Space News

NASA ROUNDUP!

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MA-8 Readies For First U. S. Six Orbit Launch

Here's Account Of What Occurs, Blow By Blow

When Astronaut Walter M. Schirra leaves the launch pad at Cape Canaveral, he will be riding a complicated mass of equipment and power known as Mercury-Atlas 8.

Its job is to put him in orbit and keep him there for six circuits of the earth, then return him safely to the Pacific Ocean.

The following is a blow-by-blow account of what happens first and last.

"Sigma 7" will rise from Cape Canaveral atop an Atlas D, which burns a highly refined kerosene-like fuel (RP-1) and liquid oxygen to develop the necessary 360,000 pounds of thrust.

It will be heading just north of east from the Cape, guided by an internal programmer in the Atlas on a heading of about 73 degrees.

About two minutes after lift-off, some 40 miles up and about 45 miles downrange, two launch vehicle engines will drop off (staging) and the sustainer and vernier engines will continue to accelerate the vehicle.

During the first two and

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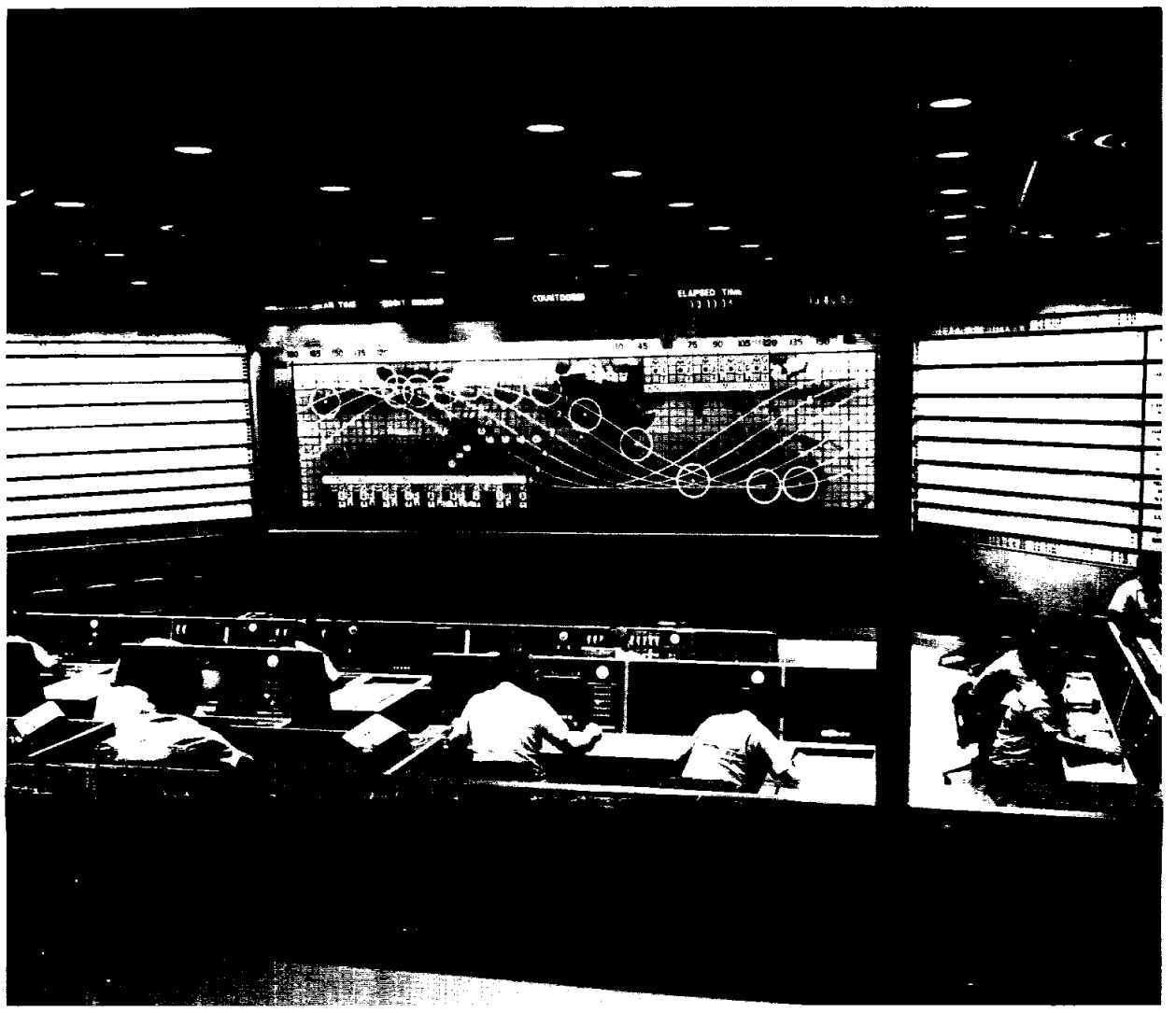
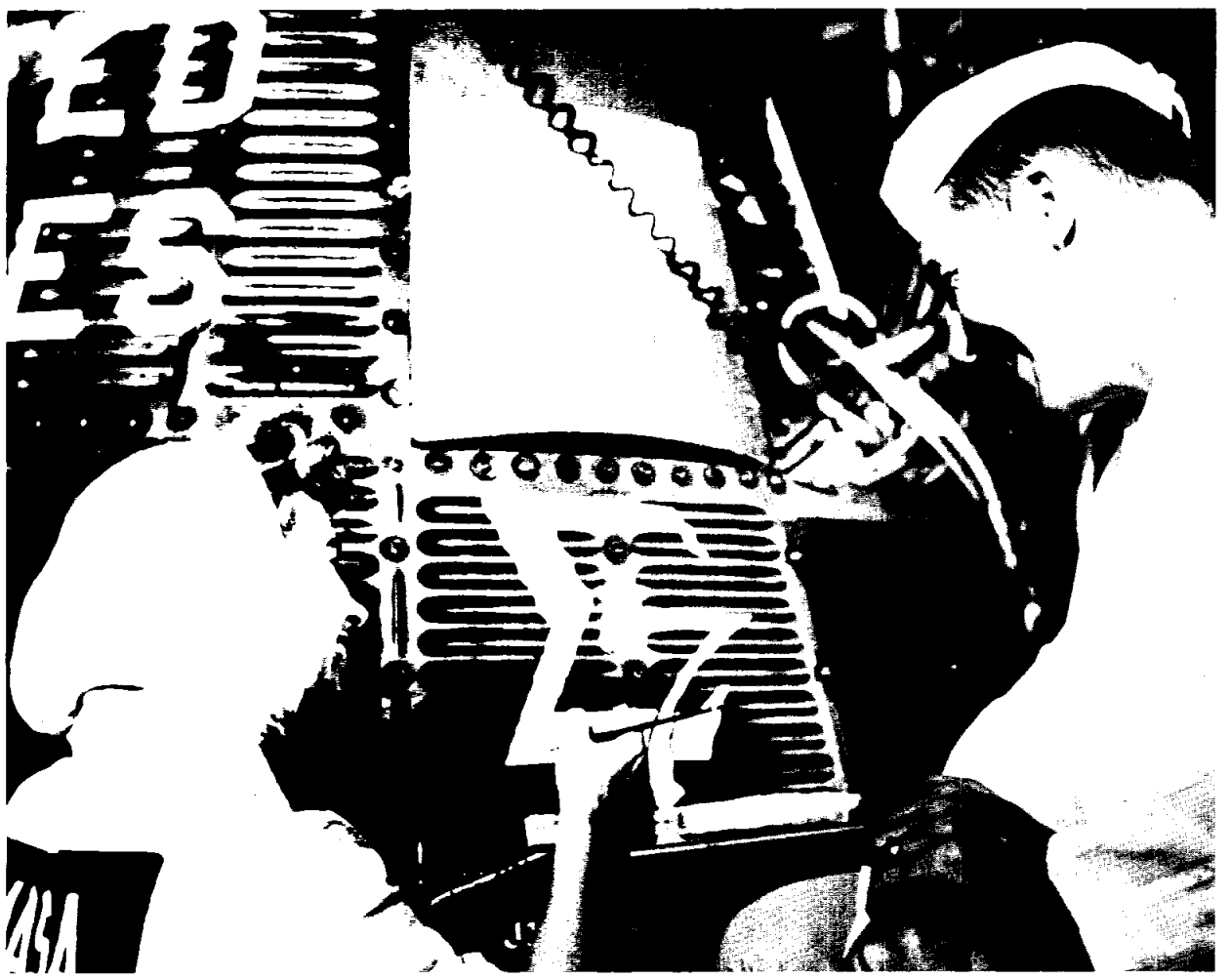


SPREAD OUT ON THE BOARD at Mercury Control Center, Cape Canaveral, Astronaut Walter M. Schirra's flight plan shows the six parallel orbital paths he will follow during the nine-hour mission. BELOW, Cece Bibby adds a final touch to launch preparations as she paints the name "Sigma 7" on spacecraft 16, while the pilot, Astronaut Walter M. Schirra, looks on.



