

Space News **ROUNDUP!**

VOL. 2, NO. 25

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

OCTOBER 2, 1963

Mercury Summary Conference To Begin Tomorrow



MERCURY-REDSTONE ERECTION—A crew from the Field Test Branch of the Technical Services Division of MSC erect the Mercury-Redstone outside the Houston Coliseum as part of the display for the International Trade Fair and the Mercury Summary Conference which begins tomorrow at the Houston Music Hall.

Beginning tomorrow, a two-day Project Mercury Summary Conference will be held here with a series of talks and technical papers to be delivered by 19 individuals who had a part in the Mercury space effort.

In conjunction with the conference, the most comprehensive display of Mercury hardware ever to be assembled in one location will be displayed at the Houston Coliseum.

Among the speakers, in addition to Dr. Robert R. Gilruth, director of the NASA Manned Spacecraft Center, will be Dr. Hugh L. Dryden, deputy administrator for the National Aeronautics and Space Administration; Walter C. Williams, MSC's deputy director for Mission Requirements and Flight Op-

erations and Astronaut L. Gordon Cooper Jr.

Astronaut Cooper will present a summary flight report on his May 15-16 22-orbit mission. Williams will team up with Mercury personnel to present a review of the now-concluded program. Dr. Dryden will make an opening statement and Dr. Gilruth will present the welcoming address.

Spotlight of the exhibits will be on Cooper's Faith 7 spacecraft. Also on hand will be an Atlas D missile, the booster used to rocket U.S. astronauts into orbital

(Continued on page 2)

Symposium Proposes 'Slow-Fly-By' To Inspect Hostile Orbiting Satellites

A new concept for inspecting an orbiting satellite to determine if it is hostile was presented in a paper at the National Space Rendezvous, Rescue and Recovery Symposium at the Air Force Flight Test Center Edwards AFB, Calif., recently.

Termed the "Slow-Fly-By" method, it proposed launching an inspecting satellite in an orbit different from that of the target satellite so that the two pass in close proximity long enough for thorough inspec-

tion. Previous methods propose launching the inspector satellite to accompany the target satellite in the latter's own orbit.

The authors of the paper, Jaques S. Gansler and Herbert Carus of General Pre-

cision, Inc.'s Aerospace Group, Little Falls, N.J., report that the new "Fly-By" method has the military advantages of reduced mission time, reduced vulnerability to attack from the ground or from the hostile satellite. They also believe the propulsion requirements of the inspector may be less.

Their paper points out that, if a five minute inspection time is desired, only three strategically located bases will permit inspection of any satellite, regardless of its orbit, within 24 hours after detection. However, if the inspection time is reduced to three minutes, only one such base will be necessary.

They also said that, using existing launch sites, the "Fly-By" method gives greater opportunity for the United States to inspect Soviet satellites than for the U.S.S.R. to inspect American ones.

Study Indicates 'Particle-Wall' Offers Best Meteoroid Shield

Air Force has announced that the "particle wall" concept appears to be the "most promising and practical" method for protecting a spacecraft against meteoroids.

Under the concept, a layer of tiny metallic particles trapped by an electrostatic field would be used to cover the surface of the spacecraft, absorbing the impact of space particles.

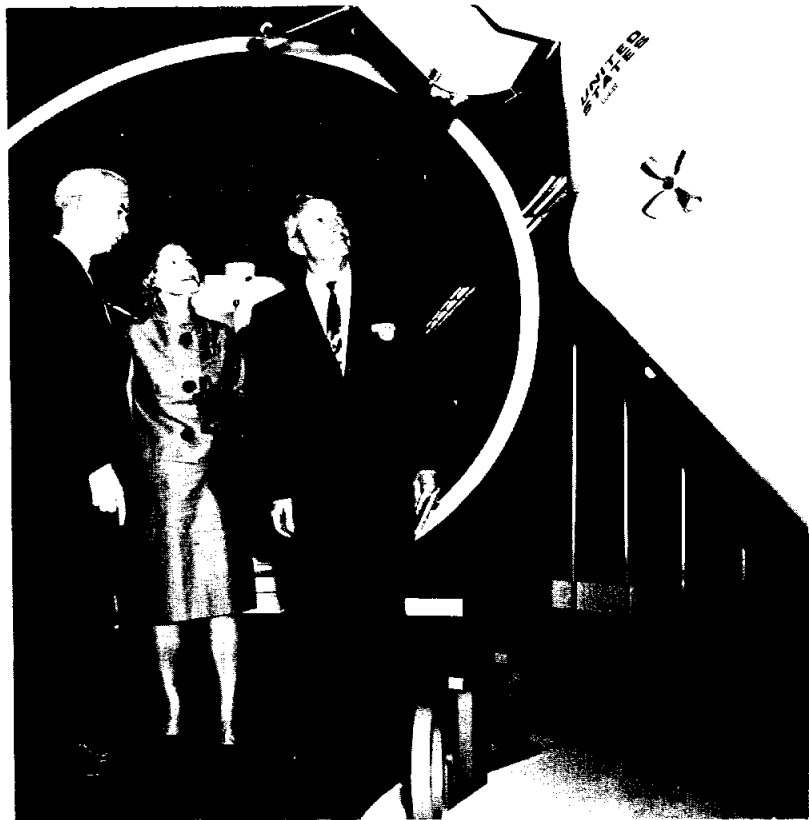
One study of the concept has been completed by Fundamental Methods Associates, Brooklyn, for the AFSC's Research Technology Division.

Results of the study, specifically concerning the indentation produced by the impact of a meteoroid, will

be checked by the RTD's Flight Dynamics Laboratory with a newly developed "meteoroid simulator gun." AF will fire the gun into a dust chamber under vacuum conditions to determine the degree of protection that the particle wall concept will give future spacecraft and satellites.

Two other concepts, in addition to the particle wall system, have been investi-

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APOLLO EXHIBIT—Examining the NASA exhibit at the International Trade Fair at the Houston Coliseum are (l. to r.) Houston Congressman Bob Casey, and Mayor and Mrs. Lewis Cutrer. They look at a model of the LEM mated in a docking configuration with the Apollo command module.



AURORA 7 SPACECRAFT—A group of children find the Aurora 7, spacecraft of Astronaut M. Scott Carpenter, a fascinating part of the Mercury exhibit at the International Trade Fair here in Houston this past week.

Astronauts Complete Part Of Gemini Water Survival Phase At Navy School

The nine new astronauts of the NASA Manned Spacecraft Center completed part of the water survival phase of their Gemini parachute training last week at the U. S. Naval School of Pre-flight, Naval Air Station, Pensacola, Fla.

Training consisted of underwater egress using a special dunking machine; parachute drag escape; life raft boarding, Gemini pressure suit flotation techniques and chute shroudline disentanglement.

Participating were Neil Armstrong, Frank Bor-

man, Charles Conrad Jr., James A. Lovell Jr., James A. McDivitt, Elliot M. See Jr., Thomas P. Stafford, Edward H. White II and John W. Young.

The purpose of the training is to teach astronauts how to land with a parachute in the event of a low-altitude abort -- under 60,000 feet -- during the

flights of Project Gemini.

The escape system of the Gemini spacecraft uses ejection seats, much like those used in jet fighter planes, that will explode the astronaut from the spacecraft if anything goes wrong during launch. The ejection seats also will be used to escape from the spacecraft if some emergency arises during the descent from the spacecraft.

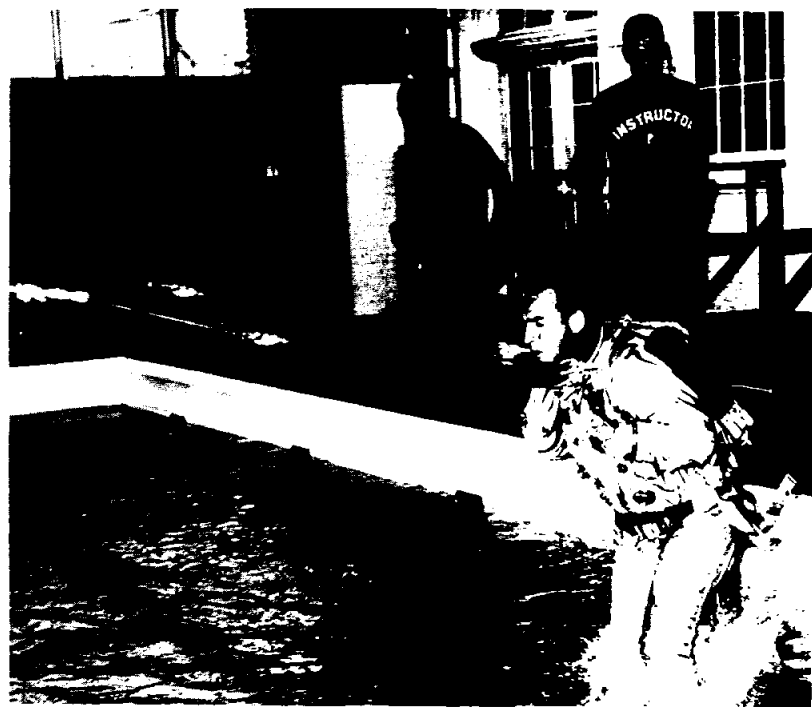
In an abort or an emergency during descent, the space pilots would come down by individual parachutes.

The dunking device, called a Dilbert Dunker, resembles an aircraft cockpit. It slides down a track, hitting the water at moderate speeds. On contact with the water, the device flips over in a maneuver designed to upset the pilot's equilibrium. This simulates experiences he would encounter in a sinking capsule.

In a parachute drag escape, rapid extraction from the harness is the key to survival.

