Space News NASA ROUNDUP!

VOL. 2, NO. 23 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS SEPTEMBER 4, 1963

Little Joe II Gets Apollo Program Off To Good Start

Vehicle testing for the Apollo program was successfully initiated last Wednesday morning at 9:00 a.m. (MST) when the first Little Joe II was launched at the White Sands Missile Range in New Mexico.

The flight, first of a series of tests planned at the New Mexico range, was a qualified success, with five of six stated mission objectives accomplished. This first qualification flight test of Little Joe II was made to demonstrate the overall capability of the vehicle for simulations of the Apollo launch phase.

The five primary objectives attained were to demonstrate the vehicle's liftoff capability; to simulate the launch trajectory of an Apollo mission; to demonstrate the adequacy of the launcher's azimuth and elevation settings to compensate for launch-site wind conditions; to determine the vehicle base pressures and base heating; and to confirm that fixed fins are flutter-free in the transonic regions.

The one objective not attained was to demonstrate the Algol 1D thrust-termination system. The Little Joe was powered by six Recruit rockets, each producing 34,460 pounds of thrust and one Algol 1D rocket 103,200 pounds of thrust. All seven motors were ignited simultaneously at launch to produce a total thrust of about 310,000 pounds. The Recruit rockets burned out in approximately two seconds and the Algol 1D continued until burned out at about 40 seconds after ignition. The order for terminating the thrust after 33 seconds of flight was issued by ground radio command. This signal, if received properly, would have ruptured the motor and terminated the powered flight.

The test configuration attained a maximum height of approximately 24,000 feet and traveled north on the White Sands range about 47,000 feet. It attained a maximum speed of about 750 miles per hour.

The configuration for the flight qualification test consisted of the launch vehicle and a dummy payload simulating the Apollo command module, adapter, and escape tower.

The launch vehicle was 154 inches in diameter and 29 feet high. Four fins were attached at the base of the vehicle, each of which was 50 square feet in area with edges swept back 45 degrees. Total liftoff weight of the vehicle and payload was 56,500 pounds, including 20,600 pounds of solid propellant fuel.

The dummy payload was fabricated of steel. The adapter was 154 inches in diameter and 167 inches long and the simulated com-

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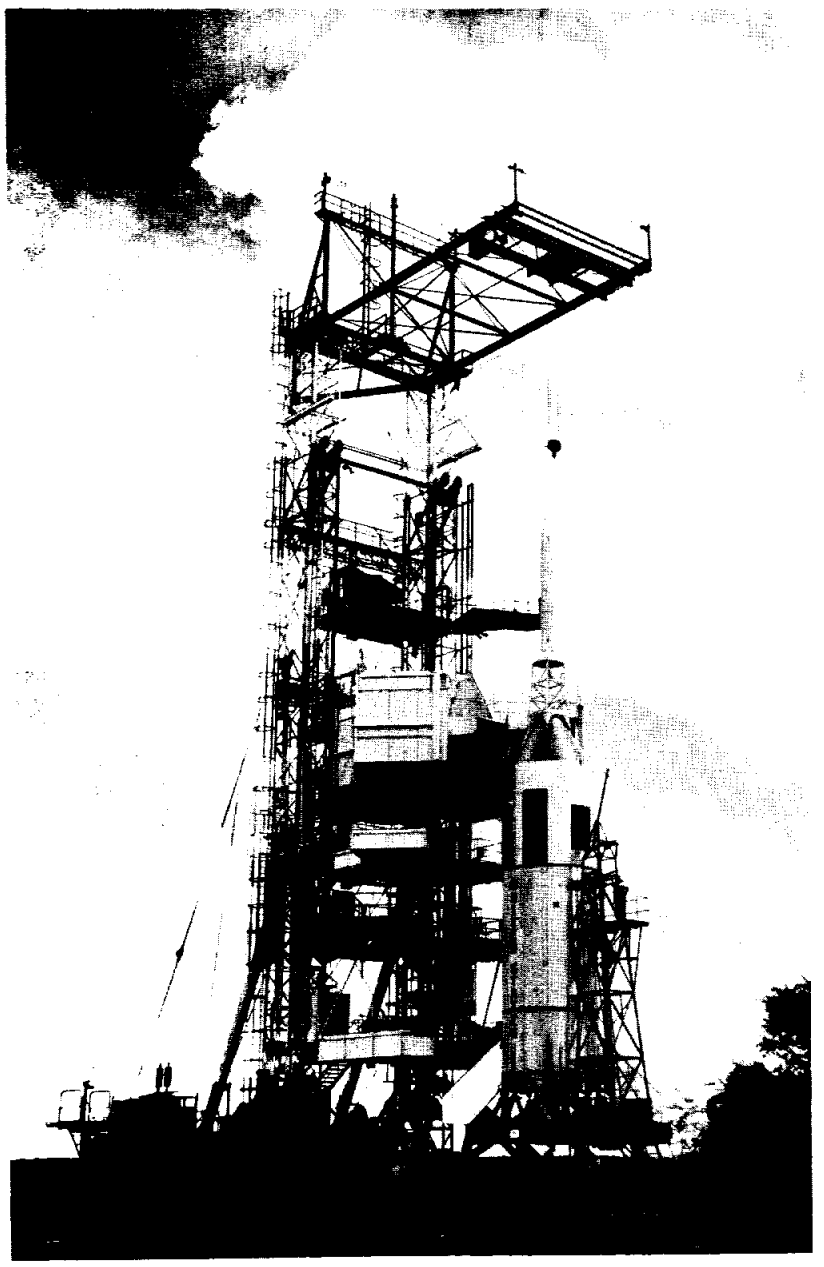
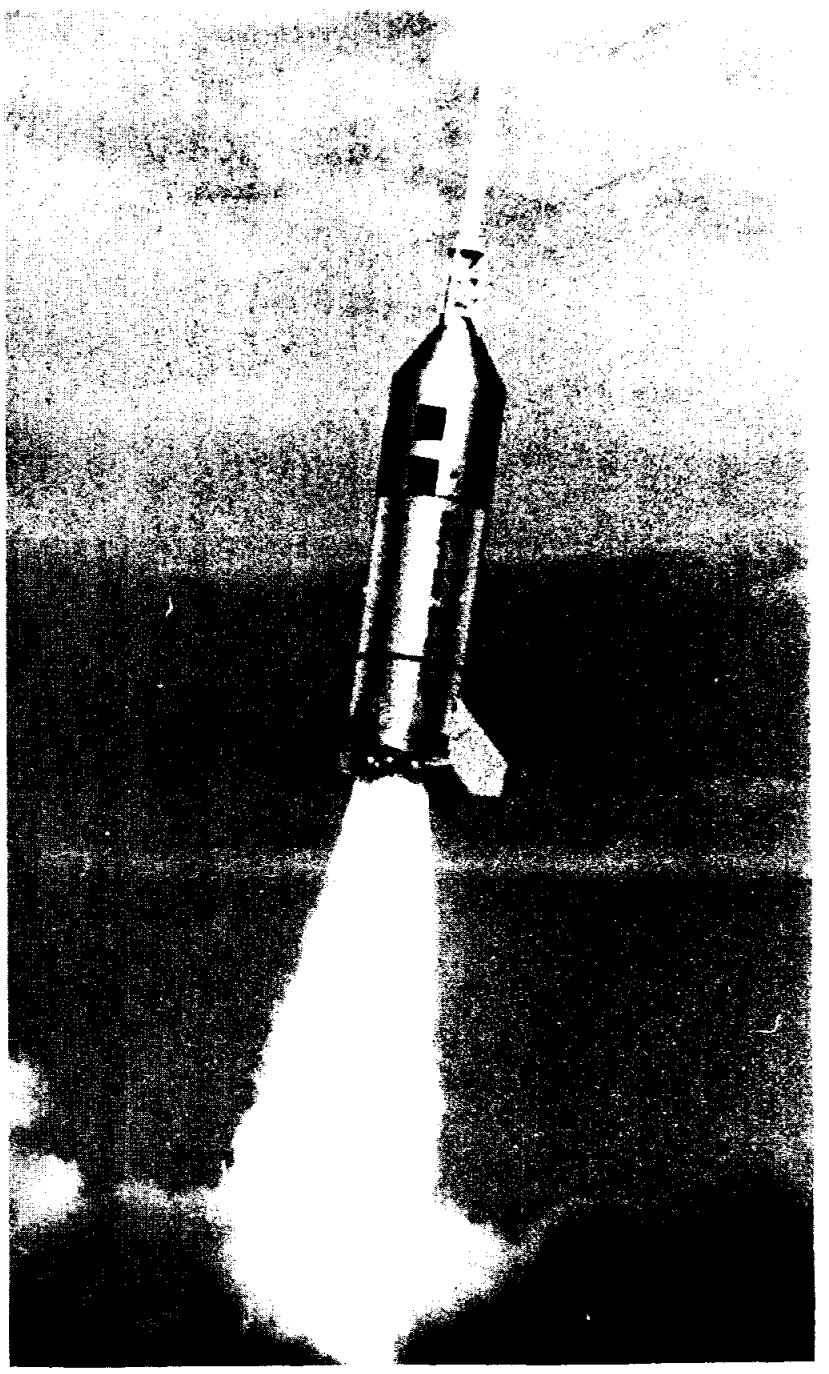


ON THE LAUNCH PAD—The Little Joe II being readied for launch at the White Sands Range. The test was the first of a series in the development of the Apollo Spacecraft.



SUCCESSFUL LIFTOFF—All seven motors of Little Joe II, ignited simultaneously at launch, with a total thrust of about 310,000 pounds. A maximum height of 24,000 feet was attained as Little Joe II traveled 47,000 feet north on the White Sands Range.

Project Mercury Conference Meets Here October 3-4

A Project Mercury Summary Conference, sponsored by the NASA Manned Spacecraft Center, will be held here October 3 and 4. The papers to be presented will review experiences and knowledge gained in the now-completed spaceflight program.

Highlights of the two-day conference will be summary reports on manned spaceflight and on Astronaut Gordon Cooper's 22-orbit mission. Other papers will cover flight crew training, launch vehicles, aeromedical and scientific experiments and an overall technical summary.

In addition to presentations by MSC personnel, NASA Headquarters, the Goddard Spaceflight Center and the Department of Defense will contribute to the program. An exhibits display also is planned.

The conference is to be held in Houston's Music Hall. Admission is by invitation and will be open to the press.

Two MSC Projects Let For $14 Million Bid Total

Bids totaling nearly $14 million were the lowest submitted here recently on two new projects at the Manned Spacecraft Center. One local and five out-of-town construction companies were low bidders on the contracts.

A savings of $4 million on the space simulation building appeared likely as the low bidder was that much below the Corps of Engineers estimate of $13,924,443.

The low bidder on the space simulation building, at $9,809,983, was a combine formed by Diversified Builders and Industrial Construction, Inc. of Paramount, Calif., with Fisher Construction of Houston.