Pilot Explains Idea Behind Name Picked

Astronaut Walter M. Schirra named his spacecraft, listed as No. 16 in engineering documents, "Sigma 7."

Sigma is a mathematical term meaning "summation," and an often-used engineering symbol.

Schirra said he picked the name because Project Mercury is the summation of "a tremendous scientific and engineering effort involving literally thousands of people."

The "7" stands for the original seven astronauts, as it has on Astronaut John Glenn's "Friendship 7" and Astronaut M. Scott Carpenter's "Aurora 7."

Built by McDonnell Aircraft Corp. of St. Louis, Mo. the spacecraft stands nine and one-half feet tall and weighs about 4,200 pounds at launch. Weight in orbit will be about 3,000 pounds and some 2,400 pounds on the water at recovery.

More information on MA-8 on pages 2 and 3. Pictures on page 7.

Schirra To Pilot 'Sigma 7' During Nine Hour Flight

The United States will put its third man into orbit no earlier than today, this time for a nine hour, 12 minute flight covering six orbits and ending in the Pacific Ocean.

If successful, MA-8 will be the longest United States manned flight to date, and will furnish invaluable information on techniques and effects of prolonged space flight for use in the later planned one-day mission.

As the Roundup went to press the launch was scheduled from Cape Canaveral between 7 and 9 a.m. EST today, with the possibility that technical or weather difficulties could cause "holds" ranging from minutes to days.

Astronaut Walter M. Schirra, 39, is prime pilot for the mission with Astronaut L. Gordon Cooper, Jr., 35, as back-up pilot.

Doubling the length of the mission gives the astronaut about four times as much opportunity for experiments and observation. During previous three-orbit missions the astronaut used the first orbit to become familiar with space flight conditions and monitor the spacecraft systems, and most of the third preparing for re-entry.

The MA-8 flight plan calls for more "drifting" flight than did plans for the two previous manned orbital missions. It includes a flare-visibility experiment, further photographic experiments and a test of heat-protection materials.

Schirra will be out of communications range of the ground stations more often during this flight that pilots in previous missions, including the major part of the fourth and fifth orbits.

As a result, more dependence will be placed upon the mission pilot to monitor spacecraft systems, a factor which will also come into play during the one-day mission.

Critical Point

The supply of hydrogen peroxide fuel for the reaction and control system and its rate of usage is the most critical item in accomplishing the six-

(Continued on Page 2)

MA-8 PILOT Walter M. Schirra, Jr. explains the function of his pressure gloves to two other Walter Schirra's—his son, Walter III, and his father, Walter, Sr., a civil engineer.

MA-8 Readies For Six Earth Orbits

(Continued from Page 1)

orbit mission. Rate of fuel usage is determined largely by the mode used in controlling the craft.

Past flight experience indicates that the automatic (ASCS) mode is the most economical of the four control modes, and the manual proportional mode the most expensive.

Schirra will be supplied with about 3,000 calories of non-residue food and about six pounds of water. The water supply, sufficient for 28 hours, is carried in two flat bottles, each fitted with an extendable tube.

Launch time for the six-orbit mission is planned to provide at least three hours of daylight search time in the primary recovery areas, located for the first time in the Pacific rather than the Atlantic Ocean.

Primary recovery area is 275 miles northeast of Midway Island. Five ships under the command of Rear Admiral C. A. Buchanan, Commander, Task Force 130 will form prime recovery forces.

Since there is a possibility that the mission could be aborted after the first, second or third orbits, more than 20 ships will be deployed in the Atlantic Ocean recovery areas, under the command of Rear Admiral Harold Bowen, Destroyer Flotilla Four.

Some 100 aircraft around the world will be standing by to be called into action in the event of emergency landing.

Astronaut Assignments

As is usual in Mercury flights, all seven astronauts will participate.

Astronaut Donald K. "Deke" Slayton will be capsule communicator (Cap Com) at Cape Canaveral. Cooper, as back-up pilot, will also be at the Cape.

Astronaut Alan B. Shepard, Jr. will be aboard the Pacific Command Ship, "Rose Knot," while Astronaut Virgil I. Grissom will be stationed on Kauai Island, Hawaii. Astronaut John Glenn, Jr. will man the tracking station at Pt. Arguello, Calif., and Scott Carpenter will be at the Guaymas, Mexico, station.

The communications system for MA-8 will remain the same as for three-orbit missions. However, telemetry transmitters and C- and S-Band beacons will be turned off during the major part of the fourth and fifth orbits when the spacecraft is not within communications distance of a tracking station. Transmitters can be turned on at the proper time by ground command when within proper range.

The MA-8 flight is to provide development of techniques and procedures directly applicable to the planned one-day mission. Flight planning and flight experience concerning the use of fuel and electrical power, tracking and communications procedures for an extended mission, and tracking procedures in areas where range coverage is limited are areas to be explored.

The MA-8 mission will also provide spacecraft systems performance data over an extended time period, something which has been checked only during ground simulations so far.

Aeromedical data and astronaut performance over a full nine hours will also furnish valuable information.

Debriefing

A flight of four, five or six orbits would bring the Mercury spacecraft down in the Pacific.

A 72-hour debriefing after four, five or six orbits will be held aboard an aircraft carrier, after which Schirra will be returned to Hawaii by carrier and then flown to Houston.

The 21-station Mercury Tracking Network which will monitor Schirra's flight includes five ships, four of them in the Pacific arranged over a 1,500-mile area between the Philippines and Midway, and one Indian Ocean ship.

The Pacific ships are the Rose Knot, the Huntsville, the Watertown and the American Mariner.

The Indian Ocean ship, which will have a key communications assignment, will be located about 840 miles east of Durben, Union of South Africa, and 50 miles south of Madagascar.

Some 500 technicians man the Mercury stations. Each station is in radio or cable contact with NASA Goddard Space Flight Center, Greenbelt, Md., where orbits and trajectories are computed, and through Goddard to the Mercury Control at the Cape.

What Occurs On Launch, Reentry During MA Flight

(Continued from Page 1)

one-half minutes of flight, an electronic brain called the Abort Sensing Implementation System (ASIS) is capable of sensing impending trouble in the launch vehicle and triggering the escape rocket, which would pull the spacecraft away from the Atlas launch vehicle.

About 20 seconds after staging, assuming the flight is proceeding as planned, the 16-foot escape-rocket tower will be jettisoned. The parachute landing system will then be armed for use after reentry. Mercury-Atlas continues to accelerate toward the insertion point, now guided by ground command stations.

Between staging and orbital insertions, the ASIS will continue to "watch" for trouble. If a significant deviation should occur, the system will automatically release the clamp ring attaching the spacecraft to the launch vehicle, and fire the posigrade rockets on the base of the spacecraft.

About five minutes after liftoff, guidance ground command will shut down the sustainer and vernier engines. As they shut down, the spacecraft-to-launch-vehicle clamp ring is released and the posigrade rockets fired, separating the manned craft from the Atlas.

A few seconds of automatic damping will follow, to remove any attitude changing motions. The spacecraft pitches over 180 degrees, so that the blunt face of it is turned forward and upward about 34 degrees above the horizontal.

"Sigma 7" is now in orbit, according to flight plan over vicinity of Bermuda. It is coasting at an altitude of about 100 miles and a speed of about 17,500 miles an hour. Only a few minutes of the nine-hour flight plan have elapsed. From this point on during orbital flight, the spacecraft can be controlled in proper attitude automatically or manually by the pilot.

Reentry

As the spacecraft approaches a point some 350 miles northwest of the Rose Knot, the Pacific Command Ship, retro and braking rockets will be fired to start reentry. The command ship, located 800 miles north of Guam, can also fire the retro rockets if necessary. The automatic attitude control system will hold the craft in the proper attitude during this braking.

Shortly after the retro rockets are fired, the exhausted retro rocket package will be jettisoned and the spacecraft will automatically assume reentry attitude. The craft begins to encounter more dense atmosphere of the Earth at an altitude of about 55 miles. At this point, temperatures will start mounting on the spacecraft's ablation heat shield. Peak reentry temperature of about 3,000 degrees F will occur at 25 miles altitude while the spacecraft is moving at nearly 15,000 miles per hour. All told, the craft will sustain temperatures in this neighborhood for about two minutes.

At about 21,000 feet, the six-foot diameter drogue chute will be deployed automatically to stabilize the craft. The pilot may elect to deploy the chute manually, however, as high as 40,000 feet. At about 10,000 feet, the antenna fairing above the spacecraft cylindrical section will be jettisoned and the 63-foot ringsail-type main land-and parachute will be deployed. The impact bag will also be deployed at this time.

At impact, the main parachute and reserve chute will be jettisoned. Onboard electrical equipment will then be shut down, and location aids—dye marker, seasave beacon, super SARAH, a flashing light, and a 3,500 foot underwater charge (dropped into water before touchdown)—will be activated.

MRS. WALTER M. SCHIRRA, SR., takes a speculative look at the suit her son will circle the globe in. The senior Schirra's live in Honolulu, Hawaii, where the astronaut will return following a 72-hour debriefing aboard ship after the flight.