The Pensacola training was the second of a three-phase program. The first one consisted of parachute landings at Ellington Air Force Base, and all 16 astronauts participated.

Parachute water landings, the next phase of training, will be learned in Galveston Bay. The astronauts will be towed by power boat. For these landings, they will be wearing their Gemini prototype suits and be



WATER ESCAPE EXPERIMENT—Astronaut James Lovell Jr. breaks water during a parachute drag escape experiment September 24 at the School of Water Safety, U. S. Naval Air Station, Pensacola, Fla.



DUNKING DEVICE—Astronaut Thomas P. Stafford gets last minute instructions from Jack Martin (right) in preparation for a ride on the Dilbert Dunker. The dunking device "plops" pilots into the water and flips them over as part of an experiment to disturb their equilibrium. Stafford and eight other astronauts recently went through water survival techniques at the School of Water Safety, U. S. Naval Air Station, Pensacola, Fla.

Mercury

(Continued from page 1)

spaceflight; a Redstone launch vehicle similar to those used on sub-orbital flights; a Little Joe I test booster; samples of space food and training aids.

Technical papers will cover space vehicle development, mission support, flight operations and mission results.

Presentations by MSC and NASA Headquarters personnel, the Department of Defense, Marshall Space Flight Center, Launch Operations Center at Cape Canaveral and the Goddard Space Flight Center will summarize the program from the research and development stages through operational phases.

The conference will be held in Houston's Music Hall and the exhibits will be on display in the adjacent Coliseum. Admission is by invitation.

Wall

(Continued from page 1)

gated by the AF: Meteoroid detection, tracking and destruction by firing a defensive projectile at the larger meteoroids, and vaporizing meteoroids by electrical discharge or arc. (Studies are being made on how to vibrate the dust in order to effectively shatter the meteoroids.)

However, the AF said the dust wall concept "appears most promising and practicable since it will give the greatest protection without significant penalties in weight, power drain or interference with the functions of the vehicle."

NASA 5-Years Old Yesterday

The National Aeronautics and Space Administration was very much in business on the day it was born--Oct. 1, 1958--and has been very much in business ever since.

Although nowhere near fully grown when it first emerged on the national scene five years ago, it had five space probe projects and three satellite programs started by the Army and Air Force, Project Vanguard, and all of what had been the National Advisory Committee for Aeronautics, including four major research laboratories.

In 1960, NASA acquired the Army Ballistics Missile Agency, including its director Dr. Wernher von Braun, at Huntsville, Ala.

Within 24 hours of its formal establishment, NASA had a staff of 8,400 people from the old NACA and Navy's Vanguard program. It was the nucleus provided by NACA from which the NASA of today has grown.

Now, as NASA approaches

its Fifth Anniversary, it has 30,000 on its payroll.

At its birth, NASA had four major research centers. It now has ten. Its first budget in fiscal year 1959 was \$339 million. Its 1963 Fiscal Year budget was \$3.67 billion

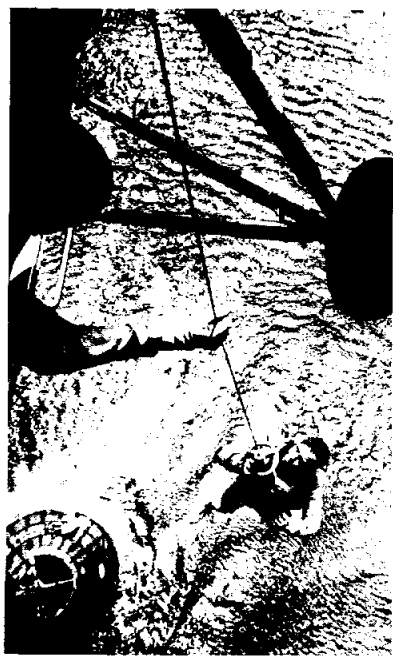
The space agency has made progress in its first five years. With more than 100 major launches, NASA has sent into space weather satellites, deep space probes, communications satellites, manned orbital space flights, and made numerous scientific discoveries. Thousands of sounding rockets have been launched to study the atmosphere.

People the world over, and especially Americans, now know the Earth is somewhat pear-shaped rather than a

perfect sphere. They also have heard about and have some knowledge of the X-15 research plane; the Van Allen radiation belts; man-made satellites; Echo, Telstar, Relay and Syncom; Mariner and Venus fly-by--all great achievements and discoveries in space exploration, and all directly attributable to an agency that did not exist only five years ago.

Project Mercury, the first of three phases in achieving the nation's objective to reach the Moon, was successfully completed with the 22-orbit flight of Astronaut L. Gordon Cooper on May 15-16, 1963.

The Mercury project came out of pioneering work at the Langley Research Center, Hampton, Va., and grew into a truly national



FIRST IN SPACE—A great moment in 5-year history of NASA was the sub-orbital flight of Astronaut Alan B. Shepard Jr., May 5, 1961. The first American to be lofted into space, he traveled 115 miles high and landed about 300 miles from Cape Canaveral. Here he is recovered by helicopter. Spacecraft is at lower left.



FIRST IN ORBIT—An entire nation shared one of the greatest moments in NASA's five-year history when Astronaut John H. Glenn Jr., (above) became the first American to orbit earth, Feb. 20, 1962. He averaged 17,400 miles per hour on his three orbits in the Friendship 7 capsule before landing in the Atlantic to be picked up by a destroyer.

effort by the time John H. Glenn, Jr., made his historic three-orbit flight Feb. 20, 1962.

NASA Announces Spacecraft Decontamination Procedures

The National Aeronautics and Space Administration has announced procedures for the sterilization of planetary spacecraft and revised the procedures for the decontamination of unmanned lunar landers.

NASA's policy continues to be that under no circumstances will an unmanned spacecraft destined for landing on the planets be launched until sterility has been assured.

The following procedures will insure the prevention of the biological contamination of the planets by NASA spacecraft until sufficient information has been obtained from unmanned missions to assure that biological studies will not be jeopardized:

Planetary Landers: It is

the NASA goal to achieve terminal sterilization of a complete capsule by heat. Present techniques require that components to be landed on or enter into the atmosphere of the planets be assembled under clean room conditions and the completed spacecraft subjected to dry heat using a temperature-time cycle that has been proven to render it sterile. The assembly will then be encased in a gas tight enclosure to maintain sterility. Following these procedures the enclosure will not be opened.

Recognizing that many of the state of the art components used in today's spacecraft would be degraded by heat requirements, a program is underway to develop components that will be able to withstand the high temperatures required. If, after exhaustive development to obtain heat resistant components, some critical subassemblies still cannot tolerate the heat sterilization, it may be necessary to sterilize them by other methods and then incorporate them into the already sterilized spacecraft by sterile assembly techniques.

Several assemblies will be procured and sterilized so that in the case of malfunction during final checkout a spare can be substituted. Thus, pre-launch procedures will be simplified and risks of missing infrequent launch windows for the planets will be reduced.

Precautions in launches of unsterile planetary flyby spacecraft will be taken to prevent accidental impacting and contamination of a planet.

U. S. Manned Space Flight To Exceed 2000 Hours Prior To Moon Trips

By the time the three-man Project Apollo team takes off for the moon late in this decade the United States will have accumulated some 2000 hours of manned flight in earth orbit, a space agency official said recently.

Addison M. Rothrock, Associate Director of Plans and Program Evaluation at NASA Headquarters, Washington, said that this experience will include rendezvous of spacecraft in orbit, transfer of man and materials from one spacecraft to another and space maneuvers. He said the 2000 hours will include about 1300 orbits of the earth by Americans in Gemini and Apollo spacecraft.



CONFERENCE PLANNERS—At a recent meeting at MSC of the officers and council members of the local chapter of the American Institute of Aeronautics and Astronautics plans were formulated for the Third Annual Manned Space Flight Conference to be held in Houston the latter part of next year. Among those attending the meeting were (l. to r.) Morris Newman, Cameron Iron Works, AIAA vice chairman; Paul E. Purser, MSC, AIAA council member; R. Scott Royce, Northrop Corporation, AIAA chairman; and George Bell III, Sterling Packing & Gasket Co., AIAA treasurer.

Facilities Management Conference Meets Here

National Aeronautics and Space Administration facilities management personnel from all over the nation attended a two day Facilities Management Conference here last Thursday and Friday.

A day-long series of sessions dealing with funding, design and construction of facilities for the space program were held Thursday, culminating with a tour of the new Manned Spacecraft Center now under construction at Clear Lake. Friday featured a briefing upon the Performance Evaluation and Review Technique (PERT) used by NASA to keep tabs upon its construc-

tion programs. In the afternoon committee reports were discussed.

During the Thursday session, speakers included Dr. Robert R. Gilruth, director of Manned Spacecraft Center, who described the MSC mission and construction status; Robert W. Long, Director of Construction, NASA Headquarters; discussed use of advance design funds; Gerald Ard, White Sands Missile Range, described NASA's expedited construction program there; Ralph E. Ulmer, director, Review and Analysis, Office of Construction, reported on the 1963 and 1964 NASA Authoriza-

tion Acts; Col. R. J. Kasper, acting deputy director, Office of Construction; and Brig. Gen. T. J. Hayes, III, of the Army Corps of Engineers, spoke on construction agent agreements, Corps of Engineers operation and pre-qualification of bidders; and T. Dale Culbertson, Executive Assistant, Office of Construction, discussed current and future construction activities.

NASA's Office of Construction was established August 26, 1963, to review and advise NASA officials on the adequacy of the agency's construction work and future plans.