Second low bidder was Blount Bros. of Montgomery, Ala., at $10,281,722. The eight bids were opened Aug. 27 at the Rice Hotel.

Awarding of the contract is expected to take place by this week, it was stated by Col. F. P. Koisch, district engineer at Fort Worth.

The contract calls for installation of a vacuum system and helium refrigeration system to simulate the cold and airlessness of space. The contractor will also install computers, of-

(Continued on page 2)

FIRST PUBLIC DISPLAY—The Gordon Cooper "Faith 7" spacecraft was put on public display for the first time here in Houston recently at the beginning of its tour of the State Capitals. Kenneth S. Kleinknecht (top), Mercury manager and James C. Elms, deputy director for Development and Programs, NASA-MSC, look into "Faith 7" as Houston Mayor and Mrs. Lewis Cutrer stand by. Insert) A line of eager viewers wait their turn to get a peek at the Spacecraft which was displayed in front of City Hall.

Bids

(Continued from page 1)

fices, control systems, plumbing and utilities, and sunlight simulators.

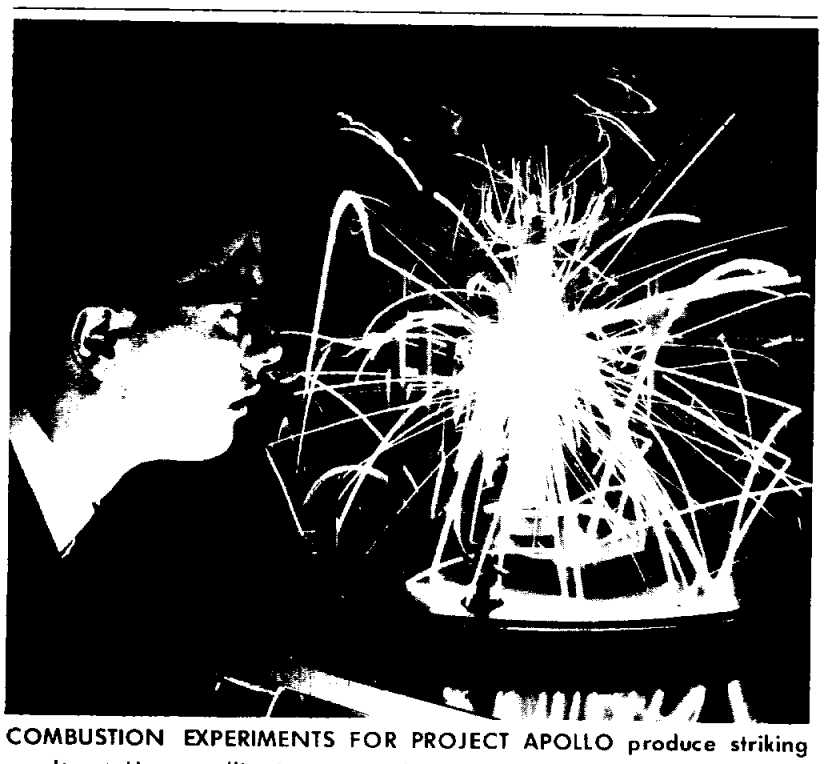
In bidding for new testing facilities at MSC, three out-of-town construction companies combined in making a low bid of $3,988,134. The three companies are C. H. Leavell of El Paso, Morrison Knudson of Boise, Idaho and Paul Hardeman of Stanton, Calif.

Construction of this project should get started this week, Colonel Koisch said.

The contract calls for laboratories and plants for MSC's 110-acre thermochemical test area. Included are a fluid components test facility, a recreation control systems and space power systems test, an electro-explosive test facility and a thermochemical space chamber test facility.

Testing heat and chemical reactions in spacecraft will be done in the new facilities.

Additional work will include roads and utilities for the thermochemical test area.



COMBUSTION EXPERIMENTS FOR PROJECT APOLLO produce striking results at Honeywell's Aeronautical Division in Minneapolis. Over 115 different materials which may be used in or on the Honeywell-developed Apollo stabilization and control system are being tested to determine ease of ignition, duration and effect of burning, and toxicity of burn-products in a typical space capsule atmosphere. Here, a technician closely observes the explosive effect of overheating an epoxy adhesive sample suspended in a bell jar containing a 100 per cent oxygen atmosphere. An electrically heated coil generates temperatures from 800 to 900 degrees C.

MSC Data Complex By Lockheed To Be Ready By Fall 1964

Lockheed Missiles & Space Co. is designing a Data Reduction Complex for NASA's Manned Spacecraft Center here.

Tentatively scheduled for operation by the fall of 1964, the computer system would process data resulting from test activities at the center, which has technical direction of the Gemini rendezvous program and the Apollo moon landing spacecraft.

Under the present Phase I contract, Lockheed Missiles & Space Co. is gathering requirements for data to be processed -- to be transformed to intelligible information -- and making a preliminary design of the computer system which would be installed.

Data will come from spacecraft environmental tests, centrifuge, vibration and thermo-chemical tests. These tests involve measurement of acceleration, pressure, temperature and other phenomena which require various instrumentation techniques.

Potential use of the system is also post mission reduction of data obtained from actual spacecraft, and data gathered by space organizations other than the Manned Spacecraft Center.

Thirty-five Lockheed personnel from the main plant in Sunnyvale, Calif., are at Houston working on the study. E. K. Fisher is program director.

Little Joe

(Continued from page 1)

mand module was 154 inches in diameter at the base and 126 inches long. The dummy escape tower was 33 feet high.

General Dynamics/Convair is under contract by NASA to build six Little Joe II vehicles — four of the fixed-fin version used in the first test and two which will have an attitude control system. The fixed-fin vehicles fly without attitude control and are designed to fly high-velocity suborbital trajectories to test conditions of high dynamic pressures within the atmosphere. The two vehicles with the attitude control system will utilize movable control surfaces, autopilot, and reaction-control motors; and will be used to test payload abort capabilities beyond the atmosphere. In this version thrust will be increased to 720,000 pounds by using seven Algol 1D rockets and liftoff weight will be about 240,000 pounds.

At a news conference following the test last week, Walter C. Williams, deputy director of MSC for mission requirements and flight operations, indicated that he was pleased with the results. He said, "Many of the objectives were accomplished. It proved the launch procedures, the launch trajectory was quite good, the performance was good, and the structural integrity qualified. The vehicle qualified."

Wesley E. Messing, manager of MSC operations at the White Sands range said there was "minimum damage to the launch site. It will not take us long to get back into operation."

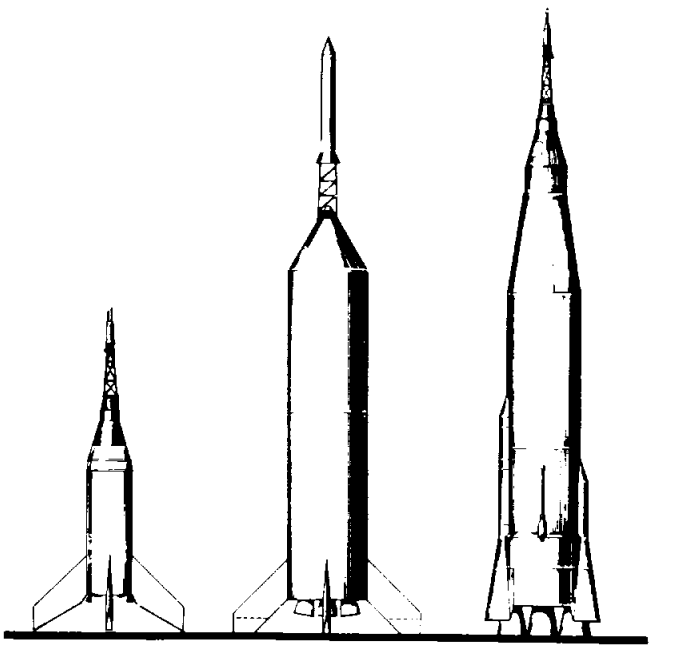
The fact that the six-hour countdown was completed on schedule without a hitch and the launch made at exactly the predicted minute was most surprising in that it was the first firing of this type vehicle. Williams attributed this to "a wonderful crew and the simplicity of the missile.

In January 1958, Paul E. Purser, now Special Assistant to the Director of Manned Spacecraft Center, and Maxime A. Faget, now Assistant Director of MSC for Engineering and Development, conceived a solid-fuel launch vehicle design for the research and development phase of a manned satellite project.

This vehicle was later designated Little Joe and was used extensively during the early testing stages of Project Mercury.

Little Joe II uses the same basic design characteristics and will be used extensively during the early testing phases of the Apollo program, thus making the Little Joe family of launch vehicles the veritable workhorse of manned space flight programs testing.

The vehicle used in Mercury was named Little Joe because when observed from the top of the vehicle before a payload was added the four engines appeared much like the four spots on a die. Additionally, the four Little Joe engines fired in pairs and two and two add up to four or the proverbial "little Joe" in any crap game.



	LITTLE JOE I	LITTLE JOE II	MERCURY ATLAS
TYPE	Suborbital Mercury launch vehicle	Suborbital Apollo launch vehicle	Orbital Mercury launch vehicle
HEIGHT (total)	48 feet	95 feet	95 feet
WEIGHT (maximum)	41,330 lbs.	245,586 lbs.	260,100 lbs.
DIAMETER	6.66 feet	12.83 feet	10 feet
PROPULSION	4 Pollux, 4 Recruit solid-fuel rockets	7 Algol solid-fuel rockets	MA-1 Liquid-fuel engine system (2 boosters; 1 sustainer; 2 vernier rockets)
THRUST	250,000 lbs.	720,000 lbs.	360,000 lbs.
MAXIMUM PAYLOAD	3,942 lbs.	80,000 lbs.	4,000 lbs.

COMPARATIVE SIZES—A comparison of the sizes of Little Joe I and II with the Mercury Atlas are shown above in an artists conception of the three vehicles. The configuration of the Little Joe II above is the same as the one launched last week at White Sands Range. The launch version was powered by six Recruit rockets and one Algol 1D rocket with a total thrust of about 310,000 pounds. Total liftoff weight of the vehicle and payload was 56,500 pounds.

Trainer

(Continued from page 8)

The entire trainer "floats" on air bearings to give the two vehicles minimum friction and maximum smoothness during "response" to pilot control.

The temporary structure at Clear Lake will house the trainer until the permanent trainer building (#5) is completed in 1965. It covers 8,600 square feet, stands 52 feet high and measures 144 by 60 feet in area. Cost of the structure, including an analog computer to drive cockpit displays, will be about $250,000.

Upon completion of the Gemini program, the trainer will be converted to simulate the Apollo rendezvous phase of the lunar mission. The Command and Lunar Excursion modules will be substituted for the Gemini and Apollo vehicles.

