

# Space News **ROUNDUP!**

## Federal Pay Raise Bill Signed By President

The new federal pay raise which was signed into law by President Lyndon Johnson, last week, will be reflected in the pay check of August 24, along with the retroactive pay beginning on July 5.

President Johnson, upon signing the Federal Pay Raise Bill last Friday, said it will enable the government to attract and keep employees of outstanding ability.

He signed the bill in a ceremony in the White House flower garden, attended by members of Congress whose committees handled the legislation, government officials, and labor leaders who supported it.

Slight adjustments were made in pay scales of grades nine through 12 before final passage

of the pay bill by Congress. The pay increases are retroactive to the first pay period beginning on July 5.

The new pay raise for members of congress, judges, government officials and about 1.7 million other federal workers, ranges from about \$100 a year for the lowest ranking civil service or postal employee up to \$10,000 a year for high officials.

It is estimated to add \$558-

*(Continued on Page 2)*

## Training Being Offered Here In Aerospace Medical Field

With a primary objective of providing the Manned Spacecraft Center and other government agencies with a source of well-trained medical doctors who have a specialization in aerospace medicine, an Aerospace Medical Speciality Training Program was inaugurated at the Center on July 1.

Purpose of the aerospace medical program here at MSC, the first of its type in NASA, is to provide a systematic, well-planned training program for third-year medical residents in the field of aerospace medicine.

The program will give the resident a specialized background in clinical aerospace medicine, research methodology, teaching, and administration in this field.

Presently there are only three fully accredited flight surgeon training schools—two military and one civilian. They are the USAF School of Aerospace Medicine, Brooks AFB, Texas;

the U.S. Naval School of Aviation Medicine, Pensacola, Fla.; and Ohio State University, Columbus, Ohio.

At the present time, two doctors are taking part in the training program here, and a third doctor is scheduled to join the program in January 1965.

MSC is the only place where doctors in the free world can get direct experience in the space medical field while under the guidance and supervision of fully qualified specialists in aerospace medicine.

The doctors are assigned to *(Continued on Page 2)*



"CLASSROOM" LECTURES—At their campsite north of Fallon, Nev., the astronauts get their first taste of the life they were to face for the next few days. They are shown listening to a lecture and demonstration on using a parachute to survive in the desert. (SEE STORY ON PAGE TWO)

## WILL BE FIRST TO OCCUPY FACILITIES — MSC-Florida Operations Employees To Begin Move To Merritt Island

The first NASA organization to occupy facilities on Kennedy Space Center's new Merritt Island complex will be Manned Spacecraft Center-Florida Operations, as 1,100 NASA and contractual employees start moving from Cape Kennedy to the Industrial Area next month.

Although the majority of MSC-Florida Operations and contractor personnel will occupy facilities in the Operations and Checkout Building, eventually it is expected that some 3,000 personnel will occupy 18 Manned Spacecraft facilities on Merritt Island.

The most impressive and the largest building in the Merritt Island Industrial Area is the Manned Spacecraft Operations and Checkout Building (O&C). This 575,000 square-foot building is a multi-storied, reinforced-concrete structure that stands 106-feet above the flat Florida countryside.

The O&C Building will include administrative and engineering areas; spacecraft assembly, test, and servicing areas; and laboratory and control areas. The laboratory area provides for manned spacecraft checkout and validation facilities as well as astronauts quarters and training equipment. The assembly and test area includes high and low bay areas for non-hazardous acceptance testing of spacecraft modules.

A high-bay area provides for Apollo spacecraft integrated sys-

tems and altitude chamber tests. It is approximately 100-feet in height and provides two bridge cranes with a hook height of 85-feet. The low-bay area will provide a similar capability for Gemini spacecraft.

The first MSC-Florida Operations organizations to move will be the Mechanical and Propulsion Systems Division and the Electrical and Electronics Systems Division. In addition, Mc-

Donnell Aircraft Corporation and North American Aviation's Preliminary Activation Group will also move. There will be approximately 250 people in the first increment.

The new facilities being occupied on Merritt Island are for testing spacecraft cryogenic, hypergolic, and pyrotechnic units. The test operations will

*(Continued on Page 2)*

## NASA Program Designed To Provide Scientists With Latest Documents

The National Aeronautics and Space Administration announced recently it has begun a pilot program designed to help scientists and engineers cope with today's rising flood of literature on new discoveries and developments.

The program, called Selective Dissemination of Information (SDI), is being developed for NASA under contract by the Advanced Systems Development Division of International Business Machines Corp., Yorktown Heights, N.Y., and is presently serving 500 NASA scientists and engineers.

SDI automatically notifies, individually, those enrolled in the program of fresh informa-

tion within their respective fields by a three-step process. It is designed to disperse information to scientists at speeds in keeping with spaceage technology.

The individual fills out an interest "profile" using terms and phrases that give a comprehensive and accurate description of the kind of information he needs.

The "profile" is matched, by *(Continued on Page 2)*



TRAINING PROGRAM DISCUSSION—Dr. Charles A. Berry (r. center), chief of Center Medical Programs and Dr. A. D. Catterson (l. center), assistant to the chief of Center Medical Programs, discuss facets of the new Aerospace Medical Speciality Training Program at MSC with Dr. Kenneth Beers (l.) and Dr. John Ziegelschmid. The latter two are the first doctors to participate in the program. The program, first of its type in NASA, was inaugurated at MSC on July 1.

## Pay Raise

(Continued from Page 1)

million to the yearly federal civilian payroll which now runs about \$15.5-billion.

The president said the pay raises stay inside the limits suggested for private industry as a means to avoid an inflationary spiral. He said the pay raise gives the government the necessary tools for the first time to reward excellence and to distinguish among marginal, competent and superior performance.

He also said that the continuing goal of the government is to make federal salaries reasonably comparable to those of private industry. (See chart and related pictures—page 5-A).

## Medical

(Continued from Page 1)

the Office of the Chief of Center Medical Programs, and will be rotated in applicable areas of the Center for receiving direct experience.

Four months will be spent in the Crew Systems Division where they will do applied research, and a similar period will be spent in the Center Medical Office where they will provide medical support of operations and two months in either of these areas as an elective choice. A two month period will be spent in the Center Medical Programs Office where they will learn of the administration of the aerospace medical program.

Doctors presently in the program here at the Center are Dr. Kenneth Beers (Air Force), who is now training in the Crew Systems Division, and Dr. John Ziegelschmid, who is presently

attached to the Center Medical Office.

Dr. Charles A. Berry, chief of Center Medical Programs, feels that this training program here at MSC will help fill a need that has existed for some time in the aerospace medical field.

The need for doctors in the aerospace medical field will continue to expand as the space program is enlarged. There are now only a little over 650 flight surgeons in the U.S. civilian and military ranks.

As supervisor of residency training, Dr. A. D. Catterson, assistant chief, Center Medical Programs, directs the Aerospace Medical Speciality Training Program here at the Center.

## Program

(Continued from Page 1)

computer, with corresponding "profiles" of the contents of newly acquired technical reports from all over the world. NASA then sends cards with brief outlines of the information (an abstract) to the potentially interested individuals. To get the full report, the individual requests it from a nearby technical library.

The SDI system is expected to eliminate the need of individuals to spend substantial time sifting through thousands of new reports listed in bulky announcement journals in order to keep up with the latest information in their fields of interest.

The Air Force has enrolled 200 persons in the NASA/SDI program on an experimental basis.

Later this year, SDI will be transferred to the NASA Scientific and Technical Information Facility at Bethesda, Md., and opened to additional users.

## NEWEST GROUP—

# 14 Astronauts Complete Desert Survival Course

Under a blazing sun at isolated Carson Sink, some 40 miles east of Reno, Nev., the nation's newest astronauts from the Manned Spacecraft Center, last week, took final "exams" in a grueling week-long desert survival course, under the direction of instructors from the U.S. Air Force 3637th Survival and Special Training Squadron at Stead AFB.

Their final exams saw the astronauts setting up desert camp sites and living for two days or approximately 48 hours, using only their parachutes, standard items furnished in their survival kits, and the new knowledge on desert survival techniques imparted by the Air Force instructors.

They used their parachutes to fashion tents and loose fitting clothing that resembles Arab attire, to protect them from the

desert sun and 100 plus degree heat. They practiced using flares, hand mirrors and other signal devices—and they ate only what they could find and catch in the desert. No food was issued with the survival kits.

The astronauts were taught these and other skills by their Air Force instructors during class room sessions and field demonstrations on Monday, Tuesday and Wednesday morning. The astronauts learned fast.

During a practice session in the field on Tuesday the astronauts managed to coax down a high-flying Navy airplane by using hand mirrors. The curious Navy pilot came back in a low pass to see what was going on, then returned the astronaut signals with a blinking light and returned to altitude to resume his course.

To help wile away some of the long hours in their isolated camp sites, the astronauts brought along a variety of reading material. Subjects covered a wide range. Some book titles observed were "Religions of The World," "To Kill A Mockingbird," "Fate Is The Hunter," "Soldiers Pay," "An Introduction To Modern Physics," and even a "Peanuts" comic book.

The cram course in desert



THE LATEST fashion in desert clothing is this burnoose fashioned from parachute remnants by Astronaut Alan Bean.

survival ended on Friday morning, and the astronauts returned to Stead AFB for a course review and critique. Following a press conference for local news media representatives, the astronauts flew back to their home base, the Manned Spacecraft Center.

## Move

(Continued from Page 1)

be sequenced to attain the spacecraft configurations that occur during various phases of a mission.

According to R. C. Johnson, chief of Facilities Planning Branch, and the MSC-Florida Operations MILA move coordinator, the move will take place at night and on weekends to facilitate an orderly flow of personnel and office equipment from existing facilities to the new buildings.

Johnson indicated that all furniture, desks, and other office equipment will be pre-positioned according to a master plan drawn in advance. "For all practical purposes," he said, "this means that personnel will leave their Cape offices at the close of the working day and take up positions at Merritt Island the next morning with no work stoppage. The key to the move, according to Johnson, is advance planning, thereby keeping inconvenience to a minimum.

The largest piece of equipment to be moved from Cape Kennedy to the new facilities is the altitude chamber used in the Mercury program. It is presently undergoing modification to enable the larger Gemini spacecraft to be inserted inside the chamber for environmental control tests.

The majority of MSC-Florida Operations personnel are expected to complete the move by the end of October.

