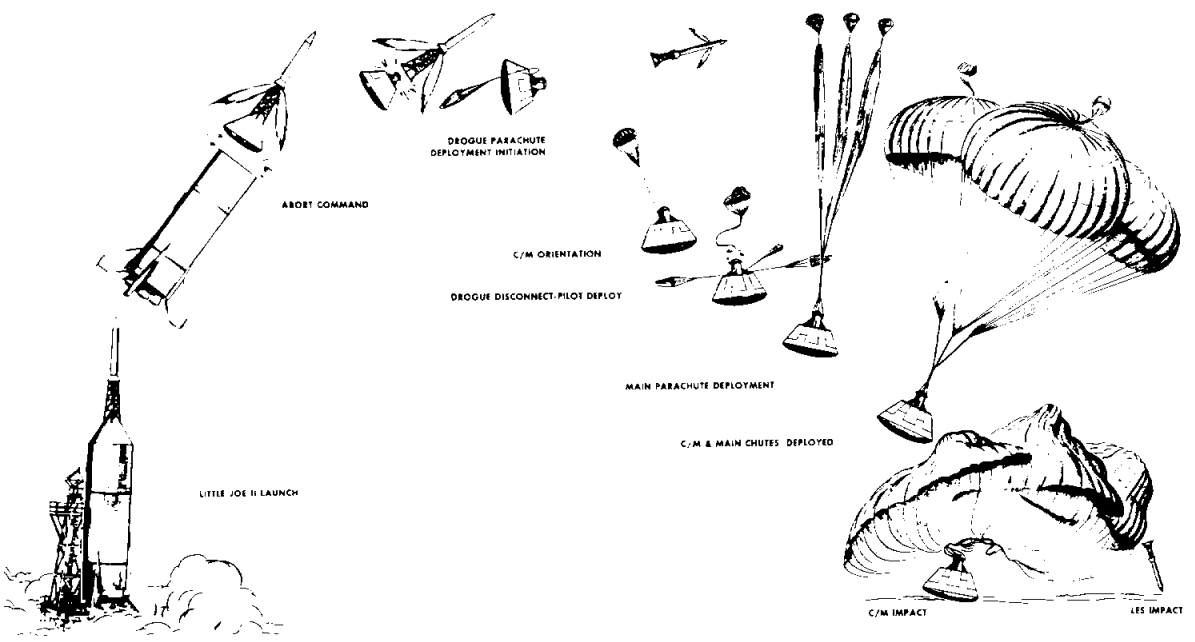
Space News ROUNDUP!

VOL. 3, NO. 15 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS MAY 13, 1964

SCHEDULED NO EARLIER THAN TODAY

WSMR Flight Tests Apollo Launch Escape System



FLIGHT PLAN--The scheduled flight plan for the Apollo-Little Joe II High-Q Abort Mission is shown above. The launch vehicle was to be oriented in a northern direction at an angle of approximately 84 degrees. The following sequence was scheduled to take place.....T minus 0--Launch; T plus 30.2 seconds--launch escape system abort initiated at 16,600 feet; T plus 38.7--launch escape system motor burnout at 22,000 feet; T plus 45.7--launch escape tower jettison at 23,500 feet; T plus 48.7--drogue parachute deployment at 23,500 feet; T plus 94.8--drogue parachute release, main parachute deployment at 11,000 feet; T plus 109--launch escape tower impact, 28,000 feet downrange; and T plus 442--command module impact, 21,500 feet downrange. (All altitudes are approximate)

The Apollo-Little Joe II High-Q (high dynamic pressure) abort mission scheduled at the White Sands Missile Range in New Mexico no earlier than **today,** is the third of a series by NASA in the development of the Apollo spacecraft.

Impact of the command module is scheduled 21,500 feet downrange. Three 88-foot diameter ringslot parachutes will land the only section of the vehicle to be recovered intact.

Under the management of the Manned Spacecraft Center, the test is primarily designed to gather aerodynamic data on the Apollo launch escape vehicle and its ability to perform in an abort situation under high dynamic pressure in the transonic speed range.

The vehicle's overall height of 86 feet consists of:

Little Joe II which is 33.3 feet tall and 154 inches in diameter and weighing approximately 33,000 pounds at launch. It is powered by one Algol motor with 103,-200 pounds of thrust and six Recruit motors, each with 33,395 pounds of thrust. The total thrust is approximately 303,000 pounds.

A service module (boilerplate) with a height of 13 feet two inches, a diameter of 154 inches, and weighing 9,080 pounds, is mounted on top of the Little Joe II vehicle.

The command module (boilerplate) with a height of 11 feet two inches and a 154 inch diameter at the base weighs 9,000 pounds. The conical design of the command module is fabricated of aluminum alloy welded into two subassemblies--the forward and aft sections of the crew compartment.

A launch escape sequencer controls separation of the command module from the service module, escape motor and pitch control motor ignition, tower separation, jettison motor ignition, and arming of the earth landing system sequencer.

Onboard instrumentation will measure various phases of the flight.

Topping off the entire vehicle is the launch escape subsystem which consists of the launch escape tower, launch escape motor, pitch control motor, tower jettison motor and tower release mechanization. This has a total weight of about 6,000 pounds, and stands about 28 feet tall.

The launch escape motor is 183 inches long and 26 inches in diameter containing 3,200 pounds of solid fuel which burns approximately eight seconds at nominal thrust. Effective thrust of this motor is 155,000 pounds.

Langley Medal Presented To Shepard, Eleventh To Receive It Since 1908

Alan B. Shepard Jr., America's first man in space, was presented the Langley Medal by the Smithsonian Institute on May 5 in Washington, D. C., on the third anniversary of his Freedom 7 suborbital space flight.

The presentation was made in the Regents Room of the Smithsonian by Chief Justice Earl Warren of the U. S. Supreme Court, who is the Chief Regent of the Institute.

Named for Samuel Pierpont Langley, American astronomer and airplane pioneer, and secretary of the Smithsonian Institute, 1887-1906, the medal is awarded for specially meritorious investigations in connection with the science of aerodromics in its application to aviation.

Shepard was the eleventh person to receive the medal since the award was initiated in 1908. First to receive the medal were the Wright Brothers in 1910, followed by: Glen Curtis, Gustave Eiffel, Charles Lindbergh, Charles M. Manly, Adm. Richard Byrd, Joseph S. Ames, Jerome C. Hunsaker, Robert H. Goddard, and Dr. Hugh Dryden.

The citation to Shepard read, "In recognition of his courageous and pioneering contribution to scientific research as the first American to fly in space and first to control the attitude of a spacecraft while in flight and during a condition of weightlessness."

In attendance were Shepard's wife Louise, their daughters Juliana and Laura; Shepard's parents Col. and Mrs. Alan B. Shepard; Mrs. Shepard's parents, Mr. and Mrs. Brewer; Shepard's aunt and uncle, Mr. and Mrs. Frederick Shepard; and other members of the Smithsonian Board of Regents.