The Apollo's immediate goal is to land two U. S. astronauts on the moon by 1970.

ARABIAN TRIBESMEN?—No, they happen to be MSC's Astronauts undergoing desert survival training at Stead AFB, Nev. The four-day course included instruction on how to live off the land, shelter making, and how to utilize survival kit equipment. They are (l. to r.) Neil A. Armstrong, Frank Borman, Charles Conrad Jr., James A. Lovell Jr., James A. McDivitt, Elliot M. See Jr., Thomas P. Stafford, Edward H. White II, John W. Young, and Donald K. "Deke" Slayton.

Sight Perception Of Astronaut Gordon Cooper Subject Of Controversy

"There is the area of El Centro. I can recognize individual fields. Smoke is coming from a chimney down there. I see several streets and houses--a little airport. There is a dry lake...."

These words of Astronaut L. Gordon Cooper which were said as he passed over the United States, May 16, 1963, on the 18th orbit of his historic 22 orbit flight, have caused some controversy in regard to the "Laws of Optics", according to an article in the July 7 issue of "Die Welt" (The World).

The article, "The Eyes of Mr. Cooper," by Von A. Barwolf expressed some doubts as to whether Cooper actually saw what he said he could see from the spacecraft.

The article stated, "A heated controversy among scientists, politicians and strategists has ignited over the observations of the American Astronaut Gordon Cooper, who, from 150 km altitude, claims to have recognized streets, houses, smoke from chimneys or the wakes of ships. If the accounts of the Air Force major are accepted, then he has turned over all optical laws and has opened the way for unexpected military astronautics. At a press conference, Cooper differed strongly with his critics."

(Referring to Cooper's observations, the article continued.) "These five sentences of Gordon Cooper have lifted the accepted laws of optics from their hinges. Human eyes cannot discern such small objects from such great height, according to these laws. The so-called resolution of the retina of the eye does not permit it."

"Had the man, after 26 hours, 40 minutes and 16 seconds of spaceflight in weightless condition experienced hallucination? Did the man, who has more than 2600 flight hours as military test pilot, suffer illusions? Scientists who had received the first vaguely formed reports about the observations of Cooper cried out in one chorus, 'Impossible'."

The article went on to state that six weeks later these same people were divided into two camps with one group saying he couldn't have seen the objects and the other group saying he very well could have."..... Possibly after extended weightlessness, his eyes were able to accomplish these unusual tasks in space."

Continuing, the article pointed up the military implications of such visual capabilities from space.

In conclusion the article stated, "..... The difference between the visual acuity of the astronauts of the West and those of the East seems only to lie in the fact that one side is open with everything, while the other side, in contrast, is always silent."

Coming to the defense of Cooper in a letter to the editor of "Die Welt", Mr. O. Wegbrod, director of the School for the Blind and Visually Handicapped, Hamburg, Germany, stated that opinions in the article on the observations of Astronaut Cooper were wholly unjustified.

Wegbrod then proceeded to give a technical explanation of how Cooper could have observed what he did from his lofty altitude without having "unhinged the laws of optics".

He went on to state, "The most important point was overlooked in the article: sight is not only a physiological function, but even more a psychic function, whose course is very complicated.

The capability to recognize indistinct outlines stems from experience, optical memory, concentration and intelligence. This capability can be raised enormously through training.

The world looks much different from up there than from down here. Now, Mr. Cooper is a military pilot. Not only through many years experience does he know how things appear from above. Unlike a sport pilot who orients himself with a picture of the landscape, military pilot Cooper has been trained to perceive objects of military interest on the ground. He can, through his experience, correctly distinguish such objects, even though he does not have an absolutely sharp retinal image of them.

My opinion is that he saw everything that he reported seeing.

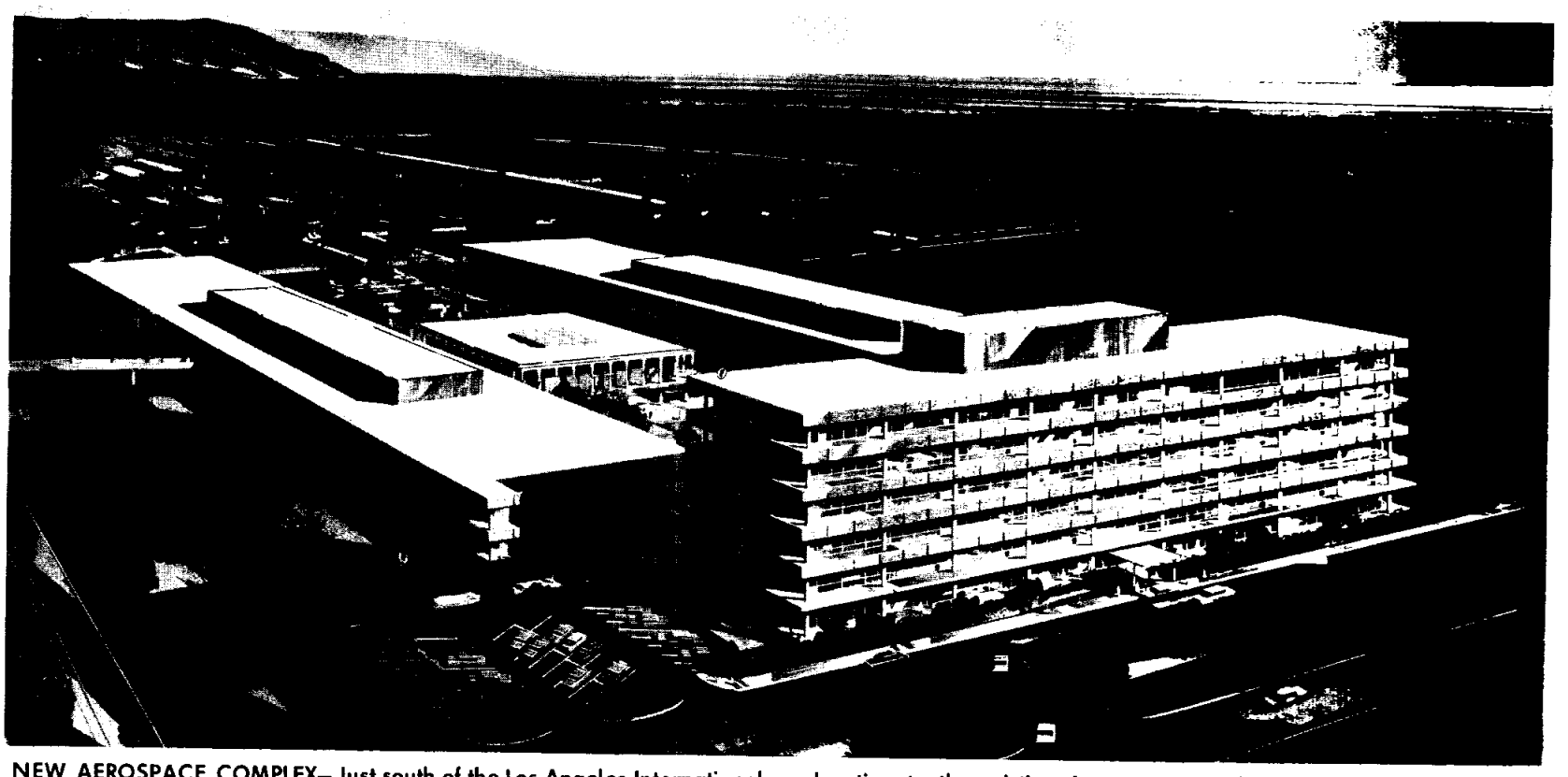
No optical laws have been lifted off their hinges, and it can be said that the eyes are adaptable 'to extraordinary tasks in space even after extended periods of weightlessness', so, it is all--excuse me--gossip."

(EDITOR'S NOTE..... The following United Press International wire story appeared in the May 16, 1963 issue of the New York Times. "Johannesburg, South Africa, May 15 (UPI) --Thousands of Johannesburg citizens on roofs of tall buildings saw Maj. L. Gordon Cooper Jr. pass overhead today in his space capsule.

The capsule was clearly visible to the unaided eye as it traveled from west to east.")

FIRST CLEAR LAKE COMPLETION—With the delivery of the new pumper fire engine to the Clear Lake Site Fire Station (Bldg. 25) recently, the first piece of equipment was placed in the first completed building at the new facility. A demonstration of the pressure hose system on the new NASA fire engine was performed for members of the local press.

DR. IVAN A. GETTING
President
Aerospace Corporation



NEW AEROSPACE COMPLEX— Just south of the Los Angeles International Airport, construction is underway on the $10 million headquarters complex for Aerospace. This new facility, coupled with the Space Systems Division's relocation to the existing Aerospace complex will permit the co-location of the two organizations for more efficient operations.

Aerospace Corporation Providing Engineering

ALLEN F. DONOVAN
Senior Vice President— Technical and Operations General Manager El Segundo Operations.

The unqualified success of Project Mercury has focused world-wide attention on NASA's Manned Spacecraft Center. A significant factor in the program's success was NASA's efficient marshalling of management, scientific and manufacturing resources.

Management for the Mercury-Atlas launch vehicles was delegated by the MSC to the AF Space Systems Division. Working side-by-side with, and under contract to, SSD was Aerospace Corporation of El Segundo, Calif. Unique among the organizations that contributed to the program, Aerospace is a nonprofit, public interest corporation established to provide objective leadership in space science and technology for the United States Government - - principally the AF Space Systems Division and Ballistic Systems Division.

For Project Mercury, Aerospace provided general systems engineering and technical direction for the modified Atlas launch vehicles. The company has been assigned the same role for the Gemini-Titan II launch vehicles. Bernhard A. Hohmann, who directed the Corporation's efforts in Project Mercury is also the launch vehicle systems engineering director for Gemini. His associate director for both programs is Ernst R. Letsch.

The company's contributions to Project Mercury included technical responsibilities for the development of the man-rated Atlas, analysis of subsystems, supervision of systems testing and the technical portion of the Atlas pilot safety program. The greatest single contribution to pilot safety in the launch vehicle was the abort sensing and implementation system (ASIS) built into the Atlas. Aerospace performed technical direction for the ASIS which had the highest demonstrated reliability rate of all the Mercury-Atlas subsystems.

From its El Segundo computer center, the company ran last-minute weather simulations to determine if weather conditions would produce dangerous aerodynamic loads. Considered as "red-line" information by the launch engineers, this weather data was one of few inputs that could, in itself, determine a "go-no go" status for the launch vehicle. Company engineers also prepared the launch trajectory including the elimination of an overpitch in the flight of Astronaut Gordon Cooper.

The company maintained a Mercury project office at Cape Canaveral. Under the management of Newton A. Mas, this office provided a continuation at the Atlantic Missile Range of the company's general systems engineering and technical direction responsibilities.