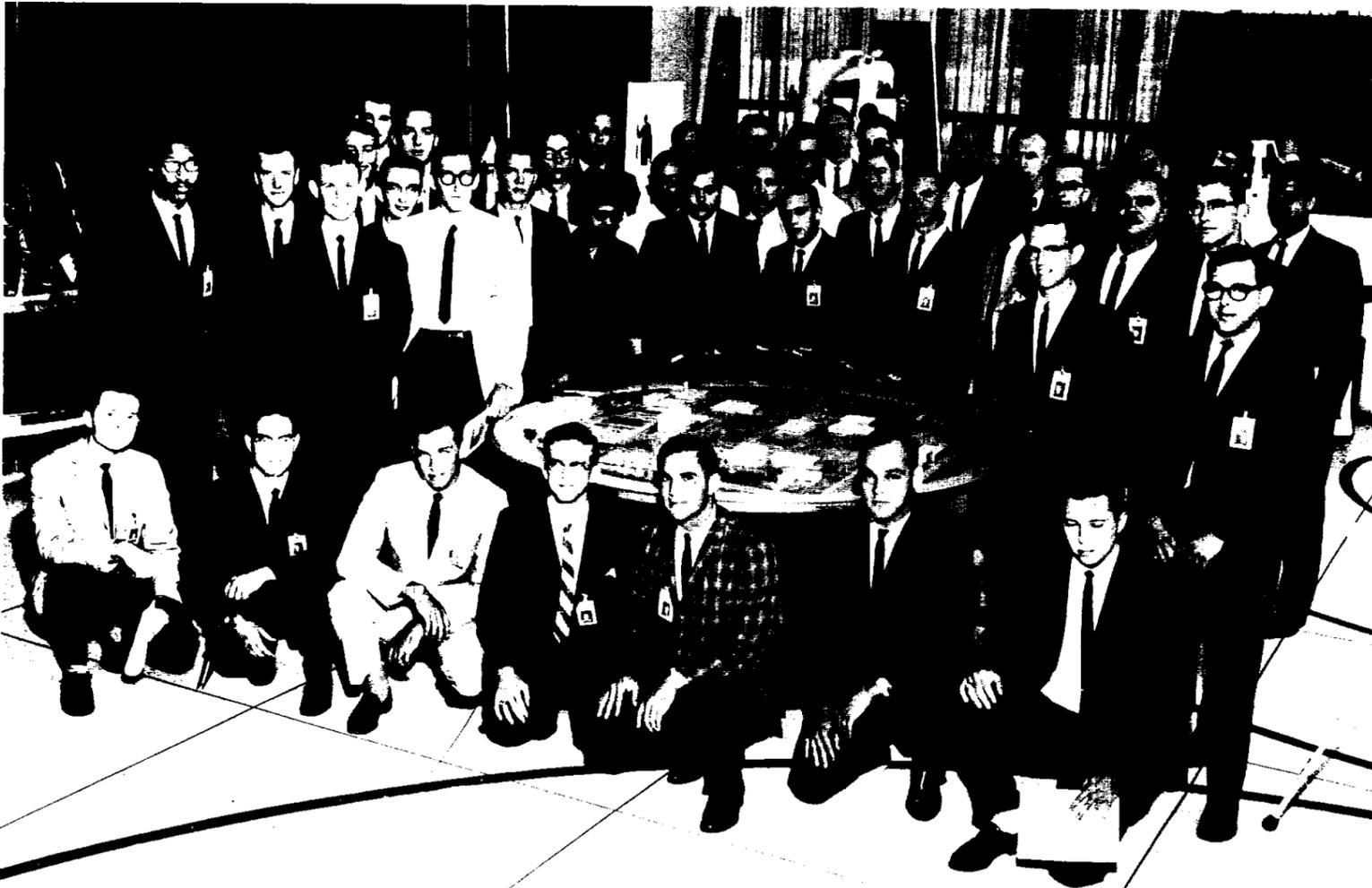
## A Sticky One For Scientists

While others try to build a better mousetrap, NASA scientists are trying to come up with a better paste.

It's needed for attaching electrodes to astronauts' bodies to record their temperatures, heartbeats, etc., during long space flights.

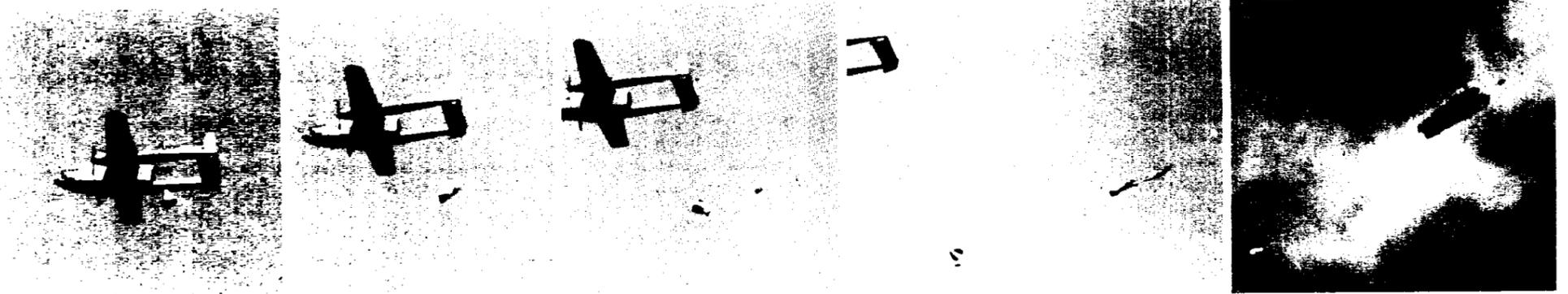


ASTRONAUT Russell Schweickart tries out his newest project, a pair of improvised sun glasses, made from parts of a parachute.



SUMMER INTERNS AT MSC—Forty-one top students, shown above, from across the nation are winding up the second Aerospace Summer Intern Program here at the Manned Spacecraft Center. Thirty-one of the students are in science and engineering academic pursuits and 10 are in administrative disciplines. The group of students representing 27 colleges and universities in 15 states came to MSC with the highest recommenda-

tions of their respective schools. The Intern Program presents an opportunity for high potential university students to work and study at MSC. The interns attend seminars, either technical or administrative, matched to the intern's academic pursuits, and generally perform project work in many areas throughout the Center.



## Gemini Drop Tests Measure Landing Impact Forces

A series of drop tests have been conducted recently using a boiler plate Gemini spacecraft to get the level of impact forces on the spacecraft as it makes a land landing.

The tests are being conducted by the Landing and Recovery Division with Fred Koons as test conductor.

Impact forces on the boiler plate Gemini are measured

through a series of test instruments with sensors attached to the spacecraft. The results are recorded by a tape recorder inside the boiler plate craft.

Test drops on land have been made at Ellington AFB, Ft. Hood, Tex., and the most recent drops were at Camp Gary Army Air Field at San Marcos, Tex.

Forces of 30 to 35 gs were experienced by the craft as it impacted the varying types of soil at the three locations. At Fort Hood a rocky soil, at San Marcus a softer soil, and at Ellington a somewhat harder soil than the latter, was experienced on the drops.

The drops were made from an Air Force C-119 at an air speed of 130 knots. The boilerplate weighs approximately 4,000 pounds, which is comparable to the actual Gemini's weight.

Length of the actual drop is about 30 seconds from an altitude of 1,500 feet.

The first 10 seconds of a typical drop, with the boiler plate falling at about 70 feet-per-second, is consumed by the deployment of the drogue and the 84-foot ring-sail parachutes. De-

scant of the Gemini boiler plate is slowed to about 20 to 30 feet-per-second just before impact depending on the surface winds.

Effects of the impacts with no wind and with winds of over 10

The series of photos above and to the right were taken last Friday from the Retriever in Galveston Bay with a 70mm sequence camera. The drop of the Gemini boiler plate was to compare the impact of water and land landings. The C-119's used in these drops are furnished by the 446th Troop Carrier Wing at Ellington AFB.

knots were measured by the instruments inside the Gemini.

Depth of the impression made by the corner landing of the boiler plate Gemini varied from six inches at Ft. Hood to a depth of 12 inches at San Marcus in a moist soil. A drop was also made on the blunt heat shield but the impression in the soil was negligible, compared to the corner landings.

A drop was made this past Friday in the Gulf to get a comparison of the impact forces on the boiler plate landing on land and in the water.



## Visitors At MSC . . .



ANDREW SISTERS—The singing trio of radio and record fame, the Andrew Sisters were recent visitors here at the Manned Spacecraft Center. They are shown as they listen to recorded conversations with astronauts in space. They are (l. to r.) Laverne, Patti, and Maxine.

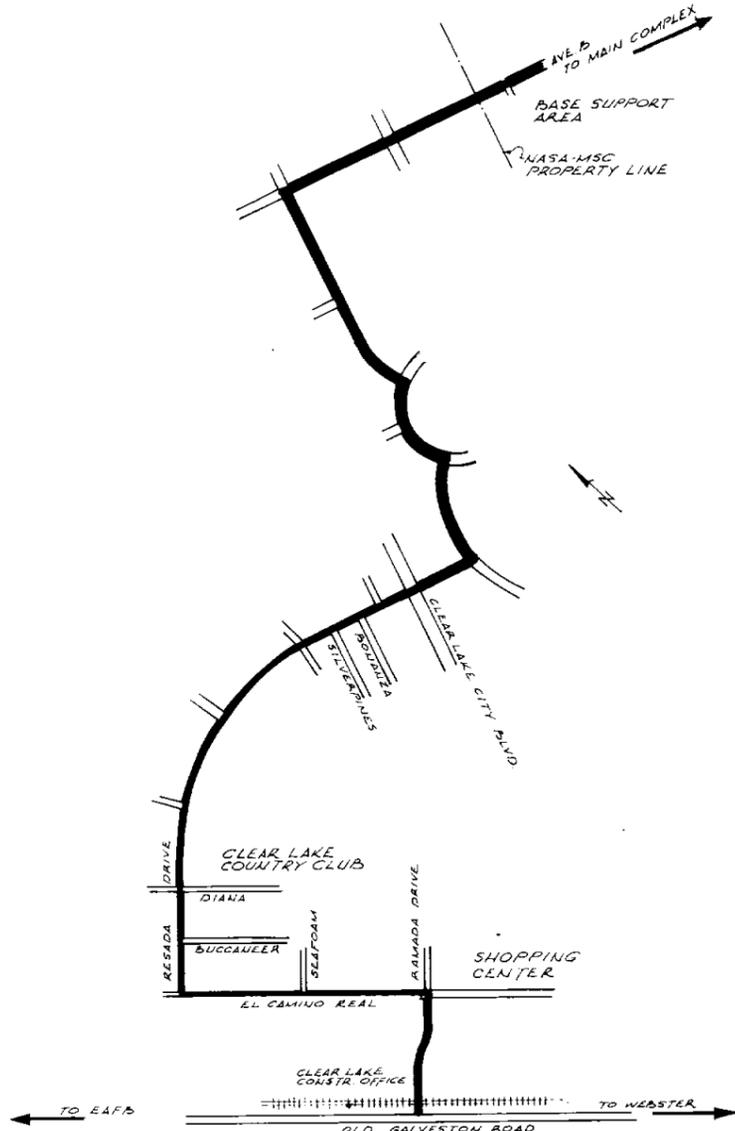


VISITORS FROM EL SALVADOR—Distinguished guests from El Salvador were recent visitors here at the Center. They are shown above examining one of the exhibits in the auditorium (l. to r.) Jose Trabanino Jr., Houston Consul of El Salvador; Dr. Victor Manuel Cuellar, director of the Central American Common Market, and his brother Francisco Cuellar.