Gemini Rough Water Egress Test Is Successful In Gulf

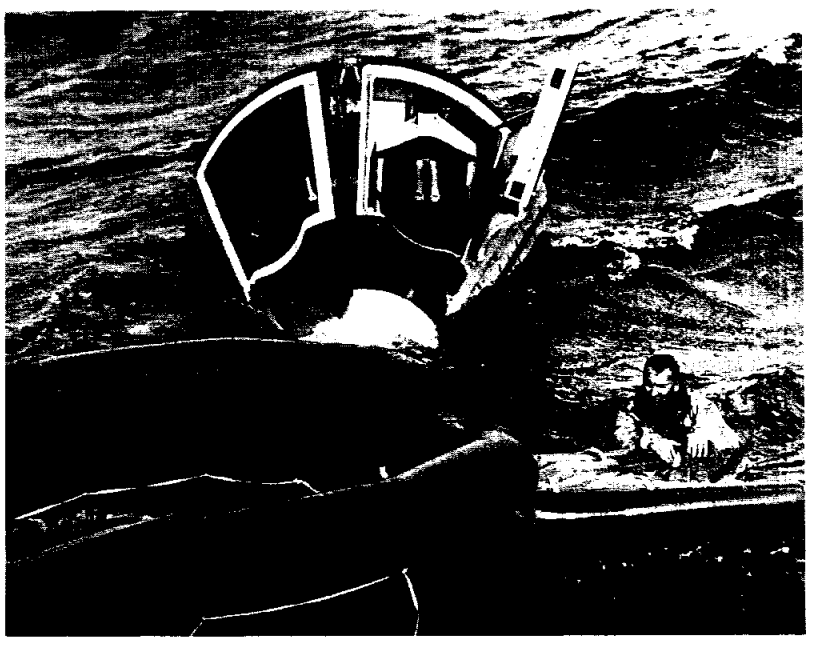
A rough water egress test using a boilerplate version of a Gemini spacecraft ended successfully May 6 in the Gulf of Mexico.

The experiment was conducted approximately 12 miles south of Galveston in waves that were running from six to eight feet high.

In this particular test, the boilerplate with two subjects inside was lowered from the NASA Motor Vessel Retriever and allowed to float--loosely tethered--in the water. A technician dressed in a frogman's suit knocked on the hatches of the spacecraft.

The men inside opened the left hatch. Then the space suited test engineer occupying the left seat left the boilerplate. He was followed by the test subject occupying the right hatch. The right seat man crawled over the instrument pedestal and center console and also egressed via the same opening. Both

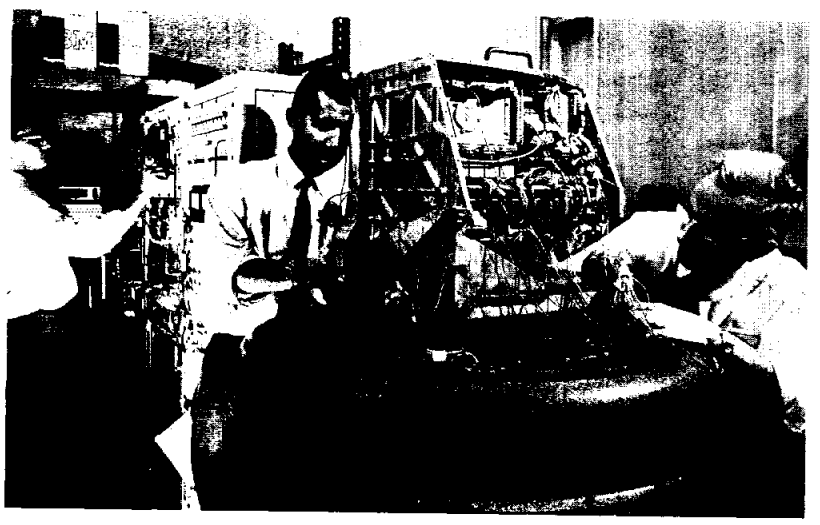
(Continued on page 6)



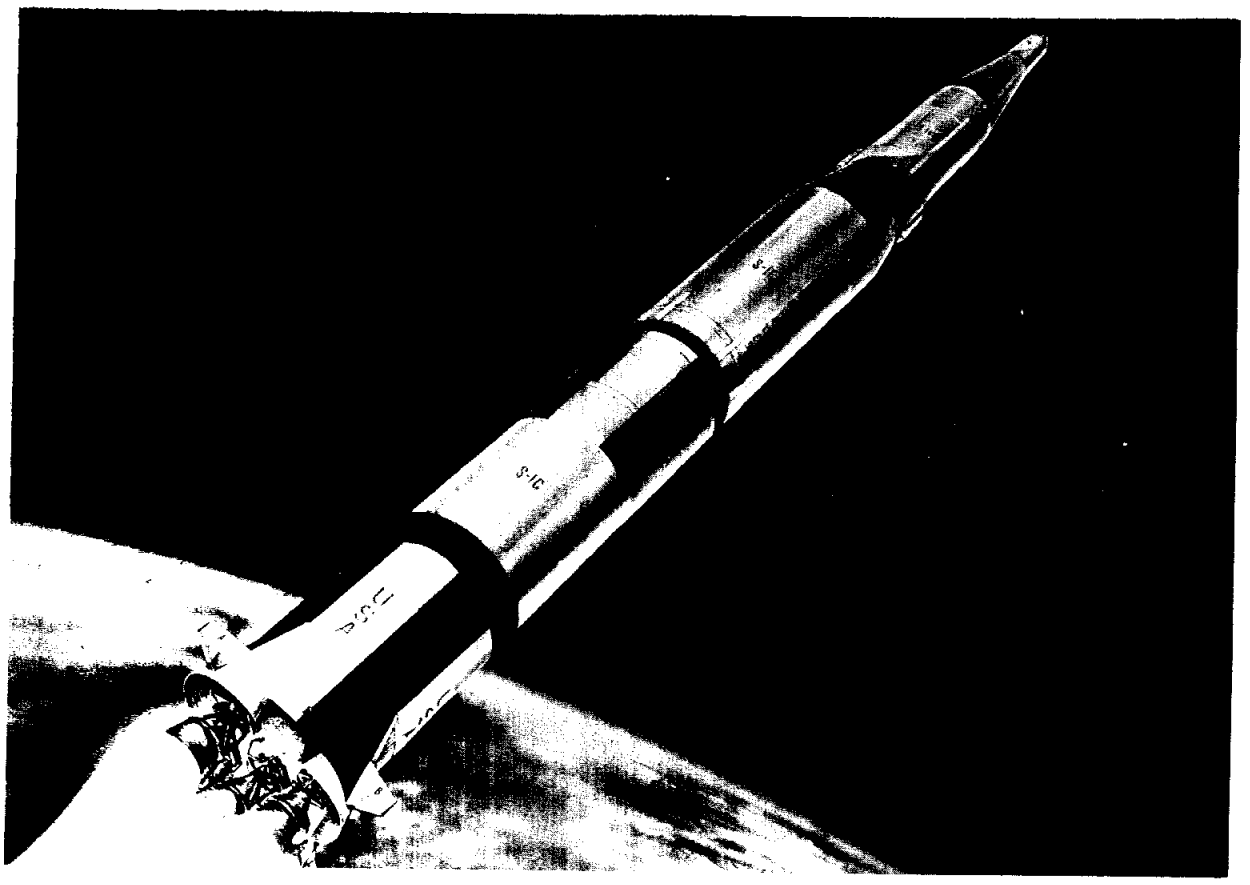
ROUGH WATER RECOVERY--The Rendezvous and Recovery section of a boilerplate version of the Gemini spacecraft is completely awash during rough water egress tests in the Gulf of Mexico. Astronaut James A. Lovell Jr., one of the test participants is in the water with waves running six to eight feet high.

IBM Computers Play Big Role In Space Program

IBM PRESIDENT A. L. Williams, standing, and IBM computer technican during recent visit to IBM Space Guidance Center by Williams.