NASA LEWIS RESEARCH CENTER scientists Pinkle and Modarelli study the Mercury spacecraft in the White Room of Hangar S prior to installation of the beryllium shingles which will carry samples of heat-protection materials. Samples mounted on the small end of the spacecraft will be studied after exposure to reentry heating during MA-8.

Four Experiments Will Be Carried Out During Flight

Scientific experiments to be conducted during MA-8 have been assigned the following priority by the Mercury Scientific Experiment Panel.

First priority is the flare-visibility study, which failed during the MA-7 mission because of heavy cloud cover.

Two sites have been chosen for the location of ground-based flares in an attempt to decrease the probability of *cloud cover interference*. The primary site is Woomera, Australia where three high-intensity flares will be ignited. The secondary site is Durban, South Africa, which will display electric lamps of three-million candle power.

The astronaut will attempt to observe an earth-based light source and establish atmospheric attenuation of this source. He will first calibrate visual perception and dark adaptation by measuring with a photometer a light source on the instrument panel and then measure the ground-based light with the photometer.

Photo Studies

Second priority is given to photographic studies similar to those conducted on the missions of Astronauts John Glenn and Scott Carpenter. A 35-millimeter camera and film will again be carried for photographs of general terrestrial features.

Scientists at Goddard Space Flight Center are particularly interested in color photography of folded mountains, fault zones, volcanic fields, meteor impacts and glaciers.

They would also like to investigate the photometric properties of various land surfaces with applications to the study of the moon and the planets.

Heat Protection Study

A third and fourth experiment are of a passive nature. In one, advanced heat-protection materials will be studied after exposure to orbital re-entry heating. Ablation samples are mounted on the cylindrical portion of the spacecraft, attached through lamination with the external beryllium shingles.

AVCO Corporation, NASA Langley Research Center and McDonnell Aircraft Corporation have been assigned two each of the available nine panels for their respective materials to be tested.

Emerson Electric, Chance Vought Corporation and General Electric bonded a sample to one each of the remaining panels.

In addition to a study of the re-entry heating effects on these materials, cracks or slots will be placed in the materials, half of which will be filled or repaired and the remainder left unaltered. This will establish the effectiveness of heat shield repairs and provide non-critical damage as a comparison.

Due to the heat-protection study, the spacecraft will require special handling after the flight.

Radiation Experiment

The other passive experiment is the radiation-sensitive emulsion study sponsored by Goddard Space Flight Center. Goddard scientists are primarily interested in the type and magnitude of nuclear interactions in orbital space.

Two packs containing an emulsion sensitive to radiation, each weighing about a pound and measuring three by two and five eights inches, will be mounted on either side of the astronaut's couch. They will be analyzed after the flight.

The experiment will study primary cosmic radiation, the energy spectrum of the low energy cosmic ray particles, high energy gamma rays, and will search for rare particles.

WELCOME ABOARD

Manned Spacecraft Center acquired 71 new employees between Sept. 9 and 19.

Gemini Project Office: James W. Thompson, Robert A. Peck, and Patricia A. Goldstein.

Apollo Project Office: Joe T. Doke, James D. Sword, and Robert V. Battey.

Spacecraft Research Division: Robert A. Dittman, Donald C. Wade, Oscar O. Ohlsson, Jr., James M. Janney, Donald J. Kessler, Kent H. Marple, Paul E. Sollock, and Cecil R. Gibson.

Life Systems Division: Larry P. McQuown, Gary F. Davis, Alexander F. Kleiner, Jr., Stanley Curtice, and Albert F. Behrend.

Preflight Operations: Anne L. Hull, Emily H. Grow, Jewell D. Garth, Ray A. Gearhart, and Martha R. Kinard.

Flight Crew Operations: John B. Lowe.

Procurement and Contracts: Barbara D. Wheat, Claire R. Nichols, Mattie S. McGehee, Jimmie K. Bacon, Sylvia J. Phillips, Thelma C. Cole, and Norman R. Cooper.

Facilities: Charles F. James, Willard W. Hendrix, and Betty J. Murray.

Technical Services Division: Neal O. Mann.

Administrative Services Div: Carolyn M. Elrod, Doris L. Agnew, and Ethel R. Sarokon (Cape Canaveral).

Flight Operations: Thomas A. Ziegler, John G. Zarcaro, Samuel E. Calvin, Janet A. Shrum, James D. Shannon, William A. Middleton, III.

Data Computation: Charles G. Krpec, Jr., Caroline L. Horton, and Martin L. Edgar, Jr., Ruby J. Sutton, and Helen G. Hunter.

Assistant Director for Administration: Betty L. Wallace, L. Maurice Clelland.

Resident Office of Manned Space Flight: Bobbie M. Wright.

Systems Eval & Devel: Mike Oberschmidt, Thomas A. Lewis, Douglas B. Trahan, Barney B. Roberts, III, Mary F. Lawrence, and Hoyt McBrayar.

Space Physics: Roy T. McCutchan.

Financial Management: Charles E. Bechman, Sandra L. Laird, and Linda K. Joplin.

Logistics Division: E. Josephine Cole, Hugh M. Cole, Cynthia A. Chapman, Donna L. Gaskill, Jacquelin M. Thompson, Janis L. Jenkins, and Richard Almendarez.

Photographic Services Division: Jose L. Cambiaso.

NSA Classes For Secretaries To Continue Through April

The Houston Chapter of the National Secretaries Association is sponsoring a series of study classes open to non-members as well as members, and covering sections of the Certified Professional Secretary examination.

Potential secretaries, stenographers, clerical workers and general office personnel as well as secretaries can benefit from the lectures.

Lectures are given Wednesday evenings from 6:30 to 8:30 p.m. in the cafeteria, 3400 Montrose Building in Houston.

The next scheduled lecture is on secretarial accounting and will be given by Mrs. Jo Ann Langford, this evening, Oct. 3. Continuing lectures on the same topic will be given by Mrs. Langford and Robert M. Hermance, Oct. 10 and 17.

Other subjects to be covered are human relations, Oct. 24; business law, Oct. 31, Nov. 7, 14 and 28, and Dec. 5; economics and business administration, Jan. 9, 16, 23, and 30; stocks and bonds, Feb. 6; secretarial procedures, Feb. 13, 20, 27; english usage and letter writing, March 6, 13, and 20; shorthand and speed building, Mar. 27 and April 3, 10 and 17.

Interested MSC employees are invited to attend a lecture at Rice University's Fonderin Library Lecture Lounge tomorrow at 2 p. m. Guest lecturer will be Dr. C. H. Ward, research biologist at the USAF School of Aerospace Medicine, who will speak on the use of algae and other plants in development of life support systems.

Lovers Of Music Invited To Attend Following Events

The 1962-63 Season of the Houston Symphony Orchestra opens Oct. 15 and 16 with the first of 32 concerts to be presented in 16 identical pairs on Monday and Tuesday evenings.

Sir John Barbirolli, Conductor in Chief, will conduct 12 of 16 pairs. Guest conductors will include Pierre Monteaux, Werner Torkanowsky and Andre Kostelanetz. The San Antonio Symphony Orchestra with Victor Alessandro conducting will be presented Dec. 3 and 4.

A large roster of guest artists will be used throughout the season.

Music lovers will also be interested in the five attractions of the Houston Friends of Music , opening with the Vegh String Quartet Oct. 27 in Cullen Auditorium, University of Houston. Tickets may be obtained by calling MO 5-3264.

Other chamber music groups to be presented include the Albeneri trio, the New York Woodwind Quintet, the Alma trio and the New York String Sextet.

Three Companies Named In Lunar Logistics Study

NASA will negotiate with three companies to conduct three-month studies of a lunar logistics system and what equipment it might carry.

If negotiations are successful, Space Technology Labs, Inc. of Los Angeles, will study various types of spacecraft which could carry supplies to the manned Apollo spacecraft landing site on the moon. Cost of the contract is estimated at about $150,000.

A major objective of this study will be to provide engineering data on how sub-systems in a 9,000-pound vehicle carrying some 1,500 pounds of equipment might form the basis for follow-on development of a 90,000 pound vehicle carrying 20,000 pounds of cargo. The small craft could be boosted by versions of the Saturn C-1, the larger by Saturn C-5.

Northrop Space Laboratories of Hawthorne, Calif. and Grumman Aircraft Engineering Corp. of Bethpage, N. Y. have been selected for negotiation of studies and operational analysis of possible cargoes which the vehicle might carry. The study will consider a number of single-purpose cargoes for the smaller craft. For instance, one vehicle might carry life support supplies—oxygen, water and the like.

Others might carry a crew shelter, a roving vehicle, a power station or a communications station. Another part of these studies will consider make-up of a combination of smaller cargoes to fly on one of the larger craft.

Cost of the two studies is estimated at $75,000 each.