Under Air Force/Aerospace management, industrial contractors are adapting the Titan III missile for use in the Project Gemini series. The Titan III has undergone extensive testing as an ICBM weapon system and the 103 foot tall launch vehicle will be highly developed to assure Aerospace,

Editor's Note: This is the twelfth 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 Office of Public Information, Aerospace Corporation.

KEY AEROSPACE FIGURES that have been associated with the Gemini launch vehicle are (l. to r.): Ernst R. Letsch, associate director of manned launch vehicle programs, Ernest La Porte (now with the Titan III development group) and Bernhard A. Hohmann, director of manned launch vehicle programs.

RESEARCH AND EXPERIMENTATION— The company's laboratories division conducts research and experimentation in ion, electrothermal and plasma propulsion, laser, hypersonic aerodynamics, material structures and properties, space radiation and communications.

The four affable secretaries chosen from various MSC divisions to be featured in this issue of the Roundup are:

N. Ray Wilson (left), secretary to Leo T. Zbanek, chief, Facilities Division, was one of the first secretaries to be employed by MSC in Houston. She was first assigned to the Procurement Division in October 1961 and later transfered, in December of that year, to her present position.

Ray was born in Chidester, Ark., but moved with her family to Houston in 1933. She was later graduated from the Jeff Davis High School.

She likes to cook, dance and read, but, horseback riding is her real love. Three years ago, Ray, who owns a number of quarter horses, took part in the Salt Grass Trail ride from Brenham to Houston. The eighty mile ride took three days to complete, and when Ray was asked if she would do it again, she said, "I wouldn't have missed it for anything, but once is enough!"

Virginia Thompson (right), secretary to Charles F. Bingman, chief, Management Analysis Division, is a native Houstonian. Following her graduation from Milby Senior High School she was employed for five years by the Social Security Administration in Houston. She has been in her present position for more than one year.

An active young woman, Virginia is now serving as chairman of the education committee for the Ellington Toastmistress Club. In the fall she will resume night classes at the University of Houston where she is majoring in office administration.

She lists her favorite sports as swimming, boating and skiing during the winter months.

Sharon Brenan (lower left), secretary to Joseph A. Kratovil, chief, Financial Management Division is another native Houstonian. Sharon joined the staff at Ellington Field in June 1962 soon after she was graduated from Jeff Davis High School.

Bowling is her favorite sport and she is an avid dancer. She enjoys doing all the latest dance steps, but is partial to the twist.

The charming young woman resides in Houston with her parents, Mr. and Mrs. R. D. Brenan and is looking forward to spending her two weeks vacation this month in San Francisco, Calif.

Alma Martin (lower right), secretary to Dave W. Lang, chief and William A. Parker, deputy chief of the Procurement and Contracts Division at Ellington Field, has been with MSC since November 1961. Prior to that time she was with the Navy Department at Great Lakes, Ill.

Born in Needville, Tex., she attended high school in Rosenburg. Alma is married to Robert Martin, who is employed by the City of Houston. The couple has four children, Jessie Ann, 13; Arthur, 11; Tommy, 10; and Phillip, 9.

In her leisure time she enjoys working in the flower gardens around her home in Houston.

Security Division Requests Compliance With Regulations

The Security Division has periodically been receiving complaints concerning family members and other unofficial visitors calling on MSC employees, at various work sites, both during and after regular working hours.

With approximately 14,000 visits each month, all employees are reminded of the necessity of limiting visits to those made in connection with official MSC business, it was announced by Donald D. Blume, chief, Security Division.

There have also been complaints concerning the unauthorized use of the official NASA insignia. In addition, Security personnel have observed noncompliance with NASA Instruction 6-5-1 concerning use of NASA insignia by a number of employees.

Reservists Asked To Contact School

Officers in the Naval, Marine Corps and Coast Guard Reserve who are new in the Houston area and wish to continue their reserve activities should contact the Naval Reserve Officers School from 8 to 4 p.m. at the Navy Reserve Training Center, 4415 Cullen Blvd.

A new academic year began yesterday with classes meeting each Tuesday at 7:30 p. m. for two hours.

Couples Needed For MSC Fall League

The MSC Couples League is reforming for the fall bowling season and has openings available for couples or full teams of four.

League play will begin at 6 p.m., Tuesday, Sept. 10, at the Mimosa Lanes.

Couples interested in joining the league are asked to contact Jim McBride at Ext. 7566.

Insurance Drive To Be Conducted At MSC

The NASA Employees Benefit Association has scheduled an enrollment drive this month to enroll Manned Spacecraft Center employees, not currently enrolled, in the NASA Group Life Insurance Plan.

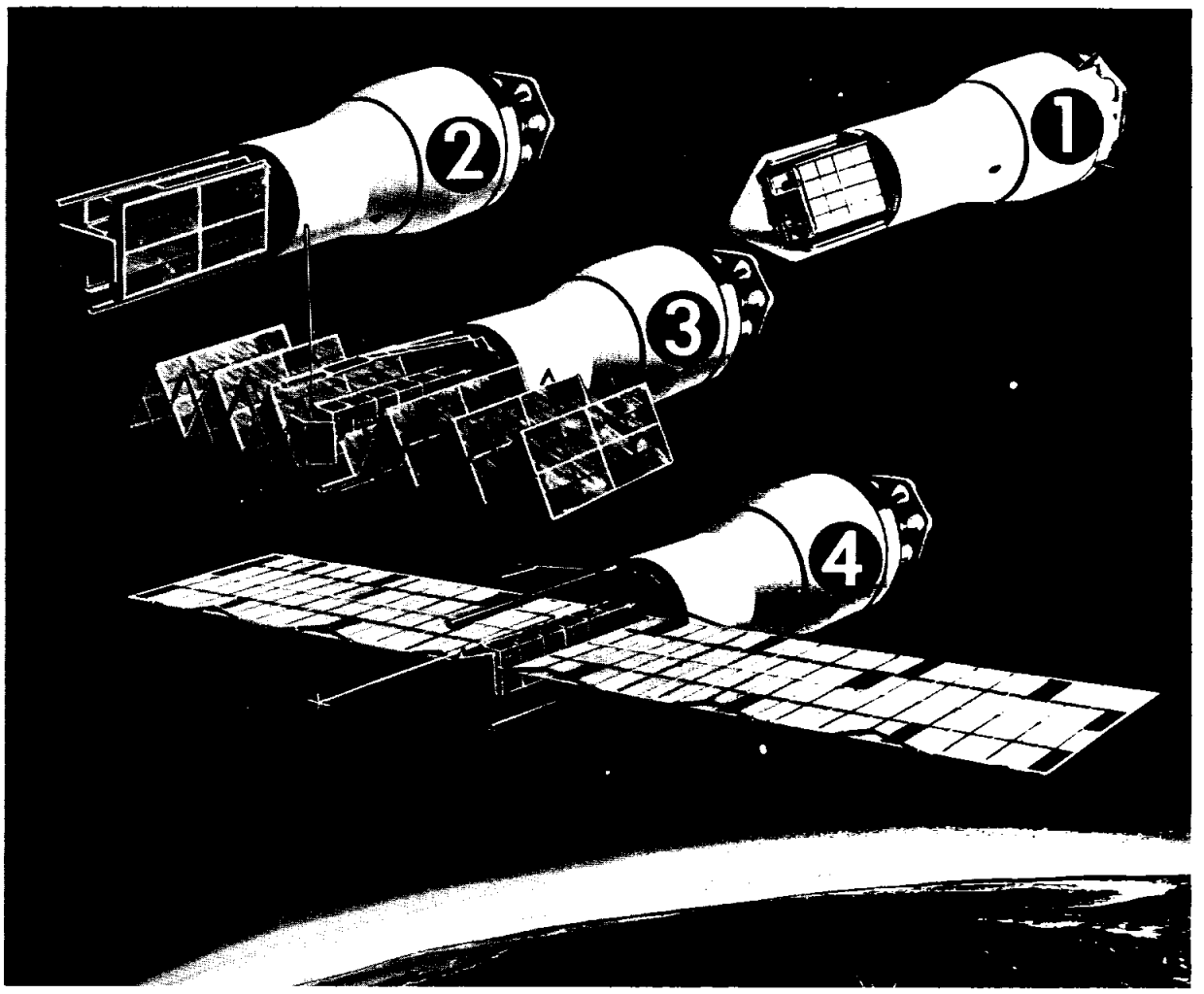
Any full-time, permanent employee is eligible to enroll in the plan and female employees may obtain the same amounts of insurance as the men.

W. Kemble Johnson, president of the MSC chapter of the association said, "NASA's group plan is the sensible way to get additional family protection at amazingly low rates. And now, the cost of this protection has been lowered further due to the increased membership."

Since 1952, NASA has been pooling its life insurance purchases to get higher protection for the lowest dollar cost and now over $140 million of life insurance safeguards the financial security of NASA families, Johnson stated.

Johnson said, "As membership in the plan has increased, the cost has gone down. The new rate—$1.10 quarterly per $1,000 of life insurance plus 15 cents a quarter for each $1,000 of accidental death benefits is the lowest in the history of the plan."

Because many employees may not be aware of the plan's advantages, representatives of the company that underwrites the plan will conduct informational meetings Sept. 11, 12, and 13 at various sites. The current enrollment period ends Sept. 20. The time and location of the meetings will be announced.



METEOROID DETECTION SATELLITE—This drawing prepared by the NASA-Marshall Space Flight Center shows meteoroid detection panels being deployed (1) on a Saturn-launched satellite; (2) in the folded position separated from the launch vehicle; and (3) unfolding. Unfolded the panels (4) have a wingspread of about 100 feet. The presence of tiny particles in space will be recorded as they collide with the skin sensor.

Solar Cell Handbook Published By NASA

Newly-published information on space radiation effects is expected to help industry produce more durable satellite solar cell systems, a National Aeronautics and Space Administration spokesman said recently.

Three earth-orbiting satellites have been silenced and many others have experienced malfunctions due to radiation damage of solar cell components.

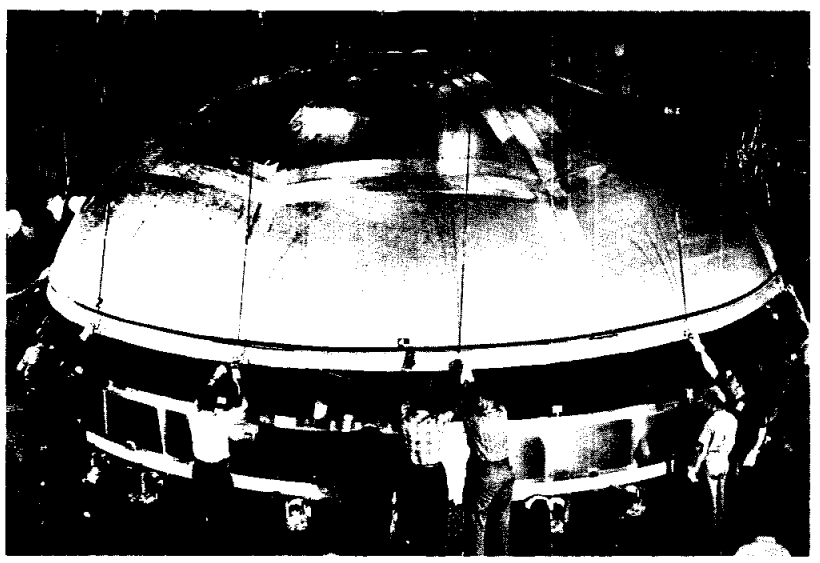
Almost all satellites use solar cells for power to operate their instruments. The cells use a photovoltaic process to convert sunlight to electricity.