YOUNG TEXAN OF YEAR—A recent visitor to the Manned Spacecraft Center was Lindsey Enderby, from Gainesville, Tex., the Optimist Club's selection as Young Texan of the year. He is shown above with Astronaut Charles Conrad Jr. (right).

## New Avenue B Entrance



GEMINI AND APOLLO—

# Navigation And Control Problems Being Studied Here

The Simulation Branch of the Guidance and Control Division is primarily concerned with providing quick response capability for performing man-in-the-loop studies, with problems in control and

navigation of the Lunar Excursion Module, the Apollo command module, Gemini and special configurations being investigated.

The facilities include a large analog computer laboratory, an

instrumented group of cockpit mockups with flight controls, and a visual display complex to provide out-of-the window scenes appropriate to a given study.

In addition to guidance and control studies, the analog computer laboratory is available for other purposes such as structural and thermal simulation problems.

Four large general purpose analog computers and one digital differential analyzer make up the computer laboratory. This computer capacity is sufficient to support two major simulation studies at the same time.

Plans are under way to expand the computer facility to permit greater flexibility and increase its capability.

A simulation version of the Apollo guidance computer is expected

sometime next month. Besides providing more realism, its use will eliminate the need to simulate the on-board computer and thus release general purpose computer capacity to other problems.

Mockups of the LEM and Gemini cockpits have been instrumented and a lunar powered descent simulation has just been completed by the Simulation Branch using the LEM cockpit.

Studies of a Gemini Parasail landing are now being prepared which will utilize the Gemini cockpit.

The way the landing simulators work is, controls and instruments in the cockpits are connected to computers, when controls are operated by the pilot, the computer reacts to make the instrument readings simulate spacecraft maneuvers.

In addition to the LEM and Gemini, mockups of the Apollo command modules for Block-1 and Block-2 are being obtained.

Visual displays of out-the-window scenes from the cockpit are provided by a digital display generator, a starfield projector,

and virtual image projectors.

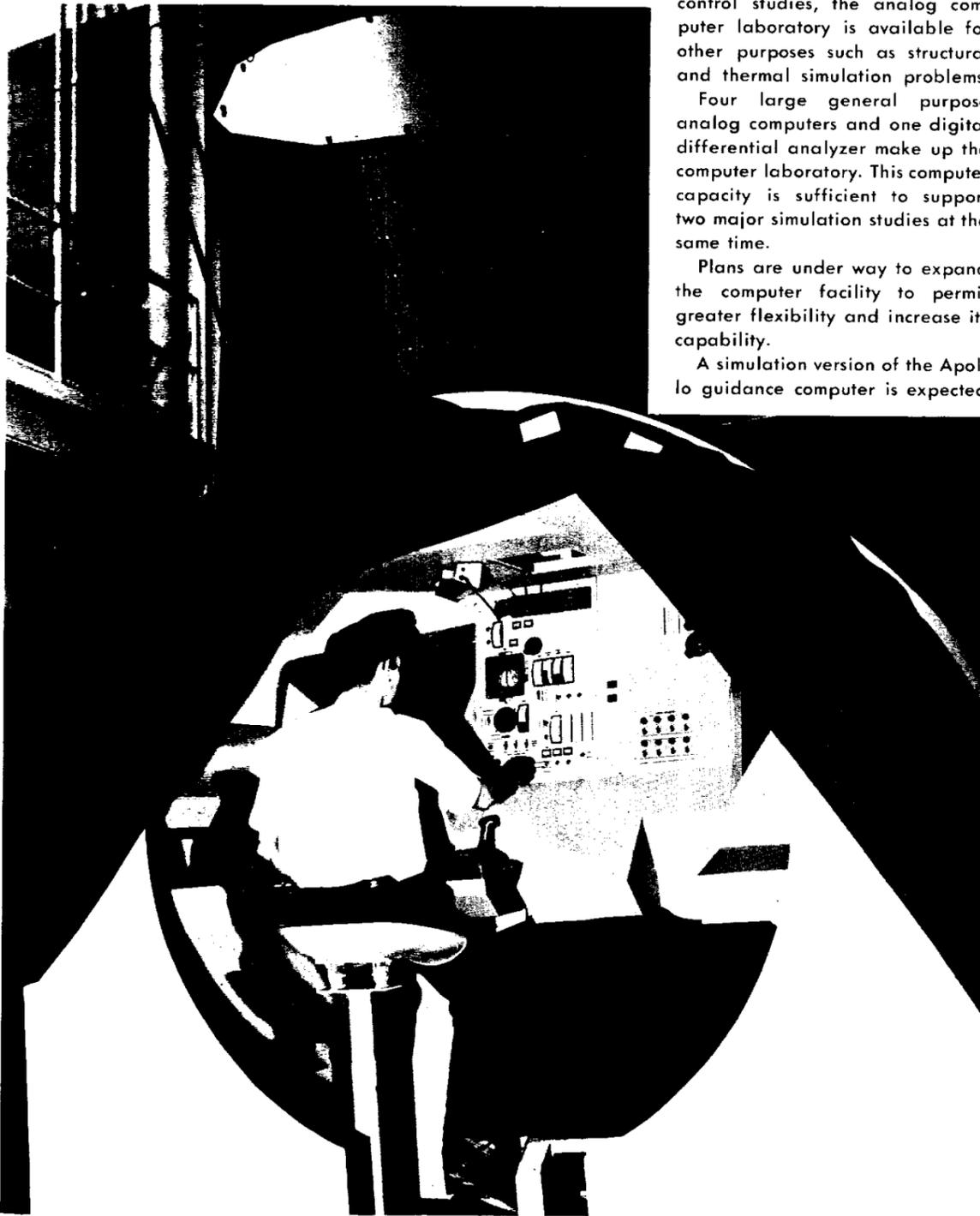
The special purpose digital computer generates scenes consisting of a two dimension patterned surface in three-dimensional perspective. These scenes are then displayed through the use of color television.

Virtual image projectors provide views of the computed scene and the starfield that appears at infinity from the cockpit windows.

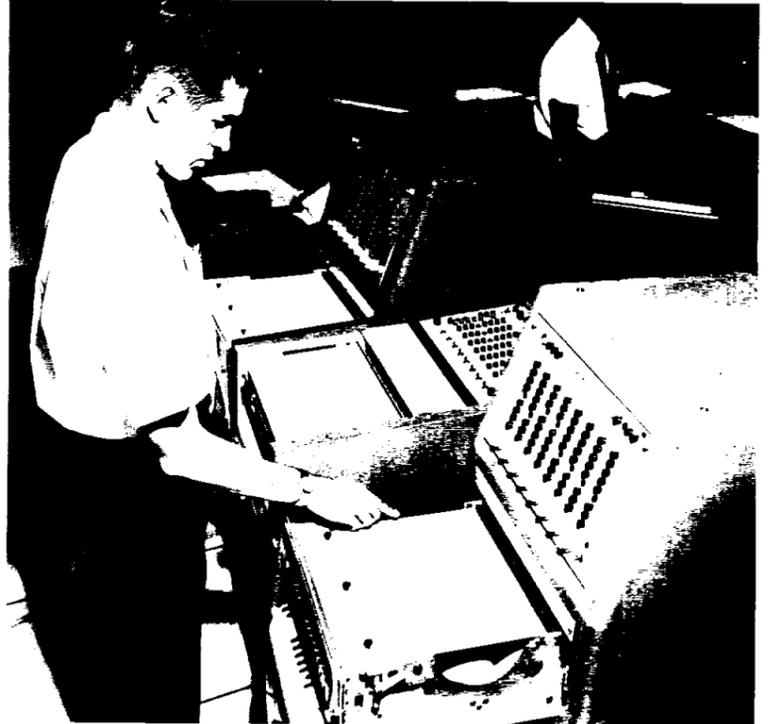
The analog computer, through special interface equipment, causes the scenes to change in proper perspective as the cockpit controls are manipulated.

Plans are to expand the visual simulation capability by adding a high resolution monochrome TV camera along with display and model systems for use in rendezvous and lunar landing studies.

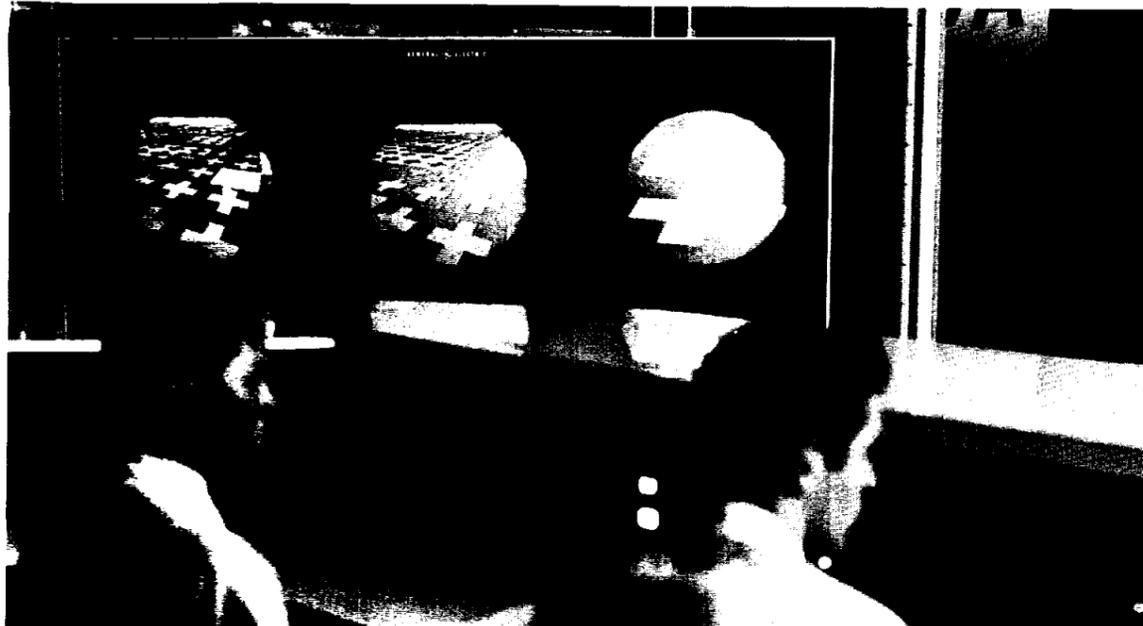
Fred T. Pearce heads up the Simulation Branch and the three sections under him are headed by Walter R. Russell, Computer Operations; William E. Miller, Simulator Development and Applications; and James A. Lawrence, Computer Applications.



