ROUNDUP

NASA MANNED SPACECRAFT CENTER HOUSTON, TEXAS

VOL. 11 NO. 7 February 18, 1972

SEPTEMBER 1962 brought President John F Kennedy to Houston and the Manned Spacecraft Center. Here he is pictured with Astronaut John Glenn (left), the first American to orbit the Earth. Glenn's Mercury flight was followed by three more in the Mercury program piloted by Scott Carpenter, Walter Schirra, and Gordon Cooper.

Ten years ago - Glenn got 'go' for Earth orbit

TEN YEARS AGO this Sunday, February 20, the United States successfully placed its first spacecraft, piloted by Astronaut John Glenn, into Earth orbit.

The flight of Mercury-Atlas 6—called Friendship 7—brought project Mercury to its fruition. The basic objectives of putting a man into Earth orbit, observing his reactions to the space environment, and returning him safely to a point where he could readily be found, were achieved with the historic Glenn flight in 1962.

America's first Earth orbital flight was preceded by a Russian orbital flight in April 1961 and two U.S. suborbital missions flown by Alan Shepard in May 1961 and Virgil I. Grissom in July 1961.

The Glenn flight originally was scheduled for January 23, but a series of bad weather systems, the discovery of fuel between the spacecraft's structural bulkhead and insulation bulkhead separating the fuel and oxidizer tanks, and the repairs needed to correct the fuel problem caused the delay to February 20.

At 9:47 a.m. on the 20th, *Friendship 7* and John Glenn were launched together on their orbital journey and into the pages of American history books.

The mission was not without tense and troublesome moments. Early in the flight, Glenn experienced difficulties with the spacecraft's yaw reaction jet, which caused an attitude control problem. As a result, he spent much more time actually piloting the craft than had been anticipated in the original flight plan.

As the history of the Mercury Program, *This New Ocean*, points out, "the flexibility of man should demonstrate the way to augment the reliability of the machine." Glenn's skillful handling of the *Friendship 7* capsule proved just that.

A more serious problem was noted during the time Glenn was

(See TEN YEARS Page 4)

Johnston named Acting Director of Medical Research and Operations

Richard S. Johnston was appointed this week as Acting Director of Medical Research and Operations at MSC. He assumes

the responsibility formerly held by Dr. Charles A. Berry, recently appointed Director of Life Sciences at NASA Headquarters.

Johnston had served as Deputy fice, Apollo Spacecraft Program Director for Biomedical Engineering for the Medical Directorate since October 1970. His previous assignments have included being Manager of the Experiment Of-Office; Special Assistant to the Director,and Chief of the Crew Systems Division.

Prior to joining NASA in 1959, Johnston served as a research chemist with the Naval Research Laboratory and with the U.S. Naval Bureau of Aeronautics, where he was responsible for integration of crew equipment into high speed/low altitude aircraft systems.

A native of West Virginia and a University of Maryland graduate, he is married to the former Jean Ambruster. They have two children, Susan, 18, and Richard, 16.

Apollo 17 landing site set

A combination mountainous highlands and lowlands valley region of the Moon designated Taurus-Littrow has been selected as the exploration site for the Apollo 17 mission, presently scheduled to carry out the sixth and final U.S. manned Apollo lunar landing in December 1972.

The landing point is about 20° north and 30° east of the center of the Moon as viewed from Earth. The site, named for the Taurus Mountains and for the crater Littrow, both of which lie to the north of the site, was selected for consideration after a thorough search through the large amount of high resolution photography from Apollo 15.

Taurus-Littrow is a keystone site in the Apollo Program, having been selected to help fill in the major gaps in the developing model of the Moon as based upon Apollo 11, 12, 14, 15 and expected Apollo 16 data. The current model shows a complex Moon which formed about 4½ billion years ago and which was subjected to intense cratering.

Apollo 14 and 15 data show that one of the last large basins, Imbrium, was formed by an impact 3.9 billion years ago. It was not until the period from 3.2 to 3.7 billion years ago, however, that the great basins, formed during the intense cratering phase, became flooded by molten lavas originating in the lunar interior.

One of the key questions remaining is to understand what happened in the period between 3.7 and 4.5 billion years. Similarly, it is important to understand whether or not the Moon has been thermally inactive for the last 3.2 billion years.

Taurus-Littrow is just beyond the southeast edge of Mare Serenitatis. Mare Serenitatis is one of the largest lunar mascons. Large, steep-sided mountains of light-colored highlands dominate the terrain and are expected to provide samples older in age and different in composition from those returned from the Mare Imbrium basin on Apollo 14 and 15.

NATURE HELPS

Nature has already helped in the sampling as one of the sample sites is a rock slide which contains debris which has fallen into the valley from high up on a 7000-foot mountain.

The targeted landing point itself will be on the other prime sampling objective which is the very dark non-mare material filling the valleys between the mountains. On occasion the dark material is found in small troughs on the mountainsides, indicating that it once thinly covered the mountains but has eroded off the steep slopes.

This observation, plus the presence of volcanic-looking cinder cones, first reported by the Apollo 15 Command Module Pilot Al Worden, indicates to lunar-scientists that the dark material is an explosively produced volcanic ash. The apparently low crater density in the area covered by the dark material also leads geologists to believe it to be among the youngest lunar volcanics.

The explosive nature of the volcanism indicates a relatively high content of volatiles or gases, both of which have been exceedingly rare in all lunar samples seen thus far. If the Moon, as the preferred models indicate, has indeed cool-

(See APOLLO 17, Page4)

EAA announces charter flight to Cape for Apollo 16 blastoff

The Employees Activities Association has announced a charter flight to Cape Kennedy for the Apollo 16 launch.