Six Major Programs In NASA

Six major program offices have developed in the National Aeronautics and Space Administration since its formal organization Oct. 1, 1958:

Manned Space Flight--Dr. George E. Mueller, Deputy Associate Administrator for Manned Space Flight. Directs Gemini and Apollo manned flight programs and three field centers directly concerned with them.

Applications--Robert F. Garbarini, Director. Seeks practical space applications such as TIROS weather satellites and the Echo, Relay, and Syncom communications satellites.

Space Sciences--Dr. Homer E. Newell, Director. Guides exploration of near-earth and interplanetary environment with scientific satellites, and deep space probes such as Mariner flyby of Venus.

Advanced Research and

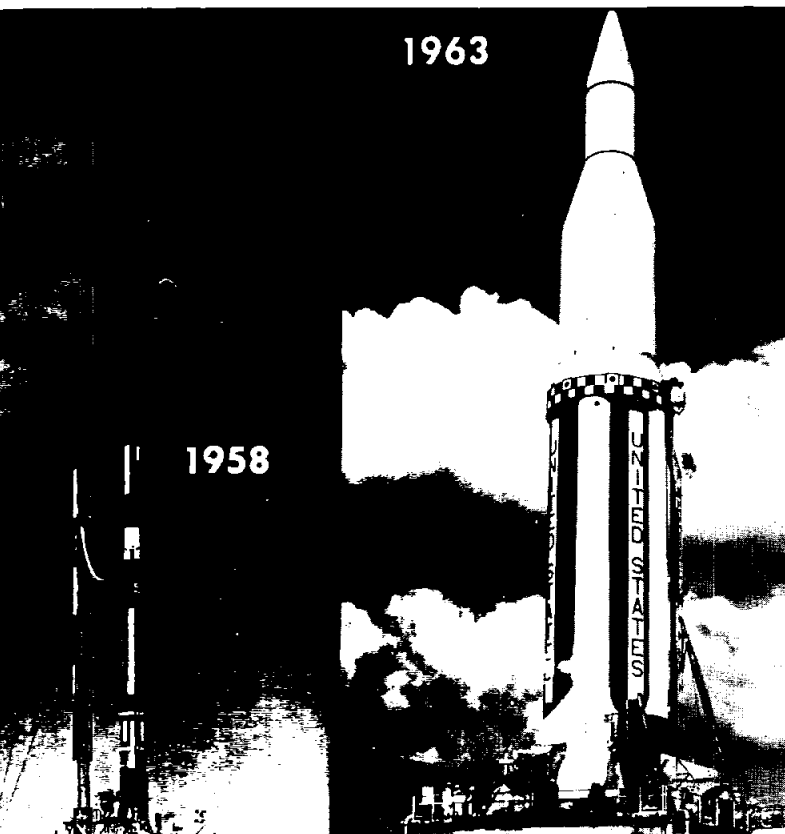
Technology--Dr. Raymond L. Bisplinghoff, Director. Supports other program areas with extensive, diversified program of advanced research.

Tracking and Data Acquisition--Edmond C. Buckley, Director.

International Programs--Arnold W. Frutkin, Director.

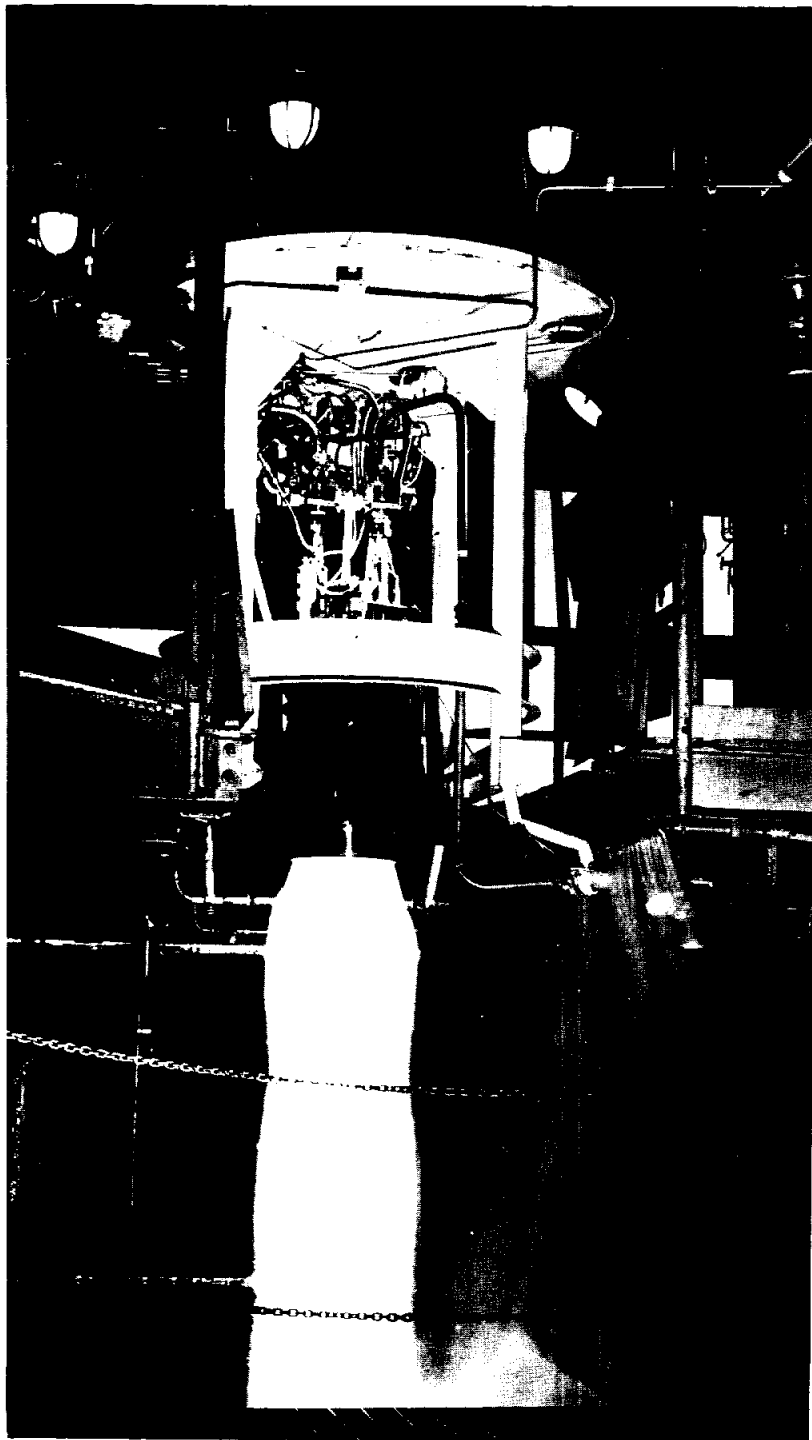


BACK FROM SPACE—On the occasion of its Fifth Anniversary, NASA wouldn't think of forgetting this happy little space pioneer, nicknamed "Ham." Here he reaches for an apple, his first food following a 420-mile ride and 4-hour stay in his Mercury capsule launched from Cape Canaveral Jan. 31, 1961. Data obtained helped blaze the way for manned flights. Ham is now a resident of the Washington, D.C. zoo.

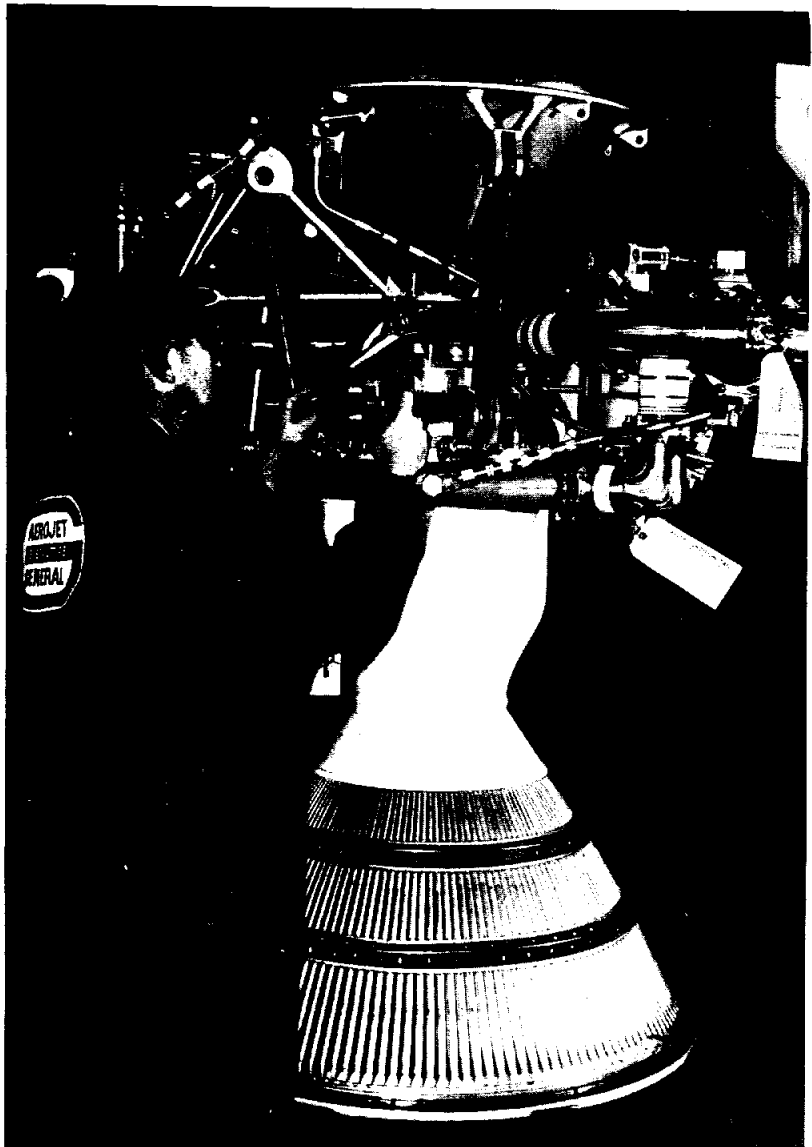


NASA GROWTH is illustrated by the contrast of the 1958 Vanguard three-stage rocket (left) and the Saturn launch vehicle of 1963. Vanguard is 72 feet and Saturn is 190 feet tall. Later Saturn models will be used in the manned lunar-landing program.