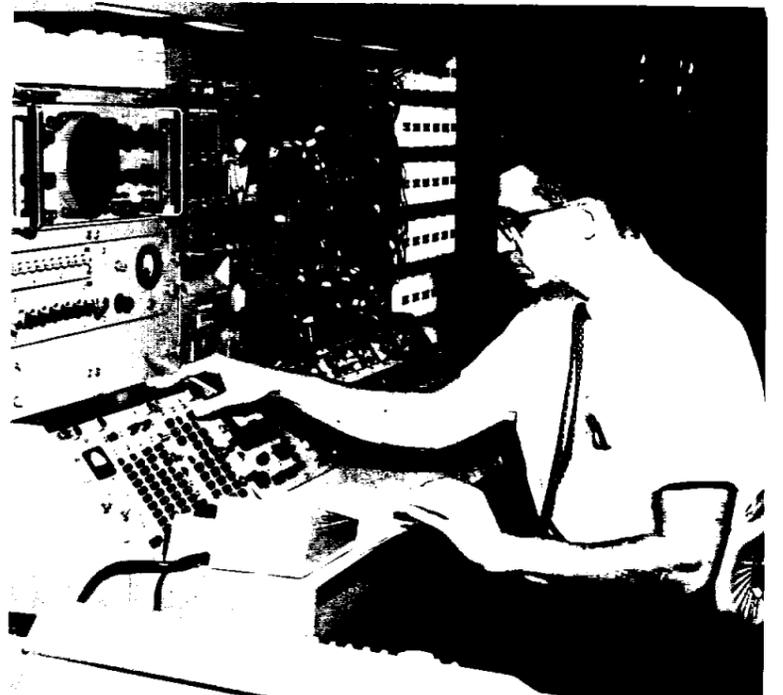
**SIMULATED LANDING**—Ronald Simpson, an engineer in the Guidance and Control Division flies a simulated lunar landing from the mockup LEM cockpit. A virtual image of the computed screen, simulating the landing area, appears at infinity through the triangular window in front of the pilot. The image seen by the pilot is projected through a series of lenses, beam splitters and mirrors so as to appear as an image at infinity through the cockpit window. Over 1,200 pounds of glass make up the projection unit which is called a "virtual image projector."



**MONITORING VARIABLES**—Donald Raschke monitors the problem variables of a simulated lunar landing on an eight-channel strip recorder.



**LANDING PATTERN**—Two engineers from the Guidance and Control Division, Simulation Branch, monitor the computed landing scene on the display console. A simulated landing pattern is shown on the three color television screens. The pattern is generated by a digital computer and is the same image that appears at infinity through the window of the LEM mockup.



**COMPUTER READ-OUT**—After completing a run from 3,000 feet altitude to landing by the pilot of the LEM simulator, Ronald Wyrick, Simulator Branch of the Guidance and Control Division, reads and records from the PACE analog computer, the end conditions (touchdown velocities) of the simulated lunar landing.

## Spotlight On Secretaries . . .



VALDEAN WARDLOW (upper left) is secretary to Richard B. Ferguson, assistant chief, Propulsion and Power Division. She joined NASA in June 1962 as a secretary in the Advanced Spacecraft Technology Division and assumed her present duties in December 1963. Born in Stillman Valley, Ill., Valdean completed high school in that city. Prior to joining the Manned Spacecraft Center, she worked as secretary in a bank in Rockford, Ill., and in the office of the Base Civil Engineer at Ellington AFB. She is married to Robert Wardlow who is in the Air Force and currently stationed in Alaska. She resides in Pasadena, Tex. and her interests include swimming, traveling, and reading.

PATSY D. SAUR (lower left) is secretary to Howard W. Tindall Jr., assistant chief, Mission Planning and Analysis Division. She joined NASA in July 1963 as secretary in the Flight Operations Divisions. Patsy was born in Lockhart, Tex. and attended high school in Alice, Tex. She was graduated from Draughton's Business College in San Antonio. Her husband, Louis L. Saur Jr., is an assistant manager with a Houston auto firm. The couple has a daughter, Denise Elaine 2, and they reside in Houston. Before joining the Manned Spacecraft Center, Patsy was a secretary at Kelly Air Force Base in San Antonio. Her interests include reading, dancing, and outdoor sports.



### MSC Rod And Gun Club Goes Deep Sea Fishing

A group of the MSC Rod and Gun Club members went deep sea fishing off the coast of Galveston recently.

It was not the day for trophies, however, as the big fish failed to show, and they had to settle for the smaller variety.

Each fisherman returned with a good sunburn, in addition to his efforts and a gleam in his eye meaning "next time I'll hook into that big one."



"Okay, Frebish, that's one ton of potato salad, two tons of spare ribs, 2,000 deviled eggs, 8,000 radishes, 10,000 green onions, 13,926 stuffed olives, 50 gallons of dill pickles, three Cokes, nine kegs of beer, and 50 napkins. Now, that takes care of the picnic committee . . ."

### MSC Picnic Date Announced

All MSC employees are urged to set aside Sunday, September 27 for a special event . . . the Annual Employees Picnic which is to be held at the Galveston County Park.

Colin Kennedy, publicity

chairman, said there would be lots of kid and adult entertainment including sports, dancing, floor shows and contests.

More details on the big event will be announced in the next issue of the ROUNDUP.

### Bridge Players Maintain Active Club

The MSC Duplicate Bridge Club continues to have good turnouts, averaging ten tables each Tuesday night.

Winners for the last two sessions were:

### Golf Association Elects Officers, Plans Tournament

On August 6, the MSC Golf Association met and elected or appointed the following officers for the year 1964-1965: Paul McGarrigle, president; Jim Lewis, secretary-treasurer; handicap chairman to be appointed by the president; and D. W. Sparkman, rules chairman.

Dana Boatman, Bob Kosinski and Louis Leopold were appointed by McGarrigle to organize a tournament for November 11. A notice will appear in the following issue of the ROUNDUP for those interested.

League play is scheduled to begin on September 12. Former members will receive forms by mail in the near future. Prospective new members are requested to contact Chuck Pace, Ext. 35141, for information.

### MSC Contributions To Health Agencies Are Announced

A total of \$1,051.95 was contributed by 269 employees of the Manned Spacecraft Center in the 1963-64 federal service campaign for National Health Agencies it was announced recently.

The campaign here at the Center was directed by Grace Winn.

July 28: NS-1 J. N. LaMarche & J. Arnett; 2-Mr. & Mrs. Fred Walser; EW-1 Richard Baldwin & Tom Moore; 2-Major and Mrs. William Stewart.

Aug. 4: NS-1 J. N. LaMarche & J. Arnett; 2-Jim Raney & Larry Stevens; EW-Tom Holt & C. C. Filley; 2-Gil Chisholm & Bill McDaniel.

Newcomers are always welcome and are reminded that the secretary of the Club, Evelyn Huvar, extension 32541, will try to find partners for those who need them.

Bridge players will be interested to know that there will be a sectional tournament in Houston, August 27 through August 30. Play will be at the Rice Hotel and there will be side games available for those who do not wish to enter the championship events. Details of the tournament are given in the announcements which have been placed on the bulletin boards at MSC.

### MSC Photo Club To Hold Meet Show Slides

The MSC Photographic Club will meet at 7:30, tomorrow evening, in the MSC auditorium west conference room for a slide show with tape commentary prepared by a film manufacturer.

The program will include the judging of flower prints and slides.

Competition for September will be architecture.

Five dollar annual club dues are now being collected, a club official stated.

### Cape Women's Club Supports Retarded Children's School

Mentally retarded children of Brevard County may stand a better chance of realizing their potential some day, thanks to the fund-raising activities of the NASA Women's Club in support of the Brevard Training Center in Rockledge, Fla.

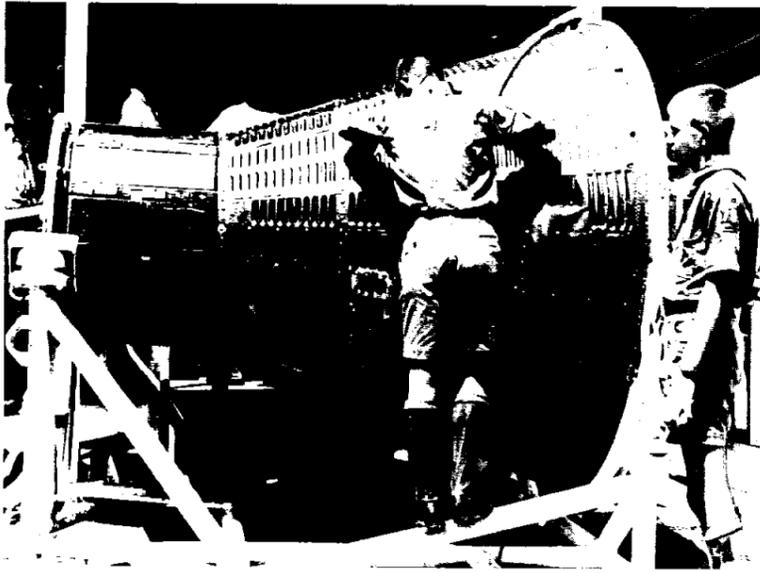


HAWAIIAN CONGA—Susie Bell of MSC-FO Contracts and Procurement Office leads out with a snappy conga during NASA Women's Club luau at Patrick Officers Club.

Highlighting their summer social season, the NASA Women's Club held a poolside luau recently at the Officers Club of Patrick Air Force Base. Forty members and their guests, clad in native Hawaiian attire, enjoyed the festivities. Dancing and swimming followed the luau.

The NASA Women's Club, is an organization of employees of MSC-FO, NASA, and associated contractors, and devoted to supporting local projects with proceeds from social benefits which enrich the recreational and cultural lives of its members.

Benefit affairs held by the club consist of dances, picnics, parties, and dinners, most of which provide revenue for the Training Center, now planning a workshop for vocational training of retarded children.