The trip will include a visit to Disney World and a stay of three days and nights at the Langford Motel in Winter Park.

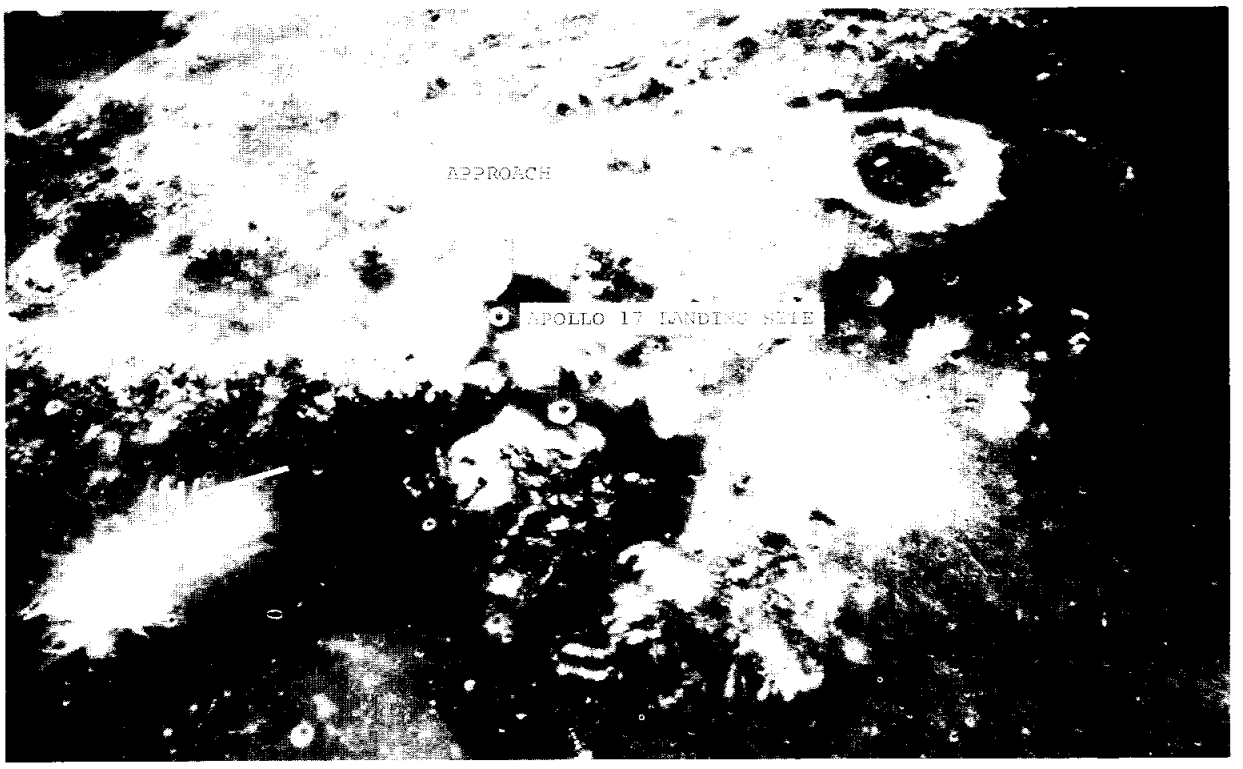
Reservations are being taken now on a first-come first-served basis. The $130 per person charge includes the round-trip air fare, ground transportation in Houston and Florida, and motel room. Disney World tickets will be available at a discounted rate at the gate.

A deposit of at least $65 is required with each reservation which should be made with Dorothy Rafuse, Building 13 Room 123, or Kay Anderson, Building 2 Room 157A.

Because space is limited, reservations should be kept to two per household.

If the launch is postponed, reservations will hold good for the new launch date, but no refunds can be made after March 15 or after four weeks before launch in the event of a reschedule.

The present launch date is April 16, and the EAA charter will depart Houston April 14 and return April 17.



Apollo 15 cameras looked eastward for this view of the landing site just selected for Apollo 17. As the 17 spacecraft approaches the target, it will pass between several noteworthy craters — Vitruvius at the upper right corner, and Littrow and Littrow A at extreme left-center.

BENEFITS CONTINUE TO ROLL IN

Aerospace research profits Earth

In the last issue of the *Roundup,* excerpts from a fact sheet which MSC will publish on "Space Benefits" were printed. We continue here with more from that soon-to-be-published pamphlet.

GREATER SAVINGS

Weather satellites survey the icefields of the Gulf of St. Lawrence with an estimated savings to the U.S. and Canada of 1.7 million dollars each year, by more accurately predicting the opening of shipping on the Great Lakes.

Space observation of weather patterns on a global scale offers the only hope of understanding weather movement, global temperature, and global wind patterns necessary for long-range forecasts.

The National Academy of Sciences-National Research Council has estimated that accurate long-range forecasts would lead to savings of at least $70 million annually from flood and storm damage; $1 billion a year to the construction industry, $500 million a year to fuel and electric power indusrties, $500 million a year to fruit and vegetable producers, and $450 million annually to livestock producers.

Although national pride, international good will, and a nation's prestige cannot be measured in dollars, these are real and tangible benefits resulting from the space program.

The Associated Press recently reported that a survey of high school student leaders in the U.S. showed this country's landing on the moon was one of the things of which students were most proud.

