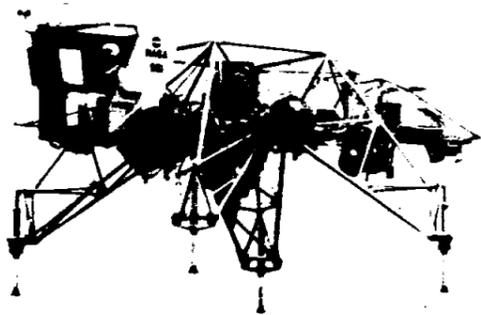


CCDT's begin on Apollo 11; July launch date holds firm



With 23 days left to lunar touchdown, the men and machines of America's space program are moving closer to the conquest of a second New World.

As the wet portion of the countdown demonstration test began this week, the decision for July 16 launch and July 20 landing for Apollo remained stable.

During the two weeks since the "go ahead" was given for a landing attempt by Apollo 11, mission planners have been counting off the major flight readiness tests, completion of which will lead to the scheduled launch.

The space vehicle hypergolic loading was accomplished at Cape Kennedy last week. The first stage fuel loading began

Monday, command module ordnance installation was on Tuesday and the wet CCDT started Wednesday.

The CCDT now in progress involves simulation of various mission phases conducted at the Cape and monitored by Mission Control Center.

The Apollo 11 crewmen—Neil Armstrong, commander; Michael Collins, command module pilot and Edwin Aldrin, lunar module pilot—have been participating in the CCDT, running spacecraft and mission control simulations and undergoing several special purpose training exercises.

The commander conducted a series of tests at Ellington in the wingless, low-altitude trainer which duplicates the LM's last 300 to 400 feet before touch-

down. Other important procedural crew checks include a back contamination walk-through, suiting and unsuiting in the command module, lunar surface operation preparations and walk-throughs and bench checks.

The terminal, or dry, CCDT is scheduled for July 3 with the crew on board and the space vehicle countdown to launch will be conducted from July 10 through 16.

"At any time between now and launch on July 16, we will not hesitate to postpone if we feel we are not ready in every way," said Lt. Gen. Sam Phillips, Apollo Program Director. "Nor, once the voyage has begun, would we hesitate to bring the crew home immediately if we encounter problems."



ARMSTRONG QUALIFIES IN LLTV AT ELLINGTON

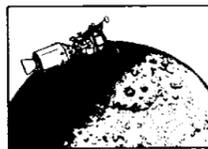
Wingless, free-flight trainer simulates crucial Moon landing maneuver

BUY US SAVINGS BONDS

ROUNDUP

NASA MANNED SPACECRAFT CENTER

HOUSTON, TEXAS



SPAN WATCHES SOLAR FLARES

(SEE PAGE 4)

VOL. 8, NO. 18

JUNE 27, 1969

McDivitt named Lunar Landing Operations head

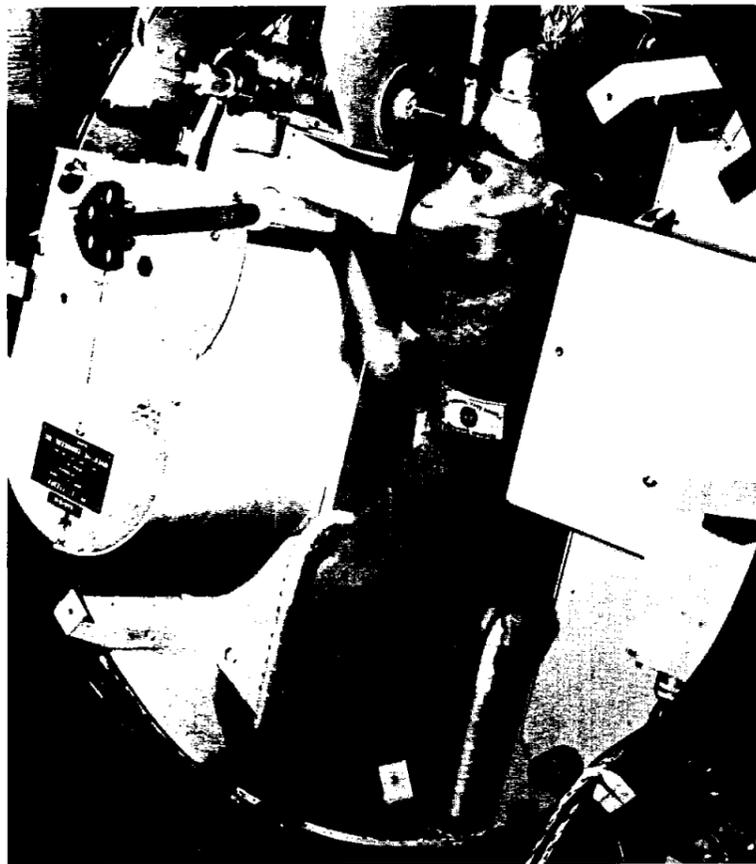
Astronaut James A. McDivitt was named Manager for Lunar Landing Operations in the Apollo Spacecraft Program Office Wednesday.

McDivitt, 40, commanded the four-day Gemini IV mission in June, 1965 and the ten-day Apollo 9 flight last March.

In his new capacity he will be responsible for planning lunar landing missions subsequent to the first landing and will report to George M. Low, Apollo Program manager.

Emphasis will be on landing site selection, mission planning and requirements for spacecraft modification to achieve mission objectives.

McDivitt will remain in the Air Force, however, the new position removes him from consideration for spaceflight crew assignments.



