-month engineering study to evaluate the use of robots in assembling structures in space.

The study uses a telerobotic device—a manipulator remotely operated by a human—mounted on the Dynamic Docking Test System's motion table in the high bay of Bldg. 13. Eventually the engineering team working on the project hopes to formulate a proposal for a future Shuttle flight experiment.

Called ACCESS Telerobotic Assembly Demonstration (ATAD), the study has two primary goals. The first is to better understand how a telerobotic device would work if mounted on the end of the Shuttle's Remote Manipulator System (RMS). The second goal of the study is to explore ways in which structures themselves can be made easier for a robot system to work with.

The telerobotic device now being planned by NASA for a variety of uses beginning in the 1990s is the Flight Telerobotic Servicer, or FTS.

The FTS could be remotely piloted by a human operator or from the Space Shuttle or the Space Station. It would mount to the end of a standard RMS, or it could be attached to an unmanned Orbital Maneuvering Vehicle or a manned Orbital Transfer Vehicle. But whatever the application, the FTS would provide a degree of dexterity which the RMS devices are not capable of, and with two or more manipulators available, would in a sense provide an extra pair of hands for working with payloads or structure assembly.

In designing the FTS for close proximity work on the end of the Shuttle or Station RMS, however, engineers will have to contend with the tendency of the RMS to flex when operated with an attached mass. One goal of the ATAD study is to understand the nature of the RMS deflection and how that affects the use of a telerobotic device.

"That's why we are using the six-degree-of-freedom table in Bldg. 13," said test conductor LaBarian Stokes. "It allows us to simulate close proximity operations and the

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## Bulletin Board

### Fame City tickets offered

Tickets to Fame City, an indoor amusement center in Houston, are available at reduced prices from the Bldg. 11 Exchange Store through the Employee Activities Association. Entertainment at Fame City includes bowling, roller skating, movies, and a water park. Tickets are on sale from 10 a.m. to 2 p.m. Monday through Friday, and a NASA badge is required when making the purchase. Call x35350 for more information.

### Astronomy seminar session listed

Upcoming JSC astronomy seminars for August and July include a lecture by Dr. Dave McKay on "The Lunar Regolith" on July 29. "Other Worlds," a discussion of space art by artist Kim Poor, will be given on Aug. 12. Poor is president of the International Association of Astronomical Artists, who will be meeting at JSC at that time. The Aug. 12 meeting will be held in the Bldg. 2 Teague Auditorium. The July 29 meeting will take place in Bldg. 31, Conference Room 193. Astronomy seminars are held every Wednesday from noon to 1 p.m. For more information contact Al Jackson, 280-2296.

### Alley subscription program underway

The Alley Theatre corporate "Dinner and the Theatre" subscription program is again being offered to NASA and contractor employees. Ten open passes and twenty-one 2-for-1 dinner certificates will be available from the EAA for \$99.90. Interested persons are urged to subscribe prior to Aug. 1, when a price increase is scheduled, according to Doris Wood. Subscription forms are available from EAA representatives or from bulletin board flyers. The forms should be sent to Wood, Mail Code FD14, before Sept. 30, or sent directly to the Alley Theatre. Call Wood at x37545 for more information.

### Comedy Showcase discounts available

The Comedy Showcase, a comedy nightclub in Houston, offers free admission to NASA employees Wednesday, Thursday and Sunday nights, and half-price admission Friday and Saturday nights. There is no limit on group size, just say that you are from NASA. Call 481-1188 for reservations.

### UH-CL Shaw Festival tickets offered

Tickets to three George Bernard Shaw plays will be offered by the University of Houston-Clear Lake for their Houston Shaw Festival. "The Devil's Disciple" will be performed July 23, 24, and Aug. 1, 2. "Heartbreak House" will play July 18, 19, 25, 26, 30, and 31. "I Believe In Make-Believe" will be shown on July 22, 23, 24, 29, 30, and 31. The NASA ticket price is \$5. For times and reservation information, call 488-9334.

### Pascal/C/Modula-2 Users Group meeting scheduled

The JSC Pascal/C/Modula-2 Users Group will hold its next meeting from 11:30 a.m. to 12:30 p.m. July 28 in Bldg. 30, Room 3101. All interested employees are invited to attend. For more information, call Keith Brown at x38952, Joe Giarratano at x38075 or John Box at x33349.

### MOD Olympics to be held in September

Organizers are formalizing plans for the next Mission Operations Directorate Olympics, an all-day family event to be held Sept. 26. All MOD and STSOC employees and family members are invited to attend the gathering. Activities will include softball, tennis, volleyball, tug-of-war and a variety of other games. Events will be structured around a slate of seven teams from MOD and seven teams from STSOC. Trophies will be awarded to each team, with an overall championship trophy going to the highest scoring group. Tickets for the olympics will go on sale in August. The rain date is October 3. For more information, call Diane Dorrian at x35775.

## Gilruth Center News

Call x30304 for more information

**Beginning tennis lessons** — Tennis lessons begin Aug. 3 and continue every Monday for eight weeks from 5:15 to 6:45 p.m. The cost is \$32.