In 1960, a worldwide poll showed the majority of the world believing that the dominant force in international affairs would be the Soviet Union.

In 1970, after the Apollo 11 landing on the moon, the same survey indicated the majority of the world's people believed that the U.S. was and would continue to be the most powerful and influential country in world affairs.

STABILIZING FORCE

Former NASA Administrator Thomas O. Paine described space as a major "stabilizing force in world affairs," which he said has given both America and the Soviet Union a unique opportunity to demonstrate before the entire world their national will, the strength of their institutions, the quality of their people, and the vision of their leaders.

In a hearing before the U.S. Senate's Committee on Aeronautical and Space Sciences, the State Department's U. Alexis Johnson cited as examples of internation cooperation fostered by the space program, the Treaty on Outer Space, which, among other things, states that no nation can claim sovereignty to outer space and forbids the stationing of nuclear weapons on celestial bodies or in space.

He also cited an Agreement on the Rescue and return of Astronauts.

More than 50 countries benefit from automatic picture-taking systems on U.S. weather satellites, which allow them to view daily weather patterns over their own terriotry.

Teams of scientists in 39 institutions representing 14 foreign countries have received samples of lunar rock and soil collected by U.S. astronauts. At the same time, the United States and the Soviet Union have exchanged lunar samples and have conducted a series of meetings aimed at developing compatible spacecraft docking equipment so that U.S. and Soviet spacecraft can link up in space in a future joint manned mission.

MORE ECONOMY

Much of the potential use of space as a new resource to benefit man depends, of course, on the cost of transporting man and his machines into space.

In 1958 the first U.S. satellite, Explorer I, cost more than $100,000 a pound to place in orbit. When we use the largest present launch vehicles, the cost now is less than $1,000 a pound. But we can do much better than that.

The United States has developed more than 20 different launch vehicles for manned and unmanned space programs. Each has required development cost, special support equipment, separate production facilities, and specially trained ground personnel, all for one launch in which the vehicle—successful or not—is destroyed.

As a result of our experience with manned and unmanned programs, space technology has advanced to the point where it is possible to return entire space vehicles from orbit and use them again.

NASA and industry teams have begun design and development work on a new generation launch vehicle and spacecraft called the Space Shuttle, which will not be discarded after a single flight but will be flown many times during its ten-year lifetime.

This versatile vehicle, which combines the features of both airplane and rocket, will be designed to carry men and supplies and unmanned spacecraft into orbit. It will be piloted like a commercial airliner and will land on conventional type runways, avoiding the cost of recovery at sea.

The Shuttle should reduce space flight costs to about one-tenth of their present level.

The reduction of operating costs is only part of the savings to be realized. The major part of total space program costs, about 80%, is reflected in the efforts required to develop and test payloads. The Space Shuttle, revolutionizing our whole approach to placing payloads in space, will provide such important economic dividends as:

- Drastic reduction of payload development costs;
- Less risk of failure in placing payloads in orbit; and
- A capability for rountine, economical operations in space.

Economies are also anticipated in the use of the Space Shuttle as a "test bed" for instrument development. Spacecraft found inoperable or erratic upon deployment could be returned to the launch site for further work before final placement in orbit. Thus, the operation of the Shuttle should virtually eliminate the risk of total failure in spacecraft operations.

* * *

The benefits fact sheet will be concluded in the next issue of the Roundup. Topics covered will include Earth Applications, Pollution Control, and the Unlimited Potential of Space.

Golfers 'scramble' to open '72 season

The MSC Golf Association 1972 season gets underway February 21, 1972 at 10:30 a.m. with a four-man 'scramble' at Tejas Golf Course near the Houston Intercontinental Airport.

This is the first of three scheduled fun tournaments of the new season. Course and dates of the others will be announced later.

More than 100 MSC golfers have signed up for 1972, according to Dave Dyer, membership chairman. Of this number 28 are new members.

The first medal play tournament is set for March 4 at Executive Country Club off Wayside in Houston. This event counts in the annual membership point standing and will be divided into flights - championship, first, second, third and 'new members.'

Other events are scheduled at Sharpstown (May), Panorama (August), Tejas (Sep), Westwood (Oct-tentative), Inwood Forrest (Oct), Atascocita (Nov-tenative). Exact dates of these and other events will be announced later.

IN REHEARSAL—Alan Glines (r.) checks a point in the script for "Sunday in New York" with director Kathy Payne, as fellow actor Toby Mattox looks on.

From Flight Controller to Thespian

Alan Glines of the Flight Control Division will put the world of computer consoles and engineering lingo behind him temporarily as he steps onstage tonight in the Country Playhouse production of "Sunday in New York."

This is not Alan's first venture into the theatrical sphere. Originally from Independence, Kansas, Alan was graduated from the University of Kansas at Lawrence with a degree in electrical engineering. Whenever he had free time, he took drama courses and lent his talents—onstage and backstages—to a number of college productions.

He has appeared locally in other shows at the Country Playhouse and at the Theatre Suburbia, Clear Creek Country Theatre, and Pasadena Little Theatre.

Alan joined MSC in 1966. When he isn't working here or rehearsing for a dramatic production, he enjoys tennis, basketball, softball, volleyball, wine-tasting, and skiing—not necessarily in that order.

"Sunday in New York" will run February 18, 19, 25, 26 and 27 and March 2 through 5. It is the story of a girl who designs a development program to change the configuration of her life.

If you want to know what that means, call 467-4497 to reserve your tickets.