GEMINI PRODUCTION prototype computer undergoing vibration testing at IBM's Space Guidance Center, Owego, N.Y. The on-board computer will help Gemini astronauts during complex maneuvers such as rendezvous and docking.



SATURN GUIDANCE – Under a recently-expanded contract from the NASA Manned Space Flight Center, IBM is supplying guidance computers and data adapters plus complete Instrument Unit integration and checkout for the Saturn IB and Saturn V launch vehicles.

In 1956, the U.S. Government selected International Business Machines Corporation to establish a data processing facility to compute the orbits of satellites launched during the International Geophysical Year. The resulting Space Computing Center, operated in Washington, D.C., by IBM's Federal Systems Division, launched the company into the space era in time to play key roles in America's first space projects. In 1958, for instance, the Van Allen radiation belts were mapped using data the IBM Space Computing Center processed.

Since the beginning then, the Federal Systems Division has been in most important National Aeronautics and Space Administration projects including OAO, Mercury, Gemini, Apollo and Saturn. (The Division also has participated in vital military programs such as the BMEWS early warning system, SAGE tactical air defense system, B-52 bomber, and the Titan missiles.)

Headquarters for FSD is in Rockville, Md. The Division, headed by President Donald T. Spaulding, is divided into two Centers: The Space Guidance Center at Owego, N.Y., produces airborne guidance and control systems; and the Washington Systems Center at Bethesda, Md., develops ground-based information processing and communications systems. FSD Vice President Bruce G. Oldfield heads the Division's space programs and field operations.

Key projects currently under development for the Manned Spacecraft Center by IBMers at these FSD Centers make the Division a major member of the MSC-industry aerospace team:

Here in Houston a 250-man FSD group is installing the Real Time Computer Complex in the Mission Control Center building.

In Bethesda, Md., the FSD team that produced the first injection laser to broadcast audio signals is continuing its leadership in this promising technology. These scientists are developing an air-to-ground laser voice communications system for MSC. The system will be used to determine the feasibility of laser optical communications for space flights.

At the Space Guidance Center in Owego, N.Y., FSD is developing a computer that will be aboard the two-man Gemini vehicles under subcontract to McDonnell Aircraft Corp. The computer, the first for manned spacecraft, will aid astronauts in guiding Gemini during intricate rendezvous and docking maneuvers. A keyboard on the vehicle instrument panel will allow the men to query the computer for, as an example, thrust changes needed for vehicle alignment prior to rendezvous.

Another FSD team at the Space Guidance Center has just finished a six-months study of a data handling system for the manned Large Orbiting Research Laboratory concept MSC is considering. The study was done with Douglas Aircraft Company who was funded by MSC. (The same Douglas/IBM team is now studying a Manned Orbiting Research Laboratory for NASA's Langley Research Center.)

The FSD engineers and scientists currently working at MSC are developing one of the most advanced and most complex communications and computer systems ever put together. The computing facility is programmed to receive data from world-wide tracking stations and from the orbiting spacecraft. It will compute and present these data for display in the Mission Control Center so that flight controllers will have information to make vital mission decisions.

DONALD T. SPAULDING, president of IBM Corporation's Federal Systems Division.

B. L. Sarahan is FSD's Houston operations manager. He reports that more than 1,000 separate computer programs are being prepared by the IBM/NASA Real Time Computer Complex team to support Gemini and Apollo missions. Another measure of RTCC's capability is a comparison to control center computer operations for the pioneering Project Mercury missions. The Houston complex will handle ten times more bulk data and produce 100 times more output for future manned space flight mission controllers.

FSD personnel are able to draw this comparison between RTCC and Mercury computer operations because the Division was also responsible for the Mercury installation. Three powerful IBM 7094 computers IBM installed at Goddard Space Flight Center were the relay and data processing link between the 18 world-wide Mercury ground stations and Mercury Control at Cape Kennedy. The computers collected data and displayed it for mission controllers at the Cape. This same IBM system at Goddard has been reprogrammed for support of early Gemini and Apollo development shots. Additionally, IBM computers are aiding NASA to control the flights of scientific satellites that Goddard Space Flight Center is developing.

All of FSD's systems are not earth based, however, Marshall Space Flight Center recently expanded FSD's role in development of the huge Saturn launch vehicle that will send U.S. astronauts on their voyage to the moon. In addition to providing an advanced guidance computer and data adapter, the IBM Division will help NASA integrate some 56 other subsystems into the booster's Instrument Unit--a three-foot-high by 22-foot-diameter "nerve center" that will monitor and control Saturn from launch until Apollo leaves Earth orbit. The just-expanded responsibility calls for IBM to take over structural and mechanical design, procurement of components and assembly, checkout and documen-

(Continued on page 3)

HOUSTON OPERATIONS – Bruce G. Oldfield (left), FSD vice president of Space Programs and Field Operations, observes computer checkout during recent visit to MSC Real Time Computer Complex. On right is B. L. Sarahan, FSD's Houston operations manager. William Stanley, with back to camera, is manager of Computer Operations for IBM at MSC.

(Continued from page 2)

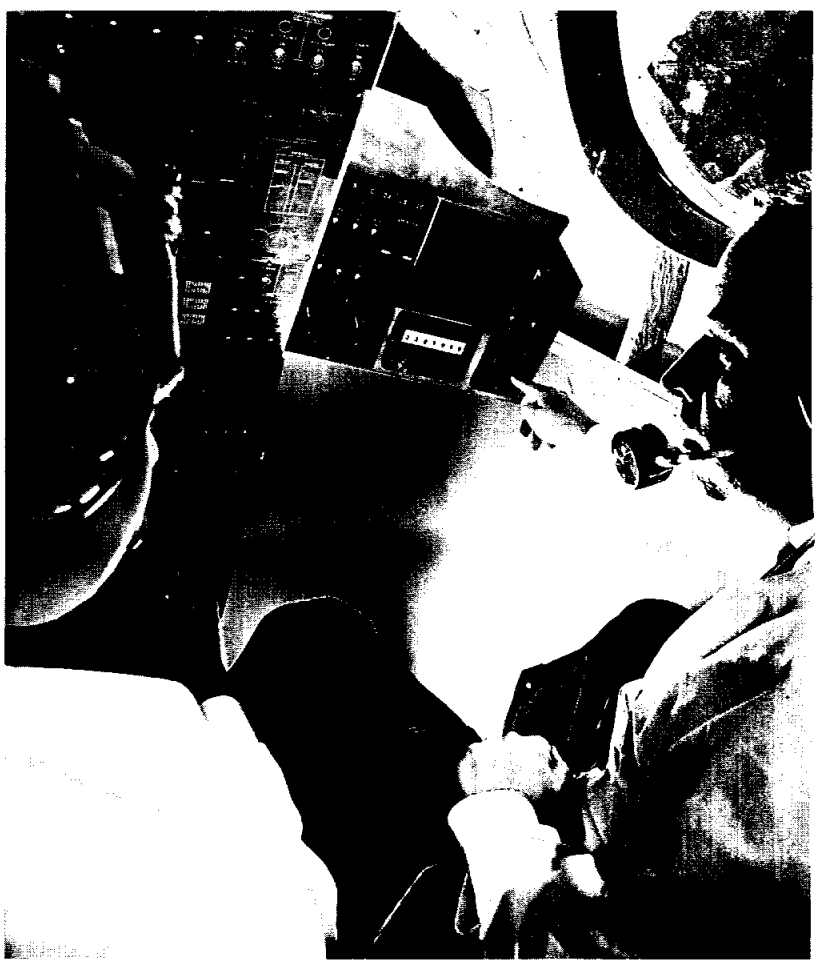
tation of the entire Instrument Unit. It is a $175,000,000 job, largest space assignment IBM has yet been given.