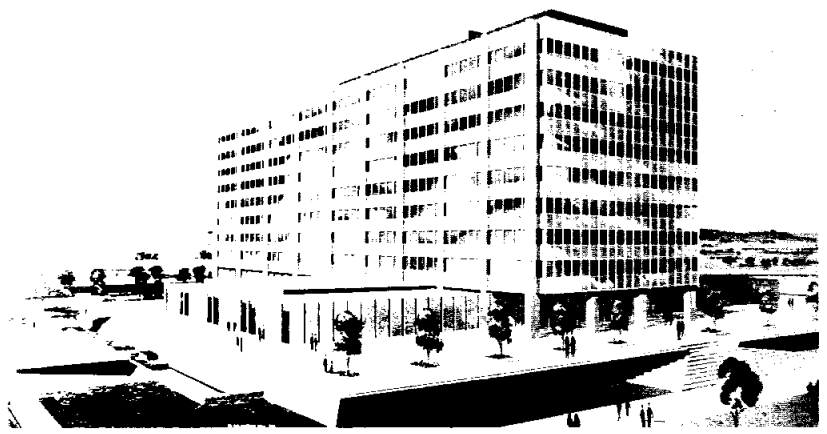
Various NASA centers will be working simultaneously on studies of lunar logistics systems, trajectories, launch vehicle adaptation, scheduling, alternate spacecraft propulsion concepts, lunar landing touchdown dynamics, and use of roving vehicles on the lunar surface.

Results of these and related NASA in-house studies could provide the information required to define the lunar logistics system in detail. Actual development must await this information before final project improvement can be considered.

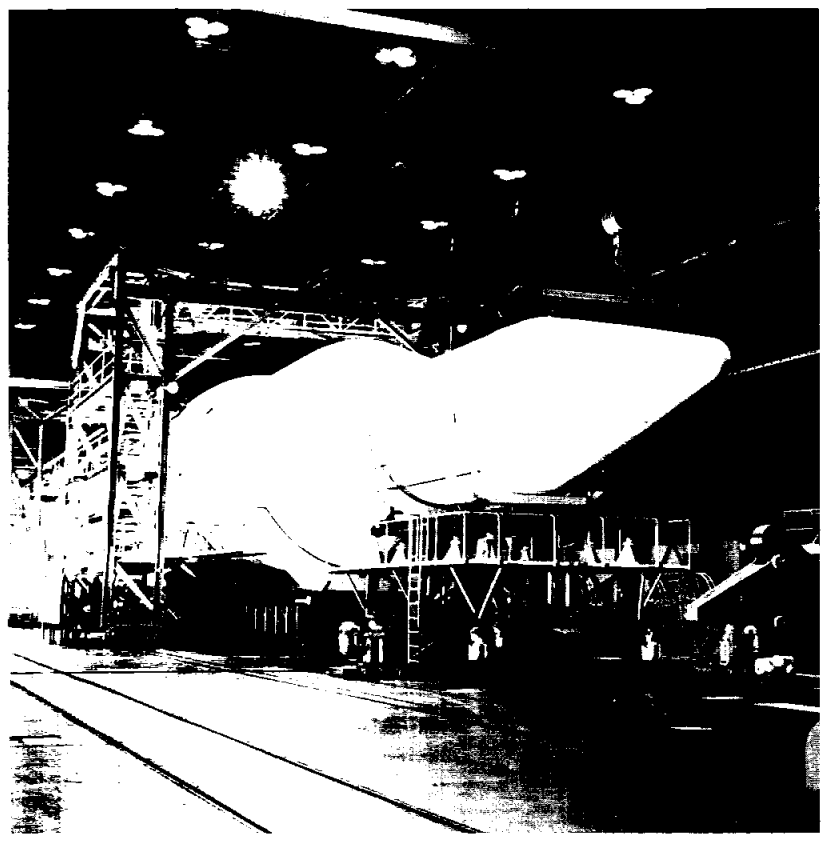
Northrop, Grumman and Space Technology were selected for negotiations after evaluation of proposals from 19 firms. Five of the firms submitted proposals for both studies.

The over-all study effort is being managed by the NASA Office of Manned Spaceflight, Washington, D. C. under the direction of D. Brainerd Holmes.

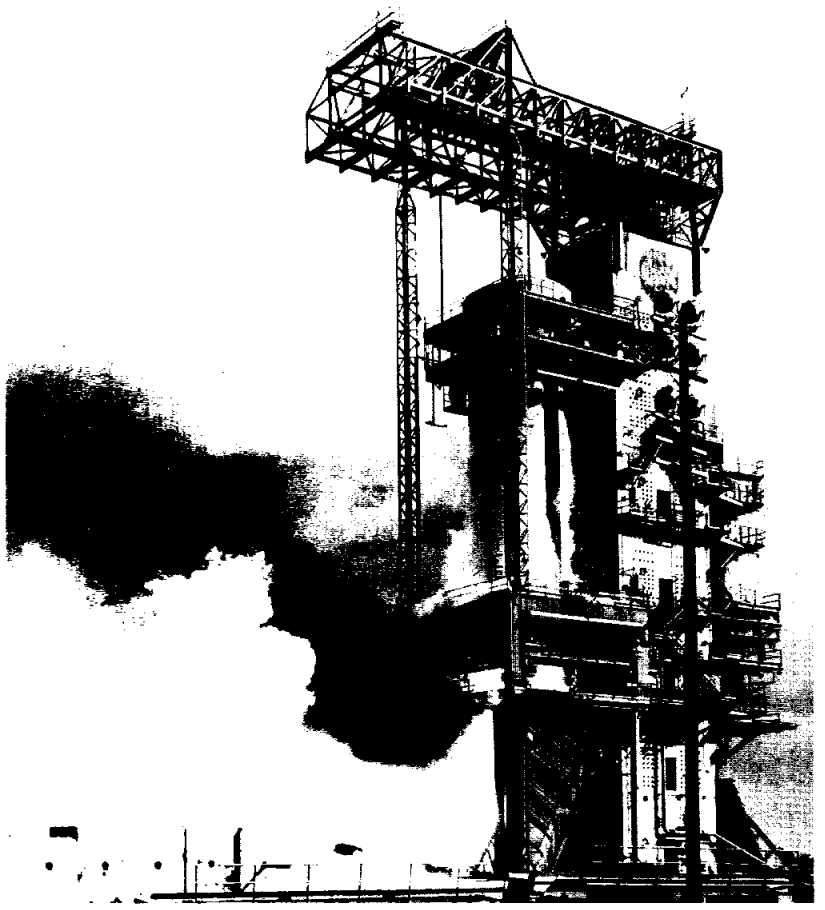
Marshall Space Flight Center Developing Saturn Fan



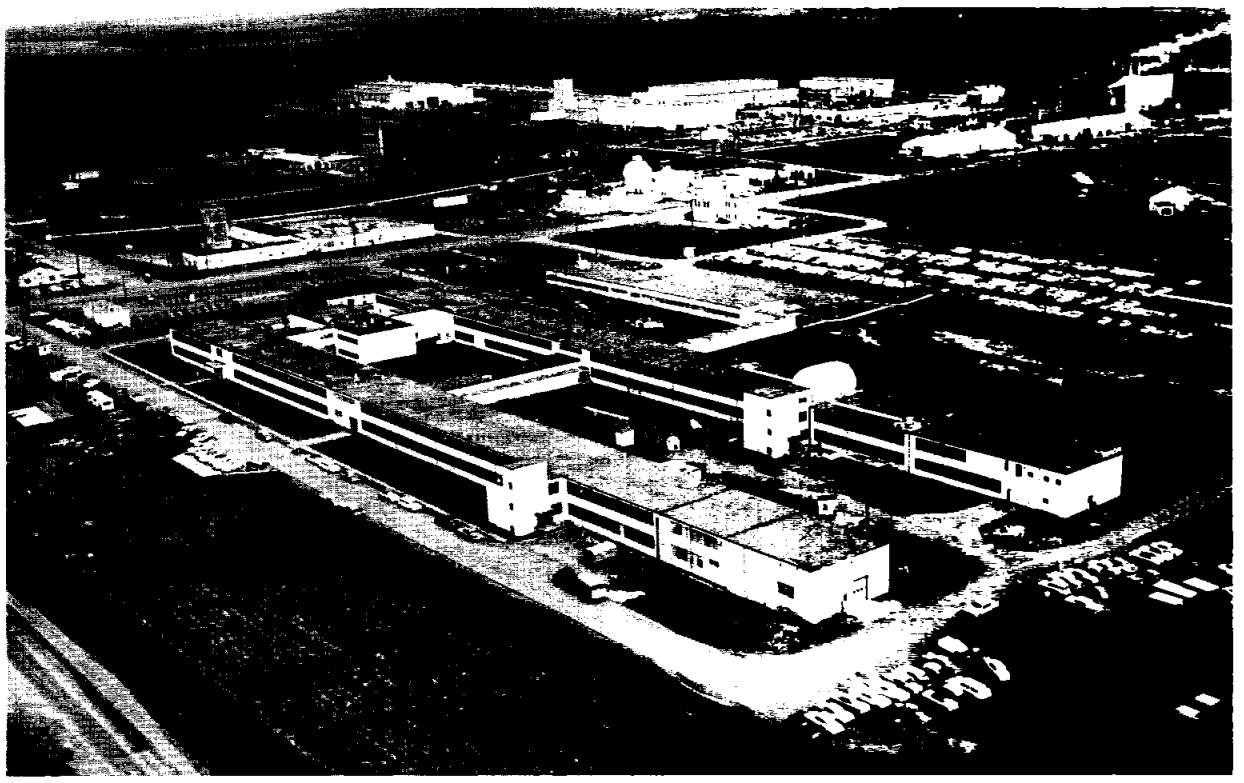
MSFC's new central lab and office building, now under construction, is scheduled to be completed early in 1963. The nine story structure will provide working space for about 1,200 of Marshall's 6,000 employees at Huntsville.



