ROUNDUP

NASA MANNED SPACECRAFT CENTER HOUSTON, TEXAS

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Apollo 204 Crew Die in Pad Flash Fire

Military honor guards transfer coffins containing the bodies of Apollo 204 crewmen Virgil I. Grissom, Edward H. White II and Roger B. Chaffee from hearses to an Air Force C-135 transport which Monday airlifted the coffins from the Kennedy Space Center skidstrip to Washington and West Point for burial.

Board Investigates Cause of Accident

The first manned Apollo crew – Virgil I. Grissom, Edward H. White II and Roger B. Chaffee – died aboard Apollo spacecraft 012 January 27 while participating in a Launch Complex 34 test. A flash fire inside the command module killed the three men at 5:31 CST during a hold at T-10 minutes in a simulated countdown.

Causes of the catastrophe are under investigation by a board of inquiry headed by NASA Langley Research Center Director Dr. Floyd Thompson. Board members are OMSF Director of Reliability and Quality Assurance George White, MSC Director of Engineering and Development Maxime Faget, Frank Borman, KSC spacecraft test engineer John Williams, Chief North American Aviation Apollo spacecraft engineer George Jeffs and Barton Geer of Dr. Thompson's staff.

Spacecraft 012's ingress hatch was sealed and the cabin atmosphere was pressurized to 16 psi of 100 percent oxygen at the time of the fire. A spurious spark or flash would have been intensified many times in a pure oxygen atmosphere. Oxygen in itself is not combustible, but supports combustion of other materials and causes them to burn more rapidly than in the normal earth atmosphere partial-pressure of oxygen.

The last words heard from the spacecraft were reports of fire. Pad safety crews attempted to remove the hatch, but heat and smoke penetrating outward from the cabin interior prevented hatch removal until five minutes after the flash. More than 25 pad crewmen were treated for smoke inhalation.

At the time of the simulated countdown, neither stage of the uprated Saturn I launch vehicle was fueled nor was hypergolic fuel loaded in the spacecraft reaction control system tanks. Also, the spacecraft fuel cells had not been activated.

The length of delay to the Apollo 204 mission is dependent upon the findings of the board of inquiry and upon preparation and verification of a substitute spacecraft.

IT'S MSC CAFETERIA WEEK–

Cafeteria Customers Eligible for Prizes

There seems to be a week for everything: Be Kind to Mothers-in-Law Week, Fire Prevention Week, Dental Health Week, United Nations Week – you name it.

So why shouldn't there be an MSC Cafeteria Week?

Well, there is, and it starts Monday with the opening of the new second MSC Cafeteria (Building 11) between the Mission Control Center and Technical Services Shop. To help get Cafeteria Week under way in Cafeteria No. 2, opening day customers will get a free cup of coffee with a purchase of $.50 or more.

But there is more to MSC Cafeteria Week than a free cup of coffee. Customers at both cafeterias during normal breakfast and lunch periods will get tickets for daily drawings of portable television sets during the week. Each patron must write his name and office or company on the ticket and drop it into a locked hopper.

Drawings for the daily prizes will be made at 12:30 pm each day alternately in both cafeterias from the previous day's tickets. Tickets still in the hopper at the end of the week will be eligible for the February 13 drawings for three grand prizes.

A color television set will be the first grand prize, a round trip for two to Acapulco the second prize, and a portable AM-FM radio/record player the third prize. Tickets winning the five portable television sets drawn for daily will not go back into the hopper for the grand prize drawing.

(Continued on page 2)

Inside . . .

. . . there is a feature story on how MSC Lunar and Earth Sciences Division, Information Systems Division and Computation and Analysis Division are working together to analyze possible Apollo lunar landing sites. On pages 4-5.

Edward H. White II Virgil I. Grissom Roger B. Chaffee

Grissom, White, Chaffee Buried

Memorial and burial services for the Apollo 204 prime crew were held early this week following last Friday's catastrophic spacecraft fire in which Virgil I. Grissom, Edward H. White II and Roger B. Chaffee lost their lives.

President Lyndon B. Johnson attended the burials of Grissom and Chaffee at Arlington National Cemetery, and Vice President Hubert H. Humphrey attended White's burial at West Point.

Memorial services for Chaffee were held Sunday afternoon at Webster Presbyterian Church, and he was buried at Arlington National Cemetery Tuesday afternoon. Pallbearers were Michael Collins, Walter Cunningham, Donn Eisele, Richard Gordon, Alan Bean and David Scott. Funeral arrangements were handled by Eugene Cernan.

Memorial services for Grissom were held Monday morning at Seabrook Methodist Church, and he was buried at Arlington National Cemetery Tuesday morning. Honorary pallbearers were Donald K. Slayton, M. Scott Carpenter, Alan Shepard, L. Gordon Cooper, Walter Schirra, John Young and John Glenn. Funeral arrangements were handled by Schirra.

Memorial services for White were held Monday morning at Seabrook Methodist Church, and burial was at the United States Military Academy Tuesday morning. Honorary pallbearers were Charles Conrad, Thomas Stafford, Edwin A. Aldrin, Neil Armstrong, James Lovell and Frank Borman. James McDivitt handled funeral arrangements.

Jastrow Speaks To AIAA Feb. 13

Dr. Robert Jastrow, director of the NASA Goddard Institute for Space Studies, will be the featured speaker at the February 13 meeting of the Houston Section of the American Institute of Aeronautics and Astronautics. Dr. Jastrow's topic will be "Formation of the Universe."

In addition to directing the Institute for Space Studies, a branch of the NASA Goddard Space Flight Center, Dr. Jastrow is adjunct professor of geophysics and chairman of the graduate program in space physics at Columbia University. He also co-edits the *Journal of Atmospheric Sciences* and is a fellow of the AIAA.

The February 13 meeting in the MSC Cafeteria No. 1 begins at 6 pm with dinner ($2/person) and the program at 7. Deadline for reservations is 12:30 pm February 10, and reservations may be made by telephone with Kathy Robbins at HU 8-1400 or 591-3030, or with Pat Todsen at HU 8-0900.

Sustained Superior Performers

SUPERIOR SUPPLIERS—Three employees of the Supply Branch of the Administrative Services Division recently received Sustained Superior Performance certificates and cash awards. Left to right are Administrative Services Division Chief D. R. Hendrickson, recipients John J. Thornton and Bill J. Warren, Supply Branch Chief Hazen Walker, and Customer Services Section chief A. C. Chance. Inset shows Jesse Press, also of the Supply Branch, who received SSP in December.

Explorer I Celebrates Ninth Year in Orbit

The first satellite launched by the United States, Explorer I, is clinging tenaciously to the vacuum of space far longer than experts predicted.

The satellite was launched nine years ago last Tuesday and has orbited the earth some 43,000 times. It is six inches in diameter and 80 inches long, including a 47-inch burned out rocket case attached to the instrumented portion. Total weight at insertion into orbit was 30.8 pounds, with 18 of that being the instrumented satellite.

Engineers assigned to the NASA-Marshall Space Flight Center teamed with the Jet Propulsion Laboratory to prepare and launch the satellite. Both groups, then with the Army, are presently with NASA. The launch vehicle was a Jupiter C (also known as Juno I), which was based on the Redstone missile.

It was once thought Explorer I would not orbit for longer than three or four years. Latest orbital decay information shows it will probably reenter the earth's atmosphere in late 1969 and burn. It orbits the earth every 102.6 minutes in an egg-shaped orbit. It goes out into space about 890 miles and whips back within 210 miles of earth 14 times a day.

Walter Stafford of MSFC's Advanced Systems Office said the satellite ceased transmitting long ago but is still tracked visually by Smithsonian Institution. The satellite discovered the Van Allen radiation belt.

When it was placed into orbit nine years ago, it sailed into space in a big loop reaching 1,585 miles at apogee and 223.7 miles at perigee. The first orbit required 114.9 minutes.

FGAA Chapter Meets Feb. 14

The Houston Chapter of the Federal Government Accountants Association will meet February 14 in the Texian Room of Bill Bennett's Restaurant, Crawford and Gray, at 6:30 pm.