To aid in development of the Saturn booster family, Saturn I vehicles will be guided by IBM on-board computers. These computers are modified versions of the proven ASC-15 computers FSD developed for the Air Force Titan II program.

Long before contemporary scientists and engineers concerned themselves with Saturns, Titans, or moon landings, another group of scientists looked to outer space to provide their professional challenges. They were astronomers. Now, our space age astronomers will utilize a new type of space vehicle sometime next year to get their first look at the stars from above the Earth's dusty atmosphere--via a telescope in the NASA Orbiting Astronomical Observatory satellite. A data processor and advanced data storage unit developed by FSD in Owego, N.Y., will furnish the satellite with pointing information, and then on command record and relay experiment results to the ground.

IBM is active in advanced developments for products in other than aerospace systems. The company maintains national and world-wide organizations that provide modern equipments to satisfy information handling requirements of industry and governments. Other IBM-MSC installations include computational equipment for the MSC Fiscal and Administrative Division and the Computation and Analysis Division.

EDITOR'S NOTE: This is the twenty-seventh 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 Information Representative, Federal Systems Division, IBM Corporation.



IBM-SUPPLIED devices which Gemini astronauts will use to question and read-out on-board computer information are shown in IBM's Gemini spacecraft simulator. Incremental velocity indicator which displays velocity information in spacecraft coordinates, a keyboard which is used for manually inserting information into computer memory, and a unit to display memory information comprise the control panel devices IBM is supplying with the spacecraft computer.

GEMINI ASTRONAUTS shown with IBM Federal Systems Division personnel during a recent visit to FSD's Owego, N.Y., Space Guidance Center. Astronauts "flew" re-entry maneuver in Gemini trainer as part of their familiarization with on-board Gemini computers IBM is developing for MSC. Pictured are (left to right) IBM engineer Dale Bachman, Astronaut Virgil I. Grissom, IBM Space Guidance Center General Manager Arthur E. Cooper, Astronaut Neil A. Armstrong and, back to camera, James C. Hundley who is IBM technical manager for Gemini project.

IBM ENGINEERS at Federal Systems Division's Space Guidance Center, Owego, N.Y., ready the primary processor for NASA's OAO satellite for system tests. Processor will relay ground commands to telescope carrying satellite and experiment data to ground.

Dr. Joseph Shea Describes Apollo Development To 4th Conference On Peaceful Uses Of Space

(EDITOR'S NOTE: The following is part of a talk delivered by Dr. Joseph F. Shea, manager, Apollo Spacecraft Program Office, at the Fourth National Conference on the Peaceful Uses of Space in Boston, Mass., April 29, 1964.)

"The Apollo Spacecraft are the apex of the lunar program pyramid--the top 90 feet of the 375 foot high vehicle which some day this decade will rise majestically from the pad at Cape Kennedy, propelling three of our more adventurous citizens to their historic rendezvous with the moon.

There are today over 130,000 Americans laboring "in the traces" to make this dream a reality. Although the goal of the program provides an overlay of glamour, the work is the same type of hard, detailed, technical development task which we have been tackling in this country to meet defense or space goals over the last three decades.

The main difference comes from the fact that the space environment, coupled with the demands of the lunar mission, is terribly unforgiving. Any design or quality deficiencies in the spacecraft or any of its subsystems will be sure to appear some time during the two week mission; causing, at the very least, an abort, and, at the worst, tragedy.

The space age has matured to the point where we understand the environment; we understand how to design to meet it; we understand how to test in our earth bound laboratories to root out deficiencies which otherwise would be found during flight tests.

This maturing of our understanding has shaped our entire program. The lunar effort began in 1961. The first major contract awarded was to the MIT Instrumentation Laboratory for development of the guidance and navigation system. In December of that year, the North American Aviation, Inc., was awarded development of the command and service modules. Almost a year later, the lunar orbit rendezvous approach to the overall mission was selected, and Grumman was brought onto the team to develop the Lunar Excursion Module. Almost a year and a half of detailed study had been devoted to defining the mission and developing the specifications for the necessary system elements.

The development program has proceeded with similar deliberation. The command and service modules, and their subsystems, have been in design and developmental test for almost two and a half years. The fruits of this effort are just beginning to ripen. Last month (March) the first functional Apollo guidance system was qualified over in Cambridge. Next month (May), the launch escape system and the earth landing system will be tested under flight conditions with a "boilerplate" spacecraft at White Sands.

A few days later, a command and service module, again of boilerplate construction, will be launched from the Cape (Kennedy, not Cod) atop a Saturn I to check our calculations of the aerodynamic loads which will be encountered during launch.

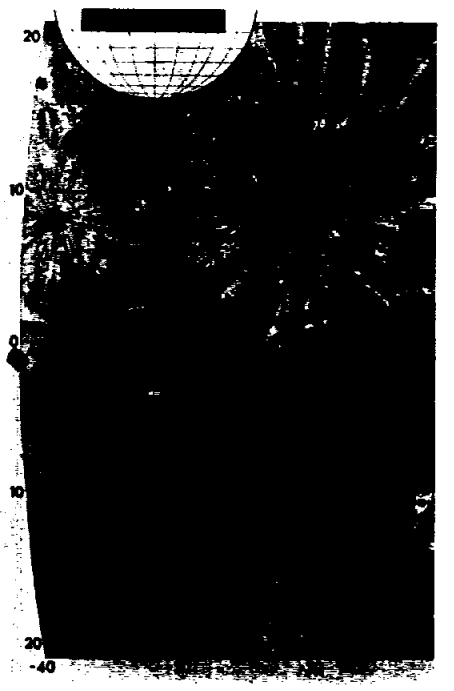
These two flight tests mark the gradual transition of the program from the development phase, where we work out the early design problems, to the qualification phase where we prove that the design is indeed worthy of flight. The focus is the first launch of a complete command service module aboard a Saturn I-B early in 1966.

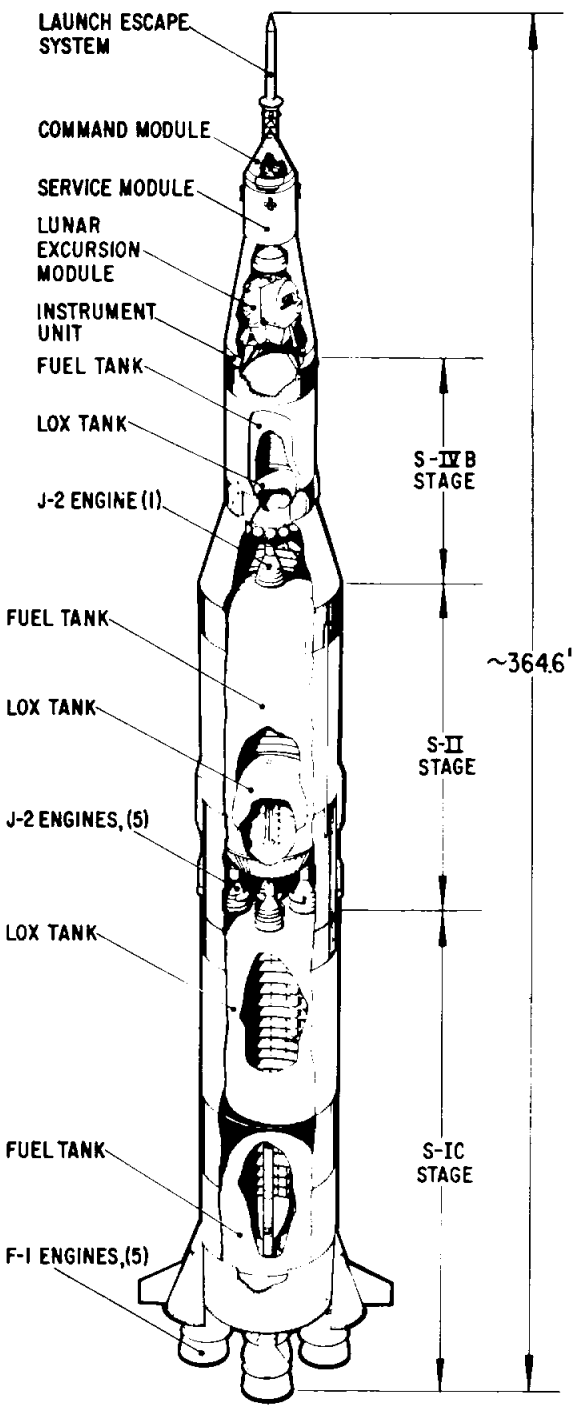
If there is any one thing that sets the manned space flight program apart from other, apparently similar, development programs, it is the rigor with which we execute the ground test program.