A LITTLE FELLOW WITH A BIG JOB—MONKEY FLIES TOMORROW
Biosatellite chimp to test effect of prolonged weightlessness on higher animals

Biosatellite III to test space effects on monkey

The third in a series of Biosatellite missions, to be launched from Cape Kennedy tomorrow, is aimed at giving mankind a lot of answers about the effects of long-term space flight on the physical and mental abilities of a highly developed animal.

The animal involved is a 14-pound, pigtailed macaque monkey.

Information gained from the flight, which is scheduled to last up to 30 days, will be of great value in adding to our knowledge of the cardiovascular and central nervous system as well as metabolism under weightless conditions.

The monkey will fly a 231-mile orbit in a spacecraft weighing a total of 155 pounds.

The instrumented monkey is one of 400 born in the wilds of southeast Asia and brought to the US as potential flight candidates.

They were acquired by the Ames Research Center which is in direct charge of the Biosatellite project.

Through long training prior to launch, the chosen monkey learned a number of tasks which are designed to give scientists inflight information on brain function—memory and ability to perform jobs requiring coordination and alertness under weightless conditions. These are correlated with inflight measurements of the cardiovascular system.

Biosatellite is seven feet long and almost four feet in diameter. It consists of the capsule, where the monkey sits; the adapter section which contains the power system, components of the tracking and telemetry systems, altitude control and water; the retrorocket assembly, which gets the spacecraft back to Earth; and the heat shield, which protects the spacecraft as it re-enters the Earth's atmosphere.

After returning to Earth where the capsule will be recovered by the Air Force in the Pacific Ocean, the monkey will be studied for physical changes. These include bone density and loss of calcium, muscle tone, and dozens of related measurements.

In addition, hundreds of post-flight chemical analyses will be made.

Results of the previous successful Biosatellite flight made in 1967 showed that weightlessness alters the orientation and normal function of plants.

Weightlessness was shown to interact with radiation and to slow growth in some young and rapidly dividing cells, allowing time for repair of radiation damage.

Nixon signs pay raise

President Richard Nixon has signed into law pay raises effective July 13 for classification act (GS) employees (see schedule on page 2).

This raise, with an average increase of about nine percent, is the third part of a three-part "comparability" raise to bring the salaries of Government employees to the level of similar workers in private industry.

The first raise was authorized in December, 1967 and the second in July, 1968.

Revised schedules for those who are paid under Section 504 (positions with special rate

ranges such as scientists, engineers, accountants, etc.) have not yet been received from the Civil Service Commission.

"It is assumed, however," said Walter Stallard, assistant in Salary and Wage Administration "that comparable pay adjustments for employees in this category will also be effective July 13."

A survey is being conducted in the Houston-Galveston area to determine wage change rates for employees paid under the wage board schedule. Any changes resulting from this survey will be effective August 24.

Kennedy's words recalled

"Those who came before us made certain that this country rode the first waves of the industrial revolution, the first waves of modern invention and the first wave of nuclear power, and this generation does not intend to founder in the backwash of the coming age of space.

We mean to be a part of it. We mean to lead it, for the eyes of the world now look into space, to the Moon and to the planets beyond, and we have vowed that we shall not see it governed by a hostile

flag of conquest, but by a banner of freedom and peace . . .

We choose to go to the Moon in this decade and do these things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win . . ."

John F. Kennedy
Rice University
September 12, 1962

Judo enthusiasts are offering summer classes

Summer Judo instruction is being conducted by the MSC Judo Club at the Harris County Park Building on NASA Road # 1, Thursdays from 6 to 8 p.m. Dale Moore, Landing and Recovery, is the head instructor, with Tom Murtagh, Mission Planning and Development; Dr. Yoji Kondo, Science and Applications; and Eli Morrell, TRW, assistant instructors.

Regular participation during the summer is encouraged.

Club dues are \$6 a month which goes to the Club's equipment fund.



IT'S THE OLD 1, 2, 3, 4 FOR BLACK BELT BILL NAGASE Dutch von Ehrenfried executes a Hani Goshi during Club exercises.

Credit Union straight talk

Do you save money under your mattress?

Few people do now, and for good reason. If you tucked away \$40 a month in your bed, in 40 years, you would have \$19,200.

By putting the same \$40 a month into a savings account at 5% interest, in 40 years you would have \$57,984. A nice bonus for retirement.

The MSC Federal Credit Union in building 11 can help you plan a savings program. The Union is now paying semi-annual dividends, and share deposits made by the 10th of the month may earn from the first.

Even with credit cards as bountiful as they are today, you still need cash now and then.

Plan now for a supplemental income later. If you invest \$500 a year at 5%, in 14½ years you may start withdrawing \$500 a year indefinitely.

The same principle applies to any amount of money because money invested at 5% doubles in 14.4 years, providing all dividends are reinvested.

NASA, engineers co-sponsor schedule of lectures, seminars

A round of lectures and seminars have been scheduled in connection with the 1969 MSC Summer Faculty Fellowship Program and the NASA-American Society of Electrical Engineers Summer Faculty Program.

Two of the seminars, scheduled for June 30 and July 30, will be presented in the building 30 auditorium. All others will be given at the Cullen College of Engineering, University of Houston.

All seminars are scheduled from 9 to 11 a.m. on the days indicated.