**Early morning workout** — Morning exercise sessions begin Aug. 10 and meet every Monday and Wednesday from 6:45 to 7:45 for eight weeks. The cost is \$24.

**Scuba** — A six week scuba class will begin Aug. 17 and meet every Monday and Wednesday from 6:30 to 9 p.m. The cost is \$45, plus fees.

**Defensive driving** — An all-day defensive driving class will take place Saturday, Aug. 22 from 8 a.m. to 5 p.m. The class qualifies drivers for a 10% reduction in auto insurance rates.

**Basketball and volleyball registration** — Sign-up for the fall Men's basketball and Mixed volleyball leagues will be held Aug. 10-17. Call the Rec Center for assigned registration times.

**Weight safety** — his class can be taken Aug. 5 or Aug. 20 from 8 to 9:30 p.m., and is required for anyone wishing to use the Rec Center Weight Room.

## AC-68 damaged

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extensively by the pressure release. The Centaur engines, the avionics module, and the Atlas appeared undamaged, but detailed inspection will be necessary to make a final determination, KSC officials said.

AC-68 had been scheduled for launch in late summer or early fall, and was to carry the FLTSATCOM F-8 communications satellite into orbit for the Navy and Department

of Defense. NASA announced July 15 the formation of a board to investigate the mishap. The team will investigate the accident and report its findings and recommendations by Aug. 14, 1987, to Rear Adm. Richard H. Truly, Associate Administrator for Space Flight. Chairman of the board is James E. Odom, Director of the Science and Engineering Directorate at Marshall. No JSC employees are on the board.

# Testing under way

(Continued from page 1)

deflection of the RMS as it grapples the FTS."

For the purposes of the study, a five-degree-of-freedom arm supplied by Deep Ocean Engineering, (DOE) Oakland, Calif., is being used. In combination with the motion table, the DOE arm is able to simulate an RMS with an FTS grappled to the end of it.

Stokes said this demonstration is the first step in the development of more robotic-friendly hardware that would be used in construction of the Space Station and other space structures. He said the goal is to help reduce the amount of extravehicular activity (EVA) required in space construction.

Engineers from the Mechanical Design and Analysis and Loads and Structural Dynamics Branches are working on the program, which was conceived in September 1986. Actual demonstrations began June 23 in the Bldg. 13 high bay. Initially,

the robotics operating group will assemble one bay of the ACCESS truss in the vertical position.

One component of the ATAD is the 6-DOF table which is made up of a triangular shaped active table and six linear hydraulic actuators. These actuators provide the table with six degrees-of-freedom: X, Y and Z translation, roll, pitch and yaw. For this demonstration, motion is constrained for roll, pitch and yaw.

Attached to the table is the Linear Translation/Load Cell Table (LTLCT) and the arm supplied by Deep Ocean Engineering. The deflection is simulated by load cells feeding data to the computer for force and moment resolution during the RMS structural dynamics simulation. The LTLCT supports the arm and provides X-axis translation. The DOE arm itself is the electrohydraulic manipulator used to tele-robotically assemble the ACCESS nodes and struts into a truss. It is controlled by a test operator who

views the end effector movement on four video monitors. The cameras are positioned in the aisle south of the arm, on the ground below the arm, behind the arm on the 6-DOF table and on the arm itself.

Upon completion of each assembly sequence the operating group members will meet to review and assess the test. Changes in the assembly techniques, test configuration and test sequence may result from these reviews. Stokes said that after review of the ATAD, planning will begin to test other designs in truss construction.

Others working on the project include Philip Sheridan, George Parma, Anita Rosenbalm, Scott Askew, Jack Humphreys, Benny Sprague, Gene Vickers, Ching Kam J. Ng, Kevin Edenborough, Don Wilbanks, Monty Carroll, Chris Young, Steve Ruiz, Allan Gist, Tom Ross, Stacy Huggins, John Yoshioka, James Madison and Lisa Thwaites.

## Aaron named to Washington post

John W. Aaron, a JSC employee since 1964, has been named Acting Assistant Administrator for the newly-created Office of Exploration.

Aaron will succeed Dr. Sally K. Ride, who is leaving NASA in early autumn to join Stanford University. Aaron reports to NASA Headquarters Aug. 5.

Aaron is currently a special assistant for Mars sample return studies to JSC Director Aaron Cohen. Prior to that he was Acting Manager of the Space Station Program Office and Deputy Manager of the Space

Station Level B Program Office.

From 1964 to 1969, Aaron served as a flight controller in the Electrical, Environmental and Communications (EECOM) discipline for Gemini and Apollo. In 1969, he was named Section Head for the Electrical Power, Sequential and Instrumentation Systems for the Command and Service Module and Skylab vehicles.

From 1973 to 1976, he served as technical assistant to the Chief of the Spacecraft Software Division. From 1976 to 1979, he was Software Project Manager for the Approach

and Landing Test and Orbital Flight Test programs.

In 1979, he was named Assistant Chief of the Spacecraft Software Division, and from 1981 to 1984 served as Chief of that organization. He joined the Station program in 1984 as Deputy Manager of Level B.

