



EYRIE FOR SPACECRAFT—The camera peers down from the top of the service structure around Apollo spacecraft 011 at Launch Complex 34. The command and service modules were mated to Saturn launch vehicle 202 July 2 and began assembly and checkout in preparation for the August 25 unmanned suborbital A/S 202 mission.

Apollo 202 Leads Way For Manned Missions

The third unmanned Apollo/Uprated Saturn I flight will be launched no earlier than August 25. This will be the second flight test of the Apollo spacecraft command and service modules and the third flight test of the Saturn I rocket in preparation for manned missions orbiting the Earth.

The 17,825-mile flight will carry the spacecraft three-quarters of the way around the Earth. Landing will be in the north central Pacific about 300 miles southeast of Wake Island.

A/S 202 will be launched from Launch Complex 34, Kennedy Space Center, Fla., at 11:30 am CST to provide a long period of daylight for spacecraft recovery

A/S 202 Mission Reset to Aug. 25

Launch of the third unmanned Apollo uprated Saturn I mission, AS-202, has been rescheduled from August 22 to August 25.

The new launch date will permit engineers to accomplish minor reworking and additional testing of components in the spacecraft stabilization guidance and control systems.

Need for the additional work and testing became apparent during the AS-202 mission flight readiness review held last week at the NASA Kennedy Space Center. Apollo Program officials decided to undertake these measures to provide greater assurance of reliable systems operation and mission success.

operations. The flight will take almost 93 minutes.

The mission is the second performance check of the Apollo command module ablative heat shield. The shield will be subjected to extended high heat loads—about 23,000 BTU/per square foot—resulting from a reentry path resembling a “roller coaster” ride on Earth.

On the first unmanned Apollo mission last February, the heat shield underwent high heating rates at a very steep angle. The reentry trajectory in this mission will be longer and shallower to produce very high heat loads.

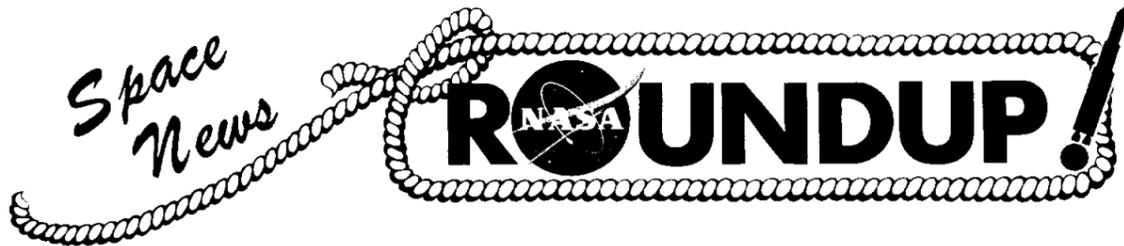
The two types of trajectories represent reentry heating conditions encountered in manned Earth orbital missions. For lunar landing mission reentry, the spacecraft heat shield will be tested next year on Saturn V missions.

The Apollo/Uprated Saturn space vehicle stands 224 feet high (launch vehicle is 141 feet and spacecraft 83 feet). Total weight on the launch pad will be 1,326,400 pounds (launch vehicle is 1,269,500 pounds and spacecraft 56,900 pounds).

The Apollo command module, although unmanned, is a fully operational spacecraft except for crew couches and a few displays for pilots. The guidance and navigation system and fuel cell electrical power system will undergo their first flight test.

The Apollo Emergency Detection System will be tested in the automatic mode. It will automatically initiate firing of the spacecraft launch escape system

(Continued on page 8)



VOL. 5, NO. 22 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS AUGUST 19, 1966

SEPTEMBER 9 LAUNCH—

Gemini XI Mission Features First Revolution Rendezvous

Launch date for the Gemini XI mission has been scheduled for no earlier than September 9 from Kennedy Space Center, Florida.

The three-day mission includes a plan to rendezvous with an Agena target vehicle on the first spacecraft revolution and the use of a fully automatic controlled reentry by the Gemini onboard computer.

The flight plan calls for the use of a power tool in space, maneuvering of two spacecraft linked together by a tether and maneuvering the spacecraft to an apogee of 750 nm.

Gemini XI command pilot is Charles (Pete) Conrad and Richard (Dick) F. Gordon is pilot. Backup command pilot is Neil A. Armstrong with William A. Anders as backup pilot.

Launch time for the Agena Target Vehicle is 7:48 am CST with liftoff of Gemini XI scheduled 97 minutes later at 9:25 am CST.

The Agena XI will be launched into a 161 nm circular orbit by an Atlas Standard

Launch Vehicle which develops 390,000 lbs. of thrust. Gemini XI, boosted by a modified Titan II, will be launched for a direct ascent to the orbiting Agena, with docking programmed during the first pass across the United States.

Gordon is scheduled for two activities outside the spacecraft—the first on a 30-foot umbilical lasting 55 minutes, the second is a 2½-hour stand-up activity during which he will take photographs. During this extravehicular activity (EVA), on the 15th and 16th revolution, Gordon is to link the Gemini and Agena with a two-inch-wide, 100-foot tether stowed aboard the Agena.

On the second day the Gemini XI crew will use the Agena's 16,000 lb. thrust Primary Propulsion System (PPS) to boost the spacecraft to an apogee of 750 nm. The Gemini-Agena will remain in this elliptical orbit (750 nm apogee by 161 nm perigee) for two revolutions until the PPS is fired for the second time and the spacecraft is returned to a 161 nm circular orbit.

After undocking, the crew will fly formation with the Agena linked to the Gemini by the tether. This exercise is designed to determine the feasibility of performing extended station-keeping to a tethered vehicle by using a Gravity Gradient Technique.

Twelve technical and scientific experiments will be performed during the 70-hour mission. They are mass determination, night image intensification, power tool evaluation, radiation & zero G on blood, synoptic terrain photography, synoptic weather photography, nuclear emulsion, airglow horizon photography, UV astronomical camera, ion wake measurement, dim sky photograph/orthicon.

Provisions have been made for two additional experiments that involve lunar and libration regions photography. Libration region photography will be conducted if there is no change in the launch date. Lunar UV spectral reflectance measurements, however, will be made only if a change in the launch schedule should result in more favorable lighting conditions on the moon.

Retrofire is scheduled for 70 hours, 40 minutes GET with splashdown planned for the western Atlantic Ocean (Recovery Area 45-1) about 725 miles east of Cape Kennedy.

(Continued on page 8)

Gemini XI Tests On Schedule for Sept. 9 Launch

The Gemini launch vehicle for the Gemini XI mission and the Atlas Standard Launch Vehicle for placing the Agena rendezvous vehicle into orbit this week underwent tanking tests at Kennedy Space Center at Launch Complexes 19 and 14, respectively.

Gemini spacecraft XI and completed joint combined systems test prior to the tanking tests. The Gemini XI Agena rendezvous vehicle presently is undergoing the primary and secondary propulsion systems tests in its hangar prior to being moved to Launch Complex 14 for mating with the Atlas. Both the Gemini and Agena spacecraft are expected to be mated with their launch vehicles within the coming week.

Pre-launch testing and preparations are on schedule for the launch of Gemini XI and the Agena rendezvous vehicle on September 9.



COCKPIT CHECKOUT—Gemini XI crewmen Richard F. Gordon and Charles Conrad mount onboard cameras as a part of the pre-mating checkout of Spacecraft XI atop the “Timber Tower” at the Kennedy Space Center bore-sight range. Electrical interference and interface tests of the Gemini and Agena spacecraft are conducted on the tower before the spacecraft are moved to the pads for mating with their launch vehicles.

There is such thing as a Free Lunch



PICKS UP TAB—Helen Hensley, MSC Credit Union assistant manager and insurance clerk, presents dinner-for-two tickets to Thomas E. Moore of Guidance and Control Division. Moore's name was chosen in the August 12 Credit Union "dinner-for-two" sweepstakes, a bimonthly drawing of names of MSC Credit Union members.

Credit Union Teaches Thrift to Youngsters

Time was when only grownups belonged to credit unions, had bank accounts and bought on credit. Youngsters were sometimes encouraged to save through the piggy-bank method, but their fiscal education rarely went beyond that.

The MSC Federal Credit Union welcomes children as members, not only as a means of teaching them the wise use of money but to begin their money education at an early age on a continuing basis.

Opening an account for a child with the MSC Federal Credit Union is easy to do, but it is up to parents to follow up with encouragement for systematic savings of earnings from odd jobs, baby sitting and paper routes.

Children often like to save toward a specific goal—a bicycle,

Apollo SPS Tests Begin at WSTF

MSC began a fourteen-day static firing simulation of the first manned Apollo mission August 8 at its White Sands, New Mexico, Test Facility.

The duplication of the manned mission profile will verify performance of the Apollo service propulsion system.

Eight firings of the SPS 21, 900-pound-thrust engine will total from 116 to 123 seconds of burn time and will be separated by coast periods of the same duration now planned for the first manned flight.

Through the fourteen-day simulation, the liquid propulsion system will be kept pressurized to mission levels.

The first Apollo manned flight is an open-ended mission that could last as long as the fourteen days of simulation.

The service propulsion system engine is built by Aerojet General Corp. for North American Aviation Inc., prime contractor for the Apollo command and service modules.

that special dress or a set of wheels. As they experience the growth of their systematic savings and reach their goals, they are more likely to be willing to work toward the long-term goals they encounter as adults.