DEVELOPING APOLLO SERVICE MODULE ENGINE, Adapting Titan II For Gemini I



APOLLO FIRED—This is a routine test firing of the engine that will be used on the Apollo Service Module to place the Apollo crew into moon orbit and return members to earth.



HANDCRAFT—An Aerojet technician makes a check of an assembly on a Gemini engine in the final assembly area of Aerojet-General's Liquid Rocket Plant.

Producing Titan II ballistic missile engines that can plunk America's most powerful Air Force ICBM on target thousands of miles away is a major assignment for Aerojet-General Corporation's Liquid Rocket Plant at Sacramento, California.

To accomplish this manufacturing feat, the plant uses the most modern facilities, equipment and production methods known to the aerospace industry. Years of Aerojet experience in the liquid rocket field have been blended with employee skills, automatic processes and refined techniques to meet these established production goals.

In the Project Gemini area of the Liquid Rocket Plant, however, these ad-

vanced propulsion techniques have been shelved for this special program. The emphasis here is on handcraft. In this area, personnel are adapting the powerful Titan II propulsion systems for new roles -- space launch vehicle engines for the man-in-space effort of the National Aeronautics and Space Administration, Project Gemini, systems integration for which The Martin Company holds responsibility.

Another area of the Liquid Rocket Plant also is engaged in handcrafting these days. This is the one devoted to the engine for Project Apollo's Service Module -- the one that will deliver men to the moon and return them safely.

Designing, building and testing the Apollo engine is a start-from-scratch effort, while providing engines for Project Gemini is one of adapting proved ballistic missile propulsion for manned launch use.

Adapting 430,000-pound-thrust first-stage and 100,000-pound-thrust second-stage Titan II rocket engines for manned spacecraft propulsion demands maximum effort on the part of the entire 600-man Aerojet Gemini team, headed by Charles L. Mraz, program manager.

Mraz, who had earned degrees from Middlebury, Vt., College, Massachusetts Institute of Technology and Stanford University by the time he was 25 years old, is respon-

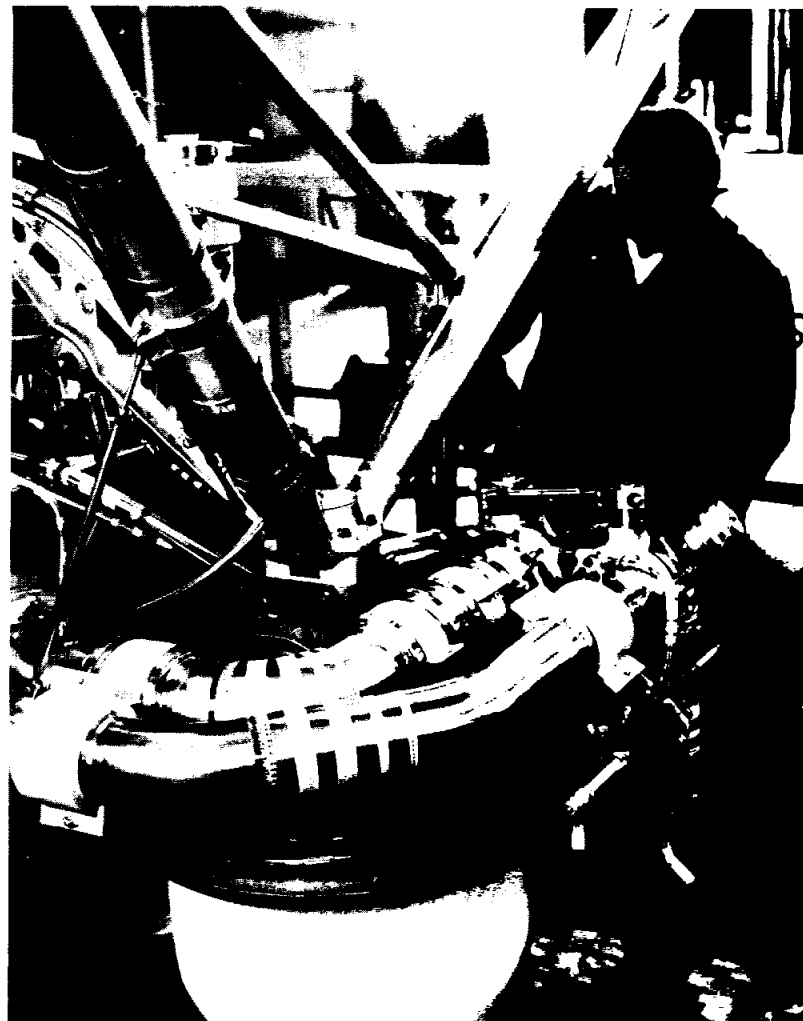


AMERICA'S LARGEST ROCKET PLANT—Sacramento, Calif., dedicated to the res- America's military and space programs. sible for all phases of Gemini engine development, manufacturing and support.

Tender loving care in manufacturing the giant Titan II engines is the "law" throughout Aerojet's Gemini program. Here, personnel attempt to maintain at all times the precision of a diamond cutter. This is absolutely necessary in man-rating the engines. Mraz emphasized. Keeping



THE GEMINI two-man spacecraft, designed for earth orbital flight, is seen in this artist's concept riding atop its launch vehicle, the Titan II. Both first and second stage liquid rocket engines will be produced by the Liquid Rocket Plant of Aerojet-General Corporation, Sacramento, Calif.



HAND-FITTED—An Aerojet production employee fits precision parts of the mighty Gemini engine together as the system takes shape in the Liquid Rocket Plant's assembly area.

The Spotlight On MSC Secretaries....

The MSC secretaries in this issue of the Roundup are noted for their sincere friendliness and for their ambitious performance of duties.

Wilma R. Wells top right, secretary to Marvin F. Mathews, Office of Patent Council, has been with MSC since August 1962. Previously she worked for eight years, on a part time basis, as a church secretary in La Porte and has also held numerous positions as a legal secretary.

A native of Tulsa, Okla., Wilma attended secondary school there and

has lived throughout the United States while her husband was in the construction business. Her husband, Lloyd K. Wells is now retired and they make their home in La Porte. The couple has three married children, two sons living in Houston and one daughter who resides in California.

Arlone "Mickie" Johnston lower right, has been secretary to M. R. Franklin and R. D. Harrington in the Office of Deputy Director for Mission Requirements and Flight Operations

since her transfer in April from the Project Apollo Office. She first joined MSC in February of 1963 after having been employed for one year as a medical secretary at the Veterans Administration hospital in Houston.

Born in Rawlins, Wyo., "Mickie" attended high school in Platt City, Mo. and was living in Kansas City, Mo. at the time her husband "Tex" was transferred to a Houston firm. The couple has a six year old son, Johnny.

In her spare time, "Mickie" likes to read and dance. Last semester she studied office administration at the University of Houston.

Virginia Laired top left, is an assistant secretary in the office of Barry G. Graves, assistant director for Information and Control. Virginia joined the MSC staff two years ago.

Born in St. Paul, Minn., Virginia attended high school in Pasadena, Tex. Before coming to NASA, she spent a number of months in Iceland where her husband, W. E. Laired, was assigned with the Air Force. The Laireds have two young daughters, Terry Lynn 4, and Debbie Kay 3.

In her free time she reads and also enjoys fishing with her husband.

Gwen Hadley lower left, has been secretary to Robert O. Piland, acting manager, Apollo Spacecraft Project Office for two years.

Gwen was born in Houston but considers League City, Tex. her home town. She attended Clear Creek High School in League City and soon after her graduation was married to Garvis Hadley. The couple moved to Houston from San Marcus, Tex. where Garvis was attending Southwest Texas State College. He is now employed by a Texas airline.

Her favorite hobbies include playing bridge, reading and water skiing.



MSC Ladies Are Active In Local 'Toastmistresses'

Mayor Lewis Cutrer, of Houston, proclaimed Sept. 21, 1963, "Toastmistress Day in Houston" when he presented a proclamation to Mrs. Mabel Cantrell, area chairman of International Toastmistress Clubs, at the quarterly meeting of Council Five held here in Houston.

Mrs. M. E. Kaduck of Tulsa, Okla., regional supervisor of the South Central Region, was honored guest.

The Ellington Toastmistress Club served as hostess for the meeting; and the thirteen Toastmistress clubs from Houston, Galveston, Corpus Christi, Laredo, and San Antonio participated.

In addition to business sessions, workshops were conducted on poise, speech technique, problems clinic, and a panel discussion of the International Toastmistress Convention held in San Francisco in July.

Mrs. Imogene Pullcine, of LaPorte, was coordinator for the meeting; and Mrs. Bobbie Wright of the Manned Spacecraft Center was joint coordinator. Other MSC personnel participating in the program were Miss Silvie Kelarek, chairman, Hostess Committee, and editor of the Council bulletin, "Four-Tel"; Miss Virginia Thompson, chairman, Kits Committee; Miss Betty Rogers, chairman, Program Committee; and Mrs. Josephine Townsend, hostess.