• June 30—Dr. R. K. Moore, "Use of Spaceborne Radar for Studying the Earth's Environ-

ment and Resources"

• July 2—Dr. Bruce Lusignam, "An Earth Resources Satellite Study as an Example of Systems Design Engineering"

• July 23—Donald S. Ross, "Specialized Photography for Studying the Earth's Environment and Resources"

• July 30—William Fischer, "Satellites for Studying the Earth's Resources and Atmosphere"

• August 5 — Anthony Barringer, "Remote Sensing for Mineral Discovery"

• August 7 — Dr. Anthony W. England, "Application of Long Wavelength Electromagnetic Radiation to Geology"

Alignment improves for planetary Grand Tours

Plans for two three-planet Grand Tours in the late 1970's are being developed by the Jet Propulsion Laboratory, Pasadena, California.

One such mission would fly by Jupiter, Saturn and Pluto, the other would go to Jupiter, Uranus and Neptune.

The eight-to-eleven-year missions to the outer planets are detailed by James E. Long of JPL's Advanced Studies Office in the June issue of *Astronautics and Aeronautics Magazine*.

Rapidly maturing technology will make it possible for space scientists to unlock the mysteries of the outer solar system, Long predicts.

"The best outer planet alignment in 179 years, occurring in the 1976 to 1980 time period, opens the outer planets to exploration in an effective and timely manner," Long says in his article.

The infrequency of such favorable alignment is due to the slow movement of the outer planets about the Sun.

Long proposes the use of either conventional or solar-electric propelled spacecraft, with a nuclear isotope power source to operate spacecraft equipment.

From Jupiter on, a Grand Tour spacecraft would employ the gravitational attraction of each planet to spin on to the next.

Television cameras and other scientific instruments aboard the unmanned spacecraft could study the planets, their atmospheres, magnetic fields and satellites, he suggests.

Of special interest are Jupiter's red spot and radiation belts and Saturn's rings.

Long pinpoints 1977 through

1979 as vintage years for launching Grand Tours. That period, he says, will afford "the best combination of the planets' closest approach altitude, flight time and launch energy requirements."

The plan for multiple-planet missions to explore the outer solar system is an in-depth extension of Dr. Homer J. Stewart's "interplanetary billiards" proposal.

The heavy mass and strong gravitational fields of Jupiter and the other larger planets make large deflections and speed changes possible for passing spacecraft.

Thus the spacecraft would "bounce" from planet to planet similar to the ricocheting of billiard balls.

Long, in his article, points out that savings in energy and flight time are so great that a Titan-Centaur launch vehicle (a new combination of presently existing boosters) could be used. Normally, this tandem would not be capable of launching a spacecraft beyond Saturn.

The trajectories projected for these missions extend into intergalactic space.

(Cont. on page 4)

Toastmaster Club membership open

For those who find public speaking difficult and who have a need and desire to improve their ability through practice, the MSC Toastmaster's Club meets each Wednesday at the Nassau Bay Sweden House from 6 to 8 p.m.

Toastmaster Jack Cohen at X2631 or 488-3171, will provide additional information and encourages interested parties to join the group any Wednesday.

SIX CITED FOR SUSTAINED SUPERIOR PERFORMANCE RATINGS



Arthur V. Torres Downey Quality Assurance



Charles L. Archer Downey Quality Assurance



Joe Cook Downey



Anthony Retrosi Downey



Harry Linder Downey

FEDERAL CLASSIFIED EMPLOYEES General Schedule Effective July 13, 1969

	2	3	4	5	6	7	8	9	10	
GS-1	\$ 1,889	\$ 4,215	\$ 4,149	\$ 4,279	\$ 4,408	\$ 4,538	\$ 4,668	\$ 4,798	\$ 4,928	\$ 5,057
2	4,350	4,525	4,650	4,775	4,900	5,025	5,150	5,275	5,400	5,525
3	4,812	5,087	5,245	5,403	5,561	5,719	5,877	6,035	6,193	6,351
4	5,522	5,725	5,950	6,174	6,398	6,622	6,846	7,070	7,294	7,518
5	6,175	6,352	6,529	6,706	6,883	7,060	7,237	7,414	7,591	7,768
6	6,882	7,117	7,346	7,575	7,804	8,033	8,262	8,491	8,720	8,949
7	7,619	7,894	8,169	8,444	8,719	8,994	9,269	9,544	9,819	10,094
8	8,449	8,731	9,013	9,295	9,577	9,859	10,141	10,423	10,705	10,987
9	9,320	9,637	9,954	10,271	10,588	10,905	11,222	11,539	11,856	12,173
10	10,252	10,604	10,956	11,308	11,660	12,012	12,364	12,716	13,068	13,420
11	11,243	11,627	12,011	12,395	12,779	13,163	13,547	13,931	14,315	14,699
12	12,299	12,715	13,131	13,547	13,963	14,379	14,795	15,211	15,627	16,043
13	13,421	13,875	14,329	14,783	15,237	15,691	16,145	16,599	17,053	17,507
14	14,609	15,094	15,579	16,064	16,549	17,034	17,519	18,004	18,489	18,974
15	15,863	16,379	16,895	17,411	17,927	18,443	18,959	19,475	19,991	20,507
16	17,183	17,729	18,275	18,821	19,367	19,913	20,459	21,005	21,551	22,097
17	18,569	19,145	19,721	20,297	20,873	21,449	22,025	22,601	23,177	23,753
18	20,011	20,617	21,223	21,829	22,435	23,041	23,647	24,253	24,859	25,465



Ralph D. Rhodes Apollo Applications Audits

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.

Director Dr. Robert R. Gilruth
Public Affairs Officer Brian M. Duff
Editor Karen J. Lumpkin
Staff Photographer A. "Pat" Patnesky

'Mission Apollo' at Planetarium

The Burke Baker Planetarium in Houston's Hermann Park is taking visitors on a trip to the Moon with its current show, "Mission Apollo."