Aaron has received numerous honors and awards, including the Exceptional Service Medal, the Exceptional Engineering Achievement Award and the Presidential Rank Award for Meritorious Executive.

## Roundup seeks club information

As a service to its readers, the *Roundup* is compiling a comprehensive directory of special interest clubs, organizations and other groups in the area whose activities may be of interest to the JSC community.

The hope is to formulate an all-inclusive listing, or as nearly comprehensive as possible. To that end, we are seeking general information on all types of groups, from recreational to professional, from the JSC Chapter of the National Management Association to the JSC Aero Club or the Lunafins.

Our primary interest is in those groups affiliated in

some way with the space center, although we are also interested in groups in the Clear Lake area whose membership is open to JSC employees.

The directory will be maintained by the *Roundup* as an informational resource and guide to recreational activities for employees, and will be updated periodically in the pages of the paper. If you would like to see your group listed as part of this directory, please clip (or photocopy) the accompanying survey form and return it to *The Space News Roundup*, Mail Code AP3, x38648.

### Club Survey

Name of club, group or organization: \_\_\_\_\_

In existence since: \_\_\_\_\_ Approximate number of members: \_\_\_\_\_

Approximate membership mix: JSC Civil Service: \_\_\_\_\_% JSC Contractor: \_\_\_\_\_% Other: \_\_\_\_\_%

Primary interests or activities: \_\_\_\_\_

Membership dues or fees: Yes \_\_\_\_\_ No \_\_\_\_\_ If so, how much? \_\_\_\_\_

Frequency of meetings, outings, etc.: Weekly \_\_\_\_\_ Monthly \_\_\_\_\_ Quarterly \_\_\_\_\_ Other \_\_\_\_\_ (specify)

General location(s) of meetings: \_\_\_\_\_

Does club maintain facilities, equipment or other property? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, please specify: \_\_\_\_\_

Does club sponsor events? If yes, please describe: \_\_\_\_\_

Affiliations, national memberships, etc., of note: \_\_\_\_\_

Mailing address and points of contact: \_\_\_\_\_

Additional information: \_\_\_\_\_

Please return, with your name and phone number, to:

**The Space News Roundup**

Code AP3, NASA Johnson Space Center  
Houston, TX 77058

# People



## JSC team finishes 6th in Superstars

Proving they are good spellers as well as athletes, members of JSC's team in the Houston Superstars competition spelled out NASA during a recent photo session. The 20 JSC employees on the team finished sixth out of 25 teams representing a variety of Houston corporations. The four-day event raised \$5,000 for the Special Olympics. Members of the JSC Team were: Rich Campbell, Ellen Baker, Rex Delventhal, Kathy Donnellan, Mike Fawcett, Karen Edelstein, Mark Ferring, Kristen Erickson, Mike Fowler, Jana Jacobson, Darin Janoschka, Debbie Johnson, Kent Joosten, Carole Keller, Y.K. Liu, Lisa Lockwood, Ralph Tolle, Kim Spurgeon and Susan Zinn.

## Hammack, an STG alumnus, to retire from JSC Aug. 1

**Jerry Hammack**, one of the last of the original 35 members of the Space Task Group still with NASA, will retire from JSC Aug. 1. Hammack, longtime Safety Division Chief and presently the Assistant to the Director of Safety, Reliability and Quality Assurance, went to work for the National Advisory Committee for Aeronautics in May 1944. His first task at the Langley Laboratory was designing propellers as part of the propulsion aerodynamics program. This led to work as project engineer for the XF-88B research aircraft, which had two jet engines in the rear and a turboprop in front. In



Jerry Hammack

November 1958 he was assigned to the STG and later shared with eight other employees in awards for the invention of the Mercury spacecraft itself. From 1966 to 1971, he was head of the Landing and Recovery Division of all manned spaceflights. After two years as Chief of the Future Programs Division, he became Chief of the Safety Division in 1973, a post he held for 14 years. Hammack said he is "too used to working" to stop entirely, and plans to report for work at Hernandez Engineering, Inc. two days after his retirement from NASA.

## Bungo and Boyce honored

JSC aerospace physicians **Michael W. Bungo** and **Joey B. Boyce** were honored recently at the 58th Annual scientific meeting of the Aerospace Medical Association. Dr. Bungo, Director of the Space Biomedical Research Institute at JSC, was given the Louis H. Bauer Award for his research on replacing the fluid volume of astronauts' blood plasma when returning from spaceflights. Bungo has also worked



Michael W. Bungo

in the use of cardiovascular ultrasound to study human cardiac changes during flights. Bungo received his doctor of medicine degree from the New Jersey Medical School in Newark. He has worked at several Houston hospitals and has a private cardiology practice. Boyce, a resident in aerospace medicine at JSC, was presented the Julian E. Ward Memorial Award for his work during residency at Wright State University



Joey B. Boyce

and at JSC. During his first year of residency, Boyce obtained a private pilot's license and studied for a masters' degree in aerospace medicine. He was commissioned in the U.S. Air Force Reserve in 1984 and attended the USAF Flight Surgeons Course in 1985. In his second year of residency, Boyce completed the USAF Primary course in aerospace medicine and then transferred to JSC for the rest of his residency.