'OPEN-ENDED' MISSION—

MSC Lab Testing Gathers Data For First Manned Apollo Flight

The nature of the first manned Apollo flight, described by MSC officials and the crew as "open ended," is best characterized in flight-oriented tests conducted by MSC.

Two tests, one just completed and one under way, both directly related to the first manned Apollo are eight days in one case, 14 in the other. Others have run for a matter of a few hours to several days.

Virgil "Gus" Grissom termed the flight "... sort of open ended. We expect it to go until we find some reason to bring it down. At this time we haven't set a time when it should be ended." Grissom is command pilot in the three-man prime crew for the first manned Apollo mission.

He was speaking, along with Senior Pilot Ed White and Pilot Roger Chaffee, at a press conference in the Downey, California, plant of Apollo spacecraft prime contractor North American Aviation, Inc. The backup crew—Jim McDivitt, Dave Scott and Russell Schweickart—also participated in the conference.

Grissom carried the thought a step further. He said, "When you find a problem up there, or some interesting phase you'd like to investigate in real-time, you can change your flight plan. You can investigate and you can bring back more data."

White emphasized that, once the spacecraft achieved its planned orbit, it would continue

Marshall Begins Talks for Buying Saturn I Items

NASA Marshall Space Flight Center has begun negotiations with Chrysler Corp. and Douglas Aircraft Co. for the procurement of long lead-time items for additional Uprated Saturn I (Saturn IB) launch vehicle.

Procurement of these items is necessary at this time to avoid an interruption of production capability for the uprated Saturn I launch vehicle. This capability must be maintained to permit procurement of additional vehicles beyond those already approved as program requirements develop.

Available engineering talent and experience built up during the program, which might otherwise be lost, will be utilized.

The first stage of the Uprated Saturn I is built by Chrysler at the Michoud Assembly Facility in New Orleans.

Douglas Aircraft Co. manufactures the second stage at Huntington Beach, Cal. Present contracts with the two firms calls for 12 vehicles. Two have already been launched and the third is scheduled for the August 25 A/S 202 mission.

The cost of these long lead-time items is estimated at \$5-10 million.

Picnic Posse Prowls For Work Volunteers

The MSC Employee Activities Association has formed a posse to track down folks to help out in the October 1 MSC Old West Picnic at Galveston County Park. Central theme of the picnic will be a stagecoach office-saloon-Boot Hill motif, and the Picnic committee has issued a call for help in doing the many chores that go into planning—and some of the chores are just plain old manual labor, such as building and painting Dodge City-type storefronts, getting together recreation equipment, kiddie favors and most important, the grub and liquid-type refreshments.

Below are listed the members of the EAA Picnic Posse who are looking for volunteers dead or alive (preferably alive) to pitch in and help with all the chores. Call the committeeman in the area in which you can help.

Chairman Evon Collins 2206; co-chairman Tony Yeater 5131; secretary Marilyn Bocking 4858.

Promotion Marvin Matthews 7365; Food/parking Lloyd Yorker 3136 and Anne Sabin 2965; Beverages Dale Blackshear 7654, Jerry Franklin 5431 and Will Brugger 5431.

Children's activities Tom White 7654, Lois Bradshaw

3385, Helon Crawford 3451, Linda Johnson 2365, Brenda Matthews 3021, and Sandra Burdsal 5156.

Adult Activities Bobbie Wright 4031, Becky Boozer, 4091, Joe Kratovil 4011, Jose Reyes 7265, Dorothy Szopski 4072, J. D. Collins 7654 and Charlotte Maltese 2321.

Trophies/prizes Carol Brinkman 3676, Vic Ettridge 3541, Mark Thomas 7311 and Penny Study 2221.

Dancing/band Karla Garnuch 5135, Marilyn Lamb 3126, Bea Herrera 5431, Linda Johnson 2365, Myra Shimek 2776, George English 2776 and Pam Howell 3021.

First aid/safety Mary Dunn 2865 and Jesse Collum 3385.

Sanitation Marvin Cohn 3521.

Information boothe Gayle Porter 2821, Alice Robinson 2489, Judy Dement 2489, Joyce Lowe 4351, Fern Macha 5411 and Ester Lizcano 5131.

Special guests Lois Nelson 7365.

Budget/tickets Myra Shimek 2776, Beck Long 7283, Rita Sommer 2397, Linda Drysdale 3051, Imogene McDonald 2858, Faye Broussard 4366, Judy Dement 2489 and Chuck Shelmander 2473.

Publicity Bill DerBing 4231, Phoncille DeVore 2565, Don Gregory 2283, Ed Banz 7265 and Stan Weiss 2676.

When the EAA Picnic Posse flushes you out of hiding, go along peaceably and do your share toward a real swingin' picnic.

PhD Astronauts Receive Wings

Three astronauts named to the manned space program a year ago have completed jet pilot training and will return to classroom and field studies at MSC this month.

Graduation ceremonies were conducted August 6 at Williams Air Force Base, Arizona, for the 60-man Air Force class that includes the three civilian astronauts—Dr. Owen K. Garriott, Dr. Edward G. Gibson, and Dr. Harrison Schmitt.

Main speaker for the graduation ceremony was Under-Secretary of the Treasury of the United States Joseph W. Barr.

Garriott, Gibson and Schmitt were selected in June 65, more for their specialized science backgrounds than for their aeronautical training. Garriott and Gibson are physicists, Schmitt a geologist.

The training at Williams, begun last July, gives the three men the jet aircraft experience desired of astronaut candidates. Each logged some 210 hours of jet time during the year of training.

And additional 30 hours basic training in T-41 propellor aircraft brought the total hours logged to 240. Jet time was 90 hours in T-37 and 120 hours in T-38 aircraft.

to fly as long as its systems operated properly and the crew could gather useful data. "This is a new concept . . . to get the most out of what you have up there," he said.

The crew's ability to work efficiently and relax comfortably in the spacious—compared with Mercury and Gemini spacecraft—Apollo command module has been confirmed over an eight-day period in Vacuum Chamber A in the Space Environmental Simulation Laboratory. Three MSC engineers entered the spacecraft in Chamber A on August 1 and came out August 9. The test was designed to verify the spacecraft and its subsystems under vacuum and thermal conditions, but the "crew" performed various tasks similar to those of the flight crew.

The 14-day test, now underway at the MSC White Sands Test Facility in New Mexico, will take the Apollo service propulsion system (SPS) through a sequence of static firings paralleling what could be the system's scheduled operation in space. In that series, engine burns totalling 116 to 123 seconds were scheduled one on the first and second days and one on every other day after the second. Coast phases applicable to the open-end Apollo flight will fill the time between engine burns. During this period, the propellant system will remain pressurized just as it will in flight.

Apollo electrical power system (EPS) fuel cells, in-flight performance of which will be a major factor in determining the duration of the first manned flight, have undergone 40 hours of continual-run testing at White Sands in an over-all three-month verification test series. Additional EPS testing was done at the Manned Spacecraft Center on completion of the White Sands series.

Overall spacecraft systems have been wrung out by the Apollo crews themselves right on the prime contractor's assembly lines "many times on a 24-hour basis to be sure the systems perform as we want them to," Ed White said.

Jim McDivitt amplified on that statement, saying "we participated in the tests on a 24-hour, seven-day-a-week basis when necessary. We also have some new concepts that will be put into effect down at the Cape."

He summed up the flexibility of the mission and at the same time gave a hint of things possibly to come in Apollo when he said "I think we've streamlined our testing procedures here. We've had a lot of progress with the operational check-out procedures, and I expect that spacecraft in the future will be able to go through testing in considerably shorter periods of time.

"I think it's a sign of maturity in the program as we go through this type of testing."

Study Contract Signed For Mars/Venus Flyby

North American Aviation's Space Division has been awarded a one year contract to study ways of sending men on flyby missions past the planets Mars and Venus.

The \$400,000 contract was awarded by the NASA-Marshall Space Flight Center.

NASA is studying Mars and Venus flyby missions as a stepping stone to manned landing missions.

The Los Angeles firm will investigate the best methods and hardware for performing manned Mars and Venus flybys with maximum use of Apollo/Saturn systems.