C. D. Weeter, assistant chief of the Internal Revenue Service Southwest Region in Dallas, will speak on "Automatic Data Processing of Income Tax Returns." Several assistants from the Houston IRS office will also be at the meeting to answer questions on preparation of income tax returns.

Guests are welcome to attend the meeting and may make reservations through Ralph Rhodes at 7771 before noon February 14.

Bridge Club Opens Winners Series

Winners at the January 24 game were North-South: Art Manson and Paul Nielson, first; Charlie and Eugenia Brown, second. East-West: Mr. and Mrs. Bill DeGeorge, first, John and Nancy Gordon, second.

Beginning February 7 a section of the Houston Unit Winners' Game will be held at the Nassau Bay Holiday Inn. This will be a regular event, held the first Thursday of each month, and open to all players in the Houston-Galveston Bay area. Playing time is 7:45 pm. Further information may be obtained from the directors, Max Cone at 4261 and Bill DeGeorge at 5201.

The MSC Club Master Point Games during 1967 will be held on the last Tuesday of each month. On February 14 there will be a Special Master Point Game.

USCG Auxiliary Holds Classes In Boat Safety

A three-lesson course in boating safety and a free courtesy motor boat examination will be conducted by Clear Lake Flotilla 68 of the US Coast Guard Auxiliary.

The boating safety classes will be held in the Southwestern Savings auditorium on NASA Road 1 opposite the King's Inn. The first class will be February 15 at 7:30 pm. Each class will run two hours and one night a week for three consecutive weeks.

Topics to be covered in the course include seamanship, small boat handling, new ventilation laws, navigation aids, rules of the nautical road, required equipment and lights, use of the compass and nautical charts and marlinspike seamanship.

The day-long courtesy motor boat inspection will be held by the Flotilla February 12 from 9 am to 5 pm at Competition Marina on NASA Road 1 adjacent to Boat Town in Seabrook.

Trailered boats may be driven through the building for inspection, while boats in the water may tie up at the dock. Boats with through-the-hill fittings must be inspected on a trailer.

Several Flotilla members will be on hand to make inspections and there is no charge for the service.

For additional information, call Jim Bailey at 7581 or 877-4898.

Global Weather Study Contracted by MSFC

The prediction of cloud cover and probable weather conditions at practically any point in the world at any time is the distant target of a study contract awarded recently by the NASA Marshall Space Flight Center.

The $72,487 study was awarded to Allied Research Associates, Inc., Concord, Mass., for an 11-month period.

In the "World Wide Cloud Coverage Study," researchers plan to compile the vast amounts of meteorological information obtained from satellites such as Nimbus and Tiros, numerous worldwide surface observing stations and other meteorological recording sources. From this an effort will be made to project a probability analysis of meteorological conditions for any place at any time.

Such information, if it becomes available on a more accurate basis than is now possible, would have many uses in aeronautics and astronautics. "The study will help enable us to design satellite experimental packages to be more effective," said O. E. Smith of MSFC's Aero-Astrodynamics Laboratory. "If we know in advance the meteorological conditions certain types of satellites—such as those studying earth resources—may encounter, it will help us design them for the maximum return of data."

Planning long-range flights of supersonic air transports and designation of suitable recovery locations for spaceflight crews returning to earth could also be aided by this study.

Hopefully the study will produce a store of data for use throughout NASA in mission planning and analysis. Other NASA centers were contacted for the incorporation of their needs into this effort.

Cafeteria Week

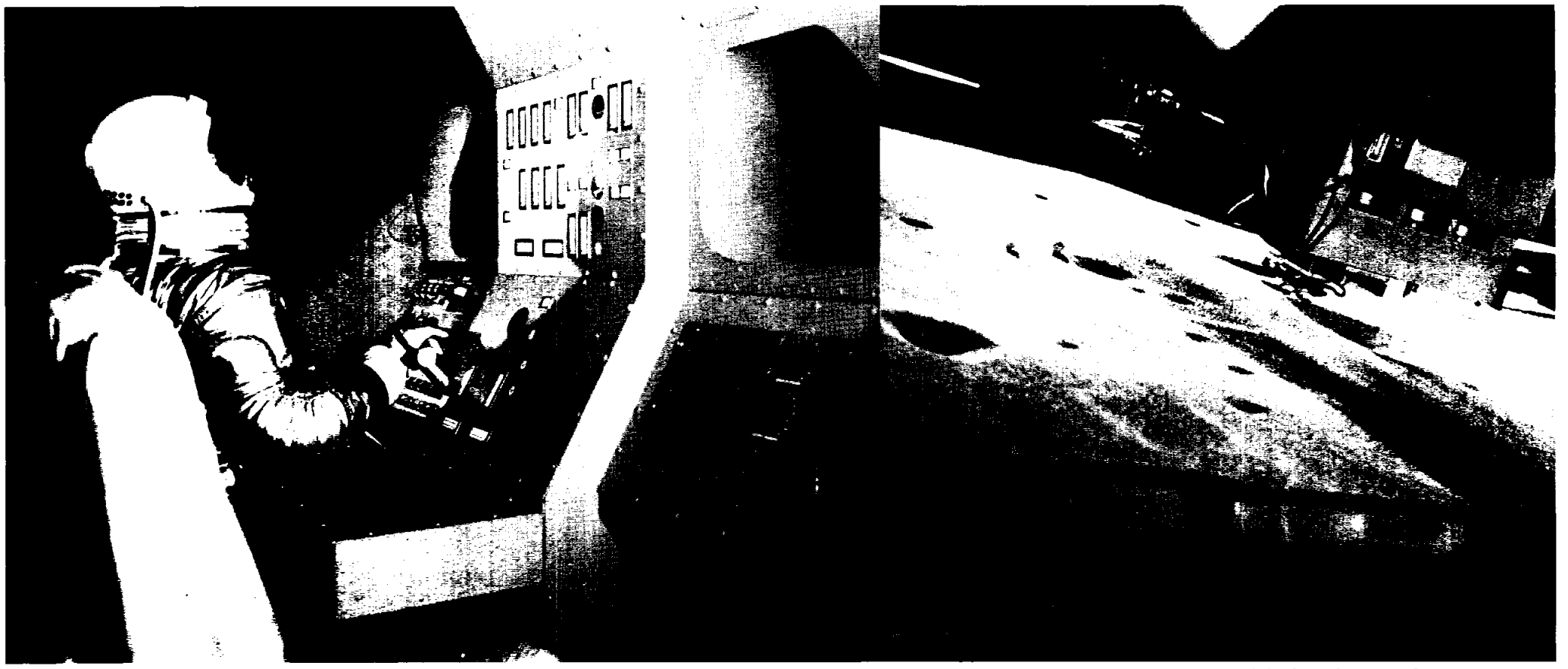
(Continued from page 1)

Both MSC Cafeterias are operated by the Exchange Council, and food pricing is directly proportional to the volume of business the cafeterias get. Food costs run 46 percent of the total cafeteria income and the remaining 54 percent of cost is a fixed cost.

Any increase in cafeteria sales with the same staff means that a higher profit is gained, and a higher profit means that food prices go *down*. For example, a 25 percent increase in Cafeteria No. 1 sales during the first nine months of 1966 would have brought a net profit of $50,000 instead of the net loss of $875.

A $50,000 profit would have allowed a ten percent *decrease* in cafeteria prices instead of the six percent increase that became necessary in August.

The MSC Cafeterias, then, are in effect a sort of cooperative enterprise which provides MSC and contractor employees with meals at reasonable prices only as long as they patronize the cafeterias at a high-volume level to keep the prices reasonable.



MOON TRAFFIC—A suited MSFC engineer, left, steers a working model of a conceptual vehicle that could operate on the lunar surface at speeds up to 10 mph. At right, a television camera photographs a three-dimensional terrain model of the lunar surface on a moving track. The TV camera transmits the close-up picture to a large projector in front of the crew.