## An honorary Doctor of Letters for Bagian

**Dr. James Bagian**, a Shuttle mission specialist, was recently awarded an honorary Doctor of Letters degree from Drexel University. Bagian, a 1973 graduate of Drexel, was also a speaker at the University's recent 100th commencement ceremonies. After earning his M.D. from Thomas Jefferson University in 1978, Bagian joined NASA as a flight surgeon. He has been an astronaut since 1981. The honorary degree was awarded by Drexel President **William S. Gaither**.

## Council honors three at banquet

The Clear Lake Council of Technical Societies honored three local engineers during their 4th Annual Awards Banquet in June. The awards for Technical Educator, Technical Person and Technical Administrator of the Year were presented by JSC Director **Aaron Cohen**, who also was the keynote speaker. **Dr. Carl Scott** of JSC's Advanced Program Office was named Technical Person of the Year for his work in aero-assisted braking. Other nominees were NASA Astronaut **Mary Cleave**, **Radhe Sharma** of Stubbs-Overbeck and **Dr. Kwei Tu** of Lockheed Engineering and Management Services Co. The award for Technical Administrator of the Year went to **Ralph Sawyer**, Chief of JSC's Tracking and Communications Division. Sawyer was honored for his leadership in the research and development of communication systems and data links for space vehicles. Other nominees were **Albert Naumann** of LEMSCO, **Carlo Montera** of Northrup, and **Donald Smith** of Bendix. **Dr. Thomas Harman**, Associate Professor of Applied Sciences at the University of Houston-Clear Lake, was honored as Technical Educator of the Year. He was recognized for his

expertise in microprocessors, microcomputers, bio-engineering and electro-optics. Other nominees were **Dr. John W. Alred** of the Advance Programs Office, **Richard Byrd** of San Jacinto College and **Dr. William E. Pinebrook** of Texas A & M University-Galveston. The council represents the American Institute of Aeronautics and Astro-

navics, the Association of Computing Machinery, the Institute of Electrical and Electronic Engineers, the Instrument Society of America, the Lunar and Planetary Institute, the Society for Computer Simulation, the Society for Technical Communication, Spaceweek Houston and the Texas Society of Professional Engineers.



JSC Director Aaron Cohen congratulates winners of the annual technical awards presented at the banquet of the Clear Lake Council of Technical Societies June 12.

## Pohl to receive Westinghouse medal

JSC director of engineering **Henry O. Pohl**, 54, has been named by the American Society of Mechanical Engineers to receive the Society's 1987 George Westinghouse Gold Medal. Selected for his "outstanding engineering ability, leadership, and management skills, evident in the development of the superb propulsion and power systems of United States manned spacecraft," Pohl will receive the medal at the ASME Joint Power Generation Conference in Miami October 4-8, 1987. Pohl was named director of engineering at JSC in 1986 after serving six years as chief of the center's power and propulsion division.

## Moore wins Bocking Award for June

**Patricia K. Moore**, secretary to Personnel Officer **Jack Lister**, is the recipient of the June Marilyn J. Bocking Award for Secretarial Excellence, according to Lister, Moore came to Personnel at a time when the staff office had been without a permanent secretary for some time. "She immediately took control of the office, realigned the filing system to accommodate a large volume of correspondence, and initiated a system so the correspondence could be tracked," Lister said. "She approached the heavy work load with an unusual enthusiasm, dedication and efficiency." Lister said she has established an effective team of secretarial support. "She is highly experienced, aggressive, and professional," he said.

## Mayfield returns

JSC Aerospace Education Specialist **Bobby Mayfield** recently returned from an 18-day tour of duty with the National Guard in the Federal Republic of Germany. Mayfield, a Major in the 111th Area Support Group based in Austin, was in Germany to participate in a joint service exercise. Mayfield served as the communications electronics officer on the exercise.

## Logistically speaking, it was chili by the numbers



Decorum and business-like demeanor were the only ingredients not in ample supply at the first annual Logistics Division chili cookoff June 26 at the Gilruth Recreation Center. Around a dozen teams participated in the event.



# Roundup Swap Shop

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

## Property & Rentals

Sale: 13.5 acres, gently rolling wooded East Tx. land, fronts city blacktop, near Tyler and Henderson, assumable, low cost Tx. Vet. loan, McLeaish, 480-7745.

Rent: Heritage Park 3-2-2, new paint/carpet, near school/pool, \$475/mo. plus deposit. Sue, x32630 or 486-9469.

Sale: 2.02 acres in Clear Creek Forest near Magnolia, wooded, restricted, \$14,000. Laura, x31903 or 474-7072.

Sale: Lake Livingston 70 x 176 ft. water view, wooded lot, Resort Country subdivision, \$12,500 OBO. Jerry, x39287.