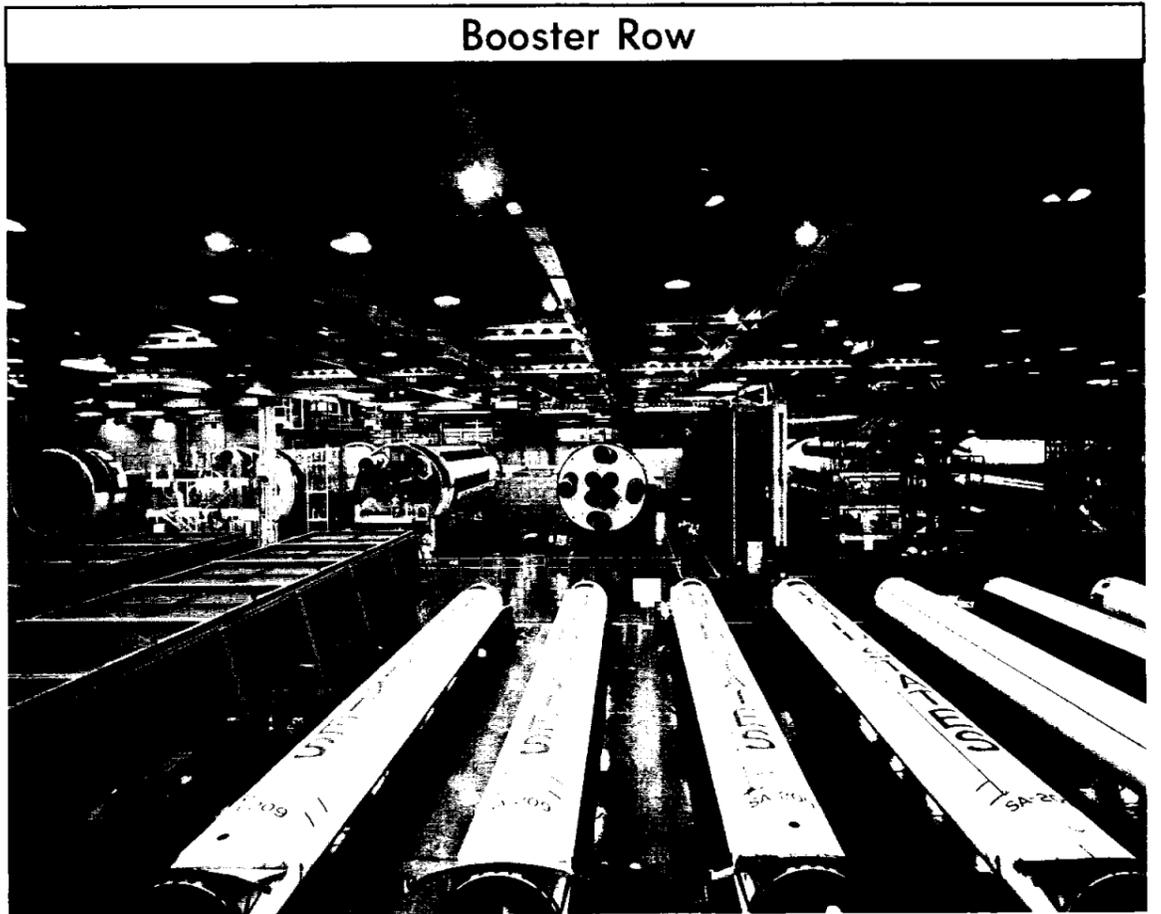
Researchers will investigate ways of acquiring scientific and engineering data which could next lead to a manned Mars landing. The study will evaluate

trips to Mars and Venus in the 1975-1980 time period and that take from one to two years. Objectives of manned flyby missions of Mars and Venus are collection of scientific and engineering data of the planetary and interplanetary environment and to qualify operational manned spacecraft equipment for landing missions on the planet Mars. Studies show that a manned Mars landing could be achieved in the 1980's.

NASA must know more about Mars surface conditions such as the "canals" and possible bacteria or viruses. Before manned landings are undertaken, there must be data developed on the composition, density and temperature of the Martian atmosphere.

Several methods of launching a four-man spacecraft toward Mars and Venus are being studied.

One mode being considered would use a modified version of the Saturn V third stage, currently being designed to inject the Apollo/lunar module spacecraft on lunar missions. Two or more modified third stages would be assembled in tandem and launch the Mars or Venus spacecraft.



Booster Row
SATURN HALL — Six uprated Saturn I first stages are shown in final assembly and checkout positions at the NASA Michoud Assembly Facility in New Orleans. In the foreground are seven of the eight 70-inch diameter fuel and liquid oxygen tanks for A/S 209 prior to being clustered around a 105-inch diameter liquid oxygen tank. The Saturn I first stage weighs more than one million pounds fueled and develops 1.6 million pounds from its eight H-1 liquid oxygen/RP-1 engines.

EAA Organizes MSC Employee Blood Program

The MSC Employee Activities Association has announced formation of a blood deposit program for the benefit of MSC employees. Arrangements have been made for periodic visits to MSC by the Blood Services of Houston (formerly Southwest Blood Bank of Houston) mobile facility for collecting blood for the MSC Group Blood Deposit Program.

Blood transfusions are not always needed by people in poor health; more often it is people in good physical condition who, without any warning, need blood and need it quickly. Some five and a half million pints of blood will be transfused this year in the U.S. 75,000 pints in the Houston area alone. Transfusions of whole blood are used in treating diseases and conditions such as cancer, anemia, cardiovascular ailments, pregnancy, leukemia, pneumonia, haemophilia, ulcers, cirrhosis, hernias, kidney disorders and, of course, accidental injuries where loss of blood threatens recovery.

Having blood on deposit in the bank, on call for quick transfusion, is a valuable form of insurance for employees and members of their families. And since the human body completely replaces red blood cells every 120 days, one pint from 14 pints in the average human body is not too much to share with someone who may need it tonight.

Mixed Bowling League Has Several Openings

There are still a few openings in the Lockheed Fall Mixed Bowling League for Tuesday and Friday night competition. Deadline for joining is August 31. Substitutes are also invited. Tuesday night games will start at 8:45 pm at Meadow Creek Lanes and Friday night at 6:15 pm at Mimosa Lanes.

Doug Wright at 5575 is the League contact at MSC.

Fire Menaces Network Station in Spain

An alternate system kept the U.S. tracking station at Robledo, Spain in operation last week-end when 500 to 600 feet of cable were burned by a forest fire rag-

ing nearby. The station, now engaged in the Lunar Orbiter flight, suffered no loss in operation during the fire last week-end, and the burned cable was replaced in about five hours.

The Spanish Air Ministry sent civil guards and military personnel to the station to help combat

the fires. Five fire engines and a helicopter from the U.S. Air Forces stood by to assist at the request of the United States Ambassador, Angier Biddle Duke.

The station has a critical role in the Lunar Orbiter program and is receiving photos of the lunar surface.

Final Standings

1966 MSC/EAFB FAST PITCH Softball League

	WON	LOST	GBL	PCT
American Division				
Philco/WDL	10	1	—	.909
IBM/RTCC	9	2	1	.818
IESD/LEC	9	2	1	.818
Link	7	4	3	.636
Lonestars (ASTD)	6	5	4	.545
747th. Rams	6	5	4	.545
Graham	5	6	5	.456
MSC/AF-Mols	3	8	7	.273
TRW	2	9	8	.182
FCD	2	9	8	.182

	WON	LOST	GBL	PCT
National Division				
Brown & Root	10	1	—	.909
2578th.	9	2	1	.818
NAA	8	3	2	.727
IESD	7	4	3	.636
MSC/Pyros	6	5	4	.545
CG/Houston	4	7	6	.364
Weather	3	8	7	.273
McDonnell Aircraft	2	9	8	.182
Lockheed Electronics	1	10	9	.091
Hustlers (Comp. & Anal.)	1	10	9	.091

1966 MSC/EAFB SLOW PITCH Softball League

	WON	LOST	GBL	PCT
American Division				
TSD-All Stars	10	1	—	.909
Misfits-IESD	9	2	1	.818
FCSO	9	2	1	.818
Mets-Security	9	2	1	.818
Animals-MPAD	8	3	2	.727
TRW-Ogos	7	4	3	.636
Lunatics-ASPO	7	4	3	.636
Pro & Con	7	4	3	.636
Philco/TR	7	4	3	.636
Batmen-FSD	3	8	7	.273
MPAD-Fab	2	9	8	.182
LRD	0	11	10	.000

	WON	LOST	GBL	PCT
National Division				
MPAD-RAB	10	1	—	.909
CG/EAFB	9	2	1	.818
Univac	9	2	1	.818
SSD	7	4	3	.636
Hustlers-P&PD	6	5	4	.545
Moonrakers-SMD	5	6	5	.456
RMD-Plus	5	6	5	.456
Lockheed-Operators	5	6	5	.456
CSD	4	7	6	.364
Virginians	3	8	7	.273
IBM	3	8	7	.273
Dirty Sox-FSD	0	11	10	.000

Apollo Reliability Chief Dies In Washington

George A. Lemke, a senior member of NASA's manned spaceflight management organization, died August 15, while attending mass at St. Dominic's Church in Washington, D. C. He was 54.

At his death, Lemke was director of Apollo Reliability and

Quality in the Office of Manned Space Flight, Washington.

He was appointed to an expected position with NASA on March 16, 1962, by the late Dr. Hugh L. Dryden. At that time he was manager of Engineering Reliability at General Dynamics-Astronautics in San Diego, having worked for General Dynamics some 20 years. Upon joining NASA, he was appointed resident manager, Apollo Spacecraft Program Office (RASPO), Downey, California, leaving there in August 1963.

From August 1963 to January 1964, Lemke was on special assignment to MSC Director Dr. Robert R. Gilruth. From January 1964 on, he was on temporary duty assignment to the Office of Manned Space Flight in NASA Headquarters, Washington.

He was born in St. Paul, Minnesota, and received a bachelor of science degree in aeronautical engineering from the University of Minnesota in 1935.

Survivors include his wife, Mrs. Eleanor Walsh Lemke, of 301 G Street, S. W., Washington, D. C.; a son, Richard G. Lemke, of La Jolla, California; a daughter, Mrs. John Evenson, Jr., of Mountain View, California; and a brother, William P. Lemke, St. Paul, Minnesota.