ON THE MOON WITH APOLLO 16

A Guidebook to the Descartes Region

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

April 1972

MOON GUIDE—"On the Moon with Apollo 16, A Guidebook to the Descartes Region" is available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. The price is $1. Dr. Gene Simmons, Professor of Geophysics at the Massachusetts Institute of Technology and formerly MSC's Chief Scientist, authored the publication.

ROUNDUP

NASA MANNED SPACECRAFT CENTER HOUSTON, TEXAS

The **Roundup** is an official publication of the National Aeronautics and Space Administration Manned Spacecraft Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for MSC employees.

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Photographer: A. "Pat" Patnesky

Roundup Swap-Shop

(Deadline for Swap-Shop classified ads is Thursday of the week preceding **Roundup** publication date. Ads are limited to MSC civil service employees and assigned military personnel. Maximum length is 20 words, including name, office code and home telephone number. Send ads, typed or legibly written, to **Roundup** Editor, AP3)

MISCELLANEOUS

Irving backpack parachute, 28-foot diameter, safety handgrip. Chappee, 932-2120 after 4 p.m.

Remington 552 BDL Speedmaster .22 automatic rifle, x/n cndn, $45. Price, 471-3314.

Tennis rackets, $6 and $8, good & x/n cndn, w/covers & clamps. Samouce, 488-0406.

Swing set parts: slide, 4 kid bench swing, horse, $5. Slightly used. Samouce, 488-0406.

5 wheels w/belted tires 678-14 from a 1970 Buick Skylark, good cndn, $50. Bruns, 877-2004.

4-blade ceiling fan (2 speed), x/n cndn, $40. Bruns, 877-2004.

Pool table, 7 foot, new $200, asking $100. McClure, 481-4660.

Borg Warner automobile air conditioner compressor, needs clutch & pulley, $12. Kaigler, 877-4731.

Toro 21" self-propelled lawn mower, $40. Kaigler, 877-4731.

Oshman's 7 x 50 binoculars, used very little, $25. Kaigler, 877-4731.

Husquavarna custom Mauser 243, 25" Douglas barrel, 10 pwr Weaver lefthand stock. Sesler, 877-1304.

Rutgers Univ. home speed reading course, 13 vols., $35. Brown, 488-0754.

VEHICLES

63 model 2-ton, 18 ft. van, International Harvester, A-1 cndn. Palmer, 482-1814, 877-1624.

Schwinn 5-speed boys bike "orange-crate," x/n cndn, $39. Cheatham, 877-1201.

71 Honda 100, Scrambler, 800 miles, x/n cndn, $295 firm. Wade, 333-3300.

65 one-ton Chevy truck, utility bed, 327 V-8. Frazier, 485-3389.

63 Ford 1/2 ton, green interior, white exterior, x/n cndn, 75,000 miles. O'Loughlin, 877-1189 after 5:30 p.m.

64 VW camper w/radio, recently tuned, good transportation, $500. Ragan, 481-0408.

12' x 65' mobile home, furnished, 2 BR, cent air, no equity. Flanagan, 932-3155.

66 Fairlane 500 station wagon, fully equipped, low mileage, very good cndn, $800. Mallary, 482-7081.

Travel trailer, 29', like new, sleeps 8, self-contained, stove, eye level oven, refrigerator, abundant storage space, other xtras. Schwartz, 477-7334.

70 VW sedan, $1400. McClure, 481-4660.

62 Mercury Comet sta. wagon, 101 hp, SIX, auto. transm, chrome luggage rack, radio, runs & looks good, new tires, $295. Dunaway, 479-7292.

52 Honda Chopper, 450cc, $90C. Grubbs, 488-3872.

69 Dodge Coronet 440, 2-door vinyl hardtop, air cond, racio, new battery, $1600 or best offer. Fitzen, 488-0736.

71 wheel camper, x/n cndn, sleeps 8, double dinette, sink, stove, ice box, 13-gal. water tank. Collins, 481-2995.

60 Chevrolet, V8, x/n work car, ultra-dependable, $150 or make offer. Christensen, 488-5619.

New 20" girls' bike, training wheels included. $25. Mieszkuc, 333-4669.

69 Chevy Nova, 350 cu in., 255 hp, 350 turbo, 2 cr, air, custom interior, radio, new polyglass tires. $1700. Clanton, 482-7187.

68 Pontiac LeMans, 2 dr HTP, 350 c.i. V-8, 265hp, 3 spd flr. shift w/consol, H.D. suspension, bucket seats, radio all vinyl interior, exceptionally clean, $1200. McGregor, 488-2775.

59 Triumph TR-3, $475. Koontz, 488-5721 after 5 p.m.

63 Rambler classic 6 station wagon, w/working A/C and radio, good work or fishing car, $100. DeAtkine, 482-1949.

1-63 Corvair body, all glass, no running gear or engine. Haul it off free. Kaigler, 877-4731.

70 Barracuda, 2-dr hardtop, A/C, power, AM/FM stereo radio, 15,000 miles, 50,000 mile warranty, barely broken in, $200 below average retail. Poindexter, 877-2023.

71 Pontiac Firebird, power, A/C, drives like a dream, 21,000 miles $3300. Poindexter 877-2023

61 Valiant, 2-door hardtop, automatic, passed inspection in January. $150. Shollenberger, 488-5372.

70 VW bus, 7-passenger, air conditioning, $2395. Sampsel, 471-0172.

70 ½ Honda CL 450, 7000 mi., x/n cndn, red, $800. Ardoin, 877-4960.