SCOUTS at the National Jamboree of the Boy Scouts of America at Valley Forge in July, take a look into Mercury spacecraft MR-2, the one that carried chimpanzee, Ham on a suborbital flight. Astronaut Edward White held a press conference July 21, for the scouts at the Jamboree and explained the space program to them.

## Employee Group Offers Sports For Ladies

The Activities Committee of the Employees Activities Association (EAA) has expressed an interest in promoting sport activities for the ladies at the Manned Spacecraft Center.

Sports such as softball, volleyball, golf, and basketball can be organized if enough ladies indicate interest.

Ladies interested in playing volleyball should contact Sue-

lynn Johnson at Ext. 35361. Those interested in organizing or participating in other sports, contact Ragan Edmiston, chairman of the Activities Committee, at Ext. 32191.

## NEW FEDERAL EMPLOYEE PAY RATES

Grade	1	2	3	4	5	6	7	8	9	10
GS-1	\$ 3,385	\$ 3,500	\$ 3,615	\$ 3,730	\$ 3,845	\$ 3,960	\$ 4,075	\$ 4,190	\$ 4,305	\$ 4,420
GS-2	3,680	3,805	3,930	4,055	4,180	4,305	4,430	4,555	4,680	4,805
GS-3	4,005	4,140	4,275	4,410	4,545	4,680	4,815	4,950	5,085	5,220
GS-4	4,480	4,630	4,780	4,930	5,080	5,230	5,380	5,530	5,680	5,830
GS-5	5,000	5,165	5,330	5,495	5,660	5,825	5,990	6,155	6,320	6,485
GS-6	5,505	5,690	5,875	6,060	6,245	6,430	6,615	6,800	6,985	7,170
GS-7	6,050	6,250	6,450	6,650	6,850	7,050	7,250	7,450	7,650	7,850
GS-8	6,630	6,850	7,070	7,290	7,510	7,730	7,950	8,170	8,390	8,610
GS-9	7,220	7,465	7,710	7,955	8,200	8,445	8,690	8,935	9,180	9,425
GS-10	7,900	8,170	8,440	8,710	8,980	9,250	9,520	9,790	10,060	10,330
GS-11	8,650	8,945	9,240	9,535	9,830	10,125	10,420	10,715	11,010	11,305
GS-12	10,250	10,605	10,960	11,315	11,670	12,025	12,380	12,735	13,090	13,445
GS-13	12,075	12,495	12,915	13,335	13,755	14,175	14,595	15,015	15,435	15,855
GS-14	14,170	14,660	15,150	15,640	16,130	16,620	17,110	17,600	18,090	18,580
GS-15	16,460	17,030	17,600	18,170	18,740	19,310	19,880	20,450	21,020	21,590
GS-16	18,935	19,590	20,245	20,900	21,555	22,210	22,865	23,520	24,175	
GS-17	21,445	22,195	22,945	23,695	24,445					
GS-18	24,500									

## MSC BOWLING ROUNDUP

**MSC COUPLES LEAGUE**  
Final Standings

Team	Won	Lost
Cotton Pickers	29½	10½
Our Gang	29	11
Four Aces	24	16
The Uncalled Four	22	18
Bowlernauts	19	21

The Thinkers	19	21
Schpidrunners	19	21
Fireballs	17½	22½
Lucky Seven	12	28
Shucks	9	31

Women's High Games: S. Swain 222, 215, 210; N. Hefferman 200.

Men's High Games: L. Galler 228; E. Patterson 221.

Women's High Series: S. Swain 590, 559, 547, 533; J. Sands 524.

Men's High Series: L. Galler 657; H. Maples 560.

Woman's High Average: S. Swain 170.

Man's High Average: L. Galler 180.

### MSC-FO Bowlers End Summer Play, Vectors Lead League

As the summer season closed on the MSC-FO Space Couples Mixed League bowling at Cocoa Beach, Pat Todd, Myrtle Oberlin, Dave Bauman, and Sam Butler of the 'Vectors' edged the 'Way Outs' Majorie Jones, Billie Miller, Bill Underwood, and Dave Ouelette 21 wins to 20 for first place.

Third place was taken by Sylvia Sharp, Jean Vaughn, Fred Sharp, and Norbert Vaughn of the 'Sleepers', finishing with 19 wins, two games ahead of Micke Long, Ann Heard, Paul Bacher, and Ed Thomas of the 'Fabulous Four.'

Trophies were awarded to Bill Sharp and Babette Cissel, both of the 'Agitators', for the male and female high season average. Sharp's average was 172, Cissel's was 153. Cissel also copped the High Series Handicap trophy with a 640 and the High Game Handicap trophy with a 244 for the feminine set. The 'sleepers' Fred Sharp took both the High Series Handicap and the High Game Handicap trophies with 684 and 270, respectively.

Mittie Smith, Babette Cissel, Bill Sharp, and Bill Lee of the Agitators walked off with a High Team Series Scratch with a 1896 and the High Team Game Scratch with a 658. High Team Series Handicap was awarded the Way Outs for their 788.

The MSC-Florida Operations Space Couples will begin their winter bowling season schedule early in September.

### HEAVY SUIT

More than 1,600 parts go to make up an astronaut's aluminized nylon and rubber space suit. It weighs about 20 pounds.

## PAY RAISE

What do you plan to do with the extra money you'll get when the new Federal pay raise goes into effect?

Several employees here at the Center were asked this question and here's what they said they planned to do.



HELEN PATTERSON, secretary, Office of the Assistant Director for Administration. — "Pay some of my bills and get out of debt."



BETTY R. SCHICK, administrative assistant, Office Services Division. — "I'm going to save mine to pay my income tax."



PAUL M. STURTEVANT, special assistant to the manager, Gemini Program Office. — "I have a possible vacation coming up and I'll use it for that, or I'll try to save it."



DONALD T. GREGORY, executive officer to the Assistant Director for Flight Crew Operations. — "I haven't really made a definite decision. I think I might use it for a vacation."



RON PHILIPS, management intern, Flight Operations Division. — "I'm going to spend it—maybe paying bills, and taking on new ones."



RUBY LAIRD, secretary, in the Gemini Program Control Office. — "I think I'll buy extra savings bonds."



ROSCOE BREELER, janitorial inspector, Office Services Division. — "Pay up some bills, and I might save a little if I can."

# MCC At Cape Kennedy Readied For Gemini

Major changes have been made to NASA's Mission Control Center (MCC) at Cape Kennedy, Fla., since completion of Project Mercury and the launch of the first Gemini boilerplate Spacecraft, GT-1.

Reconfiguration of the Operations Control Room for Gemini non- rendezvous missions is 95 percent completed. The MCC will be ready to support GT-2, the unmanned Gemini ballistic flight, and GT-3, the first manned Gemini mission scheduled for launching later this year.

Four new Gemini consoles complete a total complement of 19 consoles located in the Operations Control Room. These are the display coordinator console; the booster systems engineer console; the guidance officer console; and the public affairs officer console.

The display coordinator console provides display and communications facilities for technical control of activities during simulated and actual missions and supplements the support control coordinator console.

A booster system engineer console displays telemetry data from the Gemini launch vehicle during launch and serves as a back-up or second systems console after orbital insertion. The guidance console displays information on launch vehicle guidance and on inertial guidance system performance. Together, these two consoles enable flight controllers to monitor booster performance and recommend mission continuation or abort action to the command astronaut in the Gemini spacecraft. This procedure differs from Project Mercury where abort action could be initiated directly from either the Launch Complex 14 Blockhouse or the MCC Operations Room.

The guidance navigation and control systems engineer console is supported by an auxiliary

console which registers computer inputs and transmits summary data to selected sites.

To supplement the four plot boards carried over from the Mercury Program, a fifth board has been added. The additional board provides data for the guidance officer and is a back-up for Plot Board I, used by the flight dynamics officer. It plots guidance data directly from the General Electric/Burroughs computers.

A propulsion panel has been added above Plot Board IV. This panel, driven by Goddard and Burroughs computers, displays propulsion parameters for the guidance officer, and the flight dynamics officer.

The large eight-foot by 25-foot Mercury Tracking Network display map was altered to update station and instrumentation symbols. An eight-foot square screen to the left of the world map, retained from the Mercury Program, has been reconfigured for projection of summary data messages.

In addition, an eight-foot by 11 1/2-foot rear-projection screen displays flight rules, checklists, and time sequences, using two projectors remotely controlled at the assistant flight director console. These projection systems replace the now obsolete trend charts.

During Gemini missions, the Operations Control Room activity is conducted by elements of NASA's Manned Spacecraft Center, Goddard Space Flight Center, and by Martin Company and Department of Defense personnel.

The complete Operations Control Room configuration includes consoles for the display coordinator; support control coordinator; flight surgeon; electrical, environmental and communications systems engineer; booster systems engineer; guid-



RECONFIGURATION of the Operations Control Room in the Cape Kennedy Mission Control Center nears completion for NASA's Gemini Manned Spaceflight Program. Four new consoles have been added and existing Project Mercury consoles and display boards have been modified for controlling Gemini missions.

ance officer; flight dynamics officer; network controller; flight director; assistant flight director; operations and procedures officer; public affairs officer; operations director; DOD representative; assistant DOD representative; retrofire office; spacecraft communicator; and the Martin mission monitor.

The MCC Operations Control Room equipment was engineered, purchased and installed by GSFC to meet MSC requirements. The Goddard Manned Spaceflight Support Office at Cape Kennedy prepared the detailed installation instructions and managed the implementation effort. Their responsibilities also include modifications to installed equipment as required for follow-on missions.

## Successful Ranger Paves The Way For Surveyor And Lunar Orbiter

When Ranger VII slammed into the Moon on its historic picture taking flight July 31, it paved the way for its sister spacecraft in the photographic trio NASA will use to learn everything possible about the Moon before the first man sets foot on it.

The National Aeronautics and Space Administration will follow the Ranger series with Surveyor, now being built by Jet Propulsion Laboratory, builders of the Ranger, and the Lunar Orbiter, under construction by the Boeing Co.

Ranger is the hard-landing spacecraft which was designed to send pictures back to Earth just before impact as it did so successfully July 31.

Surveyor is a near-sighted, soft-landing vehicle whose television cameras will take pictures after the craft has settled gently on the Moon. It will give scientists detailed surface information Ranger did not obtain.

But it will be the Orbiter's job to verify a landing area of sufficient size for the manned mission.

The Orbiter is neither a hard nor soft-lander, but a Moon-circling camera laboratory that takes pictures as it goes and transmits them to Earth.

About 72 hours after launching, the 800-pound Lunar Orbiter will sail into a circular orbit about 575 miles above the Moon.