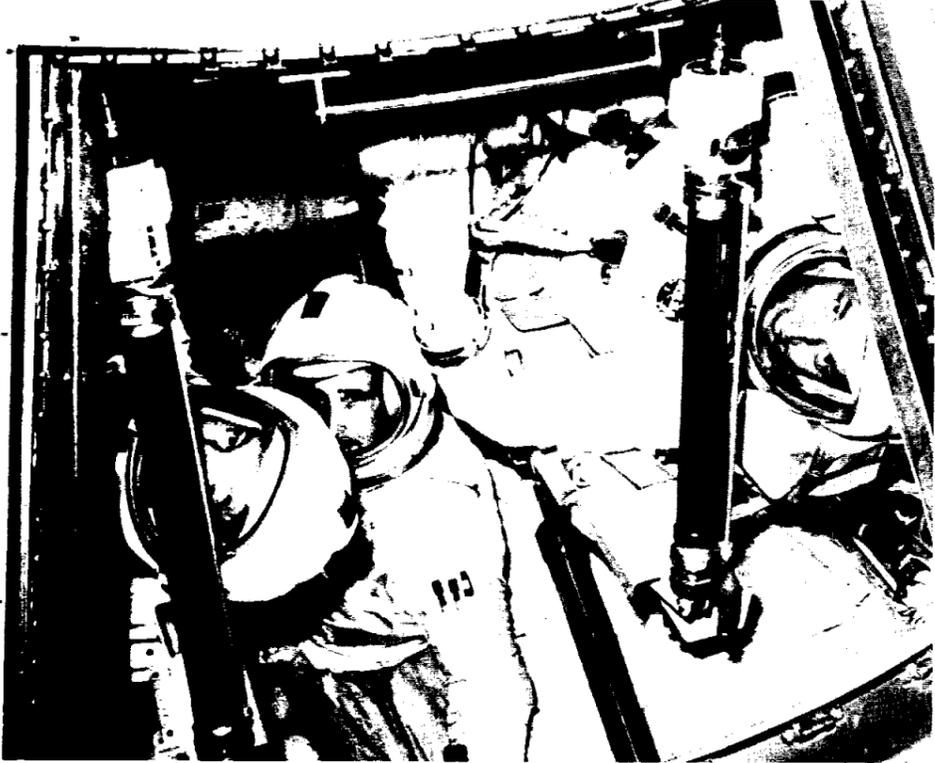
NASA Negotiates MCC-H Support With Philco-WDL

NASA has selected Philco Corp., WDL Division, Palo Alto, California for negotiation of a contract for continued systems engineering and operational support of the Mission Control Center—Houston.

The incentive contract is expected to cost 35 million dollars for work performed through June 1968, with options for three additional years.

The Mission Control Center at MSC serves as the command and control point for all US manned space flight missions. Under the contract, Philco will be responsible for operation and maintenance of the Control Center.

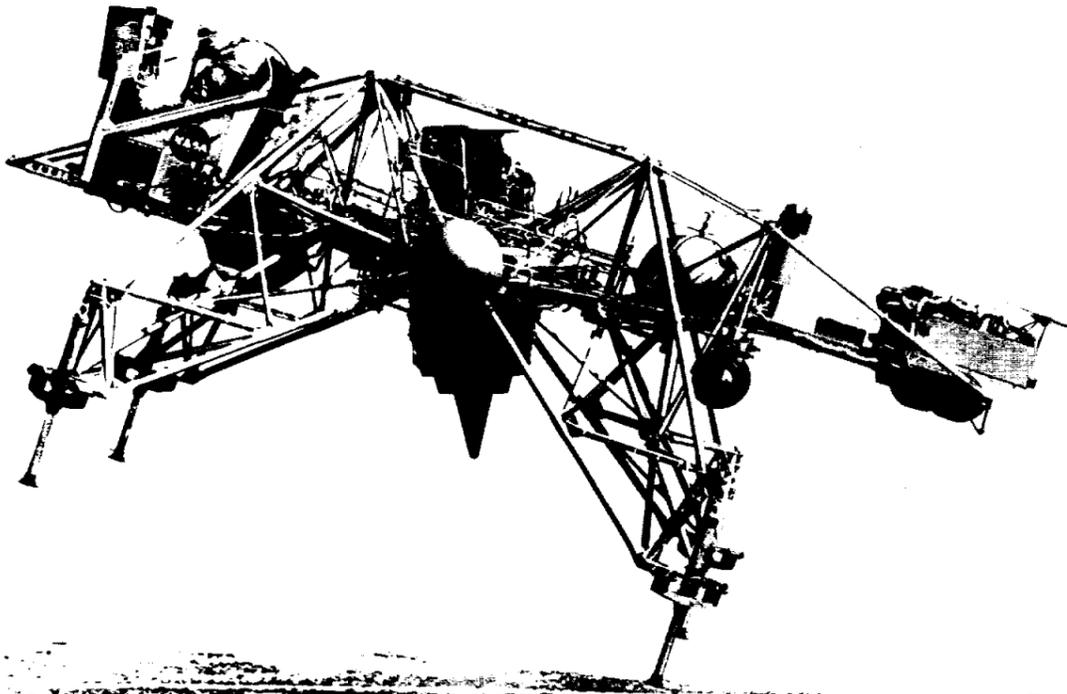
Rub-a-dub-dub, three men in a . . .



EIGHT-DAY CLOCK-WATCHERS—Apollo Spacecraft 008 last week completed an eight-day manned shakedown in the Space Environment Simulation Laboratory's Chamber A. The test series was aimed toward simulating in a thermo-vacuum environment as many of the procedures and systems usage profiles of the first manned Apollo flight as possible. In the left

photo, 008's crewmen take a last look before the command module hatch is closed. Left to right are Neil R. Anderson, Joel M. Rosenweig and Donald R. Garrett. Right photo shows Rosenweig, Anderson and Garrett eight shaveless days later as they climbed out of the command module.

Open-Air Lunar Module



FLYING BEDSTEAD—NASA Flight Research Center test pilot Donald Mallick hovers the Lunar Landing Research Vehicle (LLRV) over Rogers Dry Lake, Calif. Built for NASA by Bell Aerosystems, the LLRV simulates lunar-gravity landing by means of a turbojet engine which subtracts five-sixths of the vehicle's weight, and throttleable rocket thrusters permit hovering and descent flight profiles similar to those planned for the Lunar Module.

The Start of a Cover



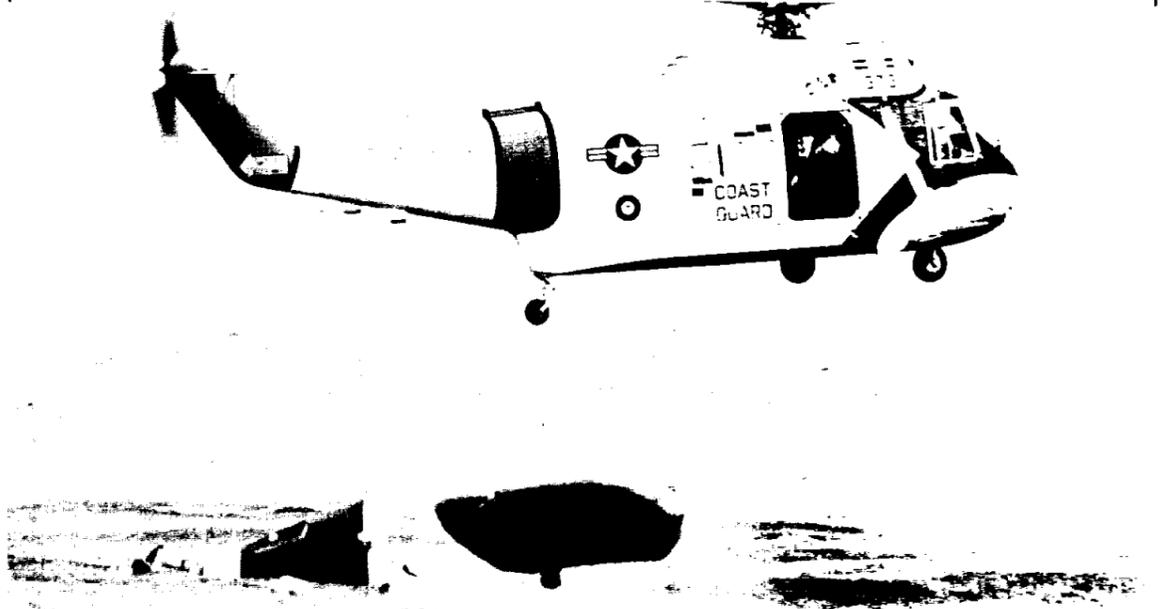
MOONSCAPE MEETING—Magazine cover artist Norman Rockwell dons a headset to talk to Jack Mays, Crew Systems Division, near the Lunar Module mockup on the Lunar Topographic Area. Rockwell visited MSC last week to make preliminary sketches and reference photographs for a magazine layout he is painting.

Deck Confab



COFFEE BREAK AT SEA—Gemini XI prime crewmen Richard F. Gordon, Jr., left, and Charles "Pete" Conrad, Jr. confer with newly-appointed chief of the MSC Landing and Recovery Division Jerome B. Hammack aboard the NASA Motor Vessel *Retriever* en route to crew spacecraft egress training in the Gulf of Mexico. The training sessions are conducted by training specialists of the Flight Crew Support Division supported by Landing and Recovery Division and Technical Services Division.