The guidelines we use are simple, and, in a way, sound like a litany of good generalizations. We take them literally, though. Every failure encountered in ground test must be understood and corrected before the spacecraft is certified for flight.

This program discipline--the refusal to shoot and hope--should make our flight tests demonstrations of the fact that we have solved our problems on the ground.

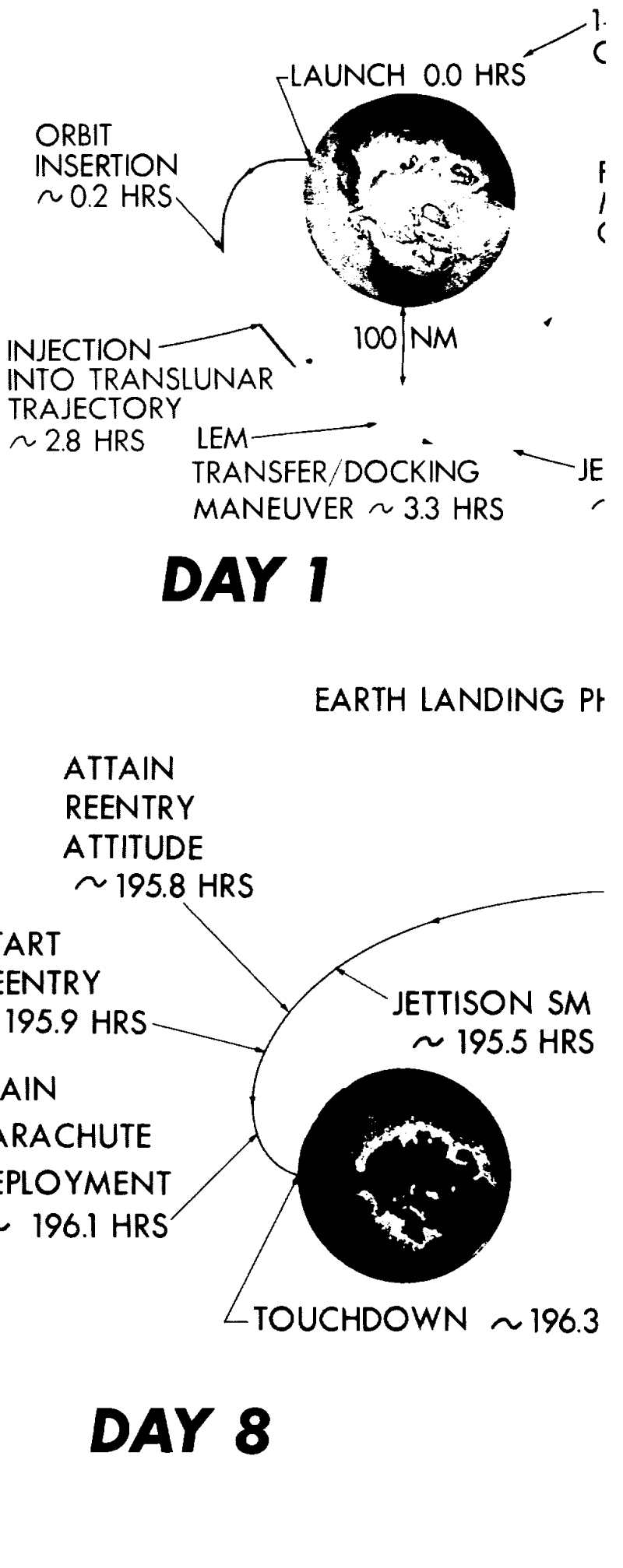
The only failures which should be encountered in flight are those which can arise from a combination of environments which we were unable to simulate in our laboratories. Since there are still several such conditions, we cannot expect a perfect record--but the success ratio should be relatively high."

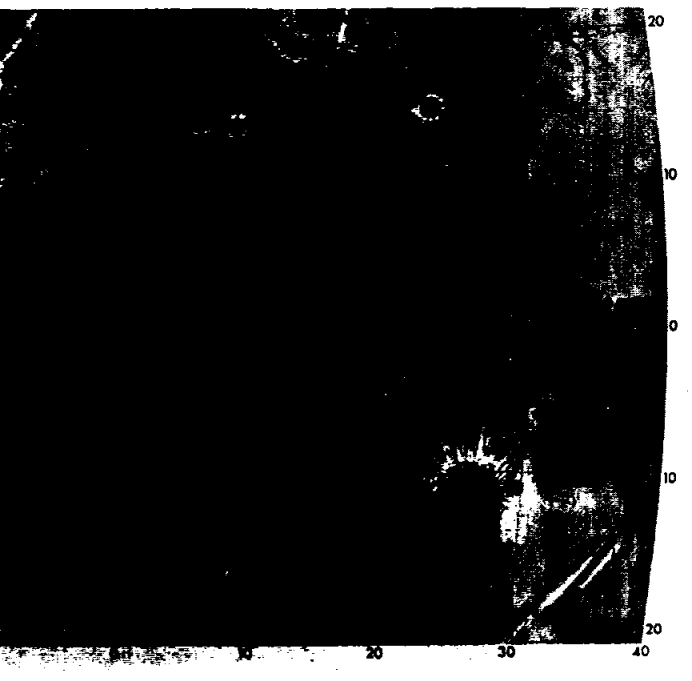




SATURN V

AS TALL as a 35-story building and as heavy as two dozen big jet transports – that's the Saturn V/ Apollo Moon vehicle under construction by the NASA-Marshall Space Flight Center, Huntsville, Ala. This new drawing shows the various elements of the big vehicle which is 375 feet tall with a maximum diameter of 33 feet.





Proposed Eight-Day Lunar Mission Sequence Profile

LUNAR LANDING AREAS—Observation and selection of the exact landing area will be made while the spacecraft is in lunar orbit. Depending on the conduct of the mission to this point, there are a number of areas along the lunar equator in photo at left which have been evaluated as possible good landing areas.