MSFC Builds Laboratory Lunar Limousine

Although the NASA-Marshall Space Flight Center is a much more serious place than an amusement park, it does have one of the strangest rides to be found this side of Disneyland. The official title of the unique device is "lunar surface driving simulator," but it might well be called a lunar limousine—experimental model.

What this complex equipment does is simulate the movement of a vehicle across the surface of the moon—at speeds up to 10 miles an hour. It has three major components: general-purpose analog computers, a general-purpose cockpit (called a crew station) and a converted Air Force visual simulator.

Driving simulators are not new, of course. Pilots have been using them since World War II, high school kids use them between English 12 and study hall, and millions of people have simulated driving in a couple of tests on network television.

What is new is the way in which the Marshall Center's driving simulator is being used. Developed by MSFC engineers, it is helping to study proposed lunar vehicles.

Driver's School

Specific experiments are being conducted by engineers in driving lunar vehicles, and may be extended to lunar flying vehicles. The simulator is used in design studies of lunar vehicle control, maneuverability dynamics and human factors.

The need for the Marshall Center's simulator stems from two design and development studies of lunar surface vehicles. About two years ago, contracts were given to the Bendix Corp. and the Boeing Co. to develop concepts of lunar surface roving vehicles.

Two substantially different concepts evolved from these studies. The Bendix design was for a four-wheel vehicle; Boeing designed a six-wheel vehicle, the two rear wheels supporting an attached trailer.

Marshall engineers who monitored the study contracts decided to simulate the two concepts for evaluation. The mathematical model of the vehicle was based on MSFC studies of suspension systems and on the contractors' final reports, from which many constants were obtained to make the simulator as realistic as possible.

The model was tested on MSFC computers to insure its validity and the stability of the computer program. Two analog computers and a digital resolver are being used. Interfacing with the instruments and the crew station is provided by an MSFC-developed control console.

The computers provide scaling for the driver's instruments in the crew station, and for the throttle, steering controls and other inputs from the driver. The program will soon be extended by the use of a third analog computer to help operate the Boeing-designed trailer vehicle.

Visuals by TV

Visual simulation is provided by an Air Force SMK-23 Visual Simulator, originally built for pilot training. It has a television camera and model unit, and a screen and projector to give the pilot a view of the terrain over which he is "flying." A three-dimensional terrain model is on a roller belt, with the ends attached for continuous motion.

The TV camera scans the model with an optical pickup that gives roll, pitch and yaw. Altitude is provided by moving the camera and pickup lens above the model. The picture is projected on a screen with an image bearing projector equipped with a color wheel.

The visual simulator delivered to MSFC required several modifications for the simulation of lunar surface vehicles, including building a lunar terrain model based on Ranger VIII photographs. The scale of the model was changed from 1-to-3,000 to 1-to-150 (accurately representing an area 600 feet wide and 4,000 feet long). This area will be increased to three times the present size.

'Wheels' are Sensors

Sensors—to simulate wheel contact with the terrain—were designed by MSFC engineers, using strain gage amplifiers with a voltage signal compatible as an input to the analog computers. Four sensors are positioned around the camera's optical pickup, corresponding to the contact point of each wheel. (The two rear wheels of the six-wheel vehicle don't have sensors, but their inputs to the computer are developed by a time relay from the middle wheel sensors.) The sensors are quite small and the strain gages are approximately 1/32 to 1/16 of an inch square.

Other improvements to the basic visual simulator included installing an optical pickup to improve the visual picture; adapting the simulator to receive signals from the analog computers; adding structural supports for the projector to fit it into the crew station; tilting the model framework and camera 12 degrees; and putting backup plates on the framework to keep unnecessary vertical motions from the camera.

The general purpose crew station was designed by the Boeing Aerospace Division as a modular concept so that the major components of the station (enclosure, seats and instrument panels) can be assembled piece-by-piece to represent several concepts.

The connections to the computer go through the control console, which has a removable patch board. Quick changes can be made by inserting another patch board and installing corresponding instrument panels in the crew station. Vehicle configurations can be changed in a few hours, and the entire computer program and simulator in a single day.

Improvements Due

Marshall Center engineers continue to improve the simulator. A wide-angle pickup and display system will soon be added. The specifications for this feature insure that the optical pickup in the camera and the visual display system will be compatible with equipment now in use.

The first lunar mission is still some time away, but Marshall Center engineers are among the people who are already studying ways to provide the astronauts with surface transportation when they do reach the moon.

Responsibilities for development of lunar mobility vehicles are being transferred to MSC.

Board Investigates S-IV B Explosion

The NASA board investigating the explosion which destroyed a Saturn V S-IVB Stage at the Sacramento, California static test stand January 20 has determined that the underlying cause of the explosion appears to be weld deficiencies in high-pressure vessels in the stage. The cause will be confirmed by further evaluation testing.

The board also determined that the deficiencies occurred only in pressure vessels produced during a limited period. The pressure vessels on the S-IV B stage for the Apollo/Saturn 204 vehicle, scheduled for launch no earlier than February 21 at Cape Kennedy, were not produced during the period when the deficient welds were made. However, as a precaution, the weld integrity of pressure vessels in AS-204 is being verified. This is not expected to delay the launch.

The board investigating the S-IV B explosion was named January 21 and is headed by Dr. Kurt Debus, Director of the Kennedy Space Center.

Board members include Karl Heimburg, MSFC Test Laboratory director, co-chairman; Hans Hueter, deputy director of MSFC Industrial Operations; L. L. Roberts, chief of the MSFC safety office; Charles H. King, Washington, D. C., Office of Manned Space Flight, NASA Headquarters representative, and T. J. Gordon, Douglas Aircraft representative.

AFGE Local Meets

Local 2284 of the American Federation of Government Employees February 13 will meet at the Webster State Bank at 5 p.m. Members—especially new members—and interested employees are invited to attend.

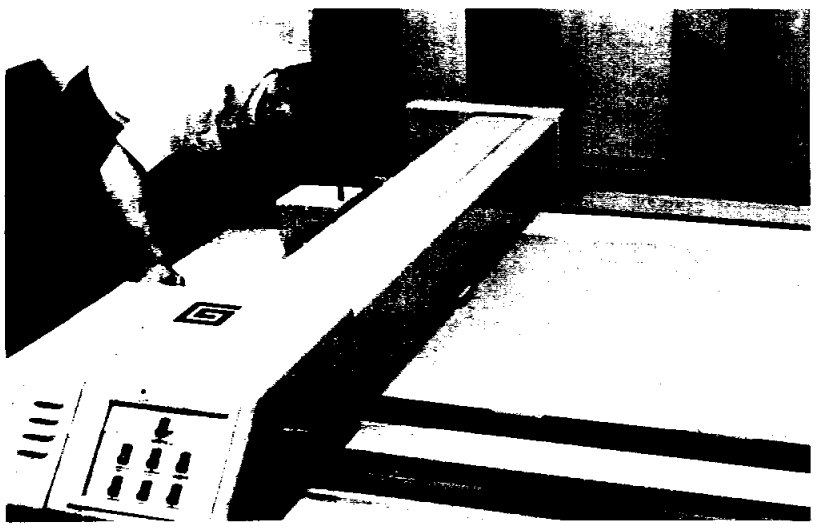
AFGE information may be had from Jim O'Neill at 2261 or Alma Hurlbert at 3281.

1967 MSC/EAFB Basketball League

Standings as of January 26

American Division			National Division		
TEAM	WON	LOST	TEAM	WON	LOST
MPAD-RAB	5	0	Philco	5	0
FCD	4	0	USCG	4	0
IBM (Blue)	4	1	Univac	4	1
P&PD	3	1	LRD	3	1
NAA	3	1	IBM (Gold)	3	1
TRW	3	2	Link	3	1
ANG	2	2	IESD/LEC	3	2
ASPO	2	3	Grumman	2	3
747th	2	3	G&CD	1	3
CSD	1	4	FCSD	1	4
FSD	0	3	MI	0	4
ISD	0	4	MPAD Red Roaches	0	4
CAD	0	5	MPAD Hawks	0	5

MOON IN STEREO—Ray Tomlinson of Raytheon/Autometrics (subcontractor to Lockheed Electronics) and Jim Sasser view Orbiter framelets through a versatile stereoscope mounted on an automated viewing table which allows spatial triangulation.