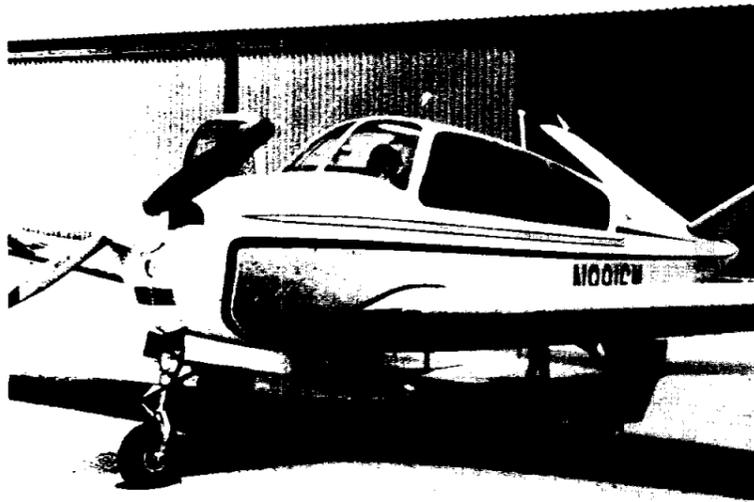
Following the profile of the first lunar landing mission, visitors will ride through the heavens of the planetarium dome, 240,000 miles to the moon and back.

The 45-minute presentation offers an excellent opportunity to review the steps leading up to the Apollo program; to learn about the Apollo navigational stars; to become acquainted with the Apollo equipment, including that scheduled to remain on the Moon; and to understand in detail some of the hazards implicit in space travel.

The simulated flight in the planetarium chamber is designed to show the viewer exactly what will be taking place during each step of this summer's historic voyage.

Programs begin at 1:30 and 2:45 p.m. Tuesday through Friday; 1:30, 2:45 and 4 p.m. Saturday and Sunday; and 8 p.m. on Friday and Saturday.

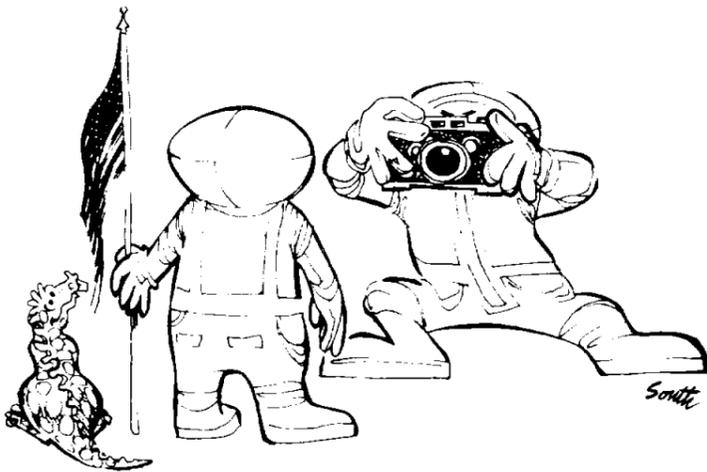
Shows start promptly at the designated times and there is no admittance after the show begins. Children under five are excluded.



AERO CLUB'S NEW BONANZA PROP STANDS READY FOR ACTION
Extra craft was necessary to take care of Club's increased membership

THE ASTRONUTS

(filched from TRW Systems Group)



Flyers buy new plane, start pilot instructions

The first meeting of the Aero Club's private pilot ground school will be on Tuesday, July 1.

Instruction, using the Sanderson audio-visual course, will be conducted each Tuesday at 5:15 p.m. in room 517 of building 2.

Partially subsidized by the MSC Employee Activities Association, the ground school tuition is \$20.

To register, attend the first class or call Fred Blankenship at 643-4170.

With increased membership qualified to operate retractable-gear aircraft, the Aero Club has purchased an additional Beechcraft Bonanza 1963 P-Model to complement the 1959 K-Model already owned.

Since two high-performance models are now available, accessibility is excellent and new memberships are both expected and encouraged.

The new plane has dual omni-radios, an ADF, and a single-axis autopilot.

Range and cruise performance is comparable to that of the K-Model, since the P-Model has a 260-horsepower fuel-injected engine and an 80-gallon internal fuel capacity.

Hourly wet rates for the club aircraft are now \$8 for the Cessna 150, \$9 for the 172, \$16 for the K-Model and \$17 for the P-Model.

The initial membership fee is still only \$50 and monthly dues are \$2 plus club shares.

Contact Bob Ward, 877-3187 or Howard Kyle, 482-7789 for additional membership information.

Low receives two honorary degrees

George M. Low, manager of the Apollo Spacecraft Program, recently received two honorary doctorates in recognition of his contributions to manned space-flight.

A Doctorate in Engineering was conferred on June 13 by Rensselaer Polytechnic Institute in Troy, New York, where Low earned both his Bachelor and Master of Aeronautical Engineering.

The University of Florida in Gainesville, where Low delivered a commencement address on June 15, presented him with a Doctorate in Science.

Low has been with NASA since it was established in 1958.

Roundup Swap-Shop

(Deadline for Swap-Shop classified ads is the Friday preceding Roundup publication date. Ads received after the deadline will be run in the next following issue. Ads are limited to MSC civil service employees and assigned military personnel. Maximum length is 15 words, including name, office code and home telephone number. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested.)

REAL ESTATE

West Galveston Island beach house, gulf view, all electric, 1 block to water, sell or rent, Green, 932-3486.

Nassau Bay 4-2-2, fenced, assume 6% loan, X7256.