MANNED LUNAR LANDING MISSION PROFILE—The lunar orbit rendezvous method of accomplishing a manned lunar landing was chosen in July 1962. Since its acceptance as the plan for attaining a lunar landing, NASA Manned Spacecraft Center and associated contractor personnel have been working out the development details and exact mission sequence. The lunar orbit rendezvous mission contains seven major propulsive steps and following in a clockwise method the illustrations below, starting with the earth launch phase at the upper left, they are: (1) launch into earth parking orbit, (2) injection into translunar trajectory, (3) braking into lunar orbit, (4) landing maneuver, (5) ascent from lunar surface and rendezvous in lunar orbit, (6) injection into transearth trajectory, and (7) atmospheric reentry and recovery.

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

Director . . . . . Robert R. Gilruth
Public Affairs Officer . . . . . Paul Haney
Chief, News Bureau . . . . . Ben Gillespie
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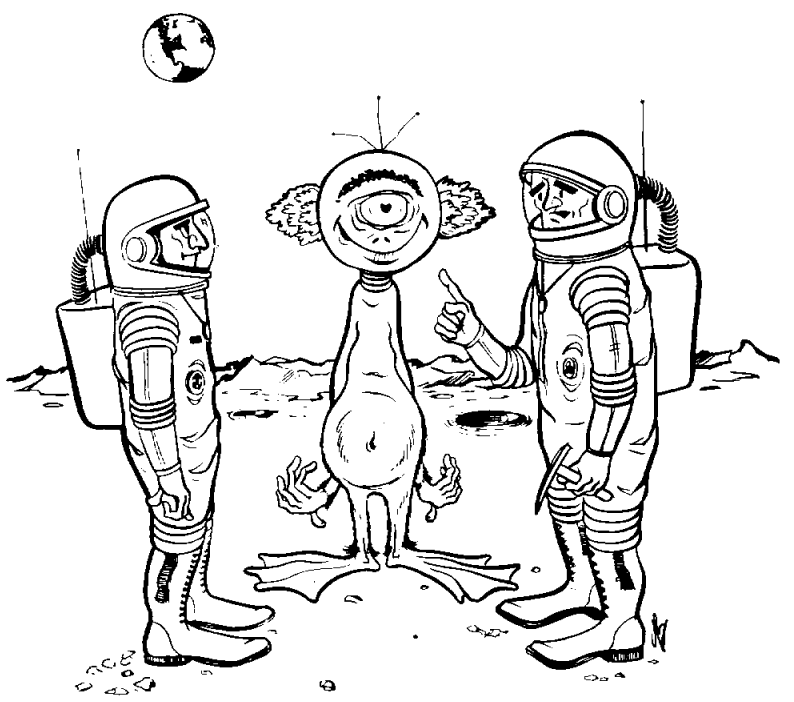
On The Lighter Side



NO, HE'S NOT WITH ME..... I THOUGHT HE WAS WITH YOU!!

TABLETOP SUNRISE--The image of the rising sun is projected on a table through the optical system of the world's largest solar telescope at the Kitt Peak National Observatory near Tucson, Ariz. Observing the image of the sun are (l. to r.) Alan L. Bean; William A. Anders; Larry Randall, with the solar section of the observatory; R. Walter Cunningham; Harold Masursky, of the U. S. Geological Survey in California; and Russell L. Schweickart. The four astronauts above were members of the astronaut team of 17 on a three day geological expedition to Sunset Crater and moon viewing sessions at the observatory.

DOCTORS VISIT MSC--A group of physicians representing 14 countries toured the Manned Spacecraft Center last week. They are in this country on a tour of U. S. Air Force facilities. Dr. Rufus R. Hessburg, assistant chief for Medical Programs, Crew Systems Division, explains in-flight bio-medical instrumentation to the group.

WELCOME ABOARD

Seventy-two new employees joined the Manned Spacecraft Center during the period April 6 through April 29, 1964. Thirteen were assigned to MSC-Florida Operations, eight to White Sands Missile Range, and two to the Gemini Program Office in St. Louis. The remaining 49 were assigned here in Houston.

PHOTOGRAPHIC DIVISION: Charles M. Turner.

OFFICE OF THE DIRECTOR: Jeannette Piccard.

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION: Bob Hendrix, Alver K. Spivey, and Daniel C. Regan.

MSC-FLORIDA OPERATIONS (Cape Kennedy, Fla.): Harry M. Leese Jr., Robert E. Pringle Jr., Charles R. Gillooley, Paul L. Davis, Robert L. Connell, Gray W. Chunn, Glenn L. McBride, Raymond M. Hunnings, Joan D. Hudson, Mona L. Beglin, Rocco A. Sannicandro, John K. Patterson, and Kenneth C. Atchison.

TECHNICAL SERVICES DIVISION: Fielding L. Pearson, Kenneth D. Easley, Richard A. Wright, Joseph D. Atkinson Jr., Fred H. Furey Jr., and Willie R. Lee.

ENGINEERING DIVISION: John R. Shadley, Richard Rahilly, Gaylen K. Hargrave, Ernest L. Kahler Jr., and Cash Russell Harper.

WHITE SANDS MISSILE RANGE (New Mexico): Billie L. Grider, Robert L. Carver, Alice V. Rayner, John W. Kroehnke Jr., Traves O. Ives, James L. Anderson, and Eduardo Baca.

PROCUREMENT AND CONTRACTS DIVISION: Larry M. Arnim, Kittie H. Alexander, Charley D. Stamps, Carolyn M. Elrod, John L. Ford, and Clara M. Wolz.

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FLIGHT CONTROL DIVISION: William P. Gatlin, and Gary E. Coen.

LOGISTICS DIVISION: Mevy H. James.

GEMINI PROGRAM OFFICE: Elmer G. Hardaway (St. Louis), Billy R. Helton (St. Louis), and Gordon C. Hrabal.

STRUCTURES AND MECHANICS DIVISION: Margaret E. Ward, and Albert B. McIntyre.

FLIGHT CREW SUPPORT DIVISION: Edward A. Sampson, and Gail S. Elred.

ADVANCED SPACECRAFT TECHNOLOGY DIVISION: Robert G. Richmond, and Richard L. Barton.

PROPULSION AND ENERGY SYSTEMS DIVISION: Loyd Dale Perry (WSMR, New Mexico), and Charles W. Glassburn.

PERSONNEL DIVISION: James A. Null, Marian C. Nelms, Billie J. McClung, Mary M. Duckett, and Patsy L. Guillory.

MISSION PLANNING AND ANALYSIS DIVISION: Robert E. McAdams, and Donna M. Wait.

APOLLO SPACECRAFT PROGRAM OFFICE: Barbara D. Niemeyer, and James H. Booker.

COMPUTATION AND ANALYSIS DIVISION: Nadine L. Bailey.

CREW SYSTEMS DIVISION: Mary Lou Ferrill, and Dicksie J. Bilder.

TECHNICAL INFORMATION DIVISION: Verna M. Smith, and Maurice S. Hatzenbuehler.

Gemini

(Continued from page 1)

men then slid into the choppy Gulf waters.

Object of the egress tests is to develop spacecraft departure techniques for astronauts after they land from a Gemini space flight. In this particular series, engineers were trying to find out how hard it would be to get two men out of the two-man Gemini in rough water.

The test was conducted by MSC's Landing and Recovery Division. Test subjects were Gordon Harvey, of the Flight Crew Support Division, and Astronaut James A. Lovell Jr.

Harvey noted that egress procedures were not as difficult as had been expected and that the spacecraft took little water even though it was rolling in heavy seas.

Last week's test was the second such experiment conducted in the Gulf. Other egress tests also have been conducted in a tank at Ellington Air Force Base.