The man-made satellite will remain in this orbit long enough for Earth command stations to make final course adjustments and take a series of pictures. The craft then will be sent into an egg-shaped orbit and will swing down to 22 miles from the Moon to take a series of sharp, detailed pictures of likely landing posts for manned spacecraft.

On a typical mission, the high-resolution portion of the Orbiter's photographic system could cover an area of 3,000 square

miles, clearly showing objects as small as a card table. At the same time, wide-angle shots would cover an area of 16,000 square miles, showing objects eight yards square—about as big as a boxing ring.

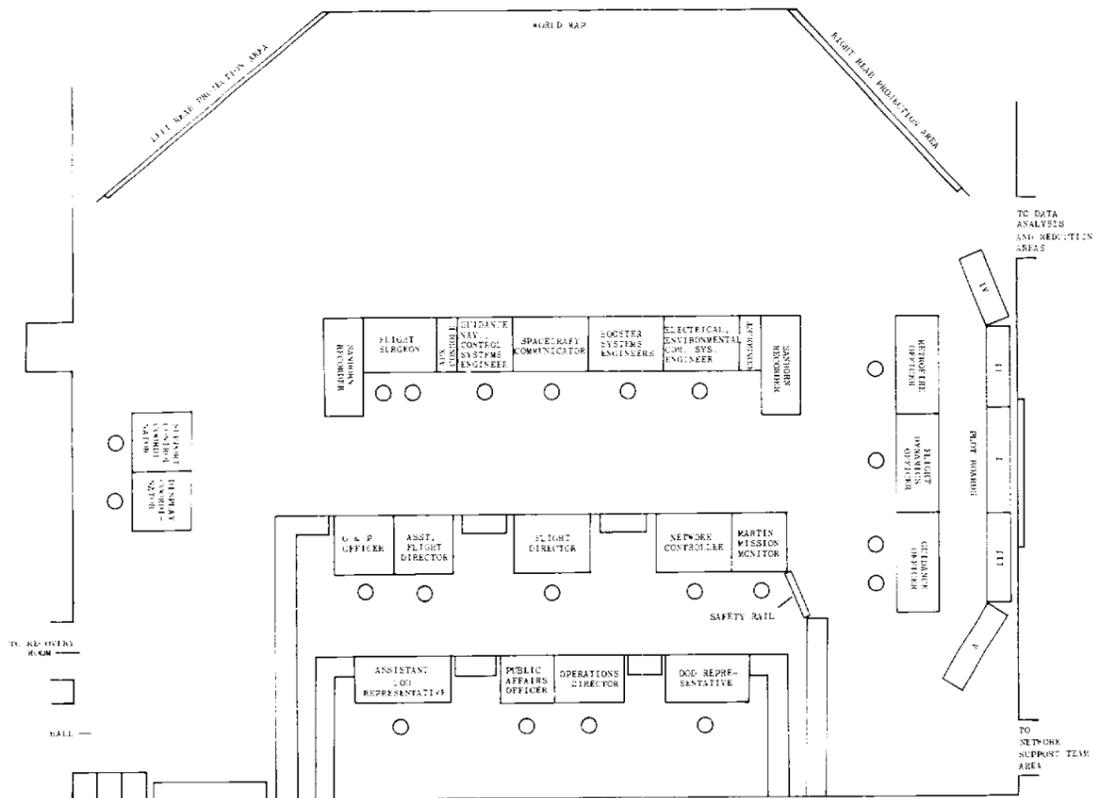
The photographic package will be composed of a camera, film, processor and read-out equipment designed by Eastman Kodak. Information on the film will be converted into electrical signals and flashed to receiving stations of NASA's Deep Space Network where they will be converted to photographs. Radio Corp. of America will provide the Orbiter's power and communication subsystem.

In addition to its cameras, the Orbiter spacecraft will carry four solar panels, a three-foot parabolic dish antenna, and an omni-directional antenna, which will pop out after the craft is safely through the Earth's atmosphere and into the frictionless realm of space.

A 100-pound-thrust restartable liquid rocket engine will control the Orbiter's speed.

The Orbiter will permit photo reconnaissance of specific areas in which scientist are keenly interested—the backside of the Moon, the polar regions and points that lie outside the area of the first manned landing.

The Orbiter also will be equipped with a number of scientific instruments. Long after its film is exhausted, the craft will remain in orbit to record information about micrometeoroids, radiation and the gravitational field around the Moon.

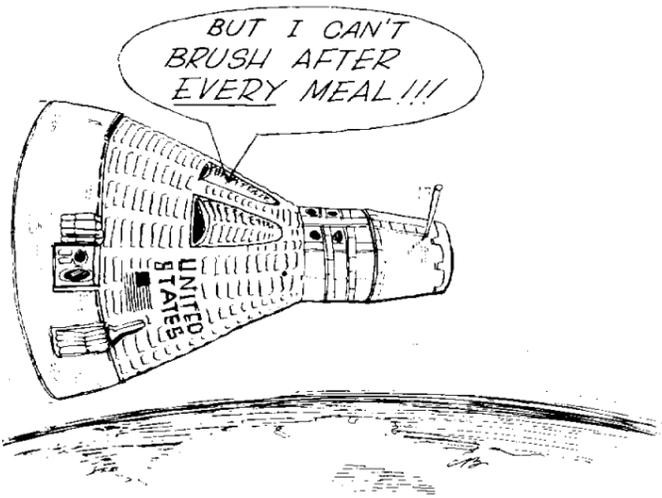


FLOOR PLAN of Modified Cape Kennedy Mission Control Center Operations Room. Operations Room will monitor upcoming Gemini Missions GT-2 and GT-3. New consoles depicted above are: Booster Systems Engineers, Guidance and Navigation Control Systems Engineer, Display Coordinator, and Public Affairs Officer.

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 . . . . . Robert R. Gilruth  
Public Affairs Officer . . . . . Paul Haney  
Chief, News Services Branch . . . . . Ben Gillespie  
Editor . . . . . Milton E. Reim

## On The Lighter Side



## Spacecraft Center's Big Impact

Reprint of an editorial in the Aug. 7, 1964 Houston Chronicle

The nation's space exploration program has had a heavy impact on the Houston area economy. Just how heavy was explained to the Gulf Area Development Committee of the Houston Chamber of Commerce Wednesday by Dave W. Lang, procurement officer of the NASA-Manned Spacecraft Center.

It has been not quite three years since Houston was selected for the location of the Manned Spacecraft Center. Yet this newest of the NASA administration centers, located on Clear Lake near Houston, "ranked first in the agency in terms of dollar and percentage of awards" for the last six months of 1963. The \$529.1 million awards made by MSC was 32 per cent of the NASA total. Only the Marshall Space Flight Center at Huntsville, Ala., approached this figure.

Briefly, this is what the MSC has meant to the Houston area:

**Personnel**—On June 30 MSC had 4277 employes of whom 3690 were residing in the Houston area. Lang did not say how many new residents of Harris County this means: a reasonable estimate would be about 15,000.

Of this personnel, 1971 are professional, scientific and engineering; 457 professional administrative; and 640 technical support employes.

**Payrolls**—Rose from \$10.5 million a year in fiscal year 1962 when there were 1786 employes, to \$20.9 million in fiscal 1963 with 3345 employes, and to \$30.9 in fiscal 1964 with 4277 personnel. For this fiscal year employment is expected to rise to 4600 with annual payroll of above \$40 million.

**Construction**—"The initial phase of major construction has almost been completed and

facilities are presently occupied . . . a hustling complex of rapidly expanding commercial, industrial and residential developments" has been built on the MSC property and adjacent area.

Through June 30 MSC construction expenditures have reached \$100 million, with another \$47 million appropriated for future construction.

**MSC Contracts in This Area**—Prime contractors on spacecraft projects are scattered throughout the country. So are the hundreds and hundreds of sub-contractors. Only a comparatively small percentage of the total spent for research and for hardware has been awarded in this area; perhaps this percentage will be greatly increased.

In fiscal 1963 Texas firms held \$9.9 million active contracts; at the end of fiscal 1964, the value had almost doubled to \$16.9 million with \$11.5 million of it in the Houston Gulf Coast area. This is, of course, entirely exclusive of construction programs at the MSC site. Texas universities and colleges have received some share of the research funds.

As the third anniversary of Houston's selection as MSC site approaches the Senate gave the "full speed ahead" order to the space program Wednesday, voting President Johnson's \$5.3 billion program for fiscal 1965 after turning down a series of proposals to trim the appropriation.

NASA has meant a great deal to Houston and Texas. According to all indications it will mean even more during the next several years. And it could mean still more if we could get more prime and subsidiary contractors to build their research and production plants in this area.

## Welcome Aboard

Sixty-six new employees joined the Manned Spacecraft Center during the last reporting period. Fifty-three were assigned to Houston; seven to Cape Kennedy, Fla.; four to White Sands Operations, N.M.; one to St. Louis, Mo.; and one to Downey, Calif.

**CENTER MEDICAL OFFICE:** Clarence A. Jernigan.

**RELIABILITY AND QUALITY ASSURANCE DIVISION:** Roy O. Dewing Jr., Austin W. Frost, Harmon R. Jones and John P. McBride.

**BUSINESS LIAISON REPRESENTATIVE OFFICE** (Downey, Calif.): Virginia L. DeHart.

**PERSONNEL DIVISION:** Marilyn K. Borski.

**OFFICE SERVICES DIVISION:** Charles O. Shelander.

**LOGISTICS DIVISION:** Everette L. Hallford.

**FACILITIES DIVISION:** Jesse P. Saulsbury.

**TECHNICAL SERVICES DIVISION:** Garlan B. Moreland, Robert N. Sheehy, William H. Sigafosse, Fred T. Simon, and Rex B. Cline.

**FLIGHT CREW SUPPORT DIVISION:** Betty S. Feddersen, Raymond A. Mitchell, and David C. Schultz.

**INFORMATION SYSTEMS DIVISION:** Henry V. Huber, and Jack W. Seyl.

**CREW SYSTEMS DIVISION:** Sam H. Davis Jr., Stanley M. Luczkowski, and Fred P. Rudek.

**COMPUTATION AND ANALYSIS DIVISION:** Beverly A. Buckman, and Betsy F. Magin.

**INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION:** Donald S. Eggers, Richard G. Fenner, Esther B. Sheehy, and William E. Zrubek.

**GUIDANCE AND CONTROL DIVISION:** Gene F. Holloway, Richard Reid, and George L. Roland.

**PROPULSION AND POWER DIVISION:** Phillip C. Gregory (WSO, N.M.).

**STRUCTURES AND MECHANICS DIVISION:** Philip

## "Camelot" Benefit Performance Provides ARCS Scholarships

Tickets for the benefit performance of "Camelot" on September 1, at the Music Hall, sponsored by the Achievement Rewards for College Scientists (ARCS) Foundation are available through ARCS members here at the Center.