68 Cougar, vinyl top, bucket seats, auto, Air, R/H, 2 new tires, 72 plates, blue, $1575. Girala, 921-7212.

Tent camper, Nimrod Americana, 1965 w/ice box and sink, sleeps 6; extras — screened side tent, 4 sleeping bags, $425. McBride, 534-2066 (Dickinson).

Honda, 750cc, 2,000 miles, like new), must sell. Roach, 783-4015 or 771-5841 after 6 pm.

70 Ford, t½ on pickup, 20,000 miles, Mavrick camper shell, like new, must sell. Roach, 783-4015 or 771-5841 after 6 p.m.

67 Mercury Montclair, 4-dr., air, power steering & disc brakes, AM-FM, good tires, new brakes, extra clean. Embrey, 946-7283.

HOUSEHOLD ARTICLES

Old fashion school desk. $10. cast iron lace sides, wood top & seat. Samouce, 488-0406.

Baby crib, good cndn good mattress, $20. Christensen, 488-5619.

Hotpoint washer, heavy duty, good cndn, $65. Higdon, 482-7029.

Extra sturdy mesh playpen with detachable sun canopy & pad, $10; deluxe Welch baby buggy, little used, $10; wooden playpen, $5. Wade, 649-0554.

G.E. electric baby feeding dish, $4; wooden outdoor baby swing seat and chains, $2; Detecto deluxe baby scales, heavy duty, x/n cndn, $7. Wade, 649-0554.

Child's large wonder horse, $10; colonial rocker, maple, $15. Wade, 649-0554.

Kitchen set, table, 4 chairs, good cndn, $20. Mieszkuc, 333-4669.

Frame for rol-away bed, assorted Venetian blinds, sheer curtains, large bamboo-roll window shade. Gorman, 521-9805.

Coppertone 14 cu. ft. Frigidaire Imperial refrigerator, bottom freezer, $200; avocado vinyl sofa, $50. Talbert, 643-9206.

Unusual antique ladies roll top desk, $250. Fuller, 488-3985.

Kenmore bronze gas dryer, approx. 2-years old, x/n working cndn, $75. Schisser, 488-3797 after 5 p.m.

Kenmore washing machine. It works, $10. White, 488-1024.

Daystrom breakfast room set, 40" round wood-grained formica top table plus two 10" leaves, 6 chairs, $40. Chimenti, 333-3897.

Early American oak chair and sofa k/removable cushions, $95 for both. DeAtkine, 482-1949.

10½' x 14' multicolored oval rug, braided, $40. Brown, 488-0754.

14' x 16' green shag rug, $100. Paletz, 481-2318 after 5:30 p.m.

Modern pedestal 42" round table w/four black leather, pedestal, swivel chairs, $125. Paletz, 481-2318 after 5:30 p.m.

Solid oak library table, recently refinished, makes good desk, $30. Kirkland, 932-4101.

Kenmore sewing machine with 4-drawer cabinet. Keyser, 946-4059.

SOUND EQUIPMENT

Sears Medalist AM/FM multiplex stereo radio, table model, wood cabinet, separate speaker, $30. Grayburn, 472-4051.

Modern Zenith stereo with six speakers, $200. Paletz, 481-2318 after 5:30 p.m.

MUSICAL INSTRUMENTS

Saxophone, Eckhart, alto w/case, $100. Proctor, 333-3842 after 5 p.m.

CAMERAS

Telephoto and wide angle lenses; 135mm f2.8 w/case, $35; 28mm f/2.8 Soligor, almost new, $45. Both lenses are automatic w/Pentax-type screw in threads. Erickson, 488-1901.

BOATS

16 SDW Ouachita Jon boat, 18 hp Evinrude, big wheel trailer, $450. Fancher, 877-1851.

Luxurious 16' speedboat, 120 hp outboard engine, trailer, equipment, including professional ski-tow bar, 1971 model in mint cndn, $3595. Bland, 333-4580.

71 tri-hull 17' fishing and skiing boat w/canopy, controls, equipment, 1970 120 hp outboard engine and trailer, x/n cndn, $2495. Bland, 333-4580.

59 Richardson cruiser, 35-ft., new twin 185 hp engine, marine air conditioning, radio-telephone, 110-V/AC generator, $9000 financing available, Nassau Bay Marina. Feddersen, 333-3411 after 5 p.m.

13 ft. boat, 10hp motor, trailer, $150 or make offer. Westover, 944-2497.

15 ft. Ouachita cane with paddle, like new, $125. Green, 331-3001.

Air boat, Mud Hen type Corvair engine, 16' Ouachita boat, x/n cndn, $1550. Moser, 877-3048 or 488-6764.

14 ft. alum. Jon boat w/6hp Mercury motor, $150. Kirkland, 932-4101.

REAL ESTATE & RENTALS

Two acres, Roy Acres, corner lot, well and septic tank. Frazier, 485-3389, 224-9379.

11.13 wooded acres on FM 830, ½ mile from Lake Conroe and about 2 mi. from Panorama Golf Course. Morris, 482-7775.

Tiki Island waterfront lot w/boatslip, 60% of equity. Morris, 482-7775.

Buy your own hunting acreage and let your investment work for you while you hunt ,$1000. Burton 481-0780.

Clear Lake City, Oakbrook, 3-2-2, all electric built-ins, shag carpeting, oversized lot on cul-de-sac, fenced; near schools, shopping rec center. Shollenberger, 488-5372.

PETS

Female beagle, AKC, 5 yrs. old, champion lines. Welch, 649-2601.