Theme for the meeting was "Pride in Performance through Better Planning."

NASA Ping Pong Club Open For Membership

The NASA Ping Pong Club meets each Monday evening at 7:30 at the Jewish Community Center, 2020 Herman Drive and new players of all strengths are welcomed.

For additional information call Steve Jacobs, Ext. 5440.

Lecture Series Set By MSC Personnel

A program of lectures at Rice Institute, University of Houston and Louisiana State University is being implemented by members of the Manned Spacecraft Center Staff.

Inspired by Dr. Robert R. Gilruth, director of MSC, the purpose of the program is to improve the capability of the schools in the field of space technology by providing them with new ideas and concepts in this area.

The lectures entitled "Engineering Design and Operation of Manned Spacecraft" are designed to get into the school systems the knowledge gained in the last five years from the Mercury, Gemini and Apollo programs.

Lectures at LSU are being given by Paul E. Purser, special assistant to the director; Walter C. Williams, deputy director for Mission Requirements and Flight Operations; and Maxime A. Faget, assistant director for Engineering and Development. The three alternate as visiting professors each Friday evening at LSU and deliver a three-hour lecture. The lectures will be given during the entire first semester of the school year.

At Rice and Houston, the lectures will be delivered by a select group of about 45 qualified personnel from MSC and will continue for the entire school year. The lectures will be delivered twice each week at each school and will be one and one-half hours in duration.

The days and scheduled hours are as follows: Rice, Monday and Wednesday from 4 to 5:30 p.m. and Houston, Tuesday and Thursday, 4 to 5:30 p.m.

Mercury Exhibit Open Friday Night For MSC Families

In conjunction with the Mercury Summary Conference, an open house of the Mercury Exhibit at the Houston Coliseum will be held for MSC employees and their families from 7 to 10 p.m., Friday, October 4.

As part of the open house two movies will be shown in the Music Hall beginning at 7:30 p.m. and repeated again at 9 p.m. Each showing will run approximately one hour.

Titles of the movies are "Project Mercury Space Flight Legacy" and "Office of Manned Space Flight First Quarterly Report." The latter is a review of the present status of all NASA programs.

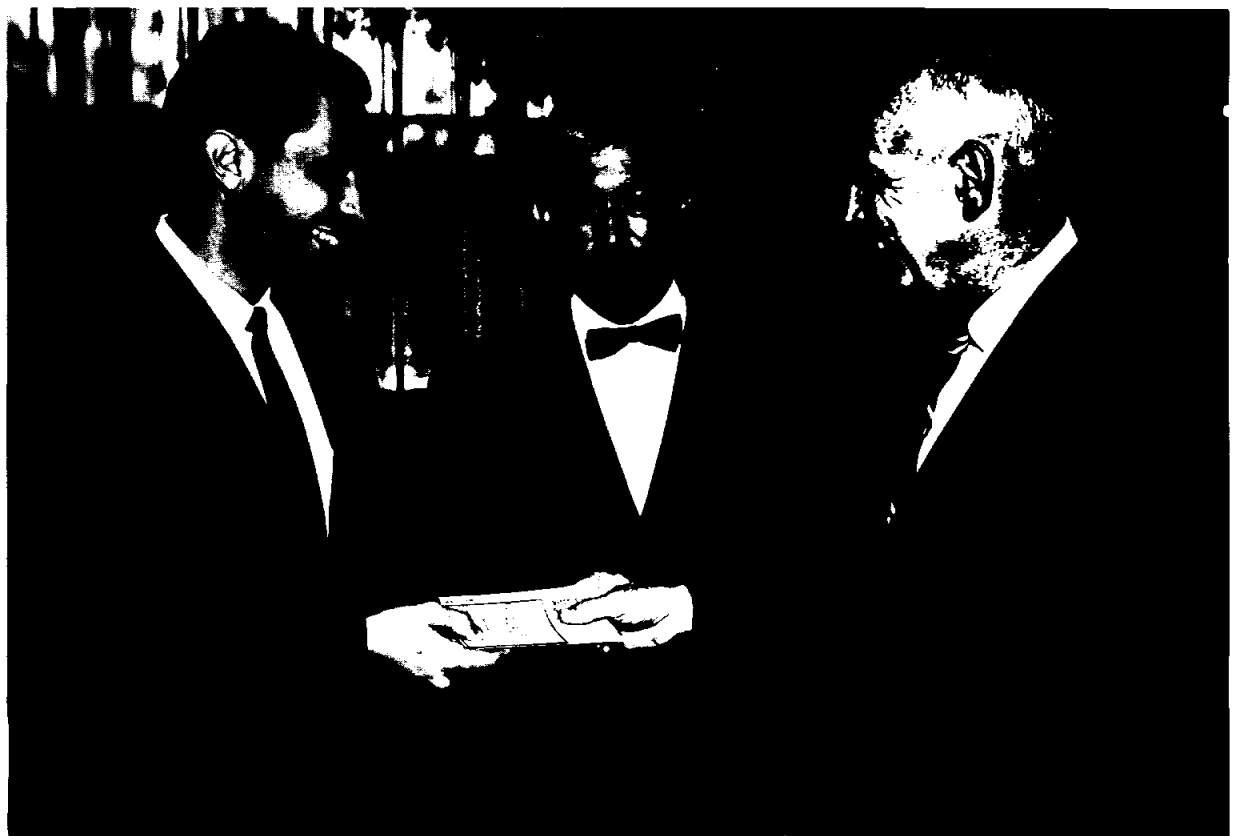
The exhibit will include the Aurora 7 and Faith 7 spacecraft, a procedures trainer and other Mercury hardware.

It's "Fire Prevention Week" Oct. 6-12

"Don't give fire a place to start," is a piece of advice often heard but too little heeded and a good policy to follow during "Fire Prevention Week," October 6-12 and every week in the year.

John M. Kanak, chief for Safety, admonished all MSC employees and their families to, "practice good fire prevention 24 hours a day and save lives."

He further stated that the home, traditionally a place of refuge, is the place where more than half of all fire deaths occur. This would indicate fire prevention should start with good family habits, including care with matches, smoking, heating and cooking equipment, appliances and frequent clean-up of combustibles.



FIRST MSC UF PLEDGE IN—Dr. Robert R. Gilruth, director, MSC hands his pledge card to Donald T. Gregory, NASA United Fund section chairman, to kick off the drive at MSC to raise \$35,609 by November 8. Looking on is Martin A. Byrnes Jr., manager, Missions and Operations Support.

UF Drive Kicked-Off At MSC

Yesterday marked the kickoff of the 1964 Harris County United Fund Drive with a specified goal of \$35,609 for the employees of MSC.

"We are striving for 100 per cent participation in this year's fund drive," said Donald T. Gregory, NASA section chairman, "Our goal is higher than last year, but we now have more employees and we are asking each person

with MSC to give something toward the goal."

The Harris County goal is \$6,501,106 and is distributed to 67 agencies. You may designate the agencies to which you would like your money to go and your wishes will be respected.

Pledge cards will be given to all employees by the various team captains. Instructions on how to fill out the pledge card will also be given each person.

If you do not receive a

pledge card within the next few days, either check the last issue of the ROUNDUP for the name of your team captain, or contact Donald Gregory by calling Ext. 5245 and someone will contact you.

Last year, MSC made an outstanding showing by contributing over 167 per cent of the goal and Gregory said, "this year, we are expecting to have as good a year percentage-wise, if not better."

MSC Employee-Family Picnic To Be Held Galveston Co. Park Week-From-Saturday

The MSC employees-family picnic will be held beginning at 12 noon, Saturday, October 12 at the Galveston County Park and will feature a western style barbecue, served from 2 to 4 p.m.

Tickets for the event may be purchased from members of the Employees Activities Association for \$1.00 per person with a maximum of \$4.00 per family, children under five free. The price includes food and drink. Those attending should bring chairs or blankets--tables and some benches are available.

Activities planned for the picnic include, volleyball, softball, football, and horseshoe pitching (some equipment will be available.) A boat ramp is available, also fishing and crabbing areas.

Entertainment for the children will include pony rides, movie cartoons, and relay races at 1:00 p.m. with prizes for the winners.

Adult entertainment will include a four-piece band with dancing from 1:30 to 5:30 p.m. with a twist contest at 5:00 p.m. and a softball game, the champions of the MSC Softball League vs an All Star MSC team.

The Galveston County

Park is located just north of League City off Highway 3 (Old Galveston Highway). See map this page.

Volunteers are needed and may contact the following for these positions: soft

drink dispensers (call Joe Schisser, Ext. 7435), food servers (call Jim McBaron, Ext. 4279), and assistants for childrens activities (call Joe McMann, Ext. 4231.)