MSC PERSONALITY

W. H. Gray And Staff Clear Gemini Spacecraft Production

In charge of the "clearing house" for NASA contracts (principally Gemini) at McDonnell Aircraft Corporation in St. Louis, Mo., is the job of Wilbur H. Gray, NASA resident manager.

He is in charge of a group in St. Louis which includes engineering, contractural, and quality assurance personnel.

As Gray put it, "Our primary function is to implement the wishes of the Gemini Program Manager, Charles W. Mathews, and in so doing we resolve or assist in resolving the myriad questions and problems which crop up daily at the prime as well as sub-contractor plants."

Part of the staff at St. Louis is currently supporting the Launch Preparation Group at McDonnell. This group is charged with certifying the checkout of Gemini spacecraft two and three at McDonnell prior to shipment.

W. H. GRAY

"On subsequent spacecraft," Gray said, "it is expected that we will inherit the bulk of this checkout verification effort."

Gray joined the Space Task Group at Langley, Va., in February 1959 as the NASA Representative to McDonnell Aircraft Corporation.

Born in Somerville, Mass., Gray completed high school in that city and in 1939 was graduated from the Massachusetts Institute of Technology with a BS degree in aeronautical engineering.

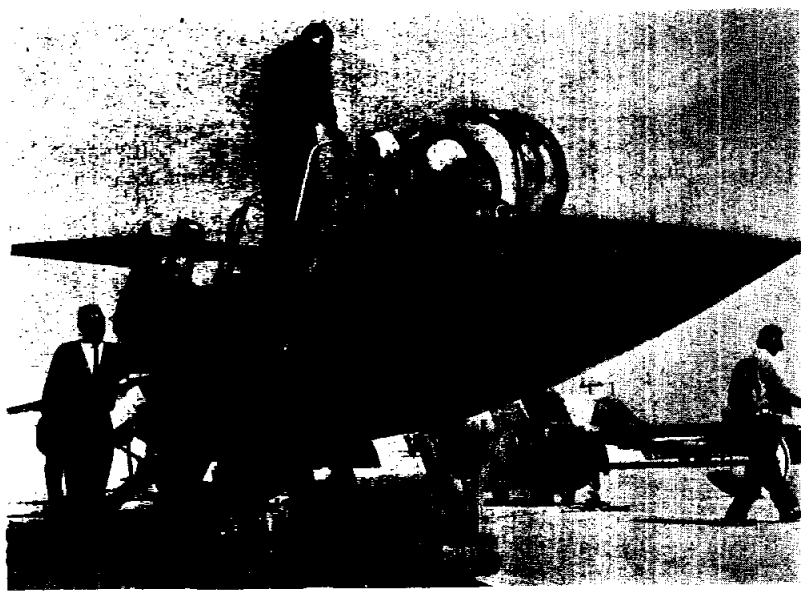
Prior jobs held by Gray include weights engineer with Curtis-Wright Corporation, St. Louis in 1939 and from 1939 to 1950 he was an aero research engineer, propeller research with NACA at Langley Field, Va.

Gray is the author of numerous NACA reports, and research fields in which he has specialized include: propeller research, vibrations, stability, and control of transonic aircraft.

He holds membership as an associate fellow in the American Institute of Aeronautics and Astronautics.

Gray is married to the former Gertrude Patterson of Somerville, Mass., and the couple has two children, David 13 and Douglass 10. The family resides in St. Louis.

Photography and woodworking are Gray's favorite hobbies and he enjoys bowling.



ROBERT CANTWELL climbs aboard a Lockheed TF-104G Super Starfighter at the company's desert test and final assembly center at Palmdale, Calif., to begin a Mach 2 flight.

2nd Summer Intern Program Begins At MSC On June 15

Thirty-five students from 28 colleges and universities across the United States will begin the second Aerospace Summer Intern Program here at the Manned Spacecraft Center, June 15 and extend through August 28.

Many of the students are presently working on advanced degrees in various scientific, technical or administrative fields and all have completed at least their junior year in college.

The interns will be in an aerospace oriented work study program with specialized work assignments as an integral part of the internship.

The technical interns will attend a daily series of Engineering Design and Operation of the Manned Spacecraft seminars led by key MSC technical and scientific people. They will work under the direction of senior MSC engineers and scientists in duties allied as closely as possible with the academic background of each intern.

Administrative interns will attend weekly seminars geared to the management of various administrative programs in the Federal Government and particularly those at MSC. The latter series will be led by key administration managers of MSC. The administrative intern will also be given assignments which are related to their special interests and academic preparation.

Spacecraft Designed To Test First Electric Rocket Engines

A spacecraft designed to flight test electric rocket engines was described recently by an engineer from the NASA Lewis Research Center in Cleveland, Ohio.

The two engines aboard SERT (space electric rocket test) will be NASA's first electric engines in space.

Banks of such electric engines with their small but continuous thrust are a contender to propel future manned Mars missions, but they will probably find more immediate use as single engines for attitude control or station-keeping of satellites, spacecraft or space stations.

The SERT engines produce rocket thrust by creating and accelerating positively charged particles or ions of propellant. The resulting 3 or 4-inch-wide ion beam can be exhausted from the engines at speeds much greater than the exhaust velocity of burning gases in conventional chemical rockets.

Although these small ion engines produce less than a pound of thrust, the increased exhaust velocity greatly increases the "impulse" -- a miles-per-gallon-type figure for rockets. Thus, electric engines can run much longer with much less propellant than conventional rocket engines.

The two electric engines to be aboard SERT I are different types. The first, a Lewis-built engine, is an electron-bombardment ion engine using mercury propellant. The other, built by Hughes Research Laboratory, is a contact-ionization thrustor using cesium propellant. The Hughes engine will operate for the first 30 minutes of the hour-long SERT flight. The Lewis engine is scheduled to run the second half hour of the ballistic flight.

Both engines are mounted so that their thrust will increase the spin of the top-like SERT I spacecraft. By measuring the increase in the spacecraft's spin rate, engineers on the ground can tell how well the tiny electric engines are working.

Flew First Solo Flight 43 Years Ago

MSC Employee And Long Time Pilot Realizes Ambition To Fly Mach-Two

If you have an ambition to do something out of the ordinary, say like flying Mach-2 in an airplane, let the right people know about it, and who knows your ambition may be realized as was Robert (Bob) Cantwell's of the MSC Procurement and Contracts Division.

Cantwell has a very colorful background in the field of early aviation and flew his first solo flight 41 years ago in 1923 out of Love Field at Dallas in a Curtiss Jennie (JN4-D).

In 1928 while in the employ of Erle P. Halliburton (of oil well cementing fame), Cantwell was sent to Los Angeles to buy and take delivery of the first Lockheed aircraft sold. It was a Vega with a J-5 Wright Whirlwind and was the third Vega assembled and the first one actually sold.

With this in his background, it was only natural for him to let his ambition to fly Mach-2 be known to D. J. Haughton, president of the Lockheed Aircraft Corporation, Burbank, Calif.

After exchanging correspondence with the Lockheed president, and his request for a flight was honored, the date was set for a flight in a F-104 at Air Force Facility No. 42, Palmdale, Calif.

Cantwell had previously cleared his proposed flight with his boss, Dave W. Lang, chief, Procurement and Contracts Division, and also been certified by a flight surgeon as physically qualified to fly at high altitude and at Mach-2.

Flying is old stuff to Cantwell. Between 1923 and 1941, when he gave up piloting planes, he accumulated over 11,000 hours in the air. During this period he became acquainted with such notables as Amelia Earhart, Charles Lindbergh, Wiley Post, Will Rogers and others.