Accidental Launch



RUBBER SPACECRAFT—Downwash from a Coast Guard helicopter lifted a Gemini liferaft clear out of the water during a recent Gemini flight crew egress training exercise in the Gulf of Mexico. Gemini spacecraft Static Article 5, used for water egress training, rode out the tempest. Water from one of the raft's ballast buckets can be seen spurting upward.

PHOTO-RECON MISSION—

Lunar Orbiter Scouts Apollo Landing Zones

Potential Apollo lunar landing sites are the target of the Lunar Orbiter photo-recon mission presently orbiting the moon. Lunar Orbiter was injected into lunar trajectory August 10 by an Atlas-Agena D launch vehicle. Liftoff was at 1:26 pm CST. Local thunderstorms and minor Agena mechanical problems scrubbed the scheduled launch the previous day. Launch was from Launch Complex 13 at Kennedy Space Center.

Nine different Apollo landing sites and hopefully the Surveyor I spacecraft sitting on the moon's surface will be photographed by Lunar Orbiter's camera and the photographs retransmitted back to ground stations at Goldstone, Calif., Woomera, Australia, and Madrid, Spain.

Although the spacecraft star tracker failed to acquire the star Canopus as a reference for calculating mid-course corrections, Lunar Orbiter operations at Jet Propulsion Laboratory substituted the moon itself as the reference point.

A de-boost maneuver Sunday brought the Lunar Orbiter into an elliptical orbit around the moon with a perilune of 117.5 miles and an apolune of 1,159.28 miles. Orbital period is three and one-half hours.

A set of pictures of a grey-scale test pattern, photographed pre-launch, was transmitted to Goldstone and Madrid over a 17-minute period Monday after the spacecraft had achieved lunar orbit.

Lunar Orbiter was scheduled to settle down to its job of photographing overlapping areas of the moon — including the backside—yesterday when sun angles were ideal for sunrise and sunset photography. Only two such times occur during the moon's 28-day period.

A second retrograde maneuver scheduled for Sunday will lower Lunar Orbiter's perilune to 28 miles and the 850-pound spacecraft's camera will begin taking the first of 352 planned photos of Apollo landing sites.

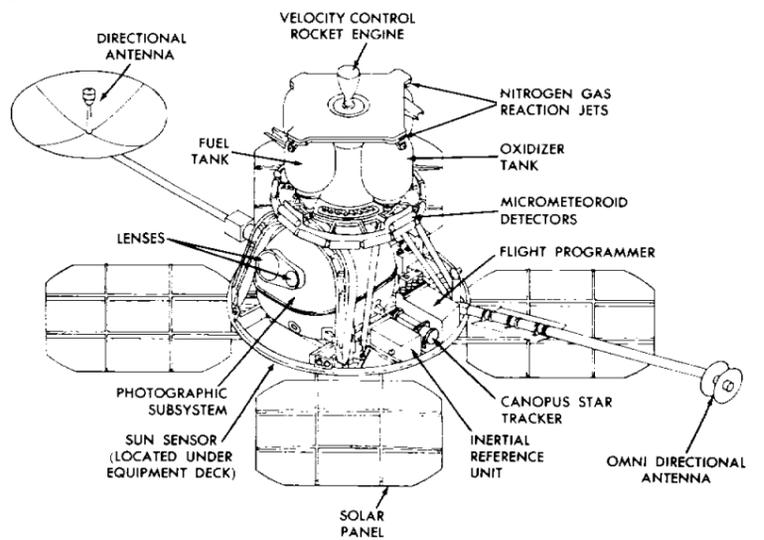
Orbiter's photos of the lunar surface are expected to be released to the world in Spain and Australia in addition to the United States. It will be the first time that US spacecraft photo transmissions will have been received and released to the public by member stations of the NASA network.

Deep Space Network tracking stations at Robledo de Chavela, near Madrid, Spain, and at Woomera, Australia, should have begun receiving and releasing photos yesterday. Australian and Spanish officials in charge of operating these stations in cooperative programs with the US will make the releases. In Australia the cognizant agency is the Department of Supply; in Spain it is the *Instituto Nacional de Technica Aeroespacial* (INTA).

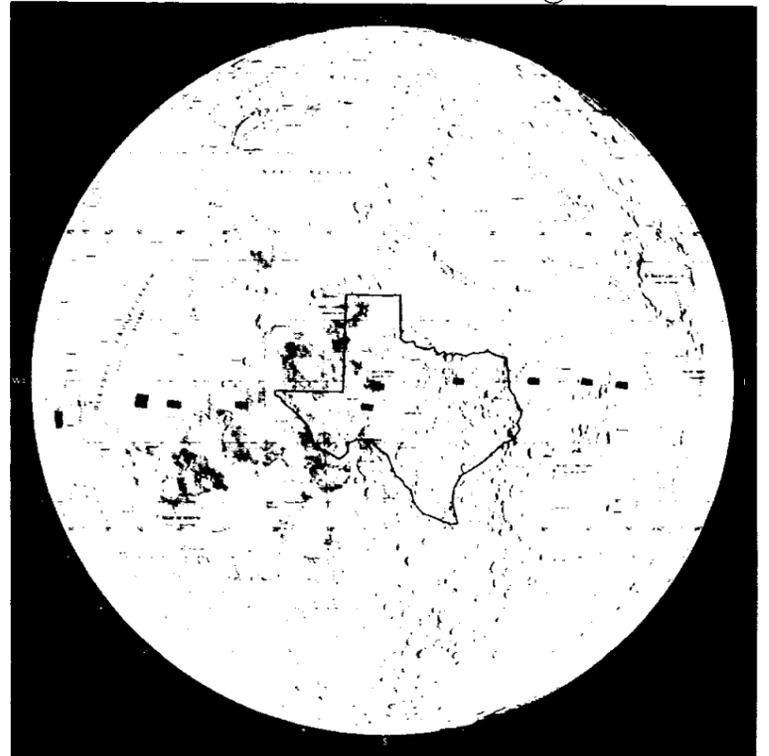
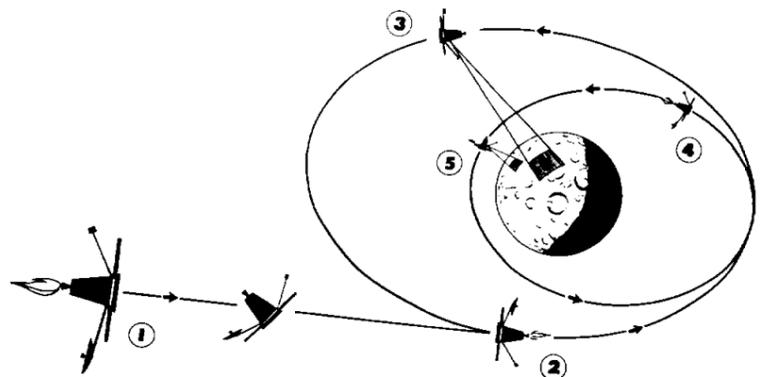
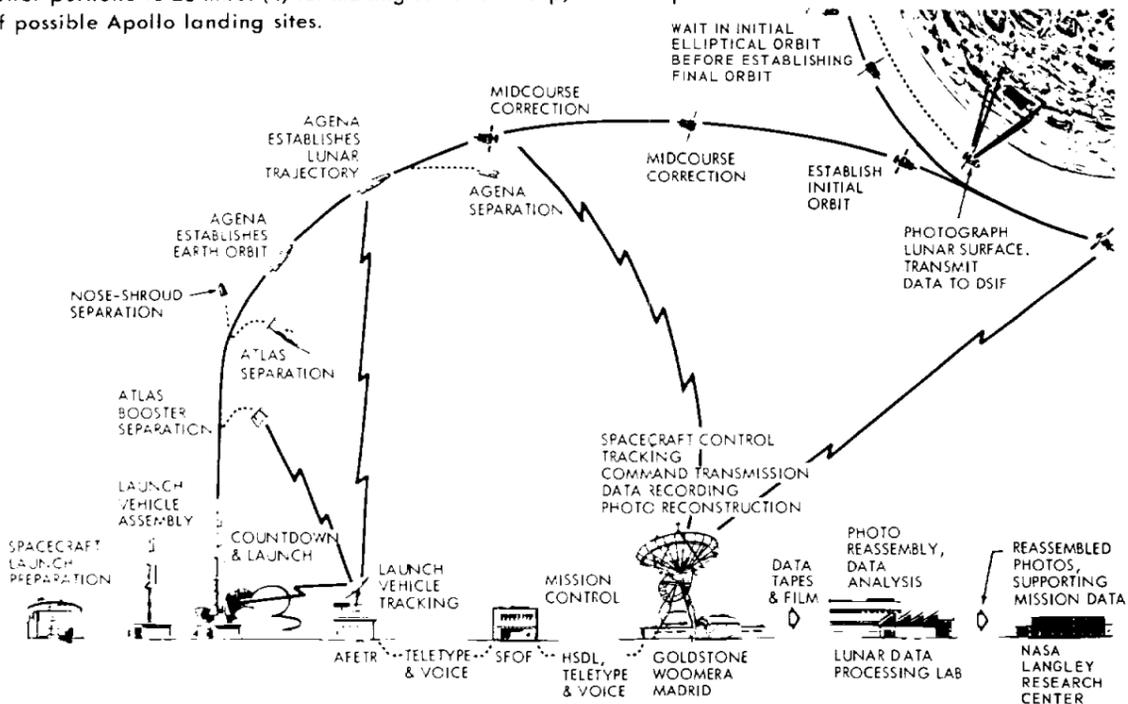
The Lunar Orbiter program is managed by the NASA Langley Research Center.