Lease: Tranquility Lake condo, refrig., microwave, FPL, W/D, security gate, covered parking, cable hook-up, jogging trail, fishing, pools, \$300/mo. plus deposit. Laurie, x32034 or 554-6892.

Sale: Heritage Park 3-2-2A home, large fenced bkdy. w/15' x 30' swimming pool, garden, fruit trees, shade trees, large inside utility area, \$65,000. Karen, x38297 or 332-6315.

Lease: 1-1 Pebblebrook condo, FPL, upstairs corner, lighted pool and tennis courts, \$275/mo. 681-4732.

Sale: Lake Livingston hwy. frontage lot, wooded, in Paradise Acres subdivision on FM 356, 8941.5 sq. ft., or .205 acre. Roger, x30093 or 472-5650.

Sale: Water-front cottage, Lake Livingston, 80' pier, Indian Hill Estates, owner finance. Jerry, x39287 or 554-6093.

Sale: 1 acre ranchette lot at Ivanhoe Land Of Lakes, six mi. south of Woodville, 24-hr. security, boating, swimming, fishing, camping, etc. Coy Martin, x39282 or 337-2682.

Lease: 3-1.5, 2-story townhome, corner unit, pool, tennis, basketball, near Hwy. 146 and Fairmont Pkwy; Sale: 3 mobile homes in Dickinson, take over payments of \$635/mo. or negotiate cash sale. 486-4466.

Lease: CLC 2-1.5-2 upstairs condo, W/D, onsite rec. facilities, near schools/shops, fresh paint/carpet, fans, from \$325/mo., negotiable. Lachhman Das, x33235 or 488-5532.

Lease: Large 2-2 condo, W/D, pools, playground, \$330/mo., low deposit, two weeks free. 280-9822.

Rent: Room in Webster condo, \$225/mo. plus utilities, \$50 deposit. Rick, x36156 or 480-1218.

Lease: CLC-University Green 3-2.5-2 townhouse w/garage door opener, FPL, W/D, refrig., microwave, \$700/mo. 487-7364.

Rent: League City 2-2 waterfront townhouse on marina, FPL, loft, W/D, unfurnished, but will consider furnishing, tennis, pool, no smokers or pets, available 7/1, \$700/mo. plus utilities. 554-6907 or FTS 755-1074.

Sale: Shore Acres 3-2-2 country home, 1/2 acre wooded lot, fenced, knotty pine kitchen and dining room, beamed ceiling master BR, walk to Bay, boat ramp, pier, HYC, \$64,500. Spindel, x30159 or 470-9267.

Lease: CLC 2 BR condo, FPL, W/D connections, pools, outside storage, \$350/mo. 486-0315.

Lease: 2-2.5 University Trace townhouse, avail. 9/1, covered parking, ceiling fans, \$475/mo. plus electricity and deposit. Steve, x38126.

Sale: Miramar, Seabrook, 3-2-2, new roof, indoor paint, fans, FPL, fenced, beside fishing pond, dog run, 12 min. from JSC, \$54,900. Ed Irvin, 486-9770.

Sale: League City landscaped 3-2-2, near school, pool, tennis, 9.5 fixed FHA assumable, low equity. David, x35464.

Lease: Lake Livingston waterfront house, 3-2, sleeps 8, fully furnished, pier, fishing, swimming, skiing, weekend and weekly rates. 482-1582.

Sale/Lease: Waterfront condo, 2-2-2 CP, fans, FPL, W/D, appliances, assume notes or rent. 484-4976.

Rent: Galveston-Jamaica Beach marina house, sleeps 8, central air/city water, \$50/day, min. 2 days, plus \$20 service fees. Darrell, 337-3970 or 280-2493.

Lease: University Green patio home, 3-2-2, fans, next to tennis courts, \$625/mo. plus equal deposit and references. 486-8551.

Sale: Meadowbend 4-2-2 by owner, 1/3 acre at end of cul-de-sac, split BR, drapes/miniblinds, garden, fruit trees, attic fans, fenced, indoor utility room, assumable 10.5% FHA loan, \$71,900. Ann, x34475 or 538-3683.

Sale: '77 mobile home, set up at TAMU, 14' x 65', 2-2, central A/H, new carpet, \$9,500. Doug, x30964 or 480-2929.

Rent: Pasadena house, Beltway 8 at Spencer Hwy., 3-2-2 w/hot tub and deck, split floor plan, central A/H, fenced, pets welcome, \$600/mo. plus \$300 deposit. Carol, 472-0869 or 487-3764.

Sale: 2 BR south Austin condo, premium carpet, built-in bookshelves,

all appliances, ceiling fan, \$39,900, will consider lease-purchase. 482-7910.

Rent: Galveston Victorian Gulf-front condo, sleeps 6, fully furnished, 2 swimming pools, 3 whirlpools, 2 tennis courts, 480-5270.

Rent: CLC condo, 2-1.5, patio, FPL, miniblinds, curtains, pools, laundry, clubhouse w/sauna, gameroom, weight-room, \$350/mo.; Sale: Baywind I condo, 2-1.5, patio, FPL, over 800 sq. ft., accessories approx. the same as above, \$41,500. 568-7857.