MSC BOWLING ROUNDUP

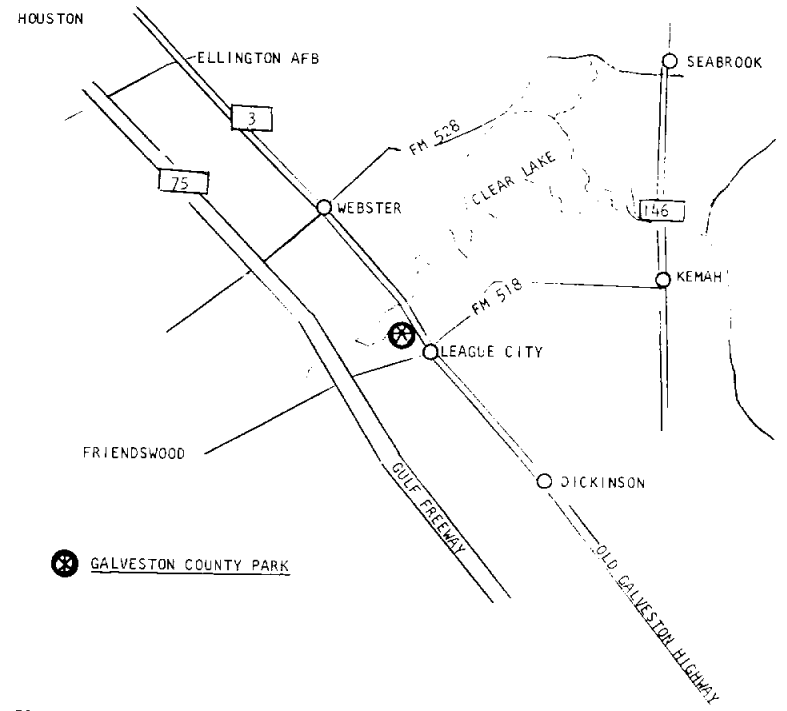
League standings through Sept. 19, 1963.

MSC MEN'S LEAGUE

Team	Won	Lost
Sherlock Homes	10	2
Whirlwinds	8	4
Cosmonuts	8	4
Tecnics	7	5
Turkeys	6	6
Pseudonauts	6	6
Asteroids	6	6
Fizzlers	4	8
Spastics	3	9
Overshoots	2	10
High Individ. Game--Joe Garino 266, Lewis Lee 233, Paul Horsman 233.		
High Individ. Series--Joe Garino 616, Arc Lee 556.		
High Team Game--Sherlock Homes 902, Asteroids 893.		
High Team Series--Sherlock Homes 2573, Asteroids 2494.		

MSC COUPLES' LEAGUE

Team	Won	Lost
Goofballs	7	1
Lame Ducks	6	2
Ridgerunners	6	2
Shucks	5	3
Schplitz	5	3
Bowlernauts	3	5
Spare-O's	3	5
Four Aces	2	6
Piddlers	2	6
Hackers	2	6
High Individ. Women's Game--Verra Lantz 184, Mary Jordan 184.		
High Individ. Women's Series--Verra Lantz 483, Mary Jordan 446.		
High Individ. Men's Game--George Sandars 212, Paul Thomas 206.		
High Individ. Men's Series--Paul Thomas 559, George Sandars 510.		



GALVESTON COUNTY PARK IS APPROXIMATELY 1/3 MILE NORTH OF THE LEAGUE CITY STOP LIGHT ON HIGHWAY # 3 BETWEEN HIGHWAY 3 AND THE GULF FREEWAY.

Aerojet-General's Assignment



This is the nerve center of Aerojet-General Corporation's 23,000 acre plant near Azusa, California, where research, development and production of both liquid and solid fuel rocket motors for

personnel aware at all times of their responsibilities is accomplished through employee indoctrinations hammering hard on the old song that a chain is as strong as its weakest link; that a tiny bolt in a Gemini engine is just as important as the thrust chamber.

"We consider every phase of our Gemini effort of greatest importance," Mraz explained. "But having extraordinary responsibility is our Gemini Pilot Safety Review Team."

This is a group composed of a chairman and representatives from the Aerojet program office, manufacturing Division, Engineering Division, Reliability and Quality Assurance and Quality Engineering Division.

These men, each an expert in his respective field, check each individual part against specifications to assure positive conformance to NASA requirements.

After the parts are accepted, they are delivered to the Gemini assembly area in the center of the Liquid Rocket Plant's Manufacturing Division building. Here, the area is super clean, and floors, equipment and work materials are gleaming white. It is fenced off from the ballistic missile sections surrounding it.

Even Gemini manufacturing personnel wear special white coats with the Project Gemini insignia prominently displayed on them.

These employees are ever mindful of Mercury Astronaut Gordon Cooper's admonition made during his recent visit to the Liquid Rocket Plant:

"You as individuals, your pride in your own work and the work you do are what will either give us a successful mission when we ride your engines, or will kill some of us if you fail." Sharing the Gemini goal of maximum reliability are members of Aerojet's Apollo team, headed by Dan David, program manager, for they are the ones who must deliver the Service Module engine that will take astronauts to the moon and return them to earth.

The Service Module engine must be the most reliable of all space engines.

When the engine becomes operational, it will bear the brunt of the load in steering the Apollo spacecraft toward the moon, placing it into a lunar orbit, ejecting it from this orbit, and bringing the Apollo crewmen home safely.

To perform this difficult mission, an engine capable of many stops and restarts, near-perfect reliability and long-duration burning is required.

Since David's Apollo team, now numbering some 500 employees, began working on the development engine in May of 1962, numerous successful firings have been conducted.

Sub-scale testing of the 21,900-pound-thrust engine was accomplished at Azusa. They have been completed, and provided early data for the full-scale tests now in progress at Sacramento.

High-altitude tests were conducted at the government's facilities at Tullahoma, Tenn.

New Apollo test facilities have been constructed at Sacramento where battleship tankage will be provided by the prime contractor, North American Aviation, Inc., to permit full-scale engine and chamber tests.

Another facility also is being constructed at Sacramento for system testing, again using battleship tankage.

These tests will demonstrate the restart requirements of the engine, as well as the ability to conduct a mission profile firing sequence.

David's personnel must demonstrate the engine's ability to abort sequence and testing will determine how much ablation occurs.

The team also has developed a fabrication technique for joining titanium and columbium materials, as well as a method for coating columbium castings used in the engine.

While complete engine qualification testing is nearly a year away, component prequalification will be completed sometime during the next year.

Many months of additional testing lie ahead, however, before the Apollo engine will be as near-perfect as humanly possible and ready for delivery to NASA.



INSPECTS ENGINE—Astronaut Gus Grissom, right inspects a portion of a Gemini engine which may power him on a future mission into space. With him is Dan M. Tenenbaum, assistant manager of the Liquid Rocket Plant.



WHITE SUITED—These uniformed Gemini production employees of Aerojet-General Corporation fit engine parts into the powerful liquid engine as the system is readied for delivery to the test area.



ASTRONAUTS VISIT—Astronauts Gordon Cooper, Frank Borman and Gus Grissom, left to right, and Dan M. Tenenbaum, assistant manager of the Liquid Rocket Plant, visit with Gemini engine test personnel at Aerojet.

Editor's Note: This is the fourteenth in a series of articles designed to acquaint MSC personnel with the Center's industrial family, the contractors who make MSC spacecraft, their launch vehicles and associated equipment. The material on these two pages was furnished by the Public Relations Office, Aerojet-General Corporation.

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, Internal Communications Ivan D. Ertel
Editor Milton E. Reim

On The Lighter Side

"Hello" Out There - Whatever You Are

Modern space scientists reconsidering the age-old question "Are we earth folk the only intelligent life in the universe?" are more and more coming to the conclusion "Probably Not!"

Dr. Melvin L. Stehsel, of the Advanced Research Department of Aerojet-General Corporation, points out that the sheer mathematical considerations point to this probability.

Our solar system--the sun, earth and 8 known planets, he points out, is just one of perhaps a billion such solar systems in "our" galaxy (the Milky Way). But beyond that are billions of other galaxies, each with its billions of solar systems.

And astronomers have estimated that six per cent of the planets in these multi-billions of solar systems could accommodate intelligent life such as ours.

These other "civilizations" could be older and far more advanced than ours, younger and of a "pre-historic man" beginning--or a development timed simultaneously with that of our own "world."

But despite this mathematical probability, the truth probably will never be known to us. The nearest solar system even within "our" galaxy is a million times farther from us than our neighbor planets in our solar system.

Thus a space mission, even travelling at a speed of some 60,000 miles a minute--would take 725 years to get there. So it would be generations-later descendants of the original starters who would finally complete the journey. They'd know the answer, but the question would have long been forgotten.

Copy by Don Bailer. Reprinted courtesy Aerojet-General.

Lunar Communications System Being Developed

A space suit communications system that will enable astronauts on the surface of the moon to converse with each other and with lunar spacecraft is being developed by ITT Kellogg Communications Systems, a division of International Telephone and Telegraph Corporation.

The system also simultaneously transmits telemetry data, over seven channels, describing the physiological condition of the astronaut and environmental data concerning his space suit. If certain suit conditions, such as pressure and oxygen flow rate, drop below predetermined levels, an audible warning is given the astronaut automatically.

The system is called EVSTC, for Extra-Vehicular Suit Telemetry Communications System.

Voice transmission for the EVSTC System is controlled by a voice-actuated switch that turns on the transmitter when the user speaks. The switch is so

rapid that less than one-tenth of a syllable of speech is needed to trip it. Data transmission is operated manually by the astronaut.

The equipment, employing solid-state circuits and miniaturized construction occupies 30 cubic inches and weighs 30 ounces, excluding headsets and microphones.

A tiny two-way radio, designed to keep an astronaut in contact with rescue aircraft if he left a spacecraft after landing, was carried on the MA-8 and MA-9 manned space flights.

The EVSTC communications system is being developed and built at the Division's Fort Wayne, Indiana, laboratories.

WELCOME ABOARD

One-hundred new employees joined the MSC staff between the period of August 19 through September 19. All but 16 were assigned in Houston.

MSC-ATLANTIC MISSILE RANGE OPERATIONS (Cape Canaveral): Laura M. Thaxton, Antonina T. Policicchio, Regina C. Crisafulli and Beverly J. May.

PREFLIGHT OPERATIONS DIVISION (Cape Canaveral): Malcolm L. Wade, Stanley J. Banach Jr., John H. Weisner, Roch C. Moise Jr., Marvin L. Nelson and Jane W. Henry.