Proceeds from the performance will go to the ARCS Scholarship Fund for deserving college level students in scientific and technological fields.

Tickets may be purchased each day in the MSC Cafeteria from 11 a.m. to 2 p.m. For further information on who to contact for tickets, call Grace Winn at Ext. 34433, or Mary Sylvia at Ext. 33958.

## MSC PERSONALITY

### Deputy Manager, MSC-FO Veteran In Aero Research

The 21-year government career of Dugald O. Black, deputy manager of the Manned Spacecraft Center-Florida Operations, spans engineering activities from solving World War II aircraft fuel boil-off problems to management operations in NASA's manned spaceflight programs.

Black plans, implements, and provides executive supervision of MSC-Florida Operations acceptance testing activities at Cape Kennedy and at contractor plants throughout the nation.

Following graduation from college in 1943, Black joined the National Advisory Committee for Aeronautics, which later became the National Aeronautics and Space Administration, and was assigned to the Flight Research Division of the Lewis Research Center at Cleveland, Ohio.

While at the Lewis Research Center, Black participated in numerous research projects including engine cooling studies on B-26 and B-29 aircraft; ram jet engine research on B-29 and P-82 aircraft; icing studies on B-24 aircraft; and fuel vapor tests on A-29 and P-47 aircraft.

In 1956, Black was one of the recipients of the Laura Tabor Barbour Award for his contribution to the solution of aircraft survival problems. Current tests conducted by the Federal Aviation Agency, to determine passenger injuries during an aircraft crash, employ similar procedures developed while Black was at the Lewis Research Center.

In December 1958, Black and 30 other Lewis and Langley engineers were assigned the task of constructing two boiler-

C. Glynn, Lester E. Goodheart, and Ralph E. Pryor.

**ADVANCED SPACECRAFT TECHNOLOGY DIVISION:** Emanuel Schnitzer.

**ASSISTANT DIRECTORATE FOR FLIGHT OPERATIONS:** Gail L. Gannon, Glenda L. Garrett, Margaret E. McGary, and Lois H. Ransdell.

**FLIGHT CONTROL DIVISION:** Keith K. Kundel, and George I. Pettitt Jr.

**LANDING AND RECOVERY DIVISION:** Francis G. Abernathy.

**MISSION PLANNING AND ANALYSIS DIVISION:** Robert Houston Brown, Michael A. Laidacker, and Robert H. Stanley.

**GEMINI PROGRAM OFFICE:** David H. Hachgontz, Betty J. Marietta, Melvin B. McGennis (St. Louis, Mo.), Barbara J. Meek, Richard A. Moke, and Aubrey E. Shapiro.

**MSC-FLORIDA OPERATIONS** (Cape Kennedy, Fla.): Moses L. Jones Jr., Craig E. McCreary, David W. Moxley Jr., Paul W. Moxley, John E. Reid, Thomas L. Smith, and John W. Soper.

**APOLLO SPACECRAFT PROGRAM OFFICE:** Richard C. Biel, Esther M. Charney, William C. Meacham, Donald M. Severson, Edwin W. Sievers Jr., and Samuel R. Weathersby.

plate models of the Mercury spacecraft from studies conducted by the Space Task Group. The Lewis group, headed by G. Merritt Preston, was later to become the nucleus of Space Task Group's Flight Operations Division at Cape Kennedy.

Transferred to Cape Kennedy in 1959 to take part in flight testing Mercury spacecraft, Black became Capsule Engineer on Mercury Spacecraft-6 and



DUGALD O. BLACK

was also responsible for preparing the Launch Operations Procedures Manual which included development of procedures for testing spacecraft systems at Cape Kennedy. He was subsequently appointed technical assistant to the manager, Manned Spacecraft Center, Atlantic Missile Range Operations, and before being named deputy manager, served as manager for Acceptance Check-out Equipment for Spacecraft, (ACE-S/C).

Black's response when queried as to the most gratifying aspects of his position as deputy manager of MSC's-FO was immediate and to the point. "Getting those boys up and down safely," he said.

Born in Mossblown, Scotland, Black immigrated with his parents to the United States in 1924, and settled in Indian, Penn. After graduation from high school, he attended the Indiana Institute of Technology at Fort Wayne, Ind. and received his BS in mechanical engineering. He also lettered in varsity basketball.

In 1963, at the Institute's Annual Homecoming Awards Dinner, Black received the school's 'Order of the Silver Slide Rule' for his outstanding efforts in America's manned spaceflight program.

Black's favorite hobby is tinkering with automobiles. "I just like to get my hands dirty every once in a while," he said. He lives with his wife, the former Carolyn Kinzel, and two daughters, Nancy and Bonnie, in Indian, Ind.

# Computer Complex Delivered To MSC — Gemini Mission Simulator To Be Operating Soon

The computer complex of the Gemini Mission Simulator (GMS) has arrived at the NASA Manned Spacecraft Center completing the delivery of the simulator component parts.

Earlier the instructor's console, crew station and auxiliary equipment were shipped from McDonnell Aircraft Corporation, St. Louis, Mo.

The GMS is being assembled in the Flight Crew Operations building at MSC and will be ready by mid-September.

When operational the simulator will accept commands and respond with appropriate signals, as would an actual spacecraft; thus providing an integrated training program for ground operations personnel, as well as astronauts.

All crew requirements and duties can be simulated: Manual flight control, navigation, spacecraft systems management and

and performance of scientific experiments. By simulating these tasks, the teams can develop and perfect procedures for specific manned missions.

The digital computers in the computer complex consist of two DDP-24s, general purpose machines, and a single Mark 1. The Mark 1 is a special purpose computer insofar as it was designed for the simulation of flight vehicles. It has a core memory of approximately 2,000 words and a drum memory of 64,000 words. The speed of the machine is the equivalent of 150,000 operations per second.

The general purpose computers have a capacity of 16,000 words memory each and a speed of about 100,000 operations per second.

The crew station is mounted on a platform that can be rotated 32 degrees from the vertical position. This increases crew

comfort by putting the astronaut's head higher than any other part of his body.

An image generation and display equipment system is being purchased directly by MSC from the Farrand Optical Company of New York City. The system consists of star images, the Agena vehicle and an image of the earth. A rendezvous image also will be available.

The Agena, star and earth

backgrounds each are reflected off mirrors and through a series of lenses, and the combined images—in proper sequence—are displayed to the pilot.

Other displays include a moving map of the world (called an orbital position indicator) located on the instructor's console, and three television screens. One screen shows the instrument panel in the crew station and two screens show the face

of each of the pilots.

The GMS is the second of two built for the National Aeronautics and Space Administration by McDonnell's Electronic Equipment Division. The other simulator has been installed at Cape Kennedy and will be used by the GT-3 crew.

Hal Parker of the Flight Crew Support Division is in charge of assembling and operation of the simulator.

## Space News Of Five Years Ago

August 19, 1959—Discoverer VI satellite orbited successfully, but reentry capsule not recovered.

August 21, 1959—During the countdown of the first programmed Little Joe launching (LJ-1 beach abort test) at Wallops Island, the escape rocket fired prematurely 31 minutes before the scheduled launch. The spacecraft rose to an altitude of 2,000 feet and landed about 2,000 feet from the launch site. Premature firing was

caused by a faulty escape circuit.

August 25, 1959—Testing was completed to check the effectiveness of the drogue parachute as a stabilizing device. The drogue parachute was fully qualified for deployment at speeds up to Mach 1.5 and altitudes of up to 70,000 feet.

Reflected signals off the moon successfully received at the University of Texas from the Royal Radar Establishment at Malvern, England.

August 28, 1959—NASA Headquarters authorized the Space Task Group to enter into negotiations with the Air Force Ballistic Missile Division for the procurement of additional Atlas launch vehicles in support of Project Mercury.

August 29, 1959—A U. S. Navy technician withstood a record 31 g's in the centrifuge at Johnsville, Pa., facility.

During the month of August 1959—Qualification tests, which were started in May 1959, were completed for the 63-foot ring-sail, main parachute.

flown on 19 NASA satellites." NASA Administrator James E. Webb.

"In the manned space flight program, we have now achieved an unbroken string of successes in 16 major launches. These include six manned missions in the Mercury program, six Saturn flights from Cape Kennedy, one Gemini flight from the Cape, and three Apollo tests . . . at White Sands.

"A rather simple formula has contributed to the success to date. We fly spacecraft, manned or unmanned only after a comprehensive set of ground and flight tests have been completed and every deviation from expected performance has been explained. We are continuing to follow that policy." Dr. George Mueller, associate administrator for Manned Space Flight, NASA.



GEMINI MISSION SIMULATOR—With the installation of the Crew Station, left foreground, and the Instructor's Console, background, all important components of the Gemini Mission Simulator have arrived at the Manned Spacecraft Center. The GMS is the second of two built for NASA by McDonnell Aircraft Corporation in St. Louis, Mo. The other GMS has been installed at Cape Kennedy. The simulator is located in the Flight Crew Operations building.



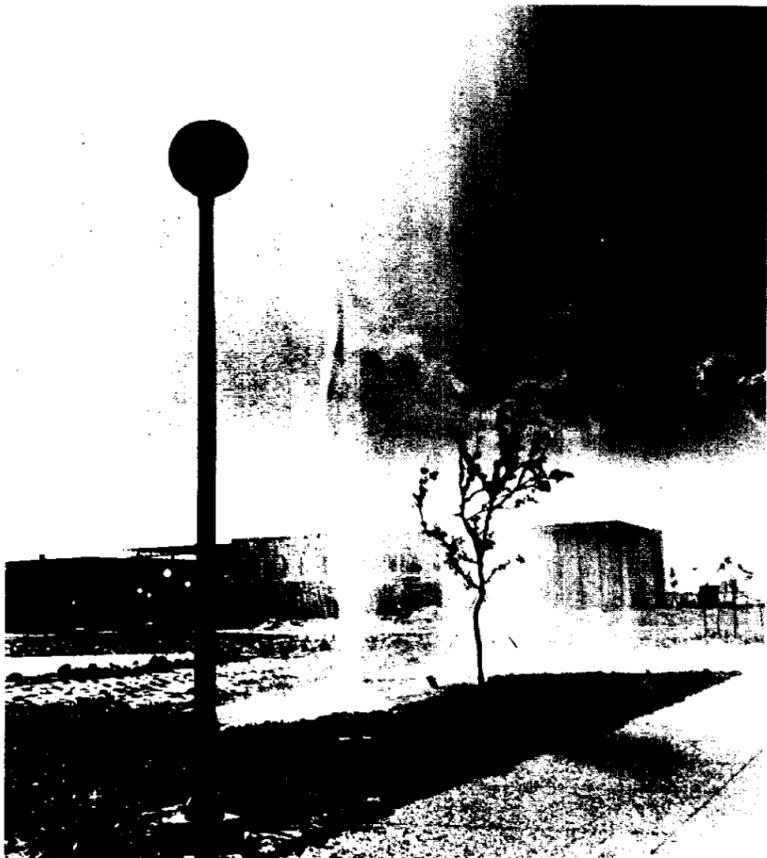
THE PRIME PILOTS selected for the first manned flight of NASA's Project Gemini undergo a flight test profile in a mock-up Gemini spacecraft at McDonnell Aircraft Corp.'s plant in St. Louis. At right, in the pilot and spacecraft commander's seat, is Virgil I. (Gus) Grissom, and in the seat to the left is his co-pilot, John W. Young. Back-up pilots for the first manned Gemini flight are Astronauts Walter M. Schirra Jr., and Thomas P. Stafford. All will soon be training in the Gemini Mission Simulator recently moved to the Center from St. Louis and scheduled to be in operation by mid-September.