Seabrook (Miramar) 3-2-2, paneled den, carpet, central A/H, built-ins, fenced, assume 5 1/4%, \$120/mo, immediate occupancy, Culling, 479-5722.

Dickinson 2-bdr house, 1721 Pine Dr, trees, rent or lease, \$120/mo w/lease, 534-2637.

Alta Loma 10 acres, 6 mi south of Alvin, highway 6, fenced, fertile, \$1000/acre, 944-6066.

Shore Acres 1 acre residential lot, utilities, trees, 10 min from NASA, \$7000, 944-6066.

Pasadena 3-2 1/2 for rent, 1-yr lease, large lot, sundeck, appliances, available August, \$260/mo, 944-6066.

Pearland 3-2-2, covered patio, near schools/shopping, \$23,500, equity, 6 1/2% loan, Gifford, 485-1815.

West Galveston Island (Spanish Grant) house for rent, 3-2, air, furnished, gulf view, \$175/week, J. Small, 591-2315.

Shoreacres 5-2-2, 2-story, 2650 sq ft, fireplace, fenced, trees, 1 blk elem school, 6 1/4%, pier/ramp privileges, \$31,000, 1-471-0928.

Deer hunters: 5.76 acres, creek frontage, wooded, on pipeline, 50,000 hunting acreage open to owner, \$2450 cash or terms, Nickerson, 225-9498.

Taylor Lake corner lot, wooded, lake view, \$1000/down, balance at 7%, owner, 591-4632.

Pearland, 1 3/8 acres, corner, 30 small pines, residential development, sacrifice \$4000, Plausche, 474-2660.

Friendswood home for rent, 3-2, central A/H, 482-1817.

AUTOS

68 VW sunroof sedan, radio, red, black vinyl interior, \$1550, J. Sutton, 932-3979.

66 Simca GLS 1000, 4-dr, full financing arranged, \$775, consider trade, F. Turner, 733-7667.

65 Allstate Mo-Ped, motor in good cond, \$50, D. Murphy, 479-1942.

66 Porsche 911, 14,000 mi, new radial tires, AM/FM, deluxe interior, R. Schweickart, 591-2439.

66 Corvette convertible, silver, 327-350, 4-sp, AM/FM, 477-1354 after 4 or 473-0672.

64 Valiant, 4-dr, air, automatic, extra clean, R. Jarvis, 649-6471.

65 Fairlane 500, air, power, automatic, buckets, 44,000 mi, D. McCutchen, 591-2663 after 4.

64 Buick Special 4-dr, 8-cyl, air, power steering, radio, automatic, excellent cond, E. Simon, 488-4043.

64 Olds F-85, 4-dr, 8-cyl, air, radio, standard, excellent cond, E. Simon, 488-4043.

62 Valiant, 4-dr, 6-cyl, automatic, good cond, \$250, B. Durand, 932-5777.

67 Chevelle, 2-dr HT, 327, standard floor shift, radio, wide oval tires, \$1695, P. Morton, 946-4752.

60 Chevy, 283 V-8, automatic, air, radio, new seat covers, \$250, D. Forsythe, 932-5267.

55 Buick Special 2-dr, recently overhauled, good transportation, \$125, 488-0182.

67 Camera, power steering, automatic, air, radio, 327, M. Pingnot, 667-9596 after 5.

65 Cadillac DeVille sedan, white, air, power, excellent cond, good tires, \$1995, J. Lockridge, 591-2628.

64 Buick Skylark, fully equipped, good cond, \$800 or best offer, N. Cryar, 483-2771 before 5.

63 Valiant 4-dr, radio, air, good cond, \$400, J. Miller, 946-8914.

63 Ford 2-dr deluxe, radio, air, new Aamco trans, good tires, B. Lehman, X7581.

66 VW, air, radio, 28,000 mi, excellent cond, \$1200, Schmidt, 472-8908 after 6.

65 Chevy suburban carryall, 6-cyl, standard, 41,000 mi, excellent, cash, W. Thomas, League City, 932-4787.

63 VW station wagon, 1500 cc, 55 hp, front end damaged but passed State inspection, \$350, E. Pyke, 488-3158 after 5:30.

63 Grand Prix, low mileage classic, air, power, electric windows, factory mags, wife's car, \$695, Ream, 877-4308.

BOATS

15' Albatross, fiberglass, 64" beam, centerboard, main & jib sails, galvanized trailer, \$1000, P. Maloney, 482-7688.

Back sailboat, 5 1/2 hp Johnson, sleeps 4, head & galley, full cushions throughout, berth at water gate, 488-3248 after 5.

13' 9" Scorpion board sailboat, fiberglass, new, still in carton, \$400, B. Ward, 591-2182.

16' Lone Star fiberglass sailboat, sails, 3.5 hp motor, compass, galvanized trailer, make offer, B. Ward, 591-2182 or 591-2138.

12' Sailfish, wood, complete w/lateen sail, \$50, M. Biggs, 471-2745.

19 1/2' ob day cruiser w/trailer, fiberglass hull & decks, excellent cond, \$750, engine not included, W. Mallory, 482-7081.

HOME FURNISHINGS

3-piece corner sleeper couch set w/table, \$100 or best offer; modern walnut dining table w/leaf, \$40 or best offer, J. Bates, 944-4687.

Sectional sofa w/table, 15', brown, like new, \$55, Minar, 877-3028.

Kenmore washer, gas dryer, washer needs minor repair, set for \$75, A. White, 591-3813.

Couch, 8' long, blue, excellent cond, \$70, Nancarrow, 946-5075.