Walter C. Scott, Chief of Space Power Technology Program in NASA's Office of Advanced Research and Technology, said the new publications "fill a real void and should be particularly valuable to industry people."

One is a "Handbook on Space Radiation Effects to Solar Cell Power Systems" prepared for NASA by Exotech, Inc., Alexandria, Va.

The handbook reviews the basic theory of solar cells; details radiation damage to cells and findings about the space radiation environment; correlates test data on solar cell performance; and presents design methods for solar cell power systems.

The other publications are two volumes of the transcript of a Photovoltaic Specialists Conference held in Washington earlier this year. Subjects include photovoltaic materials, devices, radiation damage effects, systems experience, applications and design.



MOON ROCKET ASSEMBLY—The upper dome of a fuel tank for the Saturn V moon rocket is lowered into place on a "Y-ring" to which it will be welded. The Y-ring will then be welded to a cylindrical skin segment to form half a tank. The two halves will be joined after anti-slosh baffles have been installed. Two tanks, with connecting skin segments, will form the main fuselage of the S-IC stage. Five F-1 engines, developing 7.5 million pounds thrust, will then be installed to the thrust structure.

Tour Of MSC Given Students From High School With Own Space Program

A group of high school students with a space program of their own toured the Manned Spacecraft Center this past week. The 18 students from Northeast High School, Philadelphia, Pa., have an ambitious extracurricular science program named Project Sparc after Space Research Capsule.

Project Sparc will culminate in the construction of a capsule simulator that three students can "fly" to the moon and back.

More than 50 members of the Sparc group have put in eight months of study and research on the project. The students visiting MSC are the nine Sparc-selected "astronauts" and the research group leaders.

The student-astronauts were selected from 58 volunteers on the basis of physical and psychological tests and the background of the individual students. They will be trained to operate the Sparc capsule and the ground control system for simulated test flights.

The Sparc simulator will have full exterior visual effects of a circumlunar flight provided by planetarium projection. Pitch, yaw, and roll movements of the three-man capsule-simulator will be allowed by a system of gimbals.

The cabin will contain flight plan instruments, short wave communication, and a closed circuit television system. The three astronauts will have their own space suits and will eat food prepared for the weightless condition of space.

On their way to Houston the Sparc group visited the NASA Marshall Space Flight Center in Huntsville, Ala. They will return home via the Launch Operations Center at Cape Canaveral and the Goddard Space Flight Center, Greenbelt, Md.

Industry Asked To Develop Radio Shield And Furnace

Manned Spacecraft Center has asked for proposals from industry for the development of an air atmosphere furnace capable of generating temperatures to 3,000 degrees Fahrenheit and a large radio frequency shielded enclosure to be used to determine if component parts of Apollo and LEM flight equipment are susceptible to radio frequency interference.

The furnace is intended for use in evaluating coating on refractory alloys proposed for use in development programs in future manned spacecraft. The furnace and associated control equipment will be installed in the Systems Evaluation Laboratory at Clear Lake for MSC's Systems Evaluation and Development Division.

The proposal calls for a unit approximately six feet long by six feet, four inches high and nearly five feet wide. Chamber dimensions will be three feet long by 18 inches wide by 18 inches in height.

Doors on the furnace will be air cylinder operated. Chamber insulation will be high temperature brick and an atmosphere circulation system will be installed to permit continuous distribution through the chamber and insure a plus or minus 25 degrees F temperature uniformity.

The radio frequency shielded enclosure calls for a rectangular shaped unit with inside dimensions that measure 20 feet long by 10 feet wide and eight feet high. It is to be a solid structure of copper and sheet steel capable of being disassembled and reassembled.

Interior of the chamber will be painted gray and the floor is to be covered with tile. Entry is gained through a single door installed at one end of the enclosure.

The contractor will also be required to provide an air conditioning system of sufficient size to maintain an interior temperature of 68 degrees Fahrenheit during operations. Air conditioning will be mounted outside the shielded enclosure.

CORPORATE ENGINEERING program offices are currently engaged in the development of Titan III, Thor and Atlas standard launch vehicles, random communications satellites, nuclear detection satellites and other military projects.

Direction For Titan II

SSD and NASA that a satisfactory man-rating is accomplished prior to the manned launches, according to Hohmann. For use as the Gemini launch vehicle, it is being modified to assure pilot safety during launch, under Aerospace Corporation's technical direction, along lines suggested by NASA at the time Titan II was selected for the mission.

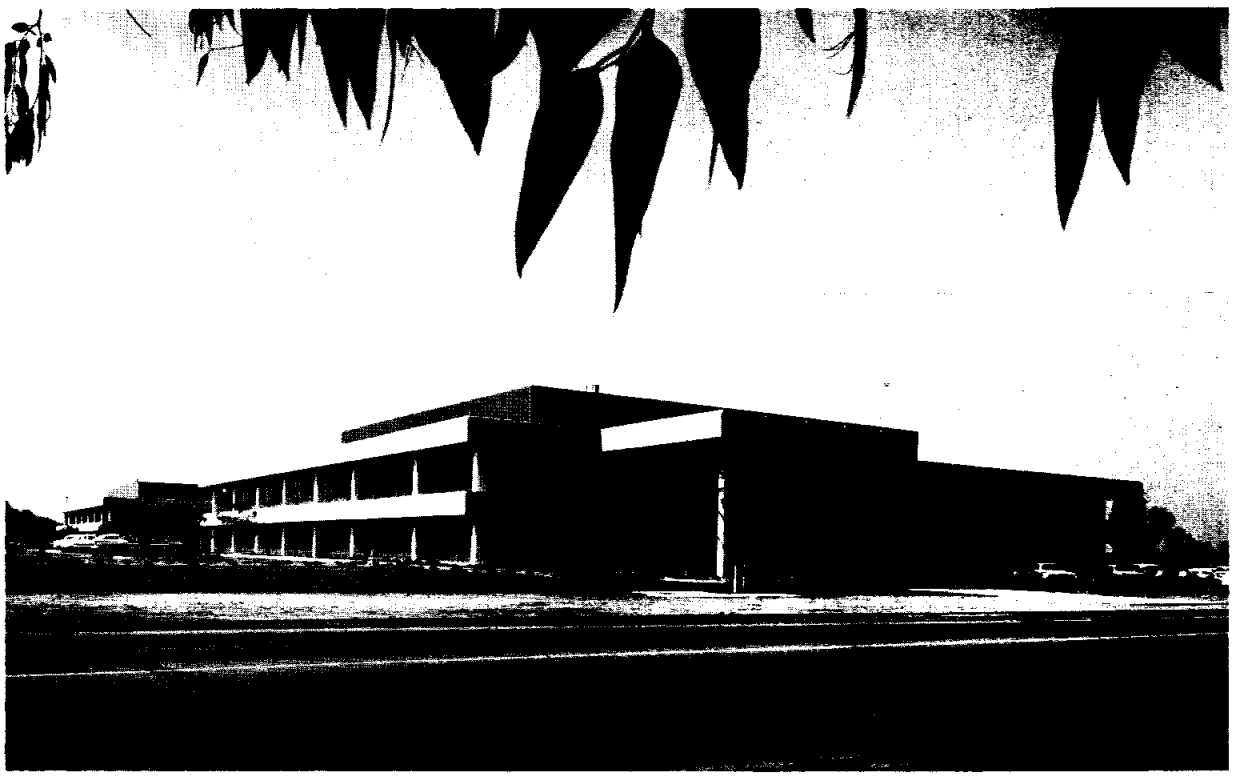
Much of Aerospace's work is performed "behind the scenes" for the Air Force. "Our role of general systems engineering and technical direction provides for continuous and objective technical management without delving into areas that the industrial contractors are quite capable of performing themselves", states company president, Dr. Ivan A. Getting.

Establishment of Aerospace Corporation in 1960 was predicated on Air Force need for top scientific and engineering competence to provide technical leadership in the advancement of space and missile science.

In March 1963, Aerospace dedicated the facilities of its San Bernardino (Calif.) Operations. Supporting the Ballistic Systems Division at Norton AFB, the San Bernardino Operations provides general systems engineering and technical direction for such programs as re-entry systems and Nike-Zeus targets.

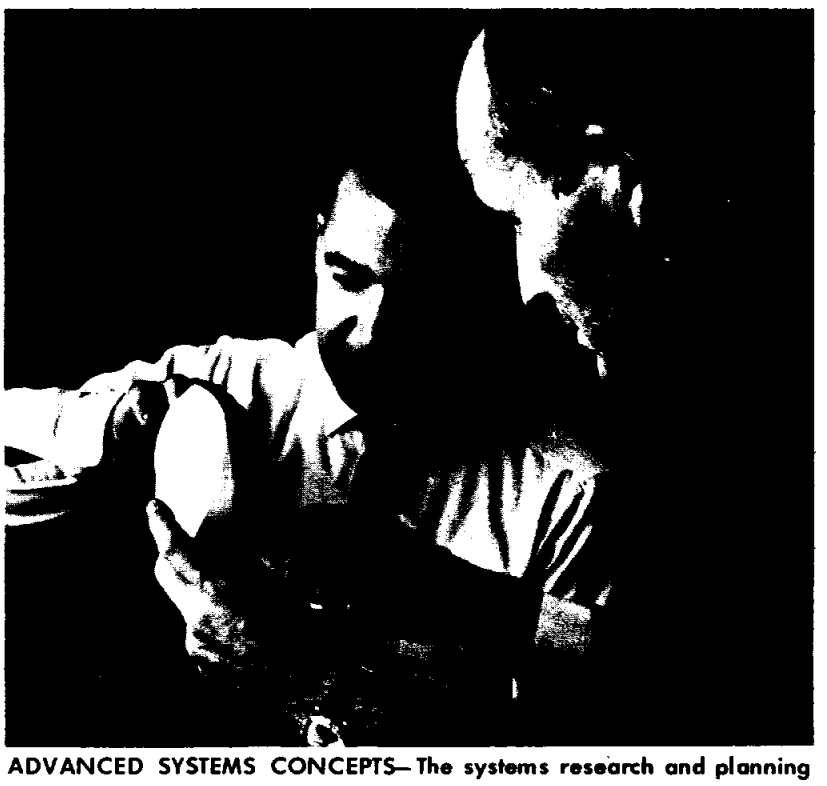
There are 4,540 people employed by Aerospace; of this number, over 1,600 are scientists and engineers. The highest concentration of personnel are in El Segundo and San Bernardino. Other company locations are at Cape Canaveral, Vandenberg AFB, and the White Sands Proving Grounds; Washington, D. C. and Lexington, Mass.