THE PLOT THICKENS—Lockheed Electronics technician Robert Cook adjusts a Gerber X-Y Precision Plotter in the Mapping Sciences Laboratories. The Plotter automatically plots lunar geodetic control points from computer tapes.

CRATER CENSUS—Lewis Wade of Raytheon/Autometrics counts and measures craters on a high-resolution Orbiter photograph using a 10X hand magnifier with a reticle graduated in tenths of a millimeter.

By Bob Gordon

Exactly where will American astronauts first set foot on the moon?

A series of simulated lunar landings at MSC will assist in providing the answers.

Engineers at MSC plan to make more than one million simulated landings by means of a computerized system specifically designed to accept photographic data of the moon supplied by NASA's Orbiter spacecraft. The data from these landings will aid MSC officials whose responsibility is to recommend to the Apollo Site Selection Board the most suitable spot for landing of the Apollo Lunar Module.

Dr. George Mueller, NASA's Associate Administrator for Manned Space Flight, will pick the final site based on the selection board's recommendations. It is MSC's responsibility to present a list of candidate sites to the selection board.

One Million Touchdowns

Dr. Norman Naugle of the Computation and Analysis Division of the Engineering and Development Directorate expects more than one million simulated landings will be performed during the site study being conducted for the Mapping Sciences Branch of the Lunar and Earth Sciences Division. Dr. Naugle is supervising the computer end of the special project for James Sasser of the Lunar and Earth and Sciences Division of the Science and Applications Directorate.

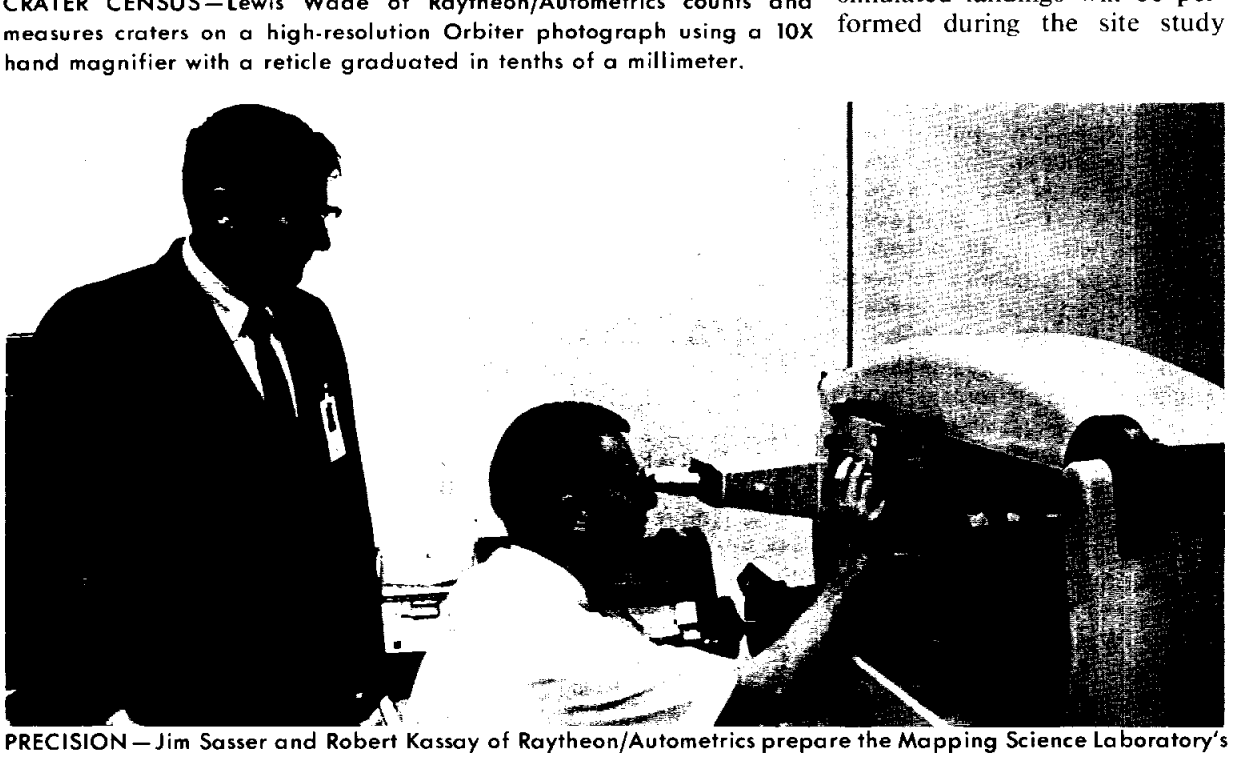
Orbiter I and Orbiter II relayed excellent photographic data on the Apollo zone of interest to the Deep Space Instrumentation Facilities (DSIF) located at Goldstone, California; Madrid, Spain; and Woomera, Australia. This information was then transferred to NASA's Langley Research Center, Virginia, where preliminary analysis by specialists in geology, photo-interpretation, photoscience and photogrammetry selected numerous potential lunar landing areas.

After the preliminary screening at Langley, Orbiter photos and analog tapes containing likely landing sites are forwarded to the Manned Spacecraft Center for the next step.

Close Scrutiny

Sasser said the Mapping and Sciences Branch conducts what amounts to a microscopic examination of the lunar surface photography. Using sophisticated photo-interpretation equipment, they scan hundreds of photos, looking for areas with topographic features suitable for Lunar Module landing.

Sasser said careful attention is given to candidate areas to assure the surrounding terrain is clear of large craters, hills or sharp slopes which could hinder the LM landing radar.



PRECISION—Jim Sasser and Robert Kassay of Raytheon/Autometrics prepare the Mapping Science Laboratory's precision Mann Comparator for a measuring run. The Comparator can measure X-Y coordinates to a one-micron accuracy. The device is used in the spatial triangulation process to precisely measure points marked in the stereoscope.

HIGH MAGNIFICATION—Images magnified from 2X to 48X are possible with this rear-projection automatic scanning viewer. Here, Gregg Baron examines a Lunar Orbiter framelet.

OPERATOR'S SEAT—William R. Weimer, systems programmer in charge of modifications for producing digital data from analog tapes, discusses a problem with computer operator James J. Smith of Lockheed Electronics Company at the Univac 1108 operator's console.

The Mapping Sciences Branch searches for elliptically shaped three-by-five-mile "footprints" or landing areas. When a potential "footprint" is clear of large craters, rocks and ridges and has a clear approach path, it is passed along to Computation and Analysis for the simulated computer landings.

Data Converted

To run the Orbiter photographic data through the UNIVAC 1108 computers, a high-speed data conversion system was developed specifically for this project by the Information Systems Division of the Engineering Directorate. Clay E. McCullough, special assistant to ISD Chief Paul Vavra, said the demodulated analog video data from Orbiter is converted to digital data for use in the 1108 digital computers.

The ISD developed system is composed of a video tape unit, time translation and tape search unit, data control unit and a display unit. The entire system is interfaced with the UNIVAC 1108 through which the simulated landings are accomplished.

Probability Studies

Naugle explains that each three by five mile potential area submitted for the simulated landings is further subdivided into 100 smaller areas approximately 650 by 650 feet in size.

It is these areas—called "chits"—on which the simulated computerized landings are accomplished, Naugle explained.

"We will make 2,000 landings on each 'chit' to determine the probability for a good landing," Naugle said. Each landing site presented by Mapping Sciences will ultimately receive 200,000 simulated landings via the UNIVAC 1108 computer.

If the Mapping Branch selects ten potential areas for study, the Computation and Analysis Division will perform more than two million landings, Naugle stated.