THE GIANT SATURN C-1 is shown in the Manufacturing Engineering Division at MSFC. It will be capable of placing about 10 tons into low earth orbit.



ALL EIGHT ENGINES of a Saturn booster are fired, generating 1.3 million pounds of thrust, in a static test at MSFC.



AN AERIAL VIEW of a portion of facilities at Marshall Space Flight Center, which occupies 1,600 acres of the 40,000-acre Redstone Arsenal at Huntsville, Ala.

"Countdown . . . lift-off for the moon!"

Sometime in the next few years an MSC Apollo spacecraft carrying three Houston-trained astronauts will blast off from Cape Canaveral on a much-awaited trip into the unknown.

It will be the greatest adventure of all time, the manned lunar landing.

The Apollo and its eager occupants will be riding atop a pile of rocket stages composing the largest space vehicle known to this country. This will be the Saturn C-5, weighing more than six million pounds and turning up 150,000,000 horsepower.

This monstrous rocket will have been provided by MSC's sister activity in Alabama, the Marshall Space Flight Center. The Saturn C-5 will represent the concentrated efforts of more than 6,000 space-minded

Dr. Wernher von Braun
Director, MSFC

employees at Huntsville, the home of the Saturn family. With a budget of more than $1 billion for fiscal year 1963, Marshall Center—directed by Dr. Wernher von Braun—is the largest installation of NASA.

For it is at MSFC that the evolving family of Saturn vehicles, each bigger and more potent than its predecessor—moves from blue print to assembly floor to test stand in preparation for launches from Cape Canaveral. Marshall Center is the nation's most complete establishment for the development of large rockets that will be used in NASA's manned lunar exploration program, which work is done under the direction of NASA Office of Manned Space Flight, headed by D. Brainerd Holmes.

The George C. Marshall Space Flight Center had its origin in the Army Ballistic Missile Agency, a part of the U. S. Army Ordnance Missile Command. While still a part of the Army, the von Braun team of scientists, engineers, and technicians that later formed the nucleus of the new space agency orbited America's first artificial earth satellite, Explorer I. The same team also developed the Juno I (Jupiter C) and Juno II space carrier vehicles while still with the Army.

On September 8, 1960, in ceremonies at Huntsville attended by the President and Mrs. George C. Marshall, the new space flight center was officially dedicated and made an integral part of NASA.

The von Braun group was transferred to NASA in 1960 and made responsible for developing and launching space vehicles.

Marshall Center occupies 1,600 acres in the middle of the 40,000-acre Redstone Arsenal reservation, adjoining the city of Huntsville on the north and the Tennessee River on the south. It represents an investment of over $100 million in property and equipment.

The Center's ten technical divisions are equipped to conceive, design, build and test giant rockets.

The Center's current projects also include the Thor Agena-B, the Atlas Agena B, Centaur, and RIFT (Reactor-In-Flight Test) vehicle. Marshall also manages NASA's engine development projects—H-1, F-1, RL-10, J-2, and M-1, all of which are being used or are slated for use in NASA space vehicles. Eighty per cent of the Center's 1962 fiscal budget was spent with private industries and research organizations.

Associated with MSFC in Huntsville are several facilities at other locations. A huge assembly plant for the Saturn vehicle is located in Louisiana. Plant representatives located in the mid-west, south and west, provide liaison with the

Dr. Eberhard Rees
Research &
Development Chief

Center's contractors. MSFC personnel are also located at other geographical areas throughout the United States.

NASA recently activated the government-owned Michoud plant at New Orleans for the fabrication of large space vehicle stages. It is under the control of Marshall Center and Dr. George N. Constan is the manager. The 846-acre Michoud facility will be the site of the production of the Saturn C-1 booster and the Saturn C-5 booster, the latter developing 7.5 million pounds thrust. These boosters manufactured at Michoud will be

ly of Space Vehicles for Manned Lunar Exploration

THE RECENTLY ACTIVATED Michoud facility of MSFC is shown with the administrative and engineering office at front and the 43-acre manufacturing plant stretching out to the rear. This will be the production site of the 1.5 million-pound-thrust Saturn S-1 booster, and the 7.5 million-pound-thrust advanced Saturn booster.

tested by NASA contractors at a static test site about 35 miles from Michoud known as the Mississippi Test Facility. It will cover some 13,500 acres in Southwest Mississippi. Dr. Constan also manages this facility, under the direction of Marshall Center and Dr. von Braun.

Rockets born at Huntsville were the launch vehicles for many of the Explorer and Pioneer satellites and space probes that have yielded much information about the makeup of the realm beyond earth. The rocketmen at Huntsville gave a major assist to MSC in Project Mercury as the developer and launcher of Redstone, the booster that sent astronauts Shepard and Grissom into suborbital flights last year, preparing the way for the Glenn and Carpenter three-orbit trips launched by Atlas boosters.

With the first stage of the Advanced Saturn, or C-5, kicking up 7.5 million pounds of thrust, it will be able to put an Apollo payload in orbit around the moon.

After Saturn will come the mammoth Nova vehicle, which will stand taller than a 30-story building and churn up 12 million pounds of thrust at life-off. Nova will provide direct flight to the moon, without orbital launch. Following the first tentative steps into space with Project Apollo, man will put on his seven-league boots and take giant strides across space to the nearer planets of the solar system.

Dr. von Braun and other NASA officials say the Saturn C-5 being developed at Huntsville will get us to the moon before 1970. In line with this, the Marshall Center is growing rapidly. New facilities and additions to old ones are going up in almost every direction. In the middle of the Center a new $4-million Central Laboratory and Office Facility is under construction. Meantime, temporary office space has been acquired in various off-Center buildings including two former motels and a

Dr. J. P. Kuettner
Manager,
Saturn-Apollo System

restaurant. The Marshall Procurement and Contracts Office, now letting contracts at a total rate of more than $600 million a year, is operating out of the former Twickenham Hotel in downtown Huntsville. A uniformed security guard mans the hotel's former registration desk.

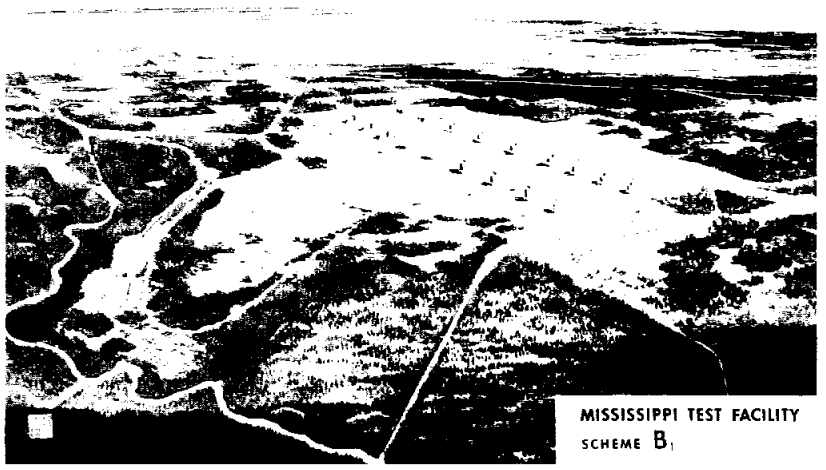
The 50-year old von Braun, a world-acclaimed rocket pioneer, directed the development of the 200-mile Redstone rocket, which was America's first large ballistic rocket. Later the von Braun team developed the Jupiter IRBM, and the Pershing rocket. Special versions of the Redstone and Jupiter were used by the von Braun group in launching the Free World's first satellites of the earth and sun, Explorer I and Pioneer IV, and in the first successful space flight and recovery of animal life.

Dr. von Braun's deputy director for research and development is Dr. Eberhard Rees, who has been in guided missile research, development and production more than 20 years. He came to the U. S. in 1945 and was assigned to Fort Bliss, Texas, and White Sands Proving Ground, New Mexico, as a consultant on V-2 firings and on new projects in the guided missile field. He went to Huntsville in 1950, becoming deputy director of the Army Ballistic Missile Agency's Development Operations Division in 1956. After the transfer of personnel to NASA in 1960, Dr. Rees was appointed to his present position.