WEATHER TEST EVALUATION—An extensive array of digital and analogy computers and associated equipment are at the disposal of company scientists and engineers. Shown here are company launch calculation specialists evaluating the results of weather tests prior to the launch of Astronaut Gordon Cooper.



OPERATIONS FOR ABRES AND ATHENA—The facilities for the San Bernardino Operations were dedicated in March 1963. The Operations, under the general management of Ernst H. Krause, performs general systems engineering and technical direction on the Advanced Ballistic Re-Entry Systems (ABRES) and Athena programs.

DISCUSSING LAUNCH CONDITIONS—Edward J. Barlow, vice president and associate general manager of Aerospace's El Segundo Technical Operations (left) is shown discussing MA-9 launch conditions with staff members of the company's Atlantic Missile Range Office. With him (l. to r.) are: Dr. Robert E. Payne, director AMRO; Jack R. Wiegand, manager, operations, who served as launch test supervisor for Mercury-Atlas launches; and Newton A. Mas, manager, Mercury project office.



ADVANCED SYSTEMS CONCEPTS—The systems research and planning staff is concerned with the formulation and initial development of advanced systems concepts including initial systems and subsystems specifications.

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

The Lighter Side moved to White Sands last week and picked up several items which seem to fit the bill.

★ ★ ★

I SAY THERE GUV'NOR

Governor Jack Campbell of New Mexico was one of the observers at the first Little Joe II firing and arrived at Las Cruces the evening before the launch. The Governor stayed at the same motel where the News Center was located and word of his presence made the rounds.

Later that evening a gentleman felt faint and was led into the dining room by Philip Hamburger, MSC's Assistant to the Director for Congressional Relations. After receiving a glass of water from Hamburger, the gentleman felt better and said, "Thank you very much Guv'nor." Hamburger replied, "That's quite all right, young man."

At this point, a youthful gentleman sitting at a nearby table jumped up and approached the duo and said, after grabbing Hamburger by the hand, "Governor, this is my first trip to your fine state and I'm very impressed with everything I've seen here so far. I'm a medical student in a northern school and I think I might even like to start a practice here after I've completed my internship."

Hamburger was so impressed with the young man's enthusiasm that he felt it would be criminal to embarrass and discourage him. So, without identifying himself, he went into a long harangue, worthy of any politician, extolling the virtues of New Mexico in general and the Las Cruces area in particular and strongly endorsed the potential of the area.

The results of the meeting are that a young man is proud of having met the Governor of New Mexico and Hamburger can add another title to his name.

★ ★ ★

THE COYOTE-SHOCKED OR CROCKED?

Recovery forces entering the impact zone by helicopter, shortly after the Little Joe II test, noticed a coyote spread-eagled near the actual impact point. As the copter hovered above the coyote, it slowly struggled to its feet and staggered away. This sidelight brings several questions to mind. First, was the coyote knocked cold by the shock of the nearby impact or was he crocked by any fumes of the Algol propellant which might have clung to the Little Joe. Second, what happened to the rabbit he was chasing if he were chasing one?

★ ★ ★

LITTLE JOE'S SISTER PRESENT

One of the PAO staffers at the Little Joe II's launching was "his sister". This may be a bit far fetched but Mary Purser was there. And it is fact that her father, Paul Purser, the Special Assistant to the MSC Director, along with Max Faget were the "fathers" of Little Joe I. So it seems to follow — with or without logic — that there is a family tie of sorts, even though it may be just pride of the product.

WELCOME ABOARD

Fifty-three new employees joined the MSC staff during the period of August 11 through August 29. All but four were assigned at Houston.

TECHNICAL INFORMATION DIVISION: Raymond C. Southers.

GEMINI PROJECT OFFICE: Leroy A. McCormack, Jesse M. Deming and Frederick J. Richmond.

APOLLO SPACECRAFT PROJECT OFFICE: Mary L. Wilde, Max D. Holley, Thomas J. Adams, Jr.; Daniel A. Nebrig, Robert N. Townsend, Joseph E. Mechelay, Louis J. Haywood, John C. Fisher, Jr., Joyce H. Dodson and Louis M. Ponce, Jr.

CENTER MEDICAL OPERATIONS OFFICE: D. Owen Coons, Willard R. Hawkins and Phillip P. Pease.

SPACECRAFT TECHNOLOGY DIVISION: Donald W. Denby, George Xenakis, Winston W. Weber, Marshall W. Horton and Wilbert F. Eichelman.

PHOTOGRAPHIC DIVISION: Armand H. Lucero.

COMPUTATION AND DATA REDUCTION: James C. Harrington, William T. Douglas, Jr., Billie G. Edwards and Bette J. Stafford.

SYSTEMS EVALUATION AND DEVELOPMENT DIVISION: James L. Gibson, William M. McCombs and Timothy A. Clancy.

PUBLIC AFFAIRS OFFICE: George R. Gaffney, Jr.

LOGISTICS DIVISION: Annie H. Fitzgerald.

WHITE SANDS MISSILE RANGE OPERATIONS: Bobby J. Wood, David H. Dickson and Donald G. Moen.

PROCUREMENT AND CONTRACTS DIVISION: Carol A. Smith.

FLIGHT OPERATIONS DIVISION: Gary G. Metz, Robert K. McDonough and Stuart M. Present.

PERSONNEL DIVISION: Barbara J. King, Sharon K. Davis, Joyce W. Roberts and Sherry L. Drew.

SPACE ENVIRONMENT DIVISION: George P. Bonner and Elbert A. King.

TECHNICAL SERVICES DIVISION: Frank E. Vaughn, Jr. and Joseph L. Edwards.

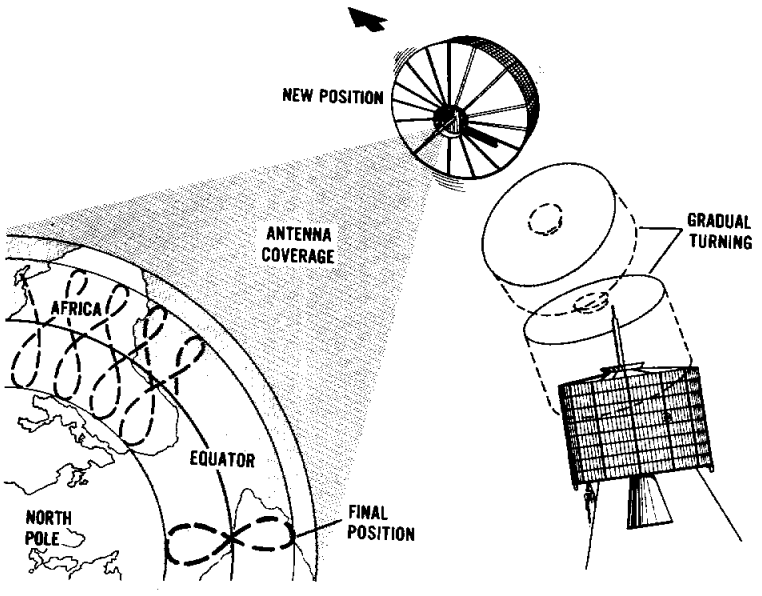
ASSISTANT DIRECTOR FOR ADMINISTRATION: Patricia A. Allen (Downey, Calif.).

CREW SYSTEMS DIVISION: Elliott S. Harris.

FLIGHT CREW OPERATIONS DIVISION: Allen L. Du Pont and Edmund B. Jones.

INSTRUMENTATION & ELECTRONIC SYSTEMS DIVISION: William D. Antrim.

GROUND SYSTEMS PROJECT OFFICE: William F. Perlich.



FIRST SYNCHRONOUS ORBIT— Syncom II is the first satellite to be "stopped" in space so that it appears to trace an elongated figure eight pattern along the 55 degree meridian to points 33 degrees north and south of the equator. Previous to this, a maneuver was made to align the satellite's antenna so that its radiating beam always contacts the earth. The Syncom II is now about 22,300 miles high and traveling 6,800 mph which matches the earth's rotation speed of 1,040 mph at the equator, thus keeping the spacecraft on station.

MSC PERSONALITY

Apollo Project Head Pioneer In Aerospace

Robert O. Piland, acting manager of the Apollo Spacecraft Project Office, began his pioneering in space exploration when he joined the science staff of the NASA Langley Research Center in 1947.

This young man who received the 1962 Lawrence Sperry Award for notable contributions to the advancement of the aerospace sciences and was nominated for Outstanding Young Man of Houston for 1962 by the Houston Jaycees, is responsible for the coordination of efforts of NASA and the Apollo Spacecraft Contractors directed toward sending a multi-manned spacecraft on lunar excursions.

Piland joined the Manned Spacecraft Center in February, 1959, as assistant chief of the Flight Systems Division. In the formative stages of the Apollo program he served as manager in the development of the module. He was then named as deputy manager for the

ROBERT O. PILAND

Lunar Excursion Module and May 8, 1963 he was appointed to his present position.

In addition to his present job he also serves as deputy manager for Command and Service Module on the North American Aviation contract.

After attending secondary schools in his home town of Portsmouth, Va., Piland was graduated from the College of William and Mary with a BS degree in mathematics in 1947. He also attended Cornell University in New York and Mt. St. Mary's in Maryland.

As a research scientist at Langley, Piland became engaged in the flight testing at Wallops Island, Va., of rocket-propelled research test vehicles. Under his supervision, three-, four-, and five-stage test vehicles were successfully developed and used to obtain unique test data in aerodynamic heating. This data substantiated theories which could be reliably used for the design of hypersonic vehicles such as ballistic missle nose cones, the X-15, the Mercury spacecraft, etc.

Piland served as a technical assistant to the President's Science Advisor in the space and missle fields during 1958. With the termination of this duty, he was asked to take the assignment of assistant chief of the Flight Systems Divisions, MSC.

He is married to the former Myra Stanton of Brooklyn, N. Y. They reside in Dickinson, Tex. with their three children, Elizabeth 8, Tom 6 and Jimmy 9.

Beech Apollo Facility Tests Space Hazards

It's about the size of a small motel, but there's enough scientific equipment inside to duplicate almost any alien condition a space vehicle might encounter on a 500,000-mile round-trip to the moon.

That in a nutshell describes the appearance and purpose of Beech Aircraft Corporation's newest test facility located at its Boulder Division site which hugs the Rocky Mountain foothills near Boulder, Colo.