Long-boy bookcase double bed w/mattress & box spring, set for \$60, C. Eldred, 471-4332.

Sacrifice GE Whirlpool electric range w/rotisserie, very good cond, Mrs. Blackburn, X3342 between 11:30 & noon only.

GE electric dryer, perfect working cond, \$45, B. Reina, 488-1326.

Sears air conditioner, excellent cond, used 2 summers, 22,500 BTU, \$150, Mrs. Black, 474-3751.

Crosley refrigerator, 10 cu ft, freezer section across top, \$40, 932-2718.

Garage-Antique Sale: school desk, bottles, flow blue plates, dinette set, June 27-28, 4506 N. Heron, Seabrook.

PETS

Free kittens, born 4-28, N. Schultz, Baytown 422-5636.

German Shorthair Pointers, excellent hunting and/or show stock, 8-wks-old, R. Reining, 946-6396.

Free kittens, born 4-18, adorable, playful, males & females, Dvorkin, 482-7957.

Appaloosa gelding, 5-yr old, Grand Champion at Halter, won in Western Pleasure, very gentle, D. Alexander, 482-1137.

3-in-1 package: black mare w/Appaloosa colt, bred back to Appaloosa stallion, D. Alexander, 482-1137.

1969 filly by Joker's Leader out of registered Appaloosa mare, D. Alexander 482-1137.

Seal-Point Siamese kittens, litter box trained, 474-3373.

ENTERTAINMENT

Giulietti Accordion, model 74, carrying case, both excellent cond, 487-0222.

Zenith color TV, 19' table model, matching movable stand, cost \$400 14-mo ago, \$300 or best offer, C. Hendrickson, 488-3283.

Fender twin-amp, very clean, looking & sounding, used only by professional musician, \$200 w/cover, J. Bates, 944-4687.

Stereo-Garrard changer, new 25-watt Olson amplifier, 2 Olson speakers, \$75, 591-3951.

Portable stereo record player, 3 speakers, good cond, \$60, L. Moore, 488-5132.

Lafayette KT-615, 12-watt hi-fi, mono amplifier, carefully assembled from kit, excellent cond, \$15, R. Musgrove, 488-3966.

Monaural hi-fi, EICO FM tuner, amplifier, Wolverine speakers, 24" cabinet, very good cond, R. Handley, 482-7041.

Sony Professional Recording Tape PR-150, new, splice-free, polyester 1/4", 1800 feet, 1.0 mil, 944-1361.

Cable-Nelson upright grand piano, reasonable cond, \$100, R. Erb, 877-1097.

Marathon electric guitar w/hand vibrato, case, cord, superb cond, \$55, 471-0068.

MISCELLANEOUS

Technicolor Movie Club membership, equipment: Super-8 camera, projector, light screen, film processing, cost \$550 new, sell \$425, 645-1001.

Surfboard, 9'6", fiberglass Newporter, \$40, T. Thomas, League City, 932-4787.

Gas patio grill in good cond, Carlisle, 2219 Bayou Dr, League City, 932-2836.

Argus camera, focus, variable aperture/shutter speed capability, built-in meter, \$55 new, \$20, L. Moore, 488-5132.

Coleman stove, Model 425C, 2 burner gasoline, like new, \$8, J. Rippey, 877-1859.

Canvas wall tent, 8' x 10'; Mauser sports rifle; small riding saddle; P. Gill, 643-8088.

Two black-faced Mickey Thompson spoke Mag wheels, \$40, Rick, 695-2709.

Infant baby carrier, \$2.50; training chair, \$2.50; little girl's dresses and play-suits sizes 3 & 4; all excellent cond, J. Cohen,

488-3171.

Ironrite automatic ironer w/stand & chair, \$50; 30-06 rifle, 1903 A3, excellent cond, w/sling & ammunition, \$50, M. Biggs, 471-2745.

B-flat Normandy clarinet, \$70; alto saxophone, \$60; table tennis board, \$7; sway bar for VW, \$5, 944-6066.

Twin stroller, \$7; Cosco net playpin, \$6; Zenith stereo, \$25, 474-2049 no-nings only.

Relaxacisor, 3-unit model, very good cond, \$65, 488-0621 after 5.

Set of Americana, set of Book of Knowledge and 10 vol of World Masterpieces in digest form, all \$75, C. Bailey, 944-3871.

Clear Lake Country Club membership, 50% off, 488-0275 after 5.

100% human hair 18" fall, dark brown, worn few times, \$90 new, \$40, V. Morris, Alvin 658-4855.

69 Travel Trailer, 17', self-contained, no shower, excellent, \$2000, Donnell, 877-1746.

USAF Officer Mess Dress, 38R, w/summer jacket, Lt. shoulder boards, \$75, L. Ledbetter, 482-7074.

Soldering gun set and propane torch, never used, \$5 each, Nancarrow, 946-5075.

WANTED

Headquarters management intern needs place to stay while on assignment to MSC, 6-28 to 8-16, D. Strother, 202-962-2814.

Lionel electric trains made before 1960, C. Neageli, 932-4171 after 5.

Ride to Ellington AFB—car pool arrangement—from 3424 Chimney Rock in Houston, hours 8 to 4:30 weekdays, C. Graham, 781-2299.

Chest of drawers or baby chest, L. Blankenship, 944-0750.

Air conditioner for 1967 Mustang V-8, H. Johnson, 485-3886.

Want to trade apt near San Francisco Bay for one near MSC July 19 to August, C. Davis, Ames, N239-12, Moffet Field, Calif.

Employed lady to share home in Pasadena, 1702 Miami, Mrs. Meyer, 473-8647.