GROUND SYSTEMS PROJECT OFFICE: Edward E. Quin and James J. Austin Jr.

OFFICE OF TECHNICAL AND ENGINEERING SERVICE: James A. Stephens, Robert L. Ruggles, Alan L. Farrow and Don R. Yancey.

SYSTEMS EVALUATION AND DEVELOPMENT DIVISION: Betty C. Smith, Gerald R. Pearson Jr., Early B. Denison, Bobby J. Bragg, Wade M. Vance, Steven P. Wallin, Frank P. Crampton, Raymond A. Williams and Allen Clauson.

FLIGHT CREW OPERATIONS DIVISION: Robert S. Sayers, Thomas E. Moon, Claudio Fernandez Jr., Tyce T. McLarty, Gaylord W. Carlock and Harold W. Condon (Cape Canaveral).

FINANCIAL MANAGEMENT DIVISION: William D. Lindsey, Alan J. Kappeler, Adelia B. Dunn, Zoe C. Raspberry and Leoma W. Self.

LEGAL OFFICE: Pam L. Howell.

PUBLIC AFFAIRS OFFICE: Paul P. Haney, Roy A. Alford and Margaret C. Lucas (Downey, Calif.).

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION: Michael W. Wedge, Harold D. Smith, Richard R. Richard, Ted R. King Jr., Bryant P. Seay Jr. and Joel M. Elliott.

COMPUTATION AND DATA REDUCTION: Nancy E. Stephenson, Donathan L. Durden, Elaine L. Russell, Janice Moody, Mildred E. Wiesner, Bernard F. Stuckey, David N. Pate and Robert L. Brezik Jr.

SPACECRAFT TECHNOLOGY DIVISION: Alan F. Sedgwick, Olga T. McCommis, Joseph Fries, Delbert A. Whitaker, Robert L. Young, Reed S. Lindsey Jr., John H. Groves, Gerald E. Suchan, Roger L. Griffin and Lloyd E. Dietert.

CREW SYSTEMS DIVISION: Warren L. Nelson, Lynn D. Russell, Robert J. Cusick, Johnnie W. Colburn Jr., Paul D. Aaron and Carl O. McClenny.

MSC PERSONALITY

Eggleston Finds Work In Space Sciences Fascinating

"I find space sciences the most interesting thing, without a doubt, that I could ever undertake to do," said John M. Eggleston, assistant chief, Space Environment Division of Manned Spacecraft Center.

He became associated with the space program and the space sciences in September 1949 when he joined the National Advisory Committee on Aeronautics, High Speed Flight Research Station, Edwards AFB, Calif., as a flight test engineer.

Born in San Francisco, Calif., Eggleston grew up in Norfolk and Virginia Beach, Va. He was graduated from Virginia Polytechnic Institute in 1949 with a BS degree in aeronautical engineering. Attending night school and summer sessions he received a MS degree in Aeronautical Engineering from the University of Virginia in 1954.

In February 1951 Eggleston joined the NACA Langley Research Center as an aeronautical research scientist in the Stability and

SPACE ENVIRONMENT DIVISION: Lawrence D. Hoover, James E. Brown, Michael F. Heidt and John N. Warren.

CENTER MEDICAL OPERATIONS OFFICE (White Sands, N. M.): Dudley J. Fitts.

PROGRAM ANALYSIS AND EVALUATION OFFICE: Michael D. Cannon, Jo Ann Birchett and Edward N. Jones, Jr.

FLIGHT OPERATIONS DIVISION: Gene W. McAnally, Wayne W. Neely, James T. Willis III and Burl G. Kirkland.

PERSONNEL DIVISION: Beatrice J. Gutierrez, Juanita M. Reynolds, Viola J. Woolard, Veronica H. Kellermeier and Mary A. Keller.

PROCUREMENT AND CONTRACTS: Sharon S. Hayes.

LOGISTICS DIVISION: Cecil L. Gallagher.

FACILITIES DIVISION: Edna M. Carroll.

BUSINESS MANAGER RESIDENT OFFICE (Bethpage, N. Y.): Iris E. Falcone.

APOLLO SPACECRAFT PROJECT OFFICE: Gary A. Coultas, Wanda Y. Grunewald, Gerald E. Anderson (Downey, Calif.).

MERCURY PROJECT OFFICE: Edward S. Ashley.

INFORMATION AND CONTROL SYSTEMS: William H. Hilliard.

OFFICE SERVICES DIVISION: Patricia L. Glenn.

AUDIT OFFICE: Ralph D. Rhodes and Francis R. Berus.

ADMINISTRATION OFFICE (White Sands, N. M.): Peggy L. Riebe.

Control Branch. Flight Research Division. There he took part in stability and control flight tests on research aircraft and other related phases.

From July 1959 to January 1962 he was assistant head of the Flight Mechan-



JOHN M. EGGLESTON

ics Branch. Aero-Space Mechanics Division at Langley. He was then designated technical assistant to chief of Spacecraft Technology Division, MSC, at Langley and Houston, and held that position through December 1962. In this latter position he was concerned with the development of present and future manned spacecraft systems, one was doing in-house research on the LEM.

He assumed his present duties as assistant chief, Space Environment Division, MSC, in December 1962 and the primary duties of his division are: define the space environment; coordinate the scientific experiments to be conducted in manned spacecraft; and the scientific training of the astronauts to conduct the experiments.

A former chairman of the Hampton Roads, Va. section of the Institute of Aeronautical Sciences (now combined with American Institute of Aeronautics and Astronautics), he is an associate fellow in AIAA, a senior member of the American Astronautical Society and a member of Sigma Xi, an honorary fraternity for research.

While at Langley he was Eggleston counts sailing and tennis as his favorite hobbies. He holds a private flying license for single-engine land planes but said he just couldn't find the time to pursue his flying hobby.

Married to the former Phyllis Holland of Norfolk, they reside in El Lago, Seabrook, Tex. with their three children, Mary 11, John 9, and Rebecca 2.

Apollo Guidance-Navigation System Prototype Viewed At MIT

Prototypes of the Guidance and Navigation (G&N) System to be used in the Apollo spacecraft were viewed last week by scientific specialists of various news media at a news conference and briefing held at Massachusetts Institute of Technology's Instrumentation Laboratory at Cambridge, Mass.

Those attending were told that the G&N system to be used by three U.S. astronauts to steer their Apollo spacecraft to the moon and return them to the earth will be totally contained on board and will be capable of operation without information or instructions relayed from earth. The system will be capable of accepting information and commands from the ground.

The media representatives were briefed on the G&N by David W. Gilbert, Manager, Spacecraft Systems Office, Guidance and Control, Manned Spacecraft Center; Milton B. Trageser, Apollo Project Officer of MIT's Instrumentation Laboratory; David G. Hoag, Apollo Project Technical Director for MIT's Instrumentation Laboratory; Hugh Brady, Apollo Program Director of AC Spark Plug Division of General Motors; Arthur M. Ferraro, Apollo Project Director for Space Division, Kollsman Instrument Corporation; Ralph R. Ragan, Operations Manager of Space and Information Systems Division of the Raytheon Company; and John Morgan, Apollo Project Engineer of the Sperry Gyroscope Company.

Gilbert opened the session by briefly describing the assigned mission and Trageser then discussed the team concept of the development program, emphasizing the close working relationship between MSC, MIT and prime contractor personnel.

It was revealed that the astronauts will have great flexibility in the manner the G&N system is operated, ranging from manual modes to automatic modes. This flexibility, in what engineers term the man-machine interface, represents one of the important advances being incorporated into the system design.

The job of getting the Project Apollo Spacecraft to the moon and back can be described in terms of the two principal functions of the G&N.

The first function is navigation. This is determination of position in space and is similar to pinpointing position on earth as is done by a ship navigator at sea. However, in space the job is considerably more complicated and in order to determine an adequate orbit one must know the past, present and predict the future position of the spacecraft.

The second function is guidance. Once having

established the position and velocity of the spacecraft, the system must then establish the steering direction and the necessary starting and stopping of the controllable engines in order to follow the road map established by the navigation function previously performed.

To carry out these functions, the Apollo G&N system is composed of three principal subunits--an Inertial Measurement Unit (IMU), an optical measurement unit and a computer unit--plus the displays and controls that relate the three and provide the flexible man-machine interface.

The inertial measurement unit is an assembly of gyroscopes and accelerometers that can establish a fixed reference from within which can measure the direction and speed of the spacecraft and determine any changes in either direction or speed.

The gyroscopes and accelerometers are mounted on a structure at the center of the IMU called the inner member. The inner member, in turn, is mounted inside three spherical gimbals, one for each principal axis of motion. The gyroscopes provide signals which are used to drive the gimbals to isolate the inner member from changes of spacecraft attitude and thus hold the inner member



PRINCIPAL ENGINEERS heading design and development of the guidance and navigation system for NASA's Project APOLLO spacecraft are shown inspecting a mockup of the system. At left is Milton B. Trageser, director of the APOLLO program at Instrumentation Laboratory, Massachusetts Institute of Technology, Cambridge, Mass. At right is David W. Gilbert, head of the Guidance and Control Division, APOLLO Project Office, Manned Spacecraft Center, Houston, Tex.

fixed. Accelerometers measure forces acting on the vehicle and keep track of its route within the gyroscopically-stabilized reference frame.

The optical measurement unit contains a telescope and a space sextant, plus associated displays and controls. The sextant is similar to nautical sextants except that it is used in an entirely new application--space--and embodies numerous automatic features.