PREFLIGHT CHECK—Lunar Orbiter is lowered into a vacuum chamber at Boeing-Seattle to undergo thermo-vacuum acceptance tests and simulation of its mission.



MISSION PROFILE—Diagram below shows Lunar Orbiter's launch and injection phase. At far right, mid-course correction (1), and a de-boost maneuver (2) place Orbiter into lunar orbit; photos from high orbit (3); lower perilune to 28 miles (4) for making series of sharp, detailed photos of possible Apollo landing sites.



LUNAR ORBITER

- has a primary mission of making close-up photos of possible Apollo lunar landing sites.
- is an open-truss structure weighing 850 pounds, is 18½ feet across with antennas deployed and is 5½ feet tall.
- carries a camera equipped with medium and high-resolution lenses which, from a perilune of 28 miles, will cover 20 square miles at high resolution and 350 square miles at medium resolution.

TARGETS—Black rectangles along the moon's equator pinpoint photographic targets, including Surveyor I spacecraft just north of the target at far left. An outline of Texas is superimposed on the moon to scale.

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

Director Dr. Robert R. Gilruth
Public Affairs Officer Paul Haney
Editor Terry White
Staff Photographer A. "Pat" Patnesky

Space News Of Five Years Ago

August 23, 1961—Saturn H-1 engine drop-tested into salt water at Cape Canaveral, then returned to Marshall Space Flight Center for inspecting, cleaning and static firing.

August 24, 1961—Mercury-Atlas 4 unmanned orbital flight was postponed.

NASA announced decision to launch manned lunar flights and other missions requiring Saturn and Nova class vehicles from expanded Cape Canaveral facilities. Based upon national space goals announced by the President in May, NASA plans call for acquisition of 80,000 acres north and west of AFMTC, to be administered by the USAF as agent for NASA and as a part of the Atlantic Missile Range. Decision followed intensive NASA-DOD survey for launching facilities, including trajectory advantages, overflight or booster impact hazards, air and water transportation, instrumentation support, and cost time and land availability advantages. Expansion of Cape Canaveral was noted as first of three major steps in accelerating the US space program, the remaining two steps being a manned space flight research center, and a booster fabrication and test facility.

August 27, 1961—Spacecraft No. 13 was shipped to Cape Canaveral. This particular vehicle was designated for the first manned Mercury-Atlas orbital flight (MA-6-Glenn). Test and checkout work on the spacecraft was started immediately.

The Soviet Communist Party organ, *Pravda*, explained why Russian space techniques and the names of spaceship designers were kept secret as follows: "A corrupt capitalist society, by its very nature, is extremely capable of turning the greatest peaceful achievements of mankind into the total means of destruction of mankind. This is why it is risky to open even the smallest loopholes in the world of Soviet rocket technique for the gentlemen who are lagging considerably behind (*Who is lagging now? Editor.*) as far as their technique is concerned, but who become militarily agitated and distracted from an honest program of general and complete disarmament and mumble something about the right of inspection of neighbors' orchards and storerooms. That is why the wonderful group of heroes who insured the mastering of the cosmos remain nameless until now."

August 30, 1961—An investigation was conducted as a result of the premature activation of

the Mercury-Redstone 4 explosive egress hatch. Tests were initiated in an environment more severe than had been conducted in prelaunch activities and tests, but no premature firings occurred. As a backup, McDonnell was asked to design a mechanical-type hatch. The model weighed some 60 pounds more than the explosive type, so other methods had to be sought to prevent any recurrence of the incident. A procedure was initiated which stipulated that the firing plunger safety pin would be left in place until the helicopter hook was attached to the spacecraft and tension was applied to the recovery cable.

Sept. 1, 1961—NASA Administrator Webb, appearing before the Senate Committee on Aeronautical and Space Sciences, requested \$60 million additional for fiscal year 1962 for the acquisition of 80,000 acres adjoining Cape Canaveral for launching facilities for the expanded space program.

OUT OF TEXAS' PAST—

Grimes County Ranch Location Of Major Firepearl Impact Area

Two years ago OTP donated one of his last two Texas firepearls to the headquarters archives of the NASA historical office in Washington: a fine apioid specimen, a genuine bediasite from Bedias, Grimes County, Texas. His very last specimen he gave last week to a teacher in the Houston school system who has made effective use of the teaching materials distributed by the Educational Programs and Services Branch of MSC. That one is a curious tektite indeed, for it is naturally spalled and etched so that it resembles a miniature Neanderthal head, with all of the facial features exquisitely defined.

Neither of these compares in size and beauty with the 50-carat firepearl that the people of Grimes County sent to England as a gift for Queen Elizabeth in 1957. That rare bauble was owned by Marge Duncan, of Bedias. It is as big as a small lemon. In its dark silicate interior there are amethystine lights that seem almost to have originated in the solar fires of undiscovered galaxies.

Mrs. Duncan's famous firepearl was found on the ranch of Edwin H. Barns, just south of the village of Bedias, which is less than 100 miles northwest of Houston. Mr. Barns used to (and

maybe still does) let Yankee tourists hunt tektites on his ranch for a fee of \$1. He is a generous man, and if a hunter failed to find a space jewel, the rancher would give him one from his own collection, which once filled a water bucket. The collection is now in a bank vault.

Scientists still disagree about the origin of tektites. In 1957 there was a popular theory that they came from the moon or perhaps from much farther out in space. About the only thing the specialists seem agreed on today is that tektites were detached from some planet or satellite by meteoritic impact. The bediasites of Texas were identified auspiciously in the state's centennial year, 1936. A foremost authority, Virgil E. Barnes, of the University of Texas, no relation to rancher Barns, reports their K⁴⁰/A⁴⁰ age at 29.4 million years.

But back to the Duncan firepearl and Queen Elizabeth II. The people of Bedias are typical nonurban Texans, proud and generous. They will give you a firepearl or two, but they will not sell one for any price. They seem to value their own collections for the fact that they were deposited on the future site of their charming little village by some mysterious cosmic event. To some degree, perhaps subconsciously, bediasites are treasured as talismans.

Anyway, Mrs. Duncan read an article in a lapidary journal reporting that the queen was an avid collector of firepearls. We saw the article. It was replete with pictures of her majesty and her collection. And it stated that some of her finest firepearls had

been given her by a Frenchman who was, himself, a space-gem collector.

So Mrs. Duncan and Mr. Barns, in collaboration with some prominent people in Navasota, the biggest town in the county, decided to present the 50-carat firepearl to the queen in behalf of the people of Grimes County, Texas.

Seeking a suitable courier, they discovered that Hobart Huson, of Refugio, a historian and an officer of the World Congress of Pythagorean Organizations, also an attorney, a vegetarian and proprietor of an unusual institution called The Dawgwood Library, was going to attend a Pythagorean meeting in England in the summer of 1957. An eloquent and distinguished gentleman, Mr. Huson said he would be happy to undertake the presentation.

But then it developed that a platoon of Boy Scouts from Navasota, commanded by Scoutmaster Clyde Prestwood, was going to a jamboree in England. So a Navasota jeweler packaged the Barns-Duncan firepearl appropriately, and Scouter Prestwood stowed it in his haversack.

The people of Grimes County, particularly those from Bedias, were keenly disappointed when Mr. Prestwood returned home with the gift and reported that he had never got to see the queen at all. He also brought a letter from Buckingham Palace, which is reproduced here, but the Texans never followed its suggestion: the gift was not re-offered.

BUCKINGHAM PALACE

Dear Mr. Prestwood, 15th July, 1957

I am commanded by The Queen to thank you for your letter of the 3rd July. While Her Majesty very much appreciates the kind thought which prompts your offer of a Bediasite stone, it would not be in accordance with her normal practice to accept presents from individuals or bodies not personally connected with her. Furthermore, in the case of such offers coming from those who are not Her Majesty's subjects, it is customary for the request to be made in the first instance through Her Majesty's Ambassador in the country concerned, and I must, therefore, ask you to make your request through Sir Harold Caccia in Washington.

I should, however, warn you that there have been other requests to make presentations to The Queen from Scout Troops attending the Jamboree and it has been decided by the Scout authorities that it would be invidious, even if time allowed, to make opportunities for presentations by individual Troops.

I am afraid that you may find this reply disappointing or think it stuffy, but I assure you that although there are genuine difficulties in the way of Her Majesty accepting your offer, the kind thought that prompted it is equally genuinely appreciated by Her Majesty.

Yours sincerely,
Edward Ford

C. L. Prestwood, Esq.,
Box 707
Navasota, Texas

The last this historian heard, Mrs. Duncan was having the lemon-sized firepearl made into a pendant to wear on a neck chain on formal occasions.

—Sigman Byrd

Cost Reduction Corner

Programmers and engineers in the Computation and Analysis Division were punching their own card corrections and low-volume data cards on a card-punch machine. Often they had to wait in line until a machine was available and many times had to re-punch a card several times before getting it correct.

Fred S. Jaap of the CAD Techniques and Operations Branch suggested an express card-punch service for low-volume jobs which permits programmers to get rapid service on their corrections by a professional card punch operator without waiting in line and without re-punching until cards are correct. Moreover, Jaap's scheme reduces computer re-run time made necessary by inaccurate cards. Estimated savings to John Q. Taxpayer: \$10,500.