Dr. Joachim P. Kuettner is manager of the Saturn-Apollo System for the Marshall Space Flight Center. During World War II Dr. Kuettner tested advanced airplanes including the six-engine Messerschmitt "Gigant" and the manned version of the V-1 for the German aircraft industry. He came to the United States in 1948 and joined the Air Force Cambridge Research Center. In 1958 he joined the Army Ballistic Missile Agency at Huntsville, as director of the Agency's efforts in Project Mercury. In 1960 he transferred with the von Braun group to Marshall Center as Chief of the MERCURY-REDSTONE Project which resulted in the ballistic space flights of astronauts Shepard and Grissom. Dr. Kuettner's office works closely ith MSC on problems dealing with Apollo.

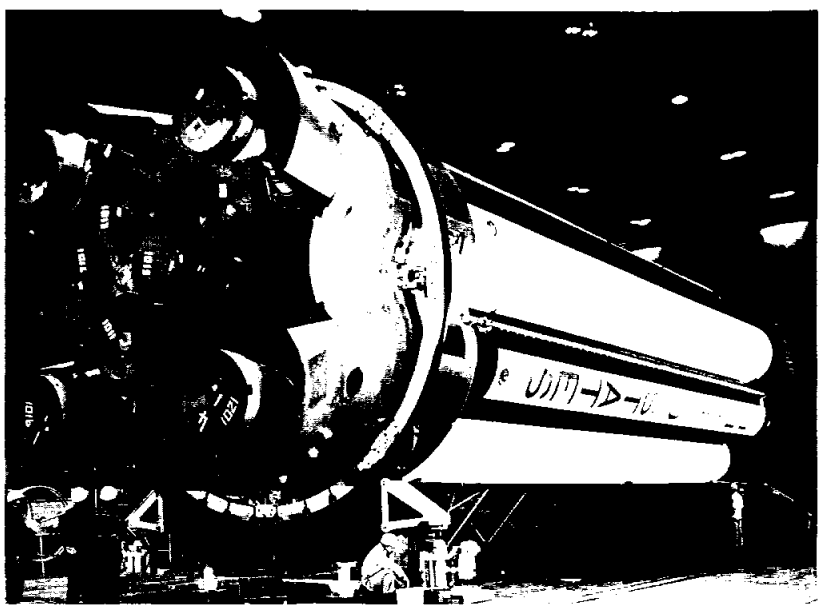
The rocketmen at Huntsville are working—in close relation with MSC—to provide the big, multi-stage vehicles that will launch a series of shots leading to the landing of men on the moon by the end of the decade.

Editor's Note: This is the second in a series of feature articles about the activities of other NASA installations. The information concerning Marshall Space Flight Center, its major projects and its key personnel was prepared special for the *Space News Roundup* by the MSFC Public Information Office.

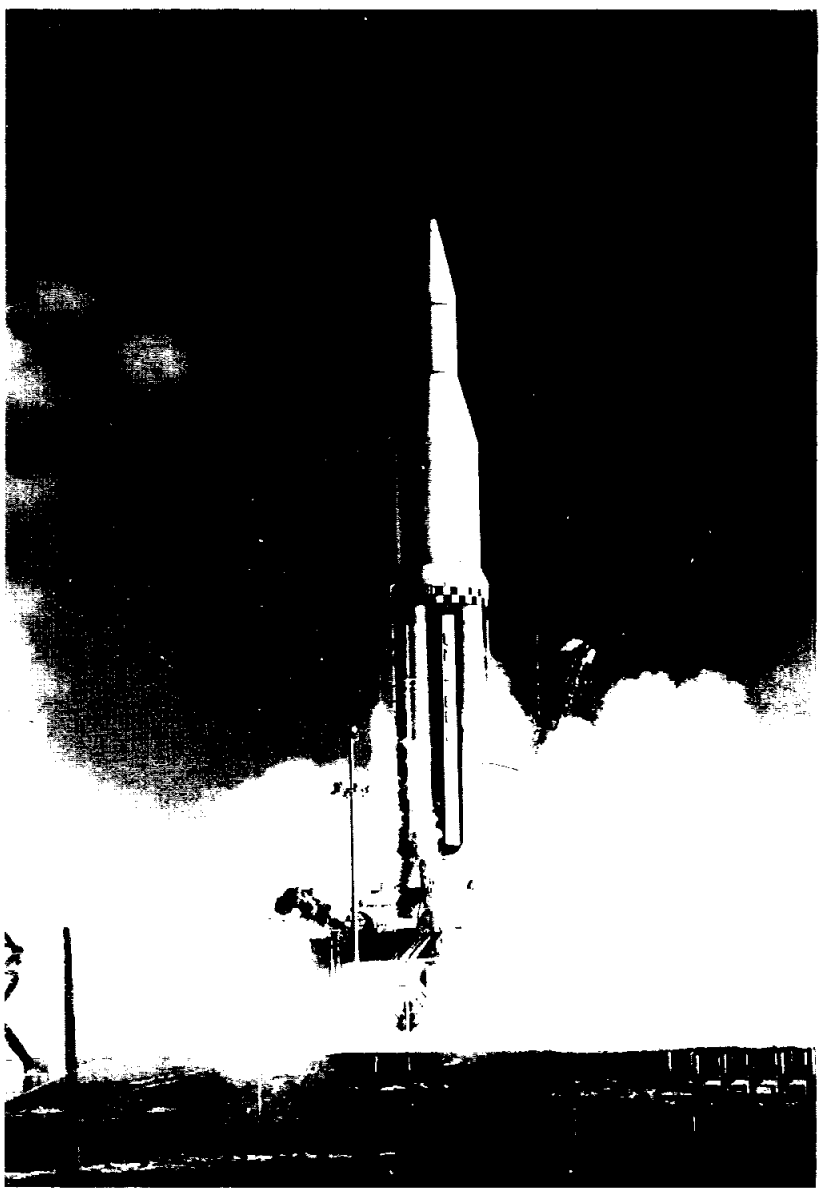


MISSISSIPPI TEST FACILITY
SCHEME B_1

AN ARTIST'S CONCEPTION of a possible arrangement of test stands at the Mississippi Test Facility, located 35 miles from the Michoud, La., facility.



THE S-1 STAGE of the Saturn launch vehicle, powered by a cluster of eight Rocketdyne H-1 engines, each of which is designed to produce 188,000 pounds of thrust, is shown in the Fabrication and Assembly Engineering Division at MSFC.



THE SECOND SATURN C-1 vehicle is shown during lift-off at Cape Canaveral April 25, 1962.

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On The Lighter Side

Kitchen Rocketry

If a "Money-At-Home" small business enthusiast ever decided to start in the rocket business on a shoestring, best place he could start would be right in the kitchen.

For the average housewife makes daily use of many household products which are simultaneously hard at work in the space industries and laboratories of Aerojet-General Corporation.

The vinegar and salt she uses to season her pickled beets, for example, are used in certain processes of making rocket fuels. And so is the bicarbonate of soda her husband takes after eating her pickled beets.

The cleaner compound she uses to open clogged drain pipes and water closets is commonly used to purify rocket fuels. She knows it by brand names, or as lye. It is called sodium hydroxide by rocket scientists who cannot tell a lye.

And the laundry bleach she uses to make her clothes sunshine bright is actually sodium hypochlorite, an ingredient of a rocket engine fuel intended to bring man closer to that sunshine.

Another rocket fuel ingredient is ethylene glycol—known as anti-freeze around the garage. And another fuel—right from the medicine cabinet: perioxide.

Cigarette lighter fluid and spot remover fluid are a couple of other handy household items at work, these two being used in chemical analyses.

And if it begins to sound like the Aerojet scientists are using just about everything but the kitchen sink—don't count that out either. The garbage disposal is almost identical to the device used to grind up certain solid rocket propellant ingredients.

—Cartoon by Pete Bentovoja, Los Angeles Examiner. Copy by Don Bailer. Reprinted courtesy of Aerojet-General.

EDITORIAL EXCERPTS

The Washington Post
Sept. 17, 1962

DOLPHIN MAY HELP MAN TALK TO SPACE CREATURES

The dolphin, a brainy creature of the sea with a high-pitched, high-speed voice, was chosen yesterday by the space agency as a tool for research on communications between man and other forms of life.

The National Aeronautics and Space Administration awarded an $80,700, one-year contract for the work to Communication Research Institute, Charlotte Amalie, St. Thomas, Virgin Islands.

The assignment: "Basic scientific research on the feasibility and methodology for establishing communication between man and other species."

Naturally, the space agency is interested in "other species" that may someday be found on distant planets.

The study will be directed by Dr. John C. Lilly, a noted authority on the dolphin, better known as the porpoise.

Dr. Dale W. Jenkins, chief of NASA's environmental biology programs, said Lilly probably will do most of the research at an aquarium at Cocoanut Grove, just south of Miami.

Jenkins said Lilly had determined that dolphins talk to each other, but at a rate eight times faster than that of human beings.

Dolphins also have a remarkable gift of mimicry of the sounds they hear.

Jenkins said that when a dolphin has been properly conditioned, it will try to repeat human speech.

The mimicry is apt to seem like an unintelligible series of squawks, squeaks, quacks and blats.

However, Lilly has reported that a dolphin repeated such phrases as "three two three" in distinguishable terms even though it was in a high-pitched Donald Duck quack-like form.