The inertial measurement unit and the optical unit will be used by the crew to take navigational readings and to pinpoint spacecraft position in space on the route to the moon and back.

The third and one of the most important elements of the system is a compact but extremely versatile digital computer that will translate the data gathered both automatically and by the astronauts into commands which will keep the vehicle on its course.

The Apollo G&N system is being developed by a close-knit team of government, industry and university scientists and engineers.

Overall supervision is provided by the Guidance and Control Division of the Apollo Project Office at NASA's Manned Spacecraft Center in Houston, Tex.

Primary responsibility for design rests with the Associate Contractor for G&N, MIT's Instrumentation Laboratory, which has pioneered development of inertial guidance, navigation and control systems for ships, submarines, airplanes, missiles and satellites.

Collaborating with Instrumentation Laboratory are four G&N Participating Contractors, all selected by NASA. They are:

AC Spark Plug Division, General Motors Corp., Milwaukee, Wisc., and Wakefield, Mass., for the inertial measurement unit and associated displays and controls, for the gyroscopes, for overall integration of the system and integration of all displays

and controls, and for the ground support equipment.

Kollsman Instrument Corporation, a subsidiary of Standard Kollsman Industries, Inc., Elmhurst, N.Y. and Syosset, N.Y., for the optical subsystem, map and data viewer, and associated ground support equipment.

Raytheon Company's Space and Information Systems Division, Bedford, Mass., and Sudbury, Mass., for the digital guidance computer subsystem and associated ground support equipment.

Sperry Gyroscope Company division of Sperry Rand Corporation, Great Neck, N. Y., for accelerometers used in the inertial measurement unit.

More than 300 engineers and scientists from NASA, Instrumentation Laboratory and the participating contractors presently are working on G&N designs in a leased three-story building near the MIT Cambridge campus. Considerable work, particularly fabrication, is underway at participating contractor plants to support the design work.

Early prototype systems which will be used for testing, including earth-orbiting flight tests, will be built at the design center in Cambridge. Actual systems and system components that will be used on moon flights will come from participating contractor plants.

Developers reported design on schedule and said G&N systems will be ready for moon flights when spacecraft and launch boosters are ready.



IMU MOCKUP--David G. Hoag, technical director of the APOLLO Guidance and Navigation System design program at M.I.T.'s Instrumentation Laboratory, inspects a mockup of the Inertial Measurement Unit contained in the system. The spherical IMU houses the gyroscopes and accelerometers used to measure changes in velocity of the APOLLO spacecraft during thrust periods.

Space News ROUNDUP!

SECOND FRONT PAGE

Webb Visits MSC Tours Exhibit, Sites

James E. Webb, administrator of the National Aeronautics and Space Administration visited the Manned Spacecraft Center this past week and conferred with MSC officials.

While here, Administrator Webb toured the NASA exhibit at the Houston Coliseum and some of the MSC temporary locations.

Also included in his visit was a tour of the facilities at the Clear Lake Site.

While here a press conference was held by Webb and in commenting on Pres-

ident Kennedy's proposal for a joint space program with Russia, he said, "The basis of cooperation will probably be an exchange of information."

Webb also stated here that, "...the space program will still be carried forward as rapidly as possible."

Saturn I Upper Stage Rocket Air-Lifted To Cape For Test

First NASA-Douglas S-IV rocket scheduled for space flight was air-lifted from Sacramento, Calif. to Cape Canaveral for launch later this year as the upper stage of Saturn I, the world's mightiest space vehicle.

The huge, high-energy liquid hydrogen and liquid oxygen fueled S-IV was transported in a modified Stratocruiser aircraft from Mather Air Force Base.

Saturn I will be capable of propelling approximately 22,000 pounds into orbit--far heavier payloads than any previous vehicle.

At Cape Canaveral, the S-IV will be joined to the S-I booster stage for the first complete flight test of the integrated Saturn I.

Liftoff from the Cape of the 163-foot-tall Saturn I will signal another research and development milestone in the NASA flight test program that will pioneer the way for first man-

ned flights to the moon.

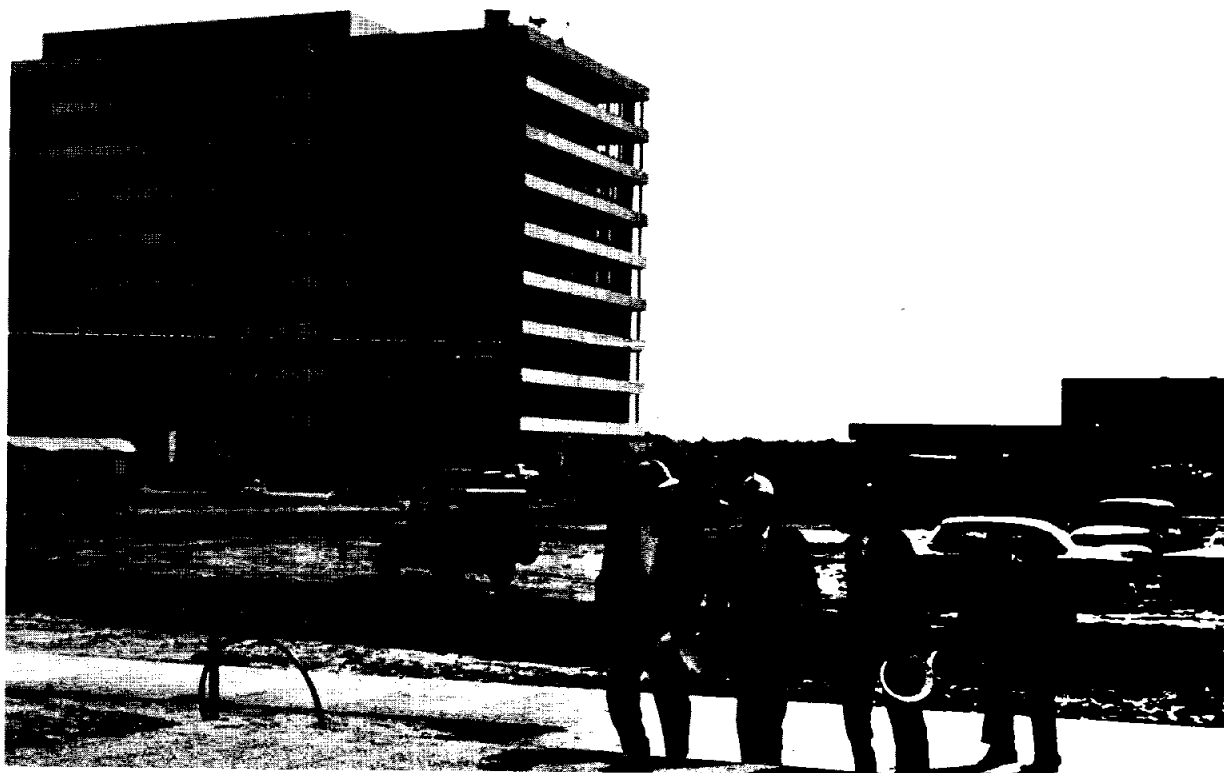
The first two-stage Saturn I flight will check out stage separation and engine performance. Afterward, early boilerplate models of the Apollo spacecraft will be launched atop the Saturn I and placed into earth orbit.

The S-IV is 18-1/2 feet in diameter and 41 feet in length. Its engines develop 90,000 pounds of thrust.

An advanced version of the S-IV, the S-IVB, now in the development stage at Douglas MSSD, will supply final stage thrust in propelling a manned Apollo spacecraft to the vicinity of the moon as the third stage of the Saturn V configuration.



EXAMINING SPACE SUITS—Prototype Gemini space suits were out for examination in the Pressure Suit Laboratory of the Crew Equipment Branch when James E. Webb, administrator of NASA (center) was given a tour of the MSC sites last week. Shown (l. to r.) are Dr. Robert R. Gilruth, director, MSC; Maxime A. Faget, chief, Space Environment Division; Webb; Warren Gillespie, technical assistant, Assistant Director for Engineering and Development; and Najeeb Halaby, administrator of the Federal Aviation Agency.



TOURING CLEAR LAKE SITE—James E. Webb, administrator of NASA and Dr. Robert R. Gilruth, director of MSC and their party are shown as they toured the soon to be completed Clear Lake Site. The building in the left background is the Project Management Building.



HERE FOR BRIEFING—Robert C. Seamans Jr., associate administrator, NASA and Dr. George E. Mueller, head of manned space flight were here at Manned Spacecraft Center recently for a briefing on the current and past MSC programs. Shown at a press conference held for the two Washington officials are (l. to r.) Dr. Mueller, Seamans and Dr. Robert R. Gilruth, director of MSC.

\$1-Million Contract Awarded For Apollo Data Acquisition Systems And Recorder

A \$1-million contract for equipment that will monitor and record test data on NASA's Apollo command and service modules has been awarded Beckman Instruments, Inc., Fullerton, Calif., by North American's Space and Information Systems Division.

The equipment, which includes two data acquisition systems and a recorder unit, will be built by Beckman's Systems Division for use in the development and test of the three-man vehicle designed for expedition to the moon.

The equipment will be used to monitor and record test data to determine the reaction of the Apollo spacecraft to such flight conditions as thrust, temperature and vibration.

The equipment will collect and record engineering test data at the rate of

some 40,000 samples per second for study and evaluation.

The data acquisition systems are scheduled for delivery to the National Aeronautics and Space Administration's test facility at Las Cruces, N. M., next December.

WEATHER SATELLITES

The seven TIROS weather satellites have sent back more than 200,000 usable photographs. As a direct result there have been more than 380 specific instances when these photos have been used to improve weather forecasting.