## SPACE QUOTES

"Man's concepts of the reality of the universe, of what happens to the planet earth as it orbits the sun at 67,000 miles per hour and receives large doses of energy from it, has changed more rapidly in the last three to five years than ever before in history. More and more scientists are becoming interested. In 1961 NASA received 480 unsolicited research proposals, and in 1963 two years later this had more than doubled to 1,126. For eleven months of the current fiscal year, 1964, the number has increased to 1,320. Working together, scientists in the nations' universities and in the government, supported by the engineering competence of American industry, have made an impressive record in the five-and-one-half years since the launching of Explorer I in January of 1958. In this five-and-one-half years 42 different university sponsored experiments have been orbited on 22 NASA satellites. Twelve of these experiments on five satellites are still operating. There are pending at the present time a total of 123 experiments representing 36 different experimental concepts contributed by 19 universities. These experiments have been approved and will be



## SECOND FRONT PAGE



**MSC GEYSER**—For a short period early last week, the Manned Spacecraft Center had a geyser of water shooting 40 to 50 feet in the air. The Roundup photographer was there to capture this dramatic shot. The spouting fountain of water erupted when a workman operating a power mower accidentally hit a sprinkler system pipe hidden in the grass.

## Operational Readiness Inspection Conducted At White Sands Facility

The first "Operational Readiness Inspection" of a major Manned Spacecraft Center test facility was conducted at the Propulsion Systems Development Facility, at the NASA/MSC-White Sands Operations, Las Cruces, N. M., July 21 through 24, by a special committee established by the director of MSC.

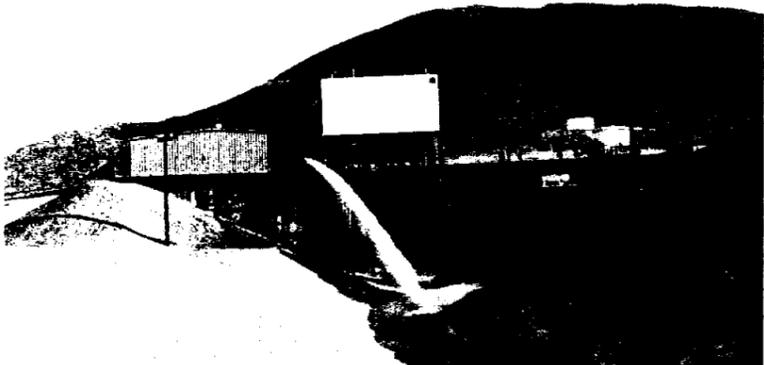
Reviewed by the group were the operational readiness of service module test stands Nos. 1 and 2, the bulk fuel storage areas, cryogenic storage areas, test preparation building, fuel conditioning area, and the block-house.

Discrepancies noted by the inspection committee are now being corrected by the PSDF staff to assure full operational readiness in time for the first firings next month, it was stated by James C. McLane Jr., Engineering and Development directorate and executive secretary of the committee.

McLane said the group also checked into the proper organization of the facility, operation adequacy of test procedures,

level of training, and suitability for the design and construction of the facilities to perform the tests.

Members of the inspection committee in addition to McLane were from Center Medical Office, Dr. Willard R. Hawkins, and John M. Kanak; Apollo Spacecraft Program Office, W. H. Taylor; Gemini Program Office, Scott H. Simpkinson; Propulsion and Power Division, Charles Yodzis, chairman of the committee, and Allen H. Watkins; Computation and Analysis Division, Rexford H. Talbert; Reliability and Quality Assurance Office, John W. Conlon; and MSC-Florida Operations, Dugal O. Black.



**TEST STAND**—One of the facilities at the MSC-White Sands Operation inspected by the special committee on the "Operational Readiness Inspection," was Test Stand No. 1 above. It is shown during a fire and deluge system test.

## 'Canned Man' To Test New Space Suits

Nicknamed "canned man," a machine that breathes in oxygen and exhales carbon dioxide is being developed to evaluate portable space life support systems, the Lockheed-California Company reported August 7.

The "canned man" test equipment will simulate human respiratory functions in testing back-mounted portable life support systems to be used by astronauts in Apollo space flights and moon landings. The test machine can also be hooked up to a pressure-suited man to provide life support while under test.

This instrumented man-simulator is being built at the Lockheed Rye Canyon Research Center (near Saugus, Calif.), under a \$93,000 contract, for the NASA Manned Spacecraft Center, here in Houston.

The "canned man," bears little resemblance to either a human being or even a robot. It is a console-like piece of equipment seven feet tall, 10 feet wide, and three feet deep.

When the test machine plays the role of man in checking out an astronaut's breathing equipment, it breathes, exhales, and sweats to simulate an astronaut in his space suit. The "canned man" takes in measured amounts of oxygen and "exhales" carbon dioxide and oxygen. Steam, pumped in through inlet ports and stainless steel tubing, supplies moisture to simulate perspiration and breath vapor.

Performance and effectiveness of the space suit and life support system will be determined by measurement and analysis of the oxygen-carbon dioxide-moisture, purification, leakage, and component reliability under various operating conditions.

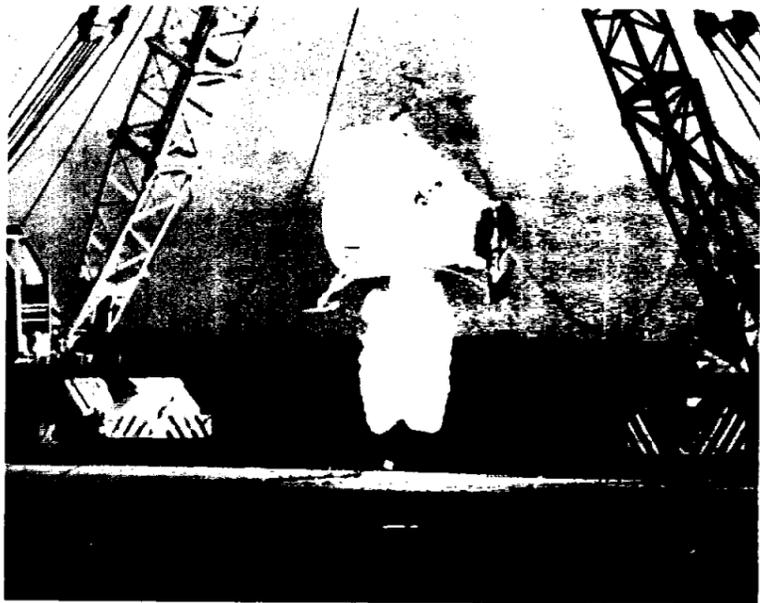
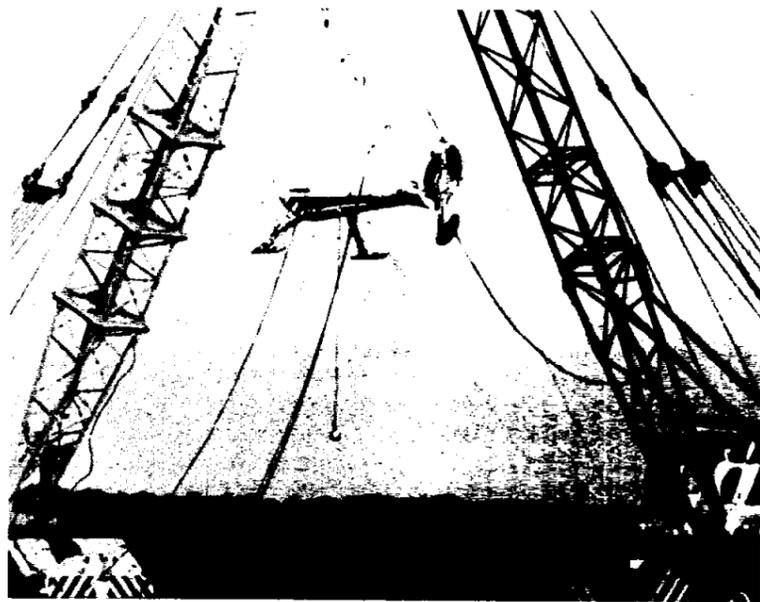
## NASA FY 1964 Cost Reduction Goals Exceeded

Cost reductions by NASA in FY 1964 of \$128,783,000 were reported to President Lyndon Johnson by Administrator James E. Webb on July 20.

The reported amount was far in excess of the \$81,780,000 goal which had been set, and in a message to all NASA employees, Earl D. Hilburn, deputy associate administrator for Industry Affairs, said, "Each of you is to be congratulated for the whole-hearted spirit of co-operation and special effort which was required to exceed the Agency's FY-64 target."

Hilburn pointed out that, "in FY 1965, Cost Reduction Program goals are going to be harder to achieve because we have tightened up the more obvious areas where definite cost savings can be accomplished.

However," he continued, "through the personal awareness and dedication of each employee, we will continue in FY 1965 to better our Agency-wide goals."



**ROCKET LANDING**—NASA Manned Spacecraft Center's Mechanical and Landing Systems Branch conducts first drop test of a boilerplate spacecraft to test landing attenuation rockets which are fired by a probe just before impact. Rocket's action slows the test craft down a second before impact, lessening landing shock for a gentle touchdown. In this test, a Gemini-size boilerplate was dropped from a crane. Later tests will combine the developmental Para-Sail landing system with the impact attenuation rocket. These systems are being developed for possible use in manned space flights, but are not currently part of the Gemini or Apollo programs.