Breeding seasons for your filly or mare now available to thoroughbred stallion. Fee, $75. For bookings, call Johnson, 643-4758.

AKC registered Lhasa Apso puppies, champion blood lines, beautiful coats. Priced to move, $125. Lewallen, 333-2566.

Quarterhorse, 5 years, saddle and bridle, $225. Green, 331-3001.

WANTED

Like-new dining room suite. Bouillion, 482-7642.

Guitar instructions for 11-year old who has had 2 years of lessons. Brenton, 483-2206.

Used Strollee baby stroller, fairly good cndn. Hawkins, 932-3845.

Metal lathe, 36" between centers. Perkins, 473-0117 after 5 p.m.

To join or form carpool from vicinity Broadway-Park Place Circle, Gulf Freeway, to Bldg. 2, hours 8:30 a.m.-5:00 p.m. Johnson, 643-4758.

Hide-a-bed, good cndn. Green, 331-3001.

1966 Mustang shop manual. Embrey, 946-7283.

Jimmy Warren Memorial Bowling League
BOWLING STANDINGS

Ball Busters	47½	32½
Chokers	45½	34½
Alley Ooops	44	36
Bit Pickers	43½	36½
Hertz	43	37
Team	42½	37½
Fabricators	41	39
Spoilers	40	40
Pin Pounders	40	40
Hexes	39	41
Mixers	38	42
Achivers	35	45
Splitters	35	45
Leftovers	26	54

High team set (3games) to date:	
Fabricators	3189
last outing:	
Hertz	3082
High team game to date:	
Fabricators	1088
last outing:	
Hertz	1074
High individual set:	
Don Flippin, Fabricators	698
last outing:	
Ron Spoilers	754
High indivdual game:	
Ron Tunnicliff, Mixers	270
last outing:	
Ron Loe, Spoilers	272

Wanna see an Old-time movie

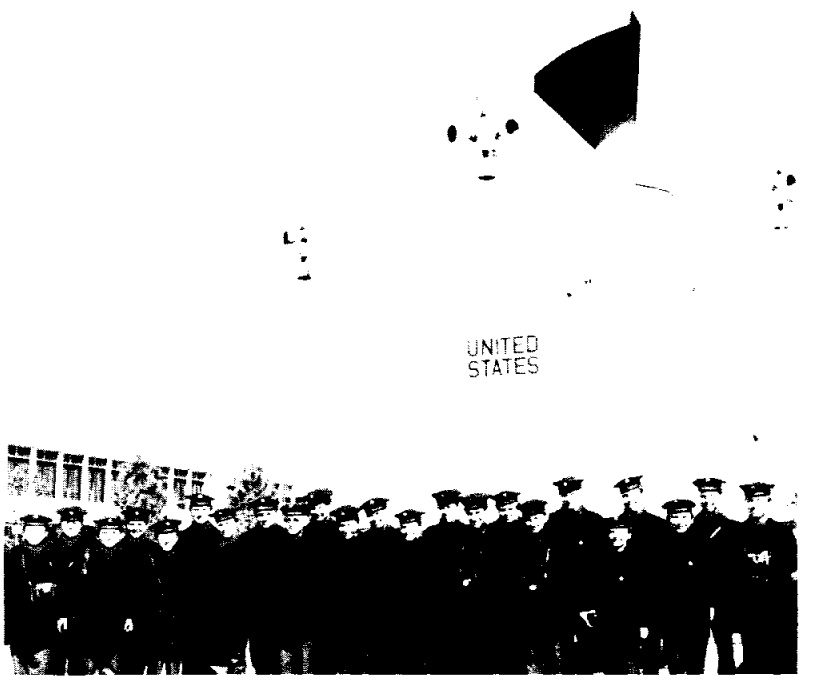
NASA Night at the Alabama Theatre this Monday, February 21, will feature Charlie Chaplin in "Modern Times." Tickets, regularly $2 each, will sell for $1.50 to MSC adults and $1 to students, but a minimum of 50 tickets must be sold for the offer to be good. Ticket reservations may be made through Joanne Sanchez at extension 4303.

Blood Drive Set

The Blood Services of Houston mobile unit will pay a visit to MSC on Thursday and Friday, February 24-25. The bloodmobile will be in the Building 8 (Dispensary) parking lot and will be open from 8:00 a.m. to 3:00 p.m.

Employees have donated blood generously in past drives. There is always a need for blood, so won't you give the "gift of life?"

Call Lester Wynn, x6124, or Barbara Freeman, x3583, for an appointment.



VIENNESE VISITORS—The Vienna Choir Boys, an organization which has been in existence for 475 years (they don't look that old!), visited MSC recently while in Houston for a singing engagement. The original group was formed in 1497 by Emperor Maximilian I to perform religious music in the Court Chapel in Vienna. Directed by Mr. Uwe Theimer, the group consists of 23 boys, ages 10 to 14. In case you're interested in this sort of thing, the correct name for the Vienna Choir Boys is "Wiener Sangerknaben."

Wanted: Outstanding citizens' names

Scenario #1: Disregarding personal danger from exploding ammunition, two men rescue a trapped policeman from his burning patrol car.

Scenario #2: Traveling at his own expense, an orthopedist spends his month's "vacation" serving as a doctor in Korea.

Scenario #3: A woman learns sign language in order to act as an interpreter for the deaf. Her dedication causes others to volunteer services, and she now conducts weekly classes to teach sign language.