Girl to share large 2-bdr apt for summer, in Houston, K. Lumpkin, 524-2732 or X5111.

FOUND

UT class ring, vicinity of building 4, identify initials, X3705 or room 286 of building 4.

SPAN to guard Apollo 11 from radiation overdose

Sun spots are a frequent occurrence on the Sun's fiery surface and most of them are harmless.

But if, during Apollo 11, a sun spot produces a solar flare, and if the flare in turn emits energetic particle radiation, and if the radiation is of high intensity, then the crewmen exploring the lunar surface could be in danger.

Therefore, a highly integrated organization known as the Solar Particle Alert Network is working around the clock to assure advanced warning of any serious solar events.

If a dangerous flare did occur, said Dr. Donald E. Robbins, head of the Solar Physics Section, it would be several hours before any radiation would reach the vicinity of the Moon, giving the astronauts ample time to leave the lunar surface and return to safety in the command module.

NASA's SPAN, which is manned by NASA, ESSA and the Air Force, consists of seven telescope stations, six of which are currently recording data. The sites are at MSC; Canarvon, Australia; Canary Islands; Boulder, Colorado; Culgoora, Australia; Oahu, Hawaii and Teheran, Iran.

Both types of telescopes employed by the Network—Hydrogen-Alpha or visual system and radio frequency telescope—are in operation at MSC.

The optical telescope-camera system uses a narrow band filter centered about the Hydrogen-Alpha spectral line. Since the Sun is predominantly hydrogen and this line is in the visible region of the spectrum, solar flares are best observed at the wavelength of this line.

Each Hydrogen-Alpha facility is fitted with a 35mm camera which takes a picture of the

Sun every 10 seconds. These register solar flares, their size, location and intensity.

Every so often the cameras will record more than just solar activity—as in this picture from the Canary Islands installation.

A weather balloon, a flock of geese, a helicopter and various other aircraft are on file, along with the formation at right which, while resembling the domestic T-6, left a conspicuous vapor trail in subsequent frames.

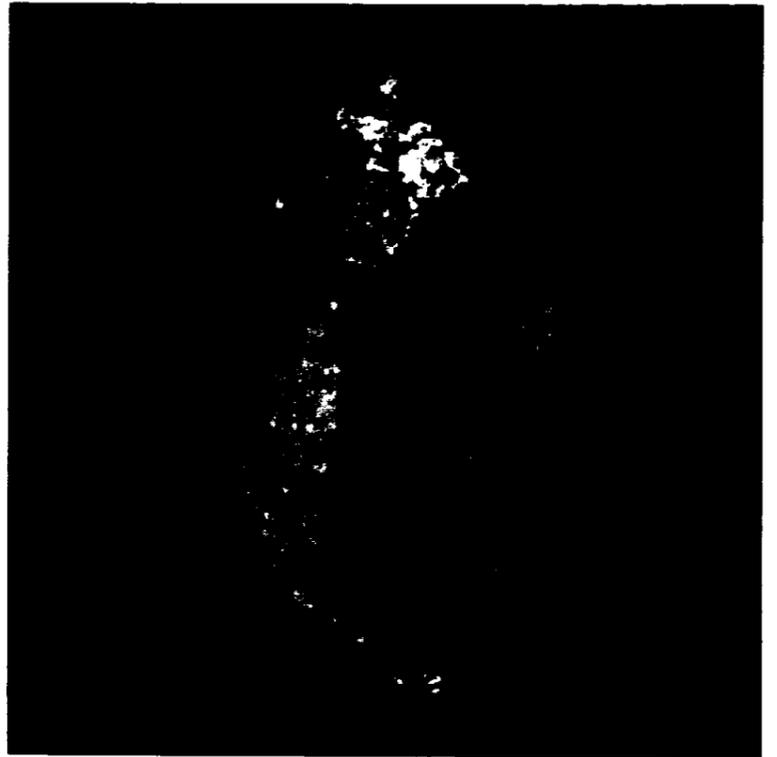
SPAN's radio frequency telescopes are set up to receive radio signals from the Sun. Network scientists integrate data from both systems on each flare to obtain an accurate evaluation of its significance.

During Apollo 11, data from six stations will be compiled and fed into the Space Environment Console in the Mission Control Center where space environment specialists will evaluate it and pass it on to the flight surgeon.

This solar activity data has been of particular value on missions where extra vehicular activity was involved and in recent Apollo flights when crewmen moved into the lunar module which does not afford as much protection from radiation as does the CM.

It will be of prime importance on the flight of Apollo 11 which has scheduled up to three hours of lunar surface activity and more than 24 hours of exposure from inside the LM.

"Events occur from time to time which could be large enough to produce a lethal dose were the men to stay on the lunar surface," said Robbins. "With SPAN, this possibility will be avoided."



UNIDENTIFIED AIRCRAFT PASS BETWEEN TELESCOPE & SUN
Formation similar to T-6's captured by Canary Island SPAN camera

Grand Tour — —

(Cont. from page 2)

After 1980, missions using Jupiter for spin-off energy will be limited to two planets, starting with a Jupiter-Pluto launch opening in 1989.

The JPL planner points out that the planetary carom effect would enable a spacecraft to reach Pluto in seven to eight years. A direct flight to Pluto (at closest 2670 million miles from Earth) would take 41 years.

Neptune, next farthest out, might be reached in eight years, instead of the 18-plus years via direct flight. To reach Jupiter, primary goal, will require a minimum of one and a half years.

The Grand Tour, however, may have to forego a swoop inside Saturn's rings.