On The Lighter Side



Boy, these maneuvering units really go, don't they Harry? Harry? . . . Harry!!!

MSC-Type Rockettes



CHORUS LINE—The MSC Astronettes will be among the featured performers in "Moonglow '66," the second MSC variety show to be held November 11-12 and 18-19 in the MSC Auditorium. Producers of the show are looking for talent ranging from banjo players to acrobats to singers to male dancers to join the Astronette routines. Would-be performers should call Juanita Bower at 2737 to arrange a try-out. Astronettes above, left to right, are Suellyn Johnson, Charlotte Maltese, Sharon Brenan, Wanda Slack, Karla Garnuch, Pat McBride, Helen Gregory, Marilyn Lamb, Sandra Burdsal and Gayle Porter.

Soviet Space Program Reviewed at ISA Meet

Soviet launch vehicle development from the Revolution up to the present and a conjectural look at the future will be presented by Joseph Zygielbaum at the August 31 meeting of the Apollo Section of the Instrument Society of America. Zygielbaum is manager of foreign technology studies at Data Dynamics, Inc., Monterey, Calif.



Zygielbaum's review will cover launch vehicle development in the Soviet Union beginning with the early Tsiolkovskiy types, the V-2 phase and on to *Sputnik*, *Lunik*, *Voskhod* and *Proton* types. He will outline the probable course of future space development by the USSR and will touch upon Franco-Soviet plans for joint space ventures.

Aero Club Accepts Financial Scheme

The MSC Aero Club financial committee at the Club's last business meeting presented to the membership a three-phase financial plan. Phase one was accepted by vote, giving the Club one of the lowest share-investment, monthly dues and hourly rates of any flying club in the country.

Aircraft of three types will be bought in the three phases of the plan. A meeting of the participants in Phase One will be held in the News Center Auditorium August 23 at 5:15 pm.

The present state of Soviet nuclear energy conversion and ionic propulsion will also be covered. Zygielbaum's program includes a 20-minute composite Soviet film on past, present, and future launch vehicles in the Soviet Union.

The ISA meeting begins with cocktails at 6:15 pm, dinner (\$3.25/person) at 7:15, and meeting at 8. For reservations, call Lawrence Lockwood at HU 8-0850, Ext. 3421. Non-ISA members are welcome to attend.

Arts Group Has Two Openings For Instructors

The Contemporary Arts Association of Houston is seeking two qualified art instructors to teach children in grades 1 to 6 in LaPorte and Dickinson elementary schools. Applicants should have experience in teaching art in these grades, plus professional experience. Teaching hours will be from 2 to 4 pm.

MSC employees' wives who qualify and who are interested in part-time art teaching should contact Ruth Lee at Kemah 877-1203.

Summer Champions



GRINS OF VICTORY—The Hi Hopes came out tops when summer league bowling of the MSC Tuesday Mixed Bowling ended August 9. The Hi Hopes won 42 games and lost 26 for a .618 percentage. Left to right are Sharon Brenan, Gloria Steeley, Clyde Lowrimore and Lloyd Arnold. The League used trophy money to finance a post-season banquet at the Ellington AFB Officers Club.

Space News ROUNDUP!

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS EMPLOYEE NEWS

Roundup Swap-Shop

(Deadline for classified ads is the Friday preceding Roundup publication date. Ads received after the deadline will be run in the next following issue. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested. Use name and home telephone number.)

FOR SALE

Lotus 7 spares for many engines. Pair of 1 1/2" SU carbs, Volvo w/ford-Lotus manifolds and linkage \$35. (Healey, TR, etc) Coxworth A-111 billet cam \$40. Stock Anglia 105-E gearbox \$35 complete. Jan Farbman, WA 6-7192 or RI 7-3435.

1960 Pontiac Star Chief 4-door sedan, power brakes/steering, radio, air, good tires and engine. Asking \$475. Vance Jones, HU 4-1321.

3-bdr 2-bath brick colonial in El Lago, air conditioned, landscaped, GE built-ins. \$23,400 or equity and assume \$110/mo payments. Frank Samonski, 877-4795.

SCM portable typewriter, green, pica type, black metal carrying case, new \$100. Gayle Porter, HU 6-4918.

AKC-registered Dalmatian puppies, \$50. Dave Lang, HU 8-4218.

Bausch & Lomb 6-power prism stereo binoculars, leather case, like new, cost \$199.50. Best offer. Frank Miceli, GR 1-0723.

4-bdr 2-bath in Arlington Heights, 2-car garage, large family room, corner lot, fenced back yard, central air and heat, carpeted, near schools. Smith, HU 6-1826.

1963 Jaguar 3.4 sedan, air, wire wheels, overdrive, radio, silver-grey w/red leather, xlnt condition. \$1895. Jim Blucher, MI 3-8584.

1965 Cadillac Sedan DeVille 4-door hard-top, low mileage, fully equipped, showroom condition. B. Herman, 591-4308 after 6.

1962 Corvair Monza 2-door, 4-speed, good tires, low mileage, xtra clean. \$575. Bob Williams, GR 4-2004.

1965 Mercury Park Lane Breezeway, all luxury accessories and power, in warranty. Dawson, HU 8-0673.

4-bdr 2 1/2-bath sandstone brick in El Lago Estates, panelled den, custom fireplace, formal dining area, ceramic tile extras, carpeted hallways, semi-detached garage. \$26,500. Ron Lennard, GR 9-1579.

Stereo components: 40-watt Fisher amplifier in walnut cabinet; twin Knight speakers in walnut cabinets; Garrard AT-50 turntable with relay to cut off amplifier after last record or may be switched to manual. One year old, xlnt condition. \$150. Sid Novosad, MI 5-2018.

100-inch brown sofa \$50. 3-speed record player \$30. R. Latta, Dickinson 534-4380.

1965 Corvette conv, leather trim, 4-speed stick, C&C group, tinted glass, wood steering wheel, AM/FM radio, transistorized ignition, positraction axle, 365-hp engine, good condition. Bill Ritz, 591-3352.

1960 Hillman, Sunbeam engine, new tires, conv top in good condition. \$300. Barbara Gibbs, HU 4-6813 after 6.

1964 Chevy Corvette, white w/red interior, 2 tops, 4-speed trnsn, power steering/brakes, AM/FM radio, auto stereo with 2 door-mounted speakers, seat belts. \$2800. Mike Hendrix, HU 6-0858 after 6.

1965 Super Porpoise sailboat with trailer, \$475. Maj. Victor Ettridge, 591-2110.

4-bdr 2-bath 2600-sq ft brick in Clear Lake City, cedar fence, central air/heat, panelled den and breakfast nook, built-in desk and bookcases, pantry, wood/gas fireplace, wall-to-wall carpeting, dishwasher and garbage disposal, rear patio, 5th bedroom in attic. Immediate occupancy with option to buy furniture and appliances, bid on equity. Mel Feldman, HU 8-2304.

Mimosa Bowlers Meet

The Mimosa Men's Bowling League will hold a Fall league organizational meeting August 25 at 5 pm in the MSC Auditorium. Dan Kennedy at 5531 is the League contact.

Garage sale—everything goes except wife and personal items. Saturday and Sunday, 9 to 9. 1610 Seagate Lane, Clear Lake City, Robin Feldman, HU 8-2304.

3-bdr brick on one acre in Friendswood. \$24,500. Ledrieu Linson, HU 2-7388.

1961 T-Bird, sell or trade for Volkswagen, Ledrieu Linson, HU 2-7388.

Small upright piano, mahogany finish, good condition, in SW Houston. \$175. J. R. Hoffman, 666-1123.

1963 126cc 6 1/2-hp Ducati motorcycle, good condition, new tires, battery. \$150. 1965 Honda Sport 90, like new, 2800 miles. \$325. Can be seen at 109 Imperial Drive, Friendswood. Helen Statz, HU 2-7607.

1965 MG Midget, white with red interior, white walls, wire wheels, tonneau cover, detachable luggage rack, gets 31-34 mpg, xlnt condition. \$1450 or best offer. John Childress, HU 7-1388.

67-ft long used chain-link fence 5 feet high, includes posts, top rails, fittings and fasteners, has been dismantled. \$45. Herb Kavanaugh, Dickinson 534-4854.

1965 Mustang convertible. James Butler, HU 6-6372 after 6.

1966 Phoenix high-speed sailing catamaran, 18 feet by 8 feet, 235 sq ft sail area, tilt trailer and cover. \$1695. R. W. Bricker, GR 1-2999.

1966 Toronado, auto shift, air, pwr steering/brakes, tinted glass, vinyl interior, clock, 2500 miles. \$4250. L. Drysdale, Alta Loma 925-2384.

Sears Exercycle, less than one year old, at half price. \$30. Jack Joerns, 932-3790.

89x135-ft wooded lot in Royal Oaks in Dickinson, all utilities, paved street. \$4950. Carl Watkins, 534-2437.

Sunfish sailboat with trailer, \$325. Chuck Pilcher, 877-1806.

3-2-2/den in Sagemont, air and built-ins. Equity \$1200. Ralph Cogswell, HU 7-2863.

Complete set Spalding Top-Flite irons with putter and four driving woods, \$65. One pair "banana peel" trick water skis, like new, \$15. Rod Bass, 932-4763.