These are but three examples of the many persons who have received Presidential Certificates of Commendation or Appreciation.

For over two years, NASA and all other federal agencies have been nominating citizens or independent organizations for these certificates on the basis of an heroic act or outstanding service to a community.

Those from MSC who have received such certificates include Emil R. Schiesser, Charles J. Tringali, Stanley Goldstein, Philip Whitbeck, Charles E. Beckman, Leo T. Zbanek, Dickie K. Warren, Eugene H. Brock, and Clarence L. Bryant (Downey).

Three White Sands employees have also been awarded certificates: E. Jay Burke, Robert B. Munson, and Evelyn A. Chapman.

Nominees need not be government employees. Recently, all agencies were asked to increase the number of nominations. We need your help.

If you know someone in your community who is performing a valuable and unselfish civic service or of someone who has demonstrated an act of heroism, let us know.

Call or write to the Special Events Office, Mail Code AP5, x4241. Or, if you're in the vicinity of Building 1, stop by Room 185 and leave the information about the person or group you would like to nominate.

Newspaper clippings or any other written material about the individual or group would be helpful but not essential. Just supply us with the names, we'll try to do the rest.

HAPPY SERVICE ANNIVERSARIES—Robert F. Thompson (r.), Shuttle Program Manager, recently presented service awards to four Space Shuttle Program Office employees. The recipients are (l. to r.) Wayne E. Koons, 15 years; Andrew Hobokan, 30 years; John E. Roberts, Jr., 35 years; and Glenda L. Malone, 10 years.

EGRESS TRAINING IS FOR THE BIRDS, TOO—Apollo 16 command module pilot Ken Mattingly, perched in a Billy Pugh net suspended from a Coast Guard helicopter, appears to be in a race with a sea gull. The picture was taken last week during an egress training exercise in the Gulf. Apollo 16 commander John Young and lunar module pilot Charles Duke also took part in the training. The gull was an uninvited visitor to the egress activity. Apollo 16 is scheduled for liftoff on April 16.

Ten years ago Glenn got 'go'

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busy coping with the attitude control difficulty. Telemetry signals received at Cape Canaveral seemed to indicate that the spacecraft heatshield and compressed landing bag had loosened.

The critical test of whether these signals were correct would come during the fiery moments of reentry into Earth's atmosphere.

This New Ocean recalls that Glenn, during this reentry period, "experienced his worst emotional stress of the flight. 'I thought the retropack had jettisoned and saw chunks coming off and flying by the window,' he later said. He feared that the chunks were pieces of his ablation protection, that the heatshield might be disintegrating, but he knew there was nothing to gain from stopping work."

After passing the peak G region, Glenn's spacecraft suddenly began vibrating to such a degree that he was unable to control the capsule manually. And to add to the tension of reentry, the fuel gave out before drogue deployment, causing the vibration to intensify.

Just as Glenn was about to deploy the drogue manually, it deployed automatically. From that point, in Glenn's words, "everything was in good shape."

In ceremonies at the White House honoring John Glenn and his historic mission, President John F. Kennedy said, "We have a long way to go in this space race. But this is the new ocean, and I believe the United States must sail on it and be in a position second to none."

Glenn and his wife now live in Columbus, Ohio. He is on the board of directors of two national corporations and is an advisor to the Governor of Ohio. Certainly his memories will be very vivid this Sunday, on the tenth anniversary of the flight of *Friendship 7*.

Apollo 17

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ed from the outside in, these youngest lunar volcanics should be derived from the greatest depths and may give the first good samples of the deep lunar interior.

WILL USE ROVER

The astronauts will use the Lunar Rover Vehicle to transport them to prospective important locations determined prior to the mission and to other points they might select during their exploration. Contingency walking traverses also will be planned to accomplish as many of the scientific objectives as possible.

The astronauts will deploy an advanced Apollo Lunar Surface Experiments Package (ALSEP), containing a heat flow experiment similar to that deployed on Apollo 14 as well as four new experiments. In addition, two new surface traverse experiments, not powered by ALSEP Central Station, will be deployed. These new experiments represent second generation scientific approaches to difficult lunar problems.

Three of the six new experiments represent new or improved geophysical techniques of exploring the hidden subsurface properties of the Moon. These experiments are (1) Traverse Gravimeter, (2) Seismic Profiling, and (3) Surface Electrical Properties.

The Traverse Gravimeter will measure variations in subsurface structure and furnish data on such problems as whether the mountains have deep roots or are merely deposits on a uniform subsurface.

The Seismic Profiling and Surface Electrical Properties Investigations will measure the physical properties of the lunar interior down about a kilometer and will indicate subsurface electrical and mechanical properties, the extent of subsurface layering and the degree of energy scattering at the landing site. Underground water, should it exist, also will be detectable.

NEW ALSEP

A new ALSEP experiment, the Tidal Gravimeter, to study both the response of the moon to the earth's tidal pull and its response to gravity waves, should they exist in space, will be a fundamental contribution to astrophysics.

Two other new experiments also will be part of the ALSEP. A mass spectrometer will measure the constituents of the lunar atmosphere — the findings of which may be correlated with the mass spectrometers carried previously in lunar orbit; a lunar ejecta and meteorites experiment will determine the frequency and energy of the small meteorites and their ejecta which constantly impact and modify the Moon.

Three new experiments are added to the Apollo 17 orbital science payload. These replace the geochemical investigations and the mass spectrometer. Three new experiments are under development and production to replace the mass spectrometer, Alpha, x-ray and gamma experiments as well as the subsatellite carried on Apollo 15 and planned for Apollo 16.