"A close approach to Saturn in the elliptic plane," Long warns, "must avoid the rings due to the expected high-mass concentration."

The technological challenges of a nine-year-plus spaceflight

are formidable but not insurmountable, the JPL planner says.

The spacecraft's power will be generated by electrical conversion of heat produced by a nuclear source (Plutonium). Work on a radioisotope thermoelectric generator is proceeding at JPL.

In arguing that the Grand Tour justifies high priority in future space exploration, Long concludes:

"The outer planets are extremely attractive subjects for extending present knowledge of the origin and evolution of the solar system as well as knowledge of interesting 'new worlds'."

Ames scientists studying Tektites show connection with Moon crater

Glass objects called tektites have long fascinated scientists as possible sources of information about the origin of the Moon and the solar system.

Experts have speculated that the objects came from the Moon, blasted out of the lunar surface by the impact of a giant meteorite.

Some tektites are small, some large and they are found widely scattered over the Earth.

Using facilities designed to study the problems of craft returning from space, scientists at Ames Research Center in Mountain View, California, helped solve part of the tektite mystery.

When small glass spheres were subjected to re-entry speeds and heat, they melted, forming the familiar ring waves of tektites found in Australia. It was these tests that determined their incoming speed from the Moon.

Dr. Dean Chapman of Ames, working with computers programmed to analyze the tektite landing patterns, has been most closely associated with these studies.

Tektites have been found scattered widely over parts of the Earth in a series of streaks

and arcs that identified the moon crater from which they fell.

Trajectories from many lunar craters were studied, but only one — Tycho — matched perfectly.

"About 700,000 years ago," Dr. Chapman said, "an iron meteorite the size of a small mountain, some three miles across, came hurtling toward the Moon. When it struck, a crater, now known as Tycho, was formed—a crater 54 miles wide.

"Intense shock waves," he said, "melted the crust and

splashed droplets out into space. As the Moon droplets cooled they were transformed into billions of tektites.

"Chunks of the iron meteorite were also thrown clear of the Moon's gravitational field and moved along on a collision course toward the Earth."

As the Earth's gravitation pulled them downward they were partially melted and reshaped, and landed as glassy showers in great arcing patterns that curved and intertwined over the Earth.

Next golf tournament July 5

The next MSC Golf Association tournament is scheduled for July 5 at the Sun Meadows course near Friendswood.

In the June 7 tourney, held at Long Meadows Country Club, Jim Barnett and Max Engert tied for low gross score honors with 80's.

Winners in the championship flight were: Barnett, 80 (gross) 16 (handicap), 64 (net); second, Frank Morgan, 85-17, 68; tied for third, Engert, 80-9, 71 and

Bill Whipkey, 85-14, 71.

Jerry Shinkle was low man in the first flight with a 92-25, 67; second, Jean Petersen, 87-18, 69 and tied for third, Sam Glorioso and Bill Johnson, both with 88-18, 70.

Second flight winners were: Phil Shannahan, 92-26, 66; second, Ken Young, 100-33, 67; third, Steve Gorman, 104-36, 68 and tied for fourth, Jim Strickland, 103-33, 70 and Don Robbins, 102-32, 70.

Spanish now operating Madrid tracking station

A Spanish crew has formally taken over operation of the US Deep Space tracking facility near Madrid, Spain.

The changeover ceremony saw Dr. Thomas Paine, NASA administrator, deliver the final American signal to an unmanned probe orbiting the Sun, after which General Luis Azcarraga, president of the Spanish Space Research Council, sent the first signal under Spanish control.

The Madrid installation, known as Deep Space Facility 62, is one of the major units of NASA's Deep Space Network used primarily for tracking, communication and control of the US unmanned spacecraft.

The Network also assists with Apollo manned flights and provides TV reception.

On his first visit to the Madrid station, Dr. Paine praised the Spanish space institute for achievements in connection with many flights, including full photo coverage and first release of the Moon pictures by three Lunar Orbiters, Mariner flights to Venus and Mars, and four Pioneer interplanetary probes.

Madrid has tracked Pioneer 9 to a distance of 80 million miles.

"Spanish determination," Dr. Paine said, "to participate in this exciting 20th Century form of exploration reminds us that five centuries ago Columbus' great voyage of exploration was carried out under the flag of Spain."

The facility, located about 44 miles east of Spain's capital, has been operated almost entirely by Spanish employees for more than six months. It is operated under a 10-year agreement signed in January, 1964 by the US and Spain.

In addition to DSF 62, the station includes another facility, DSF 61, a few miles away.

Both installations are equipped with 85-foot antennas and are spaced about 120 degrees apart so that at least one antenna can lock onto targets at all times.

NASA's worldwide communication system, NASCOM, links network stations together and to Pasadena, California; Houston; Greenbelt, Maryland and other control points through a combination of landlines, radio, satellites and undersea cables.

Stamp Club issues covers for Apollo 11

The MSC Stamp Club has announced plans for publishing a souvenir envelope to commemorate the lunar landing scheduled on Apollo 11.

The envelope will carry the insignia of the Apollo 11 flight and a four-color artist's conception of lunar exploration, together with suitable inscription.

The cover will use the Apollo six-cent stamp and will be post-marked in Houston on the day of the lunar landing.

Collectors desiring to acquire these cacheted commemorative covers should write to: MSC Stamp Club, P. O. Box 58328, Houston, Texas 77058.

The souvenir covers will cost 35 cents each, or a dollar for three, and should be accompanied by a self-addressed, 9½ inch return envelope carrying sufficient return postage (6 cents for each three covers ordered).