Lease: Piper's Meadow, 3-2-2, custom blinds, free-standing FPL, formal dining room, outside deck, fenced, security gate, near pool and tennis courts, \$600/mo. plus utilities. Diane, x35542.

Lease: CLC, 1 BR condos, FPL, appliances, microwave, W/D connections, tennis, 2 weeks free, low deposit. Briley, 282-1880 or 488-7901.

Lease: West Galveston Island beach house, 3-2, furnished, day/week. Ed Shumilak, x37686 or 482-7723.

## Cars & Trucks

'77 Camaro LT, PS, PB, A/C, 305. Auto., new tires, A/C compressor and more, ex. cond. 488-2822.

'81 Audi 4000E, mechanically sound, low mileage, \$3,300 OBO. Tim, x37048 or 488-7154.

'84 Dodge 1 ton truck, crew cab, power, long wheel base, prospector pkg., 40K mi., camper w/stove, fridge, A/C incl., \$9,500. Laura, x31903 or 474-7072.

'85 Firebird SE, one owner, ex. cond., T-tops, loaded, \$6,500. Jim, 486-4083 or x30351.

'76 Pontiac Trans-Am, AM/FM cassette, Kenwood speakers, \$1,000. Mary Rose, 480-1071 or 280-7303.

'77 Corvette, ex. cond., \$7,500, OBO. 393-1134.

'77 Buick Ltd., clean, loaded, new tires and paint, 57K mi., Geraldine Kimler, 332-2983.

'79 Olds station wagon, 64,000 mi., new tires, stereo, good cond., \$2,200. 280-9822.

'78 Datsun 200SX, good cond., 5-sp., AM/FM, \$1,375. Victor, 282-3216 or 326-2570.

'78 Mustang, good tires, \$900. 480-4404 or 480-2360.

'79 Malibu Classic, A/C, heat, tilt steering, cruise control, ex. cond., \$1,800. Carrie, x33006 or Tracie, 649-2372.

'85 Camaro, good cond., approx. 30K mi., \$7,500. Chrystal, 282-3976.

'86 Toyota truck, 4-sp., short bed, 4,750 mi., A/C, tinted glass, sld. rear window, mud flaps, dual mirrors, undercoated, paint sealant, 5 yr. unlim. mileage warranty and chrome bumper, \$7,850. Guillermo, 282-5211.

'85 Jeep Cherokee, 4 wheel drive station wagon, A/C, PS, PB, AM/FM/cassette, good cond., 47K mi., \$8,500. Diane, 480-6805.

'81 Olds Cutlass Brougham, 4-dr., V6, tilt, cruise, AM/FM, all power, ex. cond., \$3,650. Mary, 333-6697 or 943-8164.

'82 Chevy Cavalier, 4-dr., A/C, \$2,000 OBO. Gene, x38417.

'59 Mercedes-Benz 220S, \$3,000 OBO. David, x35464.

'78 Ford Granada, 2-dr., auto., PS, PB, AM/FM, A/C, 80K mi., \$800 OBO. Arun, x33763 or 538-3369.

'75 Pontiac Ventura, 350 CID, auto, PS, PB, \$600. Donald, x38869 or 488-1342.

'80 Camaro Berlinetta, 305 V8, ex. cond., T-tops, A/C, auto, AM/FM cassette. Scott, 488-0035.

'85 Toyota Cressida, AM/FM/cassette, A/C, tinted windows, leather seats. Phyllis, 282-4306 or 534-2757.

'83 Oldsmobile Firenza, auto, AM/FM cassette, \$2,200. Wayne Watts, 480-0303.

'79 Ford Fairmont Ghia, V6, PS, PB, A/C, auto transmission, 4-dr., 75K mi., good cond., but needs work, \$1,100 OBO. Clint, x39377 or 488-8919.

'81 AMC SX4, 2/4 wheel drive, loaded, 51K mi., \$2,000 OBO. Joe, x38496.

'84 Chevy S-10 P/U, ex. cond., loaded, \$6,500. Gary, x34090 or 480-5842.

'71 MG Midget convertible, \$2,500. Nat, 780-4755 or 643-1898.

'77 Dodge Monaco, 4-dr., A/C, runs well. Ben, 481-1439.

'84 VW Jetta GLI, 5-speed, A/C, AM/FM/cassette, tinted windows, 30K mi., \$6,395. John, x36484, 486-1186.

'76 Ford Elite, A/C, cruise control, \$500. Sassan, 333-6509.

'86 Olds Delta 88 Royale, loaded, 16K mi. Ray, x30620 or 554-5434.

'72 Dodge Mobile Traveler, mini motor home, 360 V8, sleeps 6, 19 ft., roof and dashboard A/C, cruise, 75,000 M/B, good cond., \$2,975. Norm, x38997 or 488-0035.

## Boats & Planes

50 hp. Chrysler outboard and control cables, \$285. Ben, x31588 or 488-1326.

16' Lamar open bow tri-hull boat, motor, trailer, motor needs ignition module, BO over \$850. J.W. Kalk, x39287.