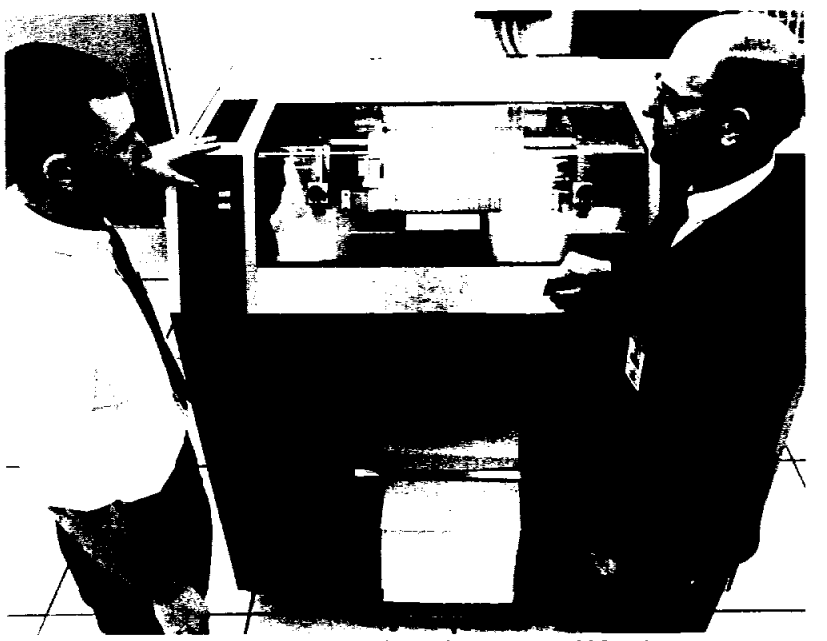
In summing up the work involved in scanning the hundreds of lunar photos, Sasser said, "Whoever said one picture is worth 10,000 words grossly underestimated the problem; one good photo of the moon is worth millions of words."

Sasser predicts: "When the Apollo astronauts prepare for their lunar landing more will be known about the landing site a quarter-million miles away than is known about many remote areas on our own planet."

THREE-D MOON—Mapping Science Branch chief John Dornbach and assistant Branch chief Jim Sasser discuss the area of the crater Copernicus as portrayed by a relief globe of the visible hemisphere of the moon.

COMPUTER NERVE-ENDS—Modifications to the Univac 1108 are examined by Clay E. McCullough, special assistant to the chief of the Information Systems Division, and Norman W. Naugle of the Theory and Analysis Office of the Computation and Analysis Division.

COMPUTER DISPLAY—Visual display as well as 35mm and Polaroid film records converted from digital information are provided by the computer's display system, here being checked by Norman W. Naugle and Gerald J. Leeson of Lockheed Electronics.



PRINTOUT—Sheafs of data spew from the Univac 1108 printer as computer operator Billy Gene Shiller of Lockheed Electronics and Mansell B. Rainbolt of the CAD Theory and Analysis Office observe. Rainbolt is in charge of the analysis of digitized information to produce topographic data.

The Spaceward Movement

With the deaths last Friday of Apollo 204 crewmen Virgil I. Grissom, Edward H. White II and Roger B. Chaffee, six pilots have died in the line of duty in the nation's manned space flight program.

While the shock of their deaths has numbed the thoughts of employees at MSC and at other NASA facilities, and indeed, the entire nation, the goals of the program of going to the moon and beyond are still there.

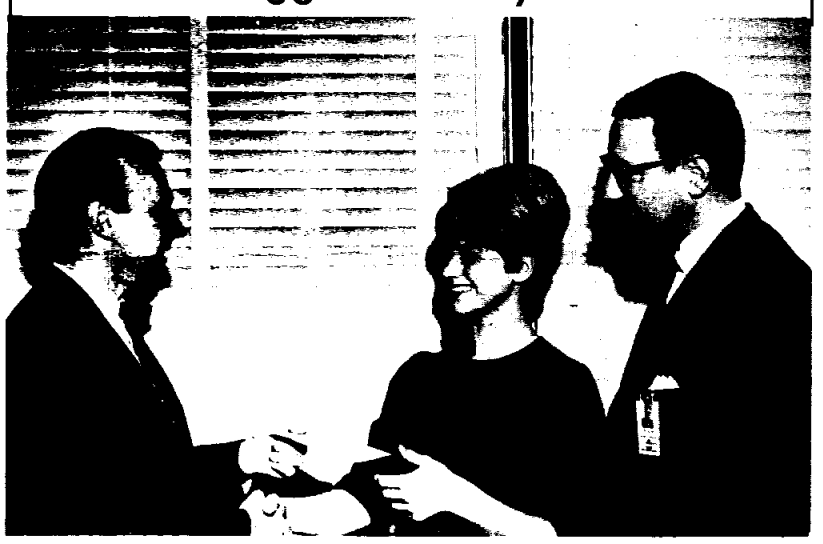
Just as Indian massacres failed to stop the movement westward in the last century, so should not accidents—even catastrophes such as last Friday's—stop the movement of space exploration in this century.

In statements before their deaths, the three Apollo crewmen recognized the possibility of disaster not only on the ground but also in space. We are sure that they would be the first to agree that the spaceward movement should not be slowed or halted, but rather that those that follow benefit from the findings of the board of inquiry.

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 . . . . . Paul Haney
Editor . . . . . Terry White
Staff Photographer . . . . . A. "Pat" Patnesky

Suggestion Payoff



CASH FOR IDEA—Pat McBride of the Medical Operations Office thought it would be good idea to use interleaved carbon sheets on a commonly-used MSC form, so she turned the idea in as a suggestion. The result was a cash award, being presented here by Dr. D. Owen Coons, Chief of the Medical Operations Office, left, and Dr. J. F. Zieglschmid.

THE VICE PRESIDENT
WASHINGTON

December 8, 1966

Dear Mr. Webb:

The Gemini program has been a most impressive success from the first flight on April 8, 1964, through the twelfth which made November 15, 1966, such a memorable and historic day.

This program has proven through experience so many things about astronauts' courage and spacemanship, the reliability of our launch vehicles and spacecraft, and the efficiency and dedication of our support personnel. Moreover, it has imprinted on the pages of space history a series of records which reflect so clearly technical competence this nation has already reached in its national space program. There is, however, much more to be done.

Above all, this Gemini program has revealed how a team representing the Federal Government and private industry can work together and, in so doing, show the world in an open fashion the vitality and efficiency of our democracy and free enterprise system.

I congratulate you and your associates for your contributions to Gemini. The American people are proud of your role and participation.

Sincerely,

Hubert H. Humphrey

Hubert H. Humphrey

The Honorable James E. Webb
Administrator
National Aeronautics & Space Administration
Washington, D. C. 20546

NOT LONGEVITY REWARD—

MSC Merit Promotion Program Seeks Fairness in Selections

There is a saying that the best promotion program ever devised will be criticized by several employees for every one who lauds it—it will be a "good" program to the one who gets promoted and a "bad" one to those who are not selected.

The Federal Merit Promotion Program is no exception.

For the program has not brought more promotions nor has it guaranteed advancement for everyone, but it has resulted in more employees being considered for promotion and has helped to assure that selections are made on the basis of merit and fairness to all.

The purpose of the Federal Merit Promotion Program is not to reward employees for long and faithful service. Rather, it is to help management select the best talent in the ranks of the career service to meet the many challenging problems facing the nation and to assure that selections are made on a fair and equitable basis.

Because of the size, complexity and wide dispersion of the federal work force the Civil Service Commission does not require agency promotion systems to be uniform—an agency may have several plans for different kinds of jobs and locations. One may require passing a written test while another may rely primarily upon supervisory or group appraisals of employees being considered for promotion.

Each agency has the authority to establish the plan best suited to its needs, provided the plan incorporates certain merit principles and conforms to CSC guidelines.

Not only must promotions be made on the basis of merit from among the best qualified employees, but promotion programs must also provide for:

• *Consultation* of agency employees in the development and installation of the individual's promotion plans and in any changes in the plans.

• *Information* provided to employees on policies and procedures governing their agency's promotion program, how the program affects them and how promotion procedures are carried out.