The first of these, a Lunar Sounder, is a pulsed radar sounder and has the potential for identifying electrical properties and layering of the lunar crust overflown by the spacecraft.

The Lunar Sounder will provide the opportunity to study detailed physical properties of the Moon up to depths of one and a half kilometers and if it exists, to aid in the location of subsurface water.

THERMAL MAP

The second, the infrared Scanning Radiometer will provide, for the first time, a high resolution thermal map of portions of the Moon.

Thirdly, a Far Ultraviolet Spectrometer will measure the compositional and density variations of the lunar atmosphere. Since this experiment has the capability of measuring these variations as a function of atmosphere height, it will greatly extend the knowledge of the lunar atmosphere that was gained through the use of the original mass spectrometers on Apollo 15 and 16.

The SIM (Scientific Instrument Module) camera system flown successfully on Apollo 15, and planned for flight on Apollo 16, also will be carried on Apollo 17. This system contains the 24" Panoramic Camera, a 3" Mapping Camera and a Laser Altimeter. The Apollo 17 ground track will permit some new areas of the Moon to be investigated and photographed. In addition, where Apollo 17 overflies areas covered ,by previous missions, the difference in sun angle will provide the photo-geologists with photographs of lunar features at new illuminations. This will greatly aid them in their scientific investigations.

Apollo 17 will be commanded by Navy Capt. Eugene A. Cernan with Navy Cmdr. Ronald E. Evans, command module pilot, and Dr. Harrison B. Schmitt, civilian scientist-astronaut, lunar module pilot.

Pioneer F launch set February 27

The February 27 launch of Pioneer F on a two year journey past Jupiter remains on schedule.

Pioneer arrived at Cape Kennedy January 15 Checkout and launch preparations for the Atlas-Centaur launch vehicle and its payload are proceeding.

If successful, the spacecraft will become the first to fly beyond the orbit of Mars. It also will be the first to investigate interstellar space, hopefully returning data on conditions billions of miles from Earth as a bonus to its primary mission of exploring Jupiter.

U. S. Manned Space Flight Log

Mission	Pilot(s)	Date	Elapsed time, hr:min:sec	Total U.S. manned hours in space, hr:min:sec
Mercury-Redstone 3	Shepard	May 5, 1961	00:15:22	00:15:22
Mercury-Redstone 4	Grissom	July 21, 1961	00:15:37	00:30:59
Mercury-Atlas 6	Glenn	Feb 20, 1962	04:55:23	05:26:22
Mercury-Atlas 7	Carpenter	May 24, 1962	04:56:05	10:22:27
Mercury-Atlas 8	Schirra	Oct. 3, 1962	09:13:11	19:35:38
Mercury-Atlas 9	Cooper	May 15 and 16, 1963	34:19:49	53:55:27
Total—Project Mercury			53:55:27	
Gemini-Titan III	Grissom, Young	Mar. 23, 1965	04:53:00	63:41:27
Gemini-Titan IV	McDivitt, White	June 3 to 7, 1965	97:56:11	259:33:49
Gemini-Titan V	Cooper, Conrad	Aug. 21 to 29, 1965	190:55:14	641:24:17
Gemini-Titan VII	Borman, Lovell	Dec. 4, to 18, 1965	330:35:31	1302:35:19
Gemini-Titan VI-A	Schirra, Stafford	Dec. 15 and 16, 1965	25:51:24	1354:18:07
Gemini-Titan VIII	Armstrong, Scott	Mar. 16, 1966	10:41:26	1375:40:59
Gemini-Titan IX-A	Stafford, Cernan	June 3 to 6, 1966	72:21:00	1520:22:59
Gemini-Titan X	Young, Collins	July 18 to 21, 1966	70:46:39	1661:56:17
Gemini-Titan XI	Conrad, Gordon	Sept. 12 to 15, 1966	71:17:08	1804:30:33
Gemini-Titan XII	Lovell, Aldrin	Nov. 11 to 15, 1966	94:34:31	1993:39:35
Total—Gemini Program			1939:44:08	
Apollo-Saturn 7	Schirra, Eisele, Cunningham	Oct. 11 to 22, 1968	260:09:03	2774:06:44
Apollo-Saturn 8	Borman, Lovell, Anders	Dec. 21 to 27, 1968	147:00:42	3215:08:50
Apollo-Saturn 9	McDivitt, Scott, Schweickart	Mar. 3 to 13, 1969	241:00:54	3938:11:32
Apollo-Saturn 10	Stafford, Young, Cernan	May 18 to 26, 1969	192:03:23	4514:21:41
Apollo-Saturn 11	Armstrong, Collins, Aldrin	July 16 to 24, 1969	195:18:35	5100:17:26
Apollo-Saturn 12	Conrad, Gordon, Bean	Nov. 14 to 24, 1969	244:36:25	5834:06:41
Apollo-Saturn 13	Lovell, Swigert, Haise	April 11 to 17, 1970	142:54:41	6262:50:44
Apollo-Saturn 14	Shepard, Roosa, Mitchell	Jan. 31 to Feb. 9, 1971	216:01:57	6910:56:35
Apollo-Saturn 15	Scott, Worden, Irwin	Jul. 26 to Aug. 7, 1971	295:11:53	7796:32:14
Apollo-Saturn 16	Young, Mattingly, Duke			
Apollo-Saturn 17	Cernan, Evans, Schmitt			
Total—Apollo Program through (Apollo 15)			5802:52:39	