'70 Coronado, 25 ft. sailboat, 6 hp. Johnson, three sails, galley, head, dinghy, CB, sleeps 4, more, \$5,300. 474-5414.

Hobie 16' high speed catamaran sailboat w/trailer, ex. cond., \$1,950. 486-5790.

'74 Chrysler 16' Bass Boat, 50 hp. Johnson w/SS prop., 3 swivel chairs, depth finder, Motorguide troll, carpeted, bilge pump, 2 6-gal. gas tanks, live well/pump, heavy duty trailer w/spare tire, \$850. Mike, 554-4766 or 332-3397.

'85 Sabre 28, roller furling, 110/130/main, diesel, wheel, bowsprit, knot/depth/VHF, stereo, LPG, dinghy and motor, Bimini, \$53,000. Carol, 333-5837 or 282-4334.

Hobie Catamaran and trailer, 14 ft. turbo, ex. cond., \$1,500. Melba, x38222.

18 ft. AMF Trac catamaran, galvanized trailer, many extras, \$3,650. 333-3056.

'84 Invader, deep V-hull, Volvo AQ 125, loaded, galvanized trailer, \$6,800. Mark, x30160 or 643-4726.

Hobie Catamaran, 16', two sets of sails, trapeze, harnesses and lifejackets, \$1,700. John, 482-6364.

'81 Hobie 18' catamaran, trailer included, Tequila Sunrise sails, 479-5340.

## Cycles

'83 Honda Magna, mags, drive shaft, water-cooled, overdrive, helmet included, good cond., \$1,244. Frank Kowis, 486-8815, B shift, or 477-6178.

'85 Yamaha Virago, 700 cc., ex. cond., 2,500 mi., Fulmer helmet, \$2,700. 331-8079.

'85 Honda Interceptor, 500 cc., 1,400 mi., matching helmet, \$2,250. John, x36484 or 486-1186.

## Audiovisual & Computers

IBM PC, IBM color monitor, two half-height disk drives, graphics card, joystick, Hayes Smartmodem 1200, computer desk/hutch, \$1,000. Jana, x31653 or 480-5527.

Compaq portable, 256K, 2 floppy ports, Panasonic 1091 printer and software, BO. Abdul, 333-6515.

HP-150B PC w/Thinkjet printer, touch screen monitor, software including FORTRAN, ex. cond., \$2,000 OBO. 554-4572.

Commodore 128 computer w/disk drive, 300 baud modem, software and manuals, used three months, \$250; VIC 20 computer w/tape drive, software and manuals, \$60. Mike, 554-4766 or 332-3397.

Apple IIe, Imagewriter, monochrome, mouse, joystick, software, \$500. Doug, 282-4702.

JBL Lancer 77 loudspeakers, 10" woofer and passive radiator, 2" tweeter, walnut veneer cabinet, w/stands, ex. cond., \$285/pair; Radio Shack 10-band stereo equalizer, ex. cond., \$50. 488-3966.

## Household

China, 45-piece set, service for 8, white on white w/silver border, in original box, \$65 OBO. Julie, 482-0833 or x31540.

Kelvinator frostless refrigerator, 18 cu. ft., gold, good cond., \$125. Dan, 282-3326 or 473-2788.

Antique, solid oak, drop-leaf table and six matching chairs, \$450. Jim, 486-4083 or x30351.

Electric dryer, 4-cycle, heavy duty, \$125. Nancy, 480-8067 or 280-1959.

Water bed, king-size, \$100. 488-2219.

Antique mahogany dresser w/mirror, ex. cond., \$150. Ann, x34006 or 488-7648.

Small, portable refrigerator, \$40. Tonya, x37326 or 532-1908.

Couch and loveseat, ex. cond., \$100; TV stand, \$10; white dresser, \$20; fish aquarium, \$20; dresser, needs work, \$5. Lorraine, 480-3377, x59.

Sofa, green floral, \$75. Melba, x38222.

GE Frost-Free refrigerator, \$100; Emerson window A/C, 18,000 BTU, 220V, \$100. Harry, x31551.

Kenmore refrigerator, 19.1 cu. ft., side by side, 2 yrs. old, ex. cond., \$350 OBO; Kenmore heavy duty washer and dryer, 3 yrs. old, white, ex. cond., \$300 for both. Ann, x30891.

## Photographic

35 mm. Summaron f/3.5 wide angle lens w/optical viewing unit and leather case for Leica M3, \$70; standard Leitz flash gun for Leica camera, \$25. Samouce, x35053.

Yashica 35 mm. camera, two interchangeable lenses, flash attachment, leather carrying case, new condition, \$150. Wayne, 480-0303.

Canon G-3 w/f 1.7 40 mm. lens, auto/manual exposure, Canonlite flash, case, \$80 OBO. Dennis, x34405 or 480-5076.

## Pets

Free to good home, two tame ferrets w/cage, both male. Bob, x32913.

Labrador puppies, black, AKC, males and females, chocolate dam and yellow sire, ready for pickup 7/28/87, \$150/ea. Melba, x38222.