• *Consideration* areas that are as broad as practicable, clearly defined, and in which jobs covered are identified.

• *Qualifications* and standards adequately spelled out and applied systematically and uniformly to all candidates.

• *Evaluation* methods for rating and ranking candidates which are reasonable, valid for the positions and applied fairly.

• *Nondiscrimination* in promotion selections for any non-merit reasons such as race, religion, sex or politics.

• *Complaints* procedure that considers employee protests of any failure to observe promotion guidelines and plans.

• *Release* of employees selected for promotion from the positions they occupy.

A merit promotion plan has been in operation at MSC since September 1962, and hundreds of promotions have been processed satisfactorily under its provisions. The plan is under continuous review by the Personnel Division and revisions are made from time to time to make the plan more responsive to both the needs of management and to employees' career objectives. Proposed changes to the plan are submitted to a representative sample of employees and supervisors for comment prior to publication.

The current plan, MSC Merit Promotion and Career Development Program is contained in MSCM 3000.

Library Changes Hours

The recent experiment of keeping the Technical Library open until 7 pm on Mondays and Thursdays has shown that not enough use was made of the Library beyond 6 pm to justify the late hours.

Effective February 1, Library hours are 9 am to 6 pm on Mondays and Thursdays, and 9 am to 4:30 pm on Tuesdays, Wednesdays and Fridays.

Space News Of Five Years Ago

February 3, 1962 — Interviewed at home, John H. Glenn, Jr. said that scheduled MA-6 launch of February 13 "can only bode for success." Surveying the crowd of newsmen on his lawn, Colonel Glenn remarked that "it looks like Hangar S was not such a bad place after all."

February 5, 1962—Results of *Aviation Week* poll of the members of the House of Representatives to secure "grass-roots" on the US space program were published. Representatives were asked to indicate how their constituents felt about key aspects. The majority indicated that the US space program is "proceeding at the right pace"; of the minority who disagreed with this, twice as many favored "speeding up the program." Landing a man on the moon was considered "something the US must do primarily to keep up with the Russians." The majority also felt that NASA rather than the military should run the space program ("emphatic support for NASA on this question by a ratio of almost 5 to 1"). Rep. Emilio Q. Daddario noted on his questionnaire that it is regrettable that the space program is linked in the public mind to the cold war contest with Russia: "I am concerned by this because the space program does not therefore stand on its own and there is the resulting danger that it will not receive the continuous support it will need over the years ahead to do what must be done . . ."

February 6, 1962 — Announced at Cape Canaveral that the MA-6 launch attempt had been changed from February 13 to February 14.

February 7, 1962—In his regular press conference, President Kennedy was asked for his "evaluation of our progress in space at this time" and whether the US had changed its "timetable for landing a man on the moon?" He replied: "I've said from the beginning we've been behind. And we are running into difficulties which come from starting late. We, however, are going to proceed. We're making a maximum effort, as you know, and the expenditures in our space program are enormous. And, to the best of my ability, the time schedule, I hope, has not been changed by the recent setbacks."

February 14, 1962—MA-6 launch postponed because of bad weather in recovery areas. At regular press conference, President Kennedy was asked about the eighth postponement of "Colonel Glenn's flight." He replied as follows: "Well, it is unfortunate. I know it strains Colonel Glenn. It has delayed our program. It puts burdens on all those who must make these decisions as to whether the mission should go or not.

"I think it's been very unfortunate. But, I have taken the position that their—the judgment of those on the spot should be final in regard to this mission and I'll continue to take their judgment.

"I think they would be reluctant to have it cancelled for another three or four months because it would slow our whole space program down at a time when we're making a concentrated effort in space.

"But I'm quite aware of the strain it has caused everyone and it's been a source of regret to everyone and—but I think we ought to stick with the present group who are making the judgment and they are hopeful still of having this flight take place in the next few days.

"And I'm going to follow their judgment in the matter even though we've had bad luck."

February 16, 1962—Following an early morning weather briefing, Mercury Operations Director Walter C. Williams advised that weather conditions again precluded a launch attempt of the MA-6 mission. February 20 was announced as the earliest possible launch date. Notified of the decision at 12:50 am, John Glenn said: "I guess it was to be expected. We all knew the weather was marginal."

ROUNDUP
EMPLOYEE NEWS

FAA's Cotten to Speak At Aero Club Meeting

Bill Cotten of the Houston office of the Federal Aviation Agency will be the featured speaker at the February 14 meeting of the Aero Club. The meeting will begin at 5 pm in the News Center Auditorium, Nassau Bay Building 6, and is open to Aero Club members and their guests.

Cotten will supplement his talk with a film.

Flying out of Spaceland Airpark in League City, the Aero Club fleet includes a Cessna 172 and a Cessna 150. Jim Donnell and Doug Shoen arrange for maintenance of the aircraft, including 25-hour inspections between the regular 100-hour inspections, and washing and vacuuming.

Nine Aero Club members January 17 completed the Ground School course conducted by Sal Tripoli and Ken Downing. They were: Robert Wiley, Tom Gunderson, Herb True, Frank Burgett, Clifford Hess, Jim Huddleston, Frank Baiamonte, Rex Lint and Jay Lewallen. The ground school graduates will be taking their FAA written exams for private pilot licenses within the next month.

The next course to be offered by the Aero Club will be the Aircraft Owners and Pilots Association 360° Instrument Course. To enroll, call Sal Tripoli at HU 8-3300.

New Film Covers Awards Program

Space-Age Recognition: The Awards Program at MSC, a 16-mm sound-color motion picture describing the MSC Awards Program, has been added to the MSC Motion Picture Library in Building 1.

The 22-minute movie traces briefly the history of awards and recognition and covers the MSC Awards Program in detail.

Awards Program Coordinators in each organization will arrange showings of the film during the next few weeks to employees and supervisors.

SPCA to Form Local Chapter

The homeless pet and petless home situation in Mainland Galveston County will come under attack February 7 when a new chapter of the Society for Prevention of Cruelty to Animals holds an organizational meeting at 8 pm in the LaMarque high school auditorium.

The new SPCA chapter hopes to establish this year an animal shelter to service Galveston County mainland and the southern Harris County-Clear Lake area. Part of the Chapter's goal will be to conduct educational programs in pet care in schools and to hold animal clinics in which services donated by veterinarians would reduce cost of immunizations and treatment.

With a philosophy of "one animal per person instead of one animal per family," the SPCA chapter will assist anyone wanting pets or anyone wanting to give away pets.

Clear Lake area contact for the new group is Patricia Jackson at HU 8-3530, Ext 2479.

Golfers' Hardware

HOOK-AND-SLICE CLUB—Members of the MSC Golf Association show off the trophies they won during various tournaments during 1966. Left to right, they are: Ray Holladay, Morgan Cooner, Joe Canniff, Lou Allen, Bill Nunnery, Sam Glorioso, Dave Rosen, Norm Beauregard and Jim White. Not present for the photo: Bill Johnson, Dave Brown, Jack Garrison and Max Engert.

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—REAL ESTATE

3-bdr 2-bath brick in Pasadena, central air/heat, built-ins, double garage, near shopping centers, schools. Equity plus assume 5½% loan. T. F. Kirkland, HU 6-3240.

3-bdr 2-bath brick, 2-car garage, built-ins, large living-dining room, breakfast area, air conditioned. Forcucci, HU 8-2609 after 5.

4/2½/2 in Clear Lake City, fenced, landscaped, 2300 sq ft, separate dining and family rooms, extras. Assume 6% $23,300 loan with $4500 equity. James W. Gray, HU 8-0415.

3-bdr 2-bath brick ranch-type in Arlington Heights, den, paneled playroom, central heat/air, built-ins, 2½-car garage, large covered breezeway, fenced backyard, near schools and shopping. Small equity. Ed Howell, HU 4-5922.