E. C. Burns, division manager, said the new building will be used for testing components of the NASA Apollo spacecraft's "cryogenic storage subsystem," which Beech is producing under subcontract to North American Aviation's Space and Information Systems Division. It became fully operational the end of August.

Technically called an "Apollo Test Complex," the new structure houses rooms or chambers capable of creating different space environments. Highly sophisticated test apparatus will simulate physical phenomena expected to confront the Apollo on its lunar voyage, such as vibration, temperature extremes and hard vacuum.

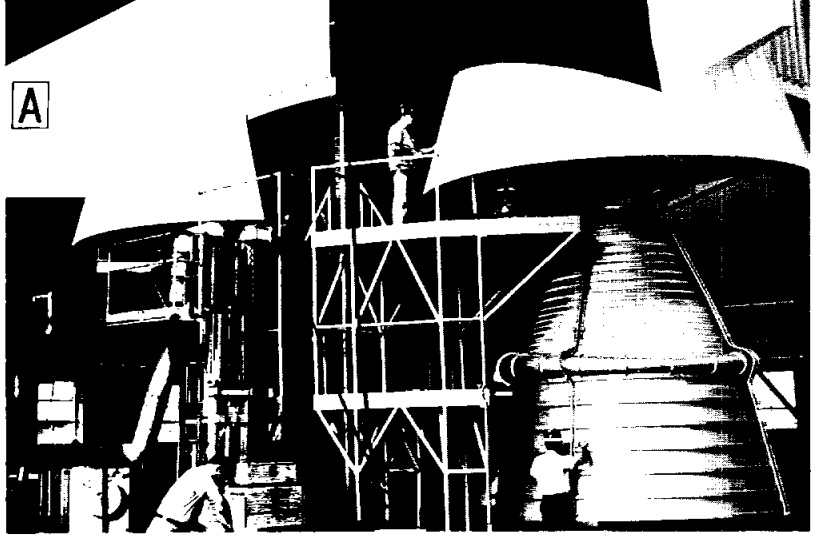
The facility is an extension to a liquid hydrogen laboratory. It will not only meet environmental requirements, it will provide a fully integrated systems management operation for Beech's Apollo project design, production and testing task.

Beech's Apollo subsystem forms the heart of the spacecraft's life support and electric power systems. It stores liquid oxygen and liquid hydrogen, then converts and delivers the elements in a gaseous state to the other systems. High reliability goals demand exhaustive design qualification testing of all its parts.

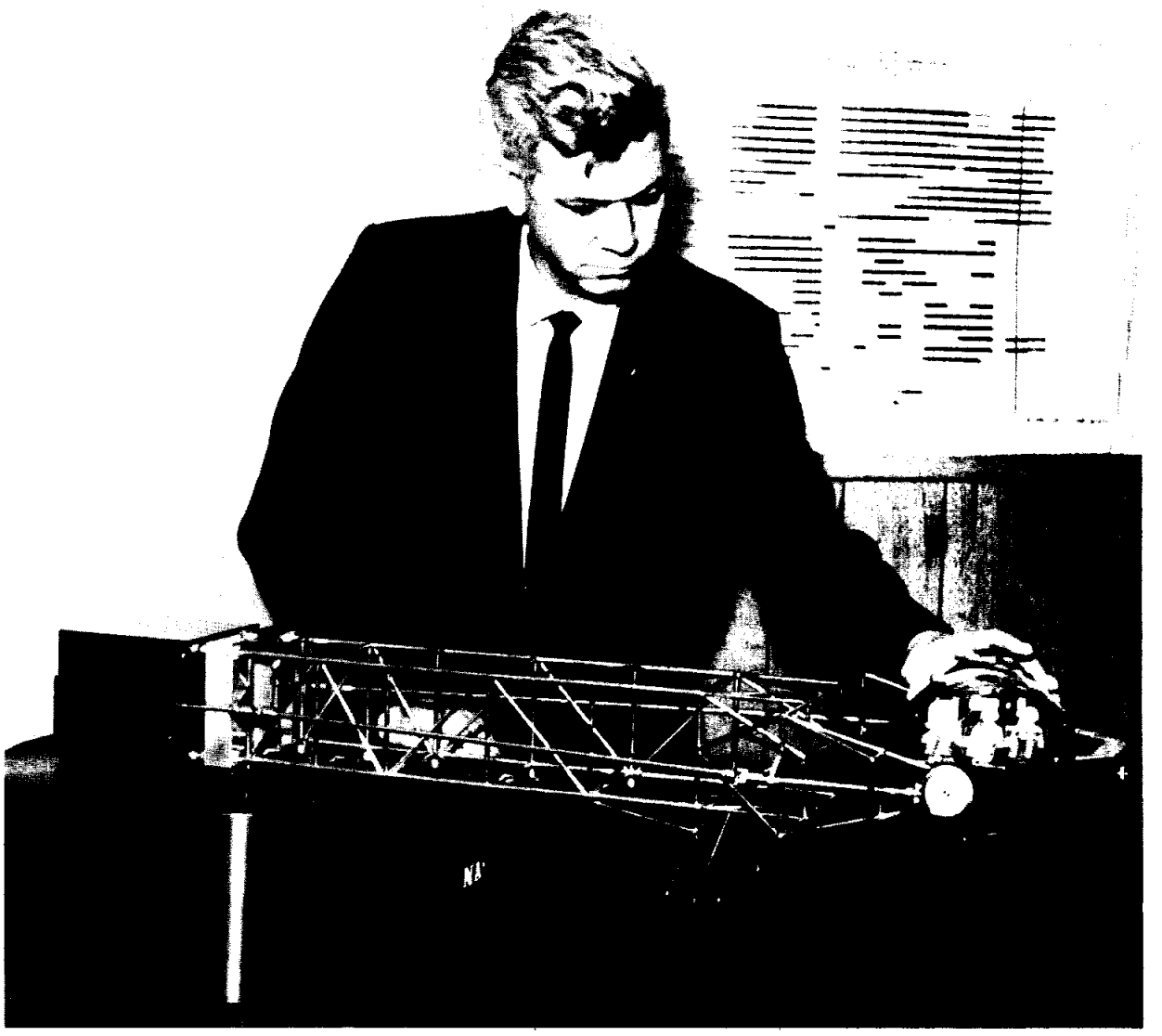
One of the new facility's dual purpose chambers will prove subsystem component resistance to explosive environments. Its altitude simulation equipment exposes test items to abrupt, simultaneous changes in air pressure and temperature.

Another chamber combines a terrific vibration with rapidly elevated temperatures as would be experienced in the boost phase of launch operations. Other test chambers will simulate shock, climate, ultra high vacuum, permeation, stresses and the punishing gravitational loads that accompany fast acceleration.

The new building is so designed that all tests can be remotely operated and automatically monitored in fully instrumented control rooms outside the immediate test area. It features complete data acquisition equipment.



SATURN V TAIL—The size of the 350-feet-tall Saturn V moon rocket is illustrated by this "soft" mockup of the thrust structure, or "business end," of the S-IC stage nearing completion at the NASA-Marshall Space Flight Center, Huntsville, Ala. The booster, 33 feet in diameter and 138 feet long, will be powered by five F-1 engines developing 7.5 million pounds thrust to start the monstrous vehicle on its journey into space. Two mock engines are shown mounted beneath the thrust structure. The first booster is scheduled for ground test firing at the Marshall Center late in 1964.



MSC'S CENTRIFUGE—William T. Lauten Jr., chief, Flight Acceleration Facility checks a point on a working model of the centrifuge that is to be constructed at the Clear Lake site. The facility is scheduled to be in operation by early 1965.

Most Powerful Centrifuge Nearing Reality; Motor Contract Is Let For MSC Facility

The world's most powerful centrifuge is nearing the construction stage at Manned Spacecraft Center's permanent site at Clear Lake, with the motor contract going to Westinghouse and other contracts to be let soon.

Able to swing a 3,000 pound payload on the end of a 50-foot arm at 42 rpms, the centrifuge will generate a maximum force of 30 g's which could be employed for three minutes.

A working model of the flight acceleration facility has been built by MSC's Technical Services Division. The model was designed by the Design Drafting Branch and engineered by Flight Acceleration Facilities Section.

The facility will be constructed in three phases. The first will be the centrifuge, controls and instrumentation. Flight Acceleration Facility chief, William T. Lauten Jr., stated that the contract for this phase should be let within the next 30 days.

Phase two will be the building, and construction should begin sometime in November, Lauten added.

The third part of the facility will be the electric motor and driving mechanism. The contract for the approximately 9,000 hp direct current motor has gone to Westinghouse.

Some idea of the massiveness of the unit can be derived from the weight of the motor and driving mechanism which will weigh about 650,000 pounds. The entire rig to be mounted on the concrete base will tip the scales in excess of one-million pounds.

When completed, the facility will be used to train Apollo flight crews, primarily to acclimate them to the gravitational forces they will experience on launch and re-entry.

On the end of the centrifuge arm will be a 12-foot gondola with accomodations for three men, their acceleration couches and equipment, including a mock-up of the Apollo control panel. The size of the gondola corresponds roughly to that of a room 8 by 8 by 8 feet.

The interior pressure will simulate that of a spacecraft interior when necessary and the gondola will also be used for biomedical studies on the effects of various gravitational forces on human subjects and supporting systems.

Another function of the facility will be to check out various entire spacecraft systems intended for use in Apollo missions. The maximum force of 30 g's could be employed for as long as three minutes but a 20 g force could be generated for sustained periods of a half-hour or more. Such forces would be employed only for systems and equipment tests.

Under certain conditions, the crew would have the capability of manipulating the gondola as they would a spacecraft during launch and re-entry.

The supporting arm will be of heavy structural steel and the gondola will turn on two axes at the end of the arm. This will allow three gravitational forces—the normal downward pull of the earth, the centrifugal force created as the gondola swings around its circle, and the backward pull of inertia - to be combined into a single "eyeballs in" force from front to back of human subjects, the direction in which they can take the largest g loads.

Respiration rates, body temperature, EKG rate, blood pressure, etc. will be monitored during tests by medical personnel to insure the well-being of human subjects inside.

Mercury pilots experienced a force of slightly more than seven g's on lift-off and up to 11 plus g's during re-entry. Human subjects have gone as high as 25 g's for a period of a few seconds on the largest centrifuge now in operation, at Johnsville, Penn. The Johnsville centrifuge also has a 50-foot arm, but it does not have the power to swing the payload which the MSC facility will have.

Space News NASA ROUNDUP!

SECOND FRONT PAGE

Gemini Docking Trainer Going Up At Clear Lake

Gemini astronauts will learn how to "apprehend" another vehicle traveling in space on a special trainer in a darkened, hangar-high structure now being erected at Manned Spacecraft Center's Clear Lake home.

The $1.4 million McDonnell translation and docking trainer will be installed and operating by April,1964. Called a dynamic trainer, it will give Gemini astronauts, and Apollo candidates, practice in docking and rendezvousing with another orbiting object.