Free kittens, 8 weeks old, 1 black and white, 1 yellow and white. Diane, x35542.

Golden retrievers, AKC registered, large, gentle, free to caring home. E. Rubenstein, x33124.

## Musical Instruments

'80 Fender Stratocaster guitar, \$350; Peavy Deuce amplifier, \$325; Both in ex. cond. Steve, x38126.

Piano, Whitney Kimball, good cond., \$500. Melba, x38222.

Buffet clarinet, ex. cond., \$450 OBO. Diane, 471-3303 or x31865.

## Lost & Found

Lost: Female tabby cat named "Chewki," July 4th weekend from The Landing subdivision in League City. Kellie, 480-3377, x58 or 332-3280.

## Wanted

Want to buy or borrow auto manual for '73 Olds 350 V8. Chuck, x34241 or 487-2978.

Want babysitter for newborn, light housekeeping in my home in Pearland, beginning in October. References, please. 485-0076.

Want used 13'-15' sailboat for dad and two daughters, \$300-\$450. Don, x31995.

Want to rent auto tow dolly for approx. one week in Sept. '87. Boykin, x37341 or 326-1267.

Want non-smoking roommate to share a 4-2-2 house 3 blocks from marina, 10 min. from JSC/STSOC, \$175/mo. plus 1/3 utilities. Victor, 282-3216 or 326-2570.

If you like Anne McCaffrey's Pern books, look into Janus Weyr/Correspondence club, bi-monthly nl., active members. Chantal, x35114 or 326-2186.

Want '79 Ford truck shop manuals. Don, x38869 or 488-1432.

Want hamster habitat, all or parts: tunnels, towers, wheel, etc. Gary or Brandon, 499-5786.

Want male roommates to share house in Brook Forest, Close to JSC and UH/CLC, \$300/mo. Steve, x30719 or 480-6783.

Want single mother to share country home w/same, non-smoker, 2 BR/ bath/den upstairs, share kitchen, \$300/mo. plus 1/2 electricity. Barbara, x37714.

## Miscellaneous

48 in. diameter game table w/two leaves and four chairs, all wood table, \$300. 333-3254.

Drop seeder spreader, ex. cond., \$20; antenna rotator model AR 40 electronic control box, \$75; Lindsay model 150 Q gasoline engine driven trailer, mounted portable air compressor, \$3000; 75 KVA transformer, 48V 3-phase to 240V 3-phase, ex. cond., \$850. 921-7212.

Huffy men's 10-sp. bike, ex. cond., \$60, or will trade for 3-sp. or conventional bike in like condition. Bob, x32193.

Trestle table, oak w/oak veneer top, 36" x 36", two 12 in. leaves, \$150 OBO. David, 282-5360 or 996-9715.

Camper cover for small pickup, molded plastic, cab height, tinted windows, \$275 OBO. 487-7364.

Sears Lifestyler 1000 rowing machine, like new, \$75 OBO; Spalding Body Pack-Stomach & Back Machine w/60 lbs. of weights, like new, \$150 OBO. Margaret, x33664 or 487-1204.

Two 14" x 5-1/2" wheels w/five holes on 4-1/2" diameter circle, fit Chrysler and others, \$15. Richard, 554-6780 or x35137.

"Cool Tooler" standard size pickup truck toolbox w/built-in 12V refrigerator, brand new, never installed, \$175; Heavy duty shop grinder, needs switch and one wheel, \$40; executive office chairs, \$60. Karen, x38297 or 332-6315.

Wedding dress, Empire gown of French silk over taffeta, high neckline, cup sleeves, matching fingertip veil, size 9, antiqued, \$165 OBO. 471-6814 or 471-4899.

Two bar stools, ex. cond., \$30; exercise bicycle, \$40. Ann, x34006 or 488-7648.

Maternity suit, navy, size 8, like new, \$30; videotapes—pregnancy exercise programs and childbirth preparation, \$20/ea. 334-1934.

One set of bunkbeds w/mattresses, \$75; basketball backstop, board, brackets, rim and net, \$30; Skamper 15' fold down camper, self-contained, needs work, \$600 OBO. Rudy, 946-7028 or x33834.

Whirlpool washer, leaky tub, broken timer, \$25. Jeff, 280-8608 or x30715.

Raleigh Record women's bicycle, ex. cond., \$60; two formal, both worn once: white full-length, size 9, \$75; black tea length, size 7, \$45. 332-3287.

Parts for '68 Camaro, body and interior parts, most are in good cond. Merrell, x37570.

Sturdy, galvanized swing set w/rings, swings, ladder and trapeze, ex. quality and cond., \$120. Wade, x30147.

64' x 12' Fleetwood trailer, 3-1-1.5, \$12,750; Wards electric washer, 3 yrs. old, good cond., \$125; Remington electric typewriter, \$55. Marge, x36536.

VW Bug parts, some performance, some service available if time permits, Ray, x30620 or 554-5434.

Walther PP 380 pistol, German, w/2 clips, 2 holsters (leather flap and codura), original and Pachmeyer grips, rug., ex. cond., \$400. Pat, x35011 or 488-3827.