FOR SALE—AUTOS

1964 Pontiac station wagon, assume $1900 Credit Union balance. Luther Palmer, 877-1269.

1961 VW sedan, xclnt condition, one owner, 48,000 miles, $600. Jim Peacock, League City 932-4458.

1955 Buick Special, autotrans, blue and white, new tires, rebuilt transmission, dependable work car. $200. Lenora Patterson, 495-3389 Mont Belvieu, Texas.

1963 Ford Galaxie 500XL 4-door hardtop, fully equipped, air, pwr brakes/steering, radio, good condition. R. H. Moore, GR 4-2118 after 5.

1964 VW sedan, 16,900 actual miles, will consider trade for van. $850. R. N. Townsend, HU 2-7720.

1966 VW, tan w/black int, radio/heater, whitewalls, low mileage, good condition. $1450 cash or $275 down and pick up $43.18 payments. Lee Adams, GL 3-7940.

1961 Ford 2-door, standard shift, 6-cyl, radio/heater, one owner, xclnt condition. Barbara Williams, HU 4-1524 after 5.

1961 Buick Invicta 2-door hardtop, pwr steering/brakes, good tires. Terry Whalen, 877-3231.

1966 Mustang V-8, radio/heater, tinted glass, stickshift, large hubcaps, whitewalls. Sacrifice. Eugene Faires, HU 6-7254.

Jaguar XKE roadster, white, black top, 3-band radio, excellent throughout. Price negotiable—will consider trade. John H. Boynton, MI 3-0926.

1956 Dodge, reliable second car transportation. $150. Alan L. Bean, HU 8-0191.

1966 Impala Super Sport, turquoise, bucket seats, 283 V-8, factory air, powerglide, PB radio, tinted glass, whitewalls, positraction, many extras. $2495. Tom Brown, MI 3-9208.

1963 Volkwagen with VW air and extras, well kept. Cost $2100—asking $1075. Dale Nussman, HU 6-0359.

FOR SALE—MISCELLANEOUS

Zeiss Ikoflex I twin-lens reflex camera, shoots 12 2¼x2¼ pix on 120 film, f/3.5 Zeiss Novar lens in Compur shutter, ever-ready case. $25. Terry White, 932-4472.

Custom-built electric guitar and large Gibson amp; sell as set only. Guitar is solid-wood flat-body construction, dual pickup, Gibson controls, volume and 3-way switch controls, red velvet-lined case. Amplifier has 70-watt output, three jack outlets, foot-pedal vibrator, volume, tone, depth, frequency controls. Combination: $125. Jerry T. Kilpatrick HU 4-8293.

1966 Ducati Motorcycle, 160cc, 70-75 mph, 90 mpg, 1500 actual miles, xclnt condition. Also helmet, tinted bubble, cable lock w/keys, tarpaulin $300 for all. J. M. Walker, RI 8-5910.

Registered AKC Irish Setter puppies, born January 5. Dr. Owen Sear, 771-1686.

Friendly spider monkey and cage, has had shots. Good pet for adults or children. Ada Moon, JA 8-6411.

Miranda-Dr 35mm single-lens reflex camera, 50mm f/1.9 auto-diaphragm lens. $65. Charles Krpec, MI 5-6089.

Tools and hide for leather tooling: 9-oz rawhide mallet, 2 modeling tools (one with deerfoot), four chrome steel saddle stamps and tools (one seed, one camouflage, two backgrounds), hand tool set for birdcage fasteners, 3-in-1 leathercraft set-punch with six attachments, adjustable gage and spacer; general leathercraft instruction book, irregular piece 4-oz hide 20x15, (approx five billfolds plus small items such as key containers), small pieces liner leather, one billfold started. All for $10. Outdoor lights: five strings of 15 lights including blue, red, yellow and white bulbs. $10. Gracie Stolar, HU 3-3551.

Craftsman 6-in lathe with motor, chucks, steadyrest, etc. $165. Bill Fulton, LaMarque WE 5-6875 after 5:30.

1964 10x55-ft Americana mobile home with carpets, window air, 10x40-ft aluminum awning, xclnt condition. D. Barclay, HU 4-5794.

Guns: British Tower flintlock musket and bullet mold, circa 1813, xclnt for making smoke, fire and noise or den decoration. $47.50. Replica of cap-and-ball dueling pistol and mold, xclnt condition. $39.95. Japanese 7.7mm rifle, satisfactory hunting rifle, make boy good birthday gift. $10. Charles Shoemake, 591-3300 Ext 3182 or HU 2-7874.

WANTED

Car pool or will pay from 2607 Cedar Drive, La Marque to Bldg 419, 7:30 a.m. to 4 p.m., Evelyn Villeneuve WE 5-3878.

Need two people with cars to share existing car pool from near Gulfgate to MSC 8-4:30. D. Bland, MI 3-0173.

Want good used router. Roy Parker, 591-2253.

Want riders from southwest Houston. Will pick up from Chimney Rock at SW Freeway on in. Mike Petitt, JA 4-9734.

Golf Association Plans Dozen 1967 Tourneys

The MSC Golf Association is laying plans for its 1967 season with a membership drive and a schedule of 12 tournaments. The Association expects to grow to about 80 members during 1967.

To play for trophy points, a golfer must have an established MSC Golf Association handicap. Scores for establishing a handicap may be recorded with Earl Patterson at 2528.

A special flight for nonhandicapped players will be set up in each tournament until they play five rounds and are officially handicapped. Until then, nonhandicapped players may compete only for tournament prizes but not for trophy points.

Association rules require that all 18-hole scores be turned in for handicapping, regardless of whether the scores were made in officially sanctioned tournaments or matches. Players failing to submit such scores may be disqualified.

The 1967 anticipated MSC Golf Association tournament schedule is as follows:

February 22	Humble
March 18	Glenbrook
April 15	El Dorado
May 6	Forrest Cove
May 30	Sharpstown
June 17	Executive
July 8	Ellington AFB
July 29*	Panorama
August 19*	Hughes Golf Course
September 16	Brock Park
October 14	Hermann Park
November 10	Atascocita

*Not confirmed to date

Employees desiring to join the Association should contact J. E. Jones, Jr. at 2231.

Motorcycle Club Forms

MSC motorcyclists interested in forming a motorcycle club are asked to call Jack Joerns at 3511.

Wearers of black leather jackets, Iron Crosses and swastikaed *Wehrmacht* helmets need not apply.

Security Issues New Car Decals

New permanent decals for personal vehicles will be issued during April and May 1967. The program is to be completed by May 15. After that date the old permanent decals will not be honored.

Under present plans, forms will be sent to each MSC and contractor organization early in April. Each employee must complete his form prior to issuance of the new decal.

Actual issuance of the decals will begin April 10. Security Branch representatives will be at specific buildings on specific days and each organization will be notified in advance where and when their employees may pick up the new decal.

Decals will also be issued at the Reception Desk in the lobby of Building 2, at Building 100 (Second Street Gate), and at Building 345 at Ellington Air Force Base.