The trainer consists of two vehicles. There is the Gemini cockpit in which two astronauts can run through a rendezvous "mission" at the same time, and the Agena target vehicle.

During rendezvous-scheduled flights in 1965, the Agena target vehicle will be launched into orbit first from Cape Canaveral. After the Agena's orbit is established, the Gemini spacecraft with two astronauts will be lofted into orbit atop a Titan II launch vehicle. The spacecraft's orbit will be computed to "catch up" with the Agena.

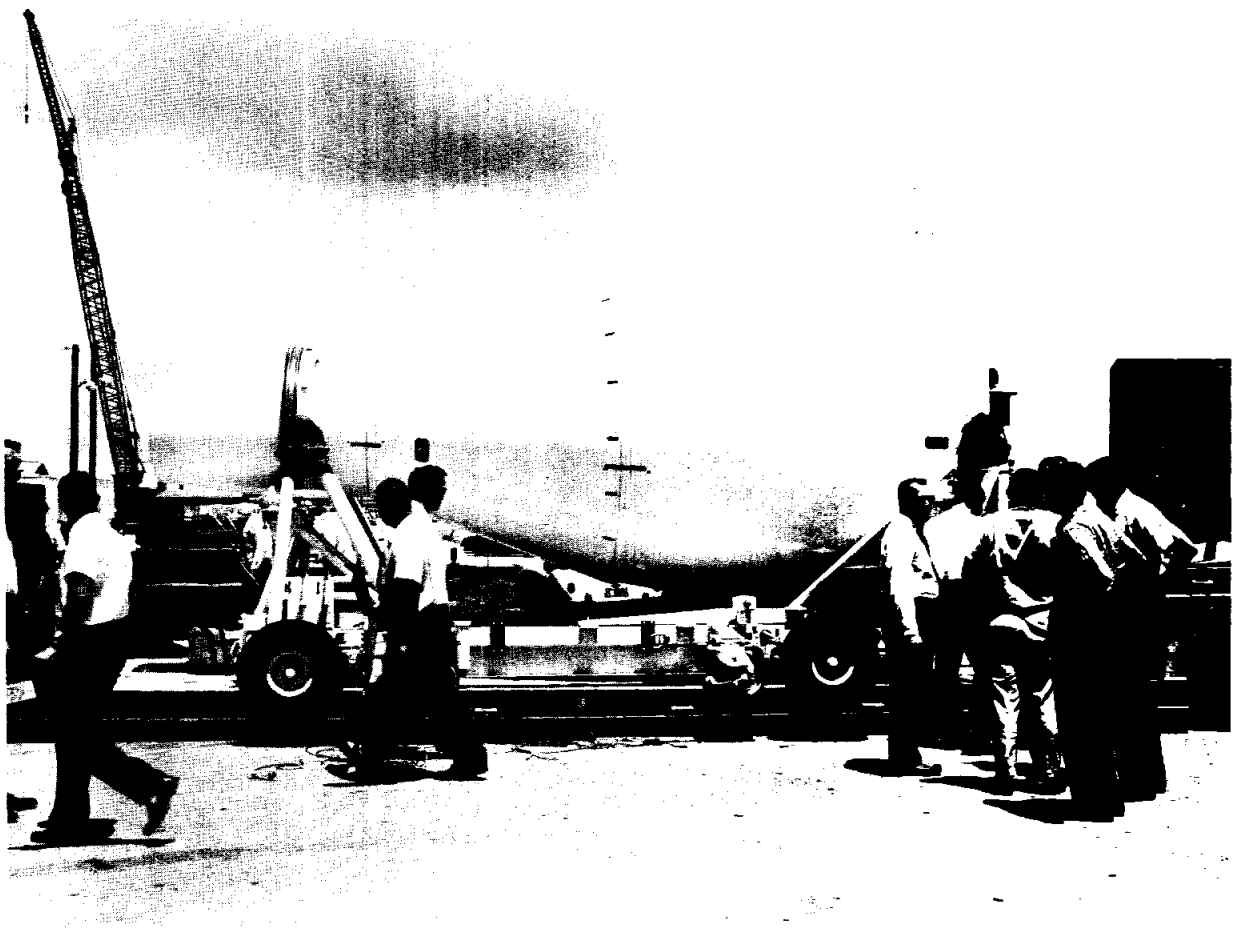
The spacecraft radar will "lock on" its target about 250 nautical miles away. Guided by computer, the astronauts will begin maneuvering toward the Agena. Attitude and translational thrusters will give the spacecraft six degrees of control.

At about five miles from the target, the astronauts will take over visually.

It is this manual portion limited to 100 feet instead of five miles that will be simulated on the Clear Lake trainer.

The trainer with both vehicles has six degrees of freedom. The Agena "vehicle" has 100 feet travel longitudinally, and 16.5 feet (plus or minus) vertically. The Gemini "spacecraft" has 24 feet travel (plus or minus) laterally, and pitch, roll and yaw capability to 45 degrees (plus or minus).

(Continued on page 3)



ARRIVES FOR TESTING—The Gemini spacecraft structural simulator arrived recently for tests at Manned Spacecraft Center's Cape Canaveral operations. The simulator was delivered by truck from McDonnell Aircraft Corporation in St. Louis, Mo.

Gemini Structural Simulator Delivered For Tests At MSC Cape Canaveral Facilities

Manned Spacecraft Center, Cape Canaveral, received the Gemini spacecraft structural simulator, recently, in preparation for the approaching Gemini program tests later this year.

The simulator is of the same size and shape as the actual Gemini spacecraft, and has the same weight and center of gravity. However it will never fly.

Instead, the simulator will be used as a stand-in for the real spacecraft in tests of the workstands, transportation dollies, gantries, and all other complex handling gear on the launch pad. By using the simulator in practice operations, engineers can be sure ahead of time that everything fits, and launch crews can perfect their handling techniques.

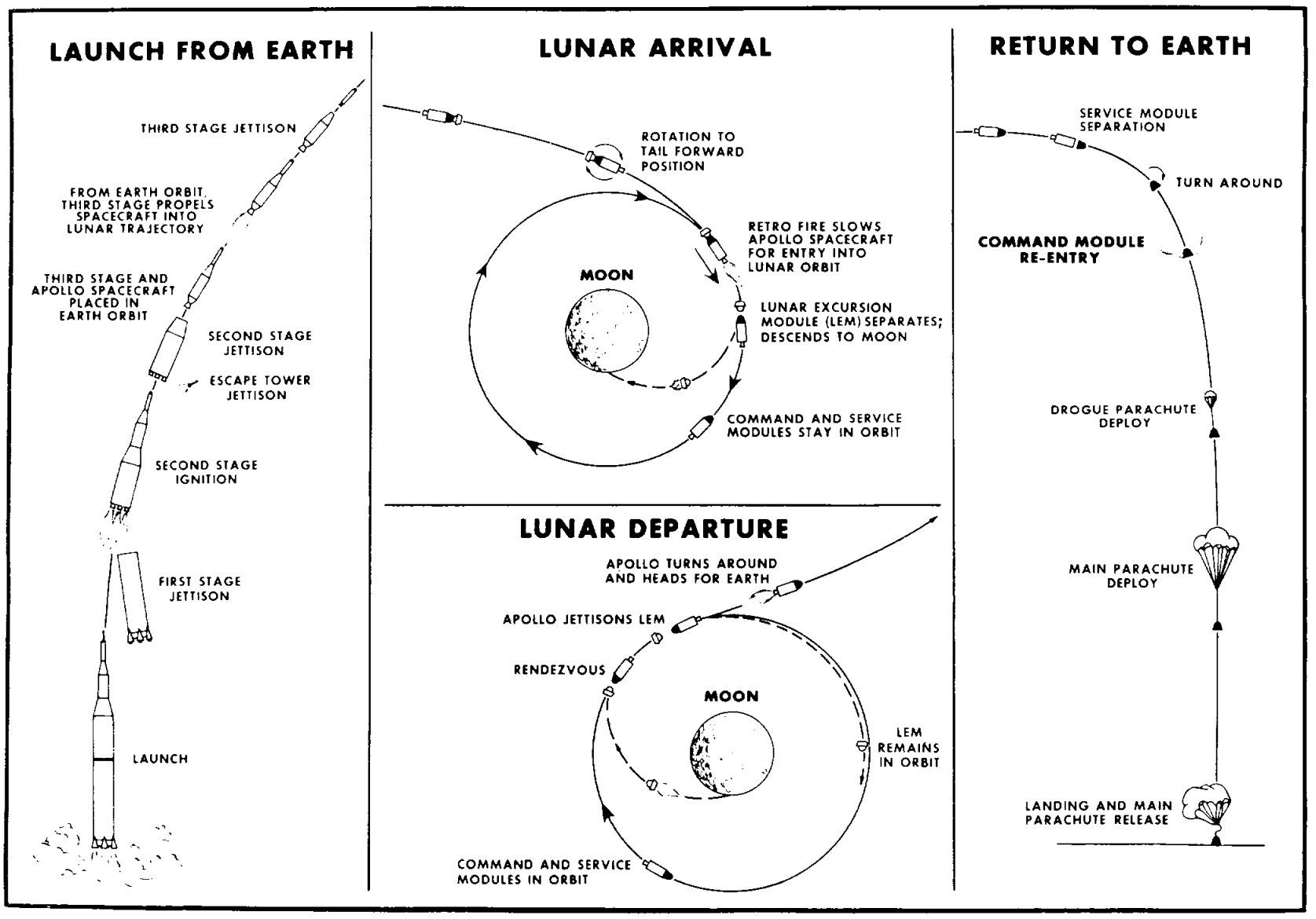
The simulator was shipped from McDonnell Aircraft Corporation to Cape Canaveral by truck. It is currently located in the AF Hangar.

The first Gemini Boilerplate spacecraft is due to arrive at Cape Canaveral soon. The first flight from the Cape will be an orbital boiler-plate flight. The flight will be unmanned and the spacecraft will not be recovered.

This flight will be a test of the structural compatibility of the Gemini and its Titan II launch vehicle, and only a minimum of working systems will be placed aboard the spacecraft. It will, however, be instrumented for acceleration, temperature, and acoustical measurements and will carry a tracking beacon.

The second Gemini flight will be ballistic, with water-landing by parachute. All systems will be flown for validation. Automatic features will be included to facilitate spacecraft maneuvers, including separation and re-entry.

The first manned Gemini shot, in which two men will be hurled into orbit, is scheduled for late 1964.



MANNED LUNAR LANDING—This drawing charts the course of the Apollo Project's manned lunar landing and return to earth. Two NASA astronauts will make the descent to the Moon's surface in the LEM (Lunar Excursion Module), top center. A third crewman will remain in the command module as it orbits the Moon awaiting rendezvous with the LEM as it and the spacemen return from the Moon's surface.