Novice ham rig: NC109 rcvr, HT40 xmtr, 80/40/15 trap antenna, relay, etc., \$150. Wes Hjernevik, Dickinson 534-5797.

RIDER POOLS

Want in car pool or will pay beginning Sept. 6 from 2607 Cedar Drive, La Marque to Bldg. 419, 7:30-4 shift. Evelyn Villeneuve, WE 5-3878.

Want ride to and from 1806 Reseda Drive, Clear Lake City and Ellington AFB Bldg. 331 8-4:30 shift. Will share expenses. Theresa Maslak, HU 8-4410.

Norma Dreszer Takes Top Spot In Bridge Series

Winner of the second 1966 MSC Duplicate Bridge Club series award, the highest percentage for five out of seven games, was Norma Dreszer, with Leona Kempainen, second. The final series of the year started with the August 2 game and will conclude on October 18.

Fuad Tawil and Alice Gowdey were first at the July 5 fractional point game, and Glenn and Merellene Platzer tied with Tom Sheldon and M. Rubin, for second place. Max Cone and Bob Wiley were first on July 12, and Bill DeGeorge and Glenn Platzer, second. On July 19, Paul Swanzy and Mark Powell were first, Betty and John Herrmann, second.

There are two opportunities to win full Master Points in August: the regular Club Master Point on August 30 and a special Charity game on August 9.

Saturn Stages Arrive At KSC During August

Elements of two large NASA launch vehicles used in the manned spaceflight program are being moved during August to the NASA Kennedy Space Center, Florida.

Shipment schedules for all portions of the fourth uprated Saturn IB vehicle (SA-204) and most of the first Saturn V (SA-501) were announced by the NASA Marshall Space Flight Center, which is in charge of building and transporting the rockets.

The Saturn V, a three-stage vehicle scheduled to be launched next year, is the first flight version of the rocket destined to one day take men to the moon and back. This first flight will be unmanned.

The uprated Saturn I, fourth vehicle in the series of 12 now scheduled, could propel the first manned Apollo flight although no decision to man this vehicle has been made. The early Apollo/Uprated Saturn flights are designed to test the three-man Apollo spacecraft and to perfect rendezvous and docking methods.

The uprated Saturn I shipping schedule follows:

The first stage (S-IB)—The booster left Michoud Assembly Facility in New Orleans, Louisiana, on August 10 aboard the NASA barge, *Palaeon*. It arrived at Kennedy Space

RTCC Contract Altered to Meet Apollo Needs

NASA has modified its contract with the IBM Corporation for the Real Time Computer Complex (RTCC), which will support Apollo-Lunar landing missions. The contract, extended through February 1970, is valued at \$107 million.

The modification provides for the work to be performed under a multiple-incentive arrangement covering cost, performance, schedule and equipment management. It also orders the RTCC converted to IBM system 360 computers which increase operational capabilities for use in the Apollo program.

The contract, with IBM Federal System Division, Gaithersburg, Maryland, includes design, development, implementation, maintenance and operation of the RTCC.

The RTCC in the Mission Control Center at MSC provides the computer capabilities required for mission monitoring, n-flight mission planning and simulation activities.

In the mission monitoring and planning functions raw data are converted and displayed in formats easily interpretable by the mission control team. Flight plan recommendations are computed and displayed for mission controller analysis and selection.

The RTCC also generates simulated raw data required for pre-flight readiness testing and training.

Center August 14.

The second stage (S-IVB)—The second stage was shipped from the Sacramento Test Center, California to KSC on August 5 on the Super Guppy aircraft and arrived at KSC August 6.

Instrument Unit—Instrument unit for this vehicle was scheduled to be shipped on August 15 from Huntsville aboard the Super Guppy.

(In addition, the Super Guppy aircraft which MSFC has under contract is being used to ship the 204 Apollo spacecraft from Long Beach, California to KSC. The complete Apollo is scheduled to be at the launch site before the end of August.)

Shipping schedule for Saturn V stages and elements follows:

First stage (S-IC)—Stage is expected to leave the NASA Marshall Space Flight Center, Huntsville, August 27 aboard the NASA barge *Poseidon*.

Third stage (S-IVB)—The third stage was flown from Sacramento to KSC on August 12 aboard the Super Guppy.

Instrument Unit — The unit left Huntsville August 19 aboard the Super Guppy.

Another significant shipment is the movement of the Saturn V second (S-II) stage for the SA-501. The stage left the west coast earlier this month aboard the USNS *Point Barrow* and arrived on August 13 at the NASA Michoud Assembly Facility, New Orleans, Louisiana. The stage will then be barged to the Mississippi Test Facility for accepting testing. It is scheduled to go to KSC in November.

An S-II simulator or "fit-up" fixture was loaded aboard the *Point Barrow* at New Orleans and shipped to the Kennedy Center August 14. At KSC, the fixture will be used in the erected Saturn V "stack" to simulate second stage spacing. As the S-II is not expected to arrive at KSC until November, the use of the fixture will give checkout crews an earlier start in preparing the vehicle for launch than would otherwise be possible.

EAA Sponsors Teen Dance At Kemah Elks

Teen-age offspring of MSC employees are invited to attend tomorrow's Teen Dance sponsored by the Employee Activities Association. The Dance will be held in the Kemah Elks Lodge on FM 518 in Kemah, just across from the Elementary School.

"The Runaways" will provide music and KILT disc jockey Bill Young will MC the show. Dress will be casual, but not as casual as shorts or slacks. All refreshments will be provided.

Tickets run \$1 per person and may be bought prior to the dance from: Sandy Burdsal, 5156, Bldg. 7A; Barbara Vickers, 5241, Bldg. 2; Betty Schick, 4326, Bldg. 419; and Dianne Bell, 2768, Bldg. 16.

An Evening in Rome



BENEFIT PREVIEW—An invitation to the September 10 Houston Chapter Achievement Awards for College Students (ARCS) benefit featuring Italian tenor Enzo Sturti is examined by Astronaut Office Chief Alan Shepard, ARCS Awards Scholarship Committee Chairman Mrs. Paul Haney and ARCS Corresponding Secretary Mrs. R. W. Cantwell. The Music Hall benefit, An Evening in Rome, will be used by ARCS to finance science scholarships in local universities. Tickets to the benefit ranging from \$2.50 to \$6.50 each will go on sale in the MSC Cafeteria Tuesday. Grace Winn of the MSC Protocol Office is Houston ARCS Chapter president.

Apollo 202 Leads the Way

(Continued from page 1)

and separation of the command module if two of the Saturn first stage engines fail, or if a guidance failure causes excessive pitch, yaw and roll during first-stage powered flight.

On manned missions, the emergency detection system can operate automatically or it will signal the crew to initiate firing of the escape system. Relay logic of the emergency detection system is located primarily in the Saturn vehicle instrument unit.

The first test of S-Band communications will be conducted on the mission, although it will not be the prime method of air-to-ground communications. The Apollo Unified S-Band system will be fully operational for Saturn V manned missions in 1968.

The 21,500 pound thrust service propulsion system engine will be fired four times in flight for a total of more than five minutes. On Apollo lunar land-

ing missions, this engine will provide thrust for the spacecraft to correct velocities en route to the Moon, break into lunar orbit and return to Earth.

A structural test of the common bulkhead separating the Saturn second stage propellant tanks will be conducted after the stage separates from the spacecraft. Similar to the check on the second Uprated Saturn I mission, it is designed to determine the strength of the sandwich-like structure which insulates the liquid oxygen at minus-297 degrees F from supercold liquid hydrogen at minus-423 degrees F.

Ground tests and the previous flight test show that the bulkhead will withstand pressure differentials of about 34 pounds per square inch—more than three times normal operating conditions. Maximum pressure is expected as the stage reenters the atmosphere over the Atlantic.

Pressure differential reached will depend on the amount of liquid oxygen remaining in the tank. It is not known whether this will cause the stage to break up as it did in the previous Saturn flight last month.

Six movie cameras and one television system will record data. A total of 2,158 measurements will be recorded during the mission, 863 from the Apollo spacecraft and 1,295 from the Saturn.

Seen on marquee of Cocoa Beach rental car office during airline strike:

MOVE HOUSTON TO FLORIDA!

Monday Bowlers Organize League

An organization meeting for a Monday night men's bowling league will be held August 29 at 5:30 pm at the Ellington AFB Bowling Alley. The meeting will be for forming teams and electing league officers.

League competition will begin September 12 at Ellington AFB Bowling Alley at 5:15 pm and will continue each Monday thereafter.

MSC employees interested in joining the league should plan to attend the August 29 organizational meeting.

Gemini XI

(Continued from page 1)

Gemini XI reentry will be controlled by the spacecraft on-board computer. The computer and inertial guidance system will feed reentry steering information into the thruster electronics in place of manual crew inputs. The crew will monitor the flight director indicator needles during reentry but will assume control only if the need arises.

This is Conrad's second flight. A Navy commander, he was pilot on Gemini V, the eight-day mission of August 21-29, 1965. This is Gordon's first flight. He is a Navy lieutenant commander.

Armstrong, a civilian, was command pilot on Gemini VIII, the first successful docking flight which was terminated after seven revolutions when trouble developed in one of the Gemini thrusters. Anders, an Air Force captain, has not yet made a flight in space.

After spacecraft splashdown, the Agena will be placed in a higher parking orbit where it will be left for possible use as a passive target on future manned missions.

Sustained Superior Performance



Leo E. Wourms
ASPO