Jenkins said that when tapes of the dolphin "speech" were slowed down to half or quarter speed, however, Lilly found something surprising.

The dolphin apparently had taken the human vocalization and compressed it as to time. By slowing the tape, thus lowering the pitch, the dolphin's voice came back in clear repetition of the human words.

Jenkins said the replies were so distinct that when one of Lilly's assistants with a southern accent spoke to the dolphin, the animal repeated the sentence faithfully even to the southern drawl.

"This work may help us toward understanding of the communications of other organisms, some of which have communications techniques far more effective than ours."

"NASA faces the problem of far off communications, of communicating over vast distances.

"We will be needing far more effective methods of communicating and of compressing our information.

"We have not yet determined whether there are any communications directed at earth from outer space. If we do make contact, we will have to work out systems of understanding."

MSC PERSONALITY

Dr. Robert R. Voas Serves As Asst. For Human Factors

A former Navy psychologist and author of more than 30 technical papers and articles in his field, Dr. Robert R. Voas presently serves as assistant for human factors to the director of MSC.

"'Human factors' is a term that has developed in the last 20 years", Dr. Voas explained. "It deals with that area involving man as an integral part of a complex mechanical system. It has to do among other things, with the display, design and use of his instruments and controls for maximum efficiency."

The 34-year-old Voas, stepson of a Royal Canadian "Mounty," was born in Evanston, Illinois and graduated from high school in New Brunswick, Canada. He received a bachelor of philosophy degree from the University of Chicago in 1946, and his B.A. M.S.,and Ph.D degree in psychology from the University of California in Los Angeles in 1948, '51, and '53, respectively.

Dr. Robert R. Voas

Voas spent his first year out of college at the U. S. Navy Electronics Laboratory in San Diego, working with human factors in the design of radar sets and sonar systems.

In January of 1954 he joined the Navy "to see the world—and saw a very limited part of it, mainly around Pensacola, Fla." for the next three years, at the School of Aviation Medicine psychology laboratory.

Here he was involved in research on the selection and training of pilots, and determination of the proper training methods to turn out successful pilots. In 1957 he transferred to Bethesda, Md. to the Naval Medicine Research Institute to do research on physiological responses of pilots during jet and high altitude flights. He also participated in animal missile flight experiments.

In 1958 he was assigned by the Navy to NASA's Space Task Group at Langley when that group was formed, and assisted Project Mercury management in the selection of the nation's astronauts. When these men joined MSC, Voas was appointed training officer and was responsible for coordinating the training program.

He has done a variety of other things as well, including human engineering work on the Mercury spacecraft and the simulators on which the astronauts have been trained to adapt to many unusual space flight conditions. He has had a hand in the selection of the additional test pilots announced this week. He was separated from the Navy Oct. 11, 1961, remaining with MSC as training officer.

Voas was named assistant for human factors on July 1 of this year, and in this position assists the director in human factors and biomedical areas relating to space flight. He participates as a member of the astronaut debriefing team which interviews the pilot immediately after each flight and works with the engineering team that analyzes the data from each manned space flight.

Dr. Voas is married to the former Carolyn S. Merry of Pasadena, Calif. and has a son, David, "almost 7," and a daughter, Jeanette, "almost 5." (Both birthdays in October.)

His hobbies include flying, which he enjoys very much, gardening, extensive technical writing, and "keeping an elaborate scrapbook with my wife on MSC acitivities."

Lately he has acquired one other hobby which he says is "not serious." It is learning the Twist.

Dancing, Anyone?

Classes in ballroom dancing for NASA personnel will begin next Tuesday night at Ellington AFB Officer's Club. This is the second course in ballroom dancing sponsored for MSC by the Club.

Intermediate class meets from 8 to 9 p. m. and the beginner's group from 9 to 10 p. m. The course lasts for 10 weeks, with one class meeting Tuesday night, at a charge of $1 pe: lesson.

Those desiring further information should call Carl Rentz at JA 3-5270 or JA 9-8958.

PREPARATION FOR MA-8 has been moving ahead full speed during the past several weeks for pilot Walter M. Schirra. Here blood pressure checks are being run on the pilot.

GETTING OUT of the spacecraft is just one of many maneuvers that must be practiced for smooth, quick performance. Schirra emerges from "Sigma 7" during egress practice.

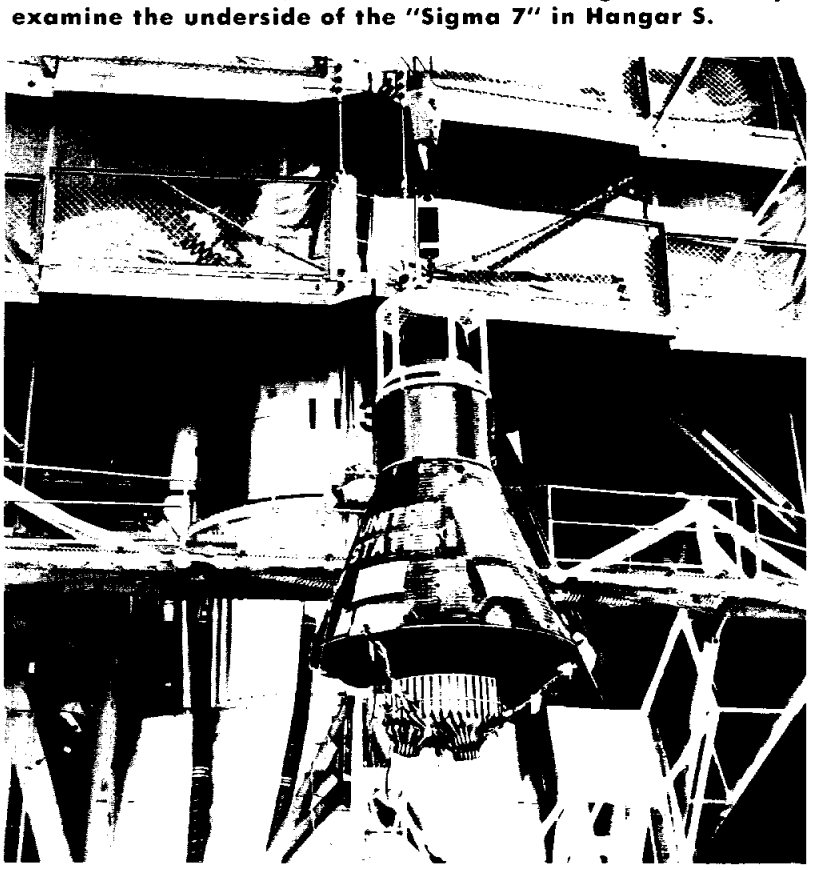
A CHEERFUL GRIN signifies the end of a series of preflight checks as Schirra climbs down from the spacecraft in Hangar S, Cape Canaveral.

BACK-UP PILOT L. Gordon Cooper exchanges helmets with Schirra (inside spacecraft) during communications checks, part of MA-8 flight preparations.

COMING UP FOR AIR after taking underwater pictures with a special camera, Cooper treads water in the Atlantic.

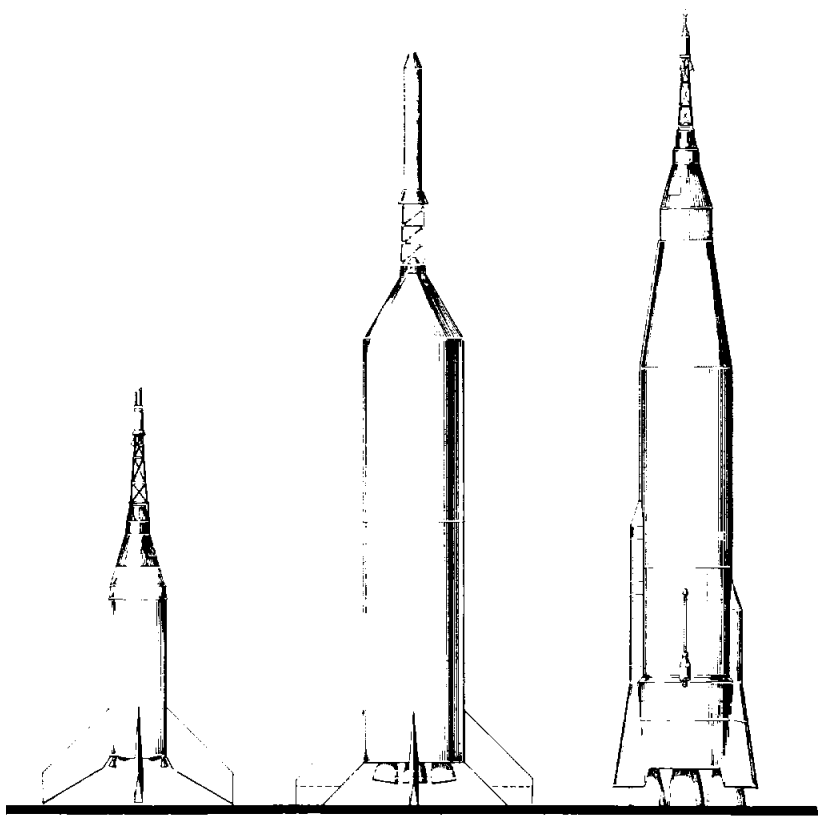
PILOT AND BACK-UP, Astronauts Schirra (right) and Cooper examine the underside of the "Sigma 7" in Hangar S.