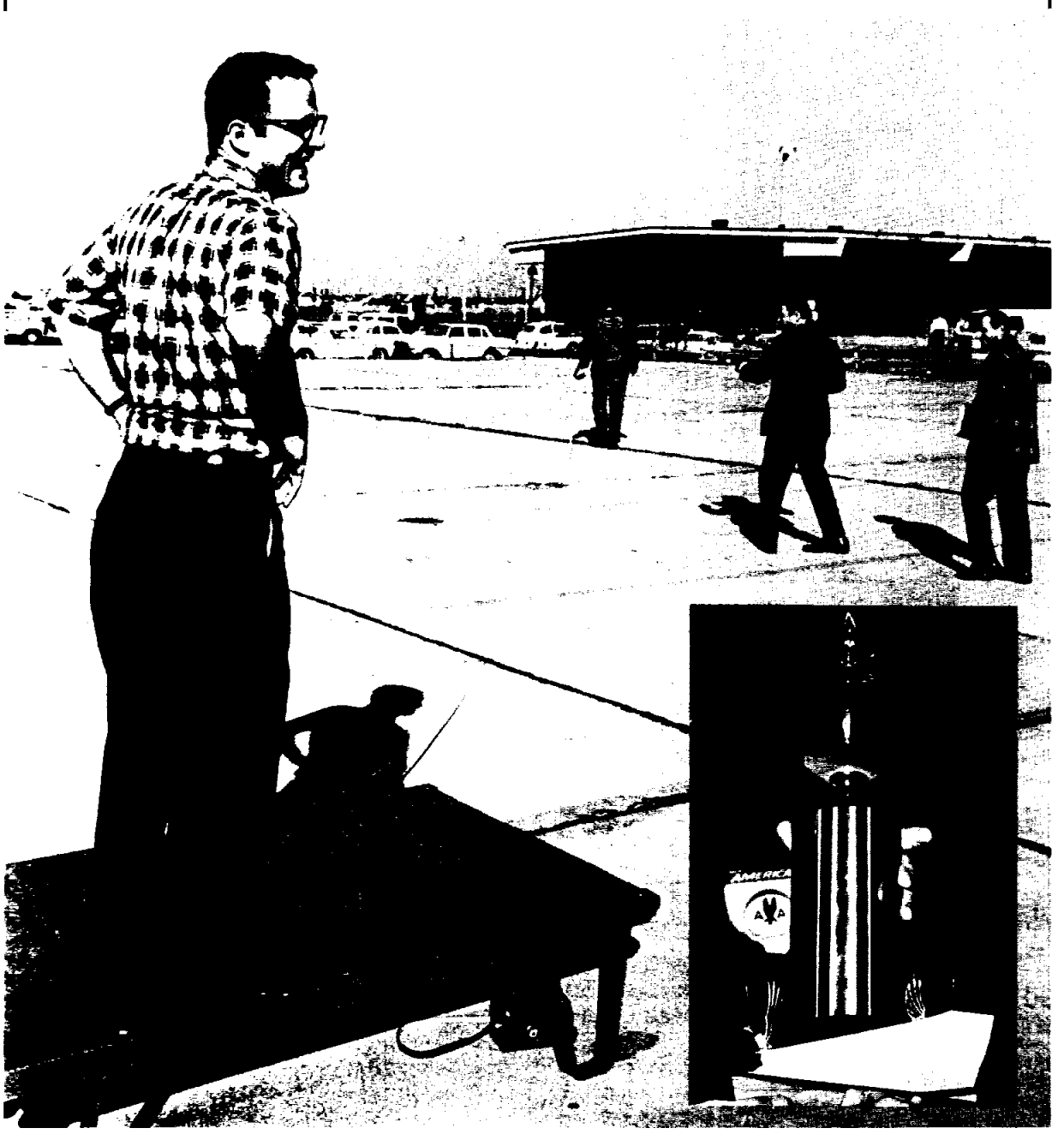
It is tentatively planned to issue new decals approximately every three years.

Card Money Buys Athletic Equipment For Boys Town

Christmas card exchange among employees of the C/SM Systems Branch of Flight Control Division was suspended for Christmas 1966. Instead, they pooled the money that would have been spent for cards and postage and bought athletic and game equipment for Teen Liberators Boys Town in League City.

Among the items given Teen Liberators were a ping-pong table, a basketball, a football and an outdoor horseshoe set.

Cross Country on Paper Wings



LAUNCH PAD—Tom Grubbs works in the Spacecraft Design Branch of the Advanced Spacecraft Technology Division. But not all of his design work is limited to exotic space-age materials. Here, Grubbs jubilantly waits while contest officials measure the length of his winning flight in the paper airplane competition January 14 at Houston International Airport sponsored jointly by American Airlines and *Scientific American* magazine. The winning flight was 266.5 feet, from the platform all the way to the far corner of the freight building. Grubbs' lacquered-paper creation is shown with the trophy it won. The airplane will be entered in the national and international competitions.

ROUNDUP

SECOND FRONT PAGE

Two-Day Conference Views Gemini Results

More than 1,200 persons representing government, industry, and educational organizations attended the Gemini Summary Conerence at MSC February 1 and 2. The conference was open to newsmen.

The conference was broken into four major sessions, two each day. Session topics were Space Orbital Maneuvering, Man's Activities in Space, Operational Experience, and Gemini Onboard Experiments. The conference ended with a summary of the Gemini Program by Charles W. Mathews, Gemini Program Manager.

Dr. Robert R. Gilruth, MSC Director, welcomed the attendees, and the conference introduction was by Dr. George E. Mueller, Associate Administrator, Office of Manned Space Flight.

Papers presented included: First session, Wednesday morning—Review and Summarization of Rendezvous Operations, Ground Monitoring and Control of Rendezvous, Onboard Operations for Rendezvous, Operational Characteristics of the Docked Configuration, Operations with Tethered Space Vehicles.

Second session, Wednesday afternoon—Summary of Gemini Extravehicular Activity, Life Support Systems for EVA, EVA Body Positioning and Restraints, EVA Maneuvering About Space Vehicles, Medical Aspects of Gemini EVA.

Third session, Thursday morning — Radiation Environment Conditions at High Orbital Altitudes, Controlled Reentry, Department of Defense Support of Gemini, Gemini Results as Related to the Apollo Program, Pre-Gemini Medical Predictions Vs. Gemini Flight Results.

Fourth session, Thursday afternoon—Summary of Gemini Experiments Program, Space Photography, Experiments Results Summary, Astronaut Flight Experience.

A 45-minute news conference with the chairman and speakers was held in the News Center after each session. The conference was monitored by closed circuit television in the News Center.

The summary conference was in the MSC Auditorium. Several hundred of the attendees watched the conference via closed circuit TV in smaller auditoriums at MSC.

Satellite Power Fixed From 292,900 Miles

Project engineers of the Goddard Space Flight Center, Greenbelt, Md., have used an electronic "screwdriver", 252, 900 miles away from Earth to restore power to a faltering satellite.

The emergency repair—believed the most distant satellite fix ever accomplished—was conducted by Goddard engineers via the tracking station at Rosman, N.C. It saved the Explorer XXXIII spacecraft from an almost certain power blackout.

The problem was first observed January 13, when engineers observed that power levels on the space science laboratory were only 13.5 volts, down from the normal 18.2 volts. Some of its electronic systems were beginning to operate erratically, and a short circuit was suspected somewhere in the miles of its electrical wiring.

Project officials decided to turn off the spacecraft transmitter in the hope that an increased power surge through the other electronic systems would eliminate the suspected short circuit.

At 4:20 p.m., the turn off signal was sent from Goddard to Rosman, thence to the satellite transmitter and the spacecraft obeyed. Goddard then waited 40 minutes—the time believed necessary to overcome the problem.

When the transmitter was again turned on, telemetry readings showed that the spacecraft power was back to the normal 18.2 volts.

Explorer XXXIII was launched July 1, 1966 from Cape Kennedy, Fla. Its orbit tops 270,000 miles at the farthest point away from Earth. This is beyond the Moon's high point of 240,000 miles.

Explorer XXXIII has returned much scientific information to Earth, including conclusive proof that the Earth's magnetosphere extends beyond the Moon. It has also recorded a shock front moving out from the Sun after a solar flare event.

Saturn Stages Make Voyages To Test Sites

The ninth Uprated Saturn I booster or first stage to be assembled at the NASA-Marshall Space Flight Center's Michoud Assembly Facility, New Orleans, arrived at MSFC-Huntsville January 26 aboard the barge *Palaemon*.

Another second stage (S-II-2) of the Apollo/Saturn V rocket was shipped last weekend from Seal Beach, Calif., to the NASA-Marshall Space Flight Center's Mississippi Test Facility, Bay St. Louis, Miss.

It is traveling aboard an ocean-going vessel, the *Point Barrow*, on a 4,800 mile journey that will take 16 days. It takes a route through the Panama Canal.

When the 82-foot long stage, built by North American Aviation, Inc., arrives at MTF, it is to be placed into a stand for two static tests of about six minutes each. The time matches the burning times of the five clustered engines during flight.

This is the second S-II flight stage. The first arrived at the NASA-Kennedy Space Center, Fla., launch site following static firing at MTF.