WATER EGRESS TRAINING for Schirra is underway here. An Army Lark unloads a spacecraft in open water. A Marine helicopter will drop divers and an auxiliary flotation collar to assist in floating the spacecraft and providing help for the astronaut.



RISING INTO LAUNCH POSITION atop the Atlas 113-D which will boost it into orbit, "Sigma 7" is silhouetted for a moment against the base of its launch vehicle, still in the gantry.

Space News NASA ROUNDUP!



LITTLE JOE I LITTLE JOE II MERCURY ATLAS

Coming Little Joe II Seen As Strong, Reliable Test Vehicle

A booster aimed solely at the successful testing of the Apollo spacecraft, and named Little Joe II, will also be able to accommodate many future requirements of NASA for space vehicle testing and should have a long, useful life as a result.

Little Joe II, successor to Little Joe I, which has been used to test the Mercury spacecraft, is being designed and build be General Dynamics/ Convair at San Diego, Calif.

Reliability is the watchword in the design of the booster vehicle, since the spacecraft must not be compromised by the reliability of the launch vehicle in tests. For Little Joe II, the reliability design goal is 0.95. Many proven, qualified components are available and are being used.

Because the development schedule is short and does not permit many of the tests associated with aerospace vehicle design, system redundancy is being used whereever logical. The performance is adequate to allow the heavier weight that this "belt and suspender" concept involves.

Compared with the Atlas, the "Big Joe" of the Mercury program, Little Joe II belies its name. The husky 13-foot diameter body encompasses a propulsion system which can exceed three quarters of a million pounds of thrust and lift a maximum payload of 80,000 pounds. The combined height of Little Joe II and the Apollo spacecraft equals that of Atlas plus Mercury (95 feet); the weight of the former, at maximum payload, (245,586 pounds) approaches the weight of the latter (260,100 pounds).

Little Joe II is structurally rugged, designed to boost very large payloads into high, suborbital trajectories. Despite its bulk, the largest subassembly weights approximately two tons. It will be transported by highway on standard low-boy trailers to the launch site at White Sands Missile Range, N. M. where it will be assembled and the payload mated, using simple bolts at the connection points.

Versatility of payload and performance is achieved by use of different rocket motors in various arrangements of numbers and stagings. The motor mountings will accommodate seven Aerojet General "Algol" motors which are 40 inches in diameter and 30 feet in length. Smaller motors, such as the Thiokol "Recruit" can be clustered in the main motor spaces.

All propulsion motors use solid propellants, adding greatly to the reliability of operation and simplicity of launch operation. The larger motors will be provided with a command destruct system. To provide finer control of performance than is attainable by motor selection, ballast can be added within the body of the launch vehicle.

The launcher is designed to pivot in a full circle as required to orient the vehicle direction with respect to winds or range requirements. To further simplify guidance problems it can be used to aim the vehicle at an elevation between 70 and 90 degrees.

Whirlpool Corp. Gets Contract For Equipment

William E. Mahaffay, vice president of research and engineering, announced today that MSC has selected Whirlpool Corporation to build the food and waste management equipment for the two-man Gemini spacecraft.

The spacecraft itself is being built by McDonnell Aircraft Corporation.

According to Dr. Norman G. Roth, manager of Whirlpool's Life Support Department, the equipment will include facilities for storing food and food waste, dispensing water, and collecting and handling body waste.

Fulfillment of the company's obligation to NASA will include the provision of mockups, simulator equipment, prototypes, and qualified flight hardware. Concurrent work will include a research program in water heating and space feeding.

OMSF Names Two To New Appointments

The Office of Manned Space Flight announced the following new appointments effective Sept. 9.

John A. Gautraud has been appointed to the position of Director of Systems Engineering, Office of Manned Space Flight. Mr. Gautraud received his B. S. in Electrical Engineering in June 1946 and his MSEE in January 1950, both from the Massachusetts Institute of Technology.

Prior to joining NASA, Mr. Gautraud was employed by the AVCO Corporation as Manager of the Guidance and Control Department. He had previously been employed by the Massachusetts Institute of Technology in its Instrumentation Laboratory, its Research Laboratory and its Radar School.

William A. Lee, formerly Assistant Director for Human Factors Studies, Directorate of Systems Studies, Office of Manned Space Flight, has been designated Director of Systems Studies, Office of Manned Space Flight.

In his capacity as Assistant Director for Human Factors Studies, Dr. Lee was responsible for coordinating all human factor activities for future manned space flight programs from a systems point of view.

All NASA employees who are members of the Masonic organization are cordially invited to attend a meeting at 8:00 p. m., October 8, at Park Place Lodge, 8118 Park Place, Houston. A short program will be given on Texas-Masonic rules, regulations, and procedures. This program is designed to acquaint out-of-state members with Texas customs.

United Fund Drive Begins Today, Runs Through Nov. 9

The 1962 United Fund Drive kicks off at Manned Spacecraft Center today to last through Nov. 9.

Team captains met Tuesday for their instructions and a "government division kick-off barbecue" will be held for team captains and section coordinators at 5:45 p. m. this evening at the Faith Home, 100 Sandman St.

Section coordinators have been appointed in each office and will turn contributions in to building team captains. The team captains for each building are as follows:

Office City, Kimble Johnson; East End State Bank, Burney Goodwin; Farnsworth-Chambers, Paul Sturtevant; Houston Petroleum Center, Unit B, and Stahl Meyers, Cris Critzos; HPC Unit A, Robert Fricke; Ellington AFB, Abner Askew; Peachy Building, Edward Campagna; Lane Wells, Lewis Lee; Canada Dry, Howard Allison; Minneapolis-Honeywell, Robert Gordon; University of Houston, John N. Shoosmith; Rich Building, Alfred J. Ligrani and Ronald D. Mercer.

Team captain for those employees moving into the new Franklin Development Complex soon will be Lee Nichols.

Open Period On Health Insurance Runs To Oct. 15

From now until Oct. 15, all employees elligible for enrollment in the Federal Employees' Health Benefit Program will be given the opportunity to make changes in their program, and those not enrolled may join during this period.

They may change health benefits from "self only" to "self and family" in the same plan and option.

They may also enroll, if they have not done so, in any plan and option available, or reenroll if they have cancelled provided they were not enrolled between May 1 and Sept. 30 of this year.

Brochures on the plans and options available may be obtained from the Personnel Office. Those who decide to enroll or make changes in enrollment must personally sign the registration form in the Personnel Office, Room 25, East End State Bank Building.

Action taken will become effective on Nov. 11.

Questions concerning the limited opportunity to change enrollment should be directed to Mrs. Shirlene Y. Vallgura, ext. 3161, 3162 or 3163.

All those MSC employees interested in joining an existing chapter of Toastmasters International are asked to contact Calvin H. Perrine, 219 Office City, extension 6262, as soon as possible. Several such groups are active in the city.

Phase II Contract Goes To Bellows, Peter Kiewit, Sons

The U. S. Army Corps of Engineers, Fort Worth District, awarded a contract for Phase II of the construction of permanent MSC facilities at Clear Lake.

Recipients of the contract award were: W. S. Bellows Construction Corporation, Houston, and Peter Kiewit & Sons Corporation, Houston.

Dollar value of the contract was $4,145,044.62. Facilities included in the contract are the central data processing building, water treatment plant and building, sewage treatment plant, central heating & cooling plant, and fire station.

The contract has been signed.

Bids were opened also on the construction of an electrical sub-station.

Apparent low bidder was Ets-Hokin & Galvan, Inc., of Houston, with a bid of $653,700. Government estimate was $678,183.

Twenty-two firms submitted bids.

Five MSC Employees Elected Officers Of Accounting Group

Five MSC employees were on the slate of officers elected to head the Houston chapter of the Federal Government Accountants Association, which received its charter Sept. 18.

Robert H. Voigt of the Audit Office was elected president of the Houston chapter; Jerry L. Grief, also of the Audit Office, treasurer; D. W. Haven of Management Analysis, secretary; J. Mertz Hanberry of Procurement, director of publicity; and Thomas J. Cassias, chief of the Audit Office, director of memberships.

Other officers included John K. Bember, U. S. Army Corps of Engineers, vice president; Charles H. Branch, Jr., U. S. Army Audit Agency, director of education; Sy Werner, Federal Power Commission, director of meetings and programs; and Herbert L. Richter, U. S. Army Corps of Engineers, director of editorial and research work.

Presentation of the charter was made by George W. Noel, national vice president and regional audit manager for NASA at Marshall Space Flight Center, Huntsville, Ala.

This association of federal government supervisory personnel in areas of accounting, budgeting, auditing and similar financial operations now consists of 46 chapters including 4600 members.