In September of 1928, Cantwell was class winner of the transcontinental derby, New York to Los Angeles National Air Race, making the trip in 23 and one-half hours in a Lockheed Vega with a Pratt & Whitney Wasp engine. He finished the race three hours ahead of his nearest competitor.

Cantwell also won two closed course races in the 1929 Cleveland National Air Races, and this was when he became acquainted with Lindbergh.

His flying experience also included two and one-half years with Pan American-Grace Airlines in South America as a senior flight captain. He flew 287 round-trip flights over the Andes Mountains from Santiago, Chile to Buenos Aires, Argentina. From 1937 to 1941 he was a production test pilot with Convair in San Diego, and then entered the contracts management field with Convair in Fort Worth.

The date for Cantwell's flight in the F-104 was set for April 27. After an uneventful trip to California he was met by Lockheed representatives, and from there until his departure from the West Coast he was given the "red carpet" treatment.

MACH TWO PIN--Robert Cantwell the proud possessor of a Mach-2 lapel pin tries it on for "size." He was presented the pin after having flown at twice the speed of sound in Lockheed's TF-104G Super Starfighter.

Upon arrival at the Air Force Facility at Palmdale, he was outfitted in a flight suit and given a thorough briefing prior to boarding the F-104.

At 9:15 a.m., the F-104 was airborne with pilot Ed W. Brown at the controls and Cantwell as the passenger. With the aircraft pointed toward the sky they reached an altitude of 40,000 feet in one minute and 20 seconds, Cantwell said, and then settled back to 35,000 feet for the Mach run.

When the needle moved past Mach-2 and on to Mach-2.1, Cantwell said one of the greatest ambitions in his 64 years of living had been realized.

Then the pilot put the F-104 through a few tricky maneuvers climaxed with a dive to lose altitude, and at the bottom of this a g-force of four-gs pinned him to the seat, Cantwell said.

At 9:45 they touched down, just a short 30 minutes after takeoff; but a never to be forgotten experience for Cantwell.

This was followed by the traditional Mach Deuce party at which Cantwell was presented a Mach-2 card and lapel pin.

Cantwell joined the Manned Spacecraft Center at White Sands Missile Range in August of 1962 and in November of last year was transferred to Houston.

Prior to coming with MSC he was with the Air Force on the Atlas missile program.

Cantwell is a native of Oklahoma and presently resides in Clear Lake City with his wife and son.

AMBITION REALIZED – Robert Cantwell, left, of MSC and veteran pilot who took delivery on Lockheed Aircraft's first aircraft sale -- a Vega 1 bought by Halliburton Oil Co. in 1928 -- is shown just after he completed his Mach - 2 flight in Lockheed's latest speedster, a TF-104G with Engineering Test Pilot Ed Brown at the company's desert test and final assembly base in Palmdale, Calif.

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SECOND FRONT PAGE

CENTRIFUGE MOTOR PART--Workmen use a heavy duty crane to lift the 197,000 pound rotor for the direct current drive motor which will propel the centrifuge now under construction in the Flight Acceleration Facility (Building 34). Delivery was made last week on this part of the largest DC motor ever built which develops 10,700 horsepower. The centrifuge will be capable of generating 30 g's of force on material and lower forces for personnel.

MSC Labor Relations Office Opened For Site Contractors

The Labor Relations Office established at the Manned Spacecraft Center on March 30 will serve as a central control for all labor matters relating to all procurement contracts for construction, service, and installation of equipment at the Center, it was announced by Wesley L. Hjornevik, Assistant Director for Administration.

This will encompass interpretation and application of all Federal Labor Acts and local labor agreements as they apply to the MSC programs and respective contractors and subcontractors.

Bailey R. Chaney has been designated as the Labor Relations Officer with offices in Bldg. 2, Rm. 957B.

AFGE Meetings Scheduled

The American Federation of Government Employees will meet individually with interested employees during the week of May 18, to discuss membership in AFGE.

Representatives of AFGE will be available in the conference room at IIPC, plus the cafeterias at Ellington AFB and the Clear Lake Site, to discuss membership with interested employees.

All employees have the right to participate or refrain from participating during their lunch period and after working hours in accordance with the following schedule:

May 18, IIPC, Room B-132 (Employees from HPC, Stahl and Myers, and Office City may attend), 11:30 - 12:30.

May 19, Ellington Cafeteria, Building 367, 11:00 - 12:00, 4:30 - 5:30.

May 20, Clear Lake Site Cafeteria, Building 3, 11:00 - 12:00, 4:30 - 5:30.

May 21, Clear Lake Site Cafeteria, Building 3, 11:00 - 12:00, 4:30 - 5:30.

May 22, Clear Lake Site Cafeteria, Building 3, 11:00 - 12:00, 4:30 - 5:30.

Martin Byrnes Leaves MSC, Joins Aerospace Corporation

Martin A. Byrnes Jr., a member of the Site Survey Team which participated in selection of the Houston area in 1961 for the permanent location of the Manned Spacecraft Center and presently executive officer to the Assistant Director for Flight Crew Operations, has resigned from MSC.

Byrnes is leaving MSC to become an assistant to Walter C. Williams, who recently left MSC to become vice president of the Aerospace Corporation, Los Angeles, Calif.

Since he joined the Langley Research Center in 1946 as procurement clerk, Byrnes has been with the government until the present time. In 1949 he transferred to the NASA Flight Research Center at Edwards AFB and in 1951 became budget officer on the staff of Williams, then chief of the high speed flight station.

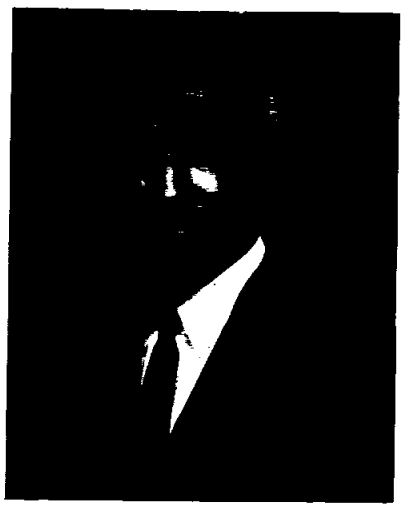
Staying at Edwards until the X-15 program was underway, he then returned to Langley as management assistant to the director for Project Mercury.

After selection of the Houston site for MSC, Byrnes was appointed manager in Houston pending the arrival of the director.

He recalled, "I was in the group of six that moved into our first office in Houston--two store fronts in Gulfgate."

Prior to being appointed to his present position at MSC, Byrnes was manager of Missions and Operations Support.

Byrnes, with his wife, son and daughter will be moving to California soon to begin his new job.



MARTIN A. BYRNES JR.

Astronaut's New Emblem Symbolizes Unity of Mercury-Gemini-Apollo Teams

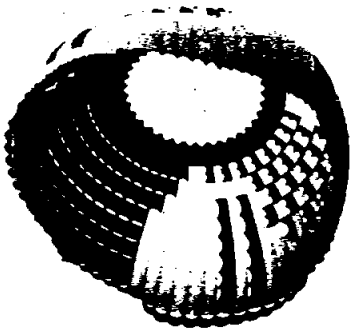
NASA's twenty-nine astronauts are wearing a new emblem, unofficially signifying the unity of the Mercury-Gemini-Apollo flight teams.

The design shows a trio of trajectories merging in infinite space, capped by a bright shining star and encircled by an elliptical wreath denoting orbital flight. They are either gold or silver. Gold emblems are worn by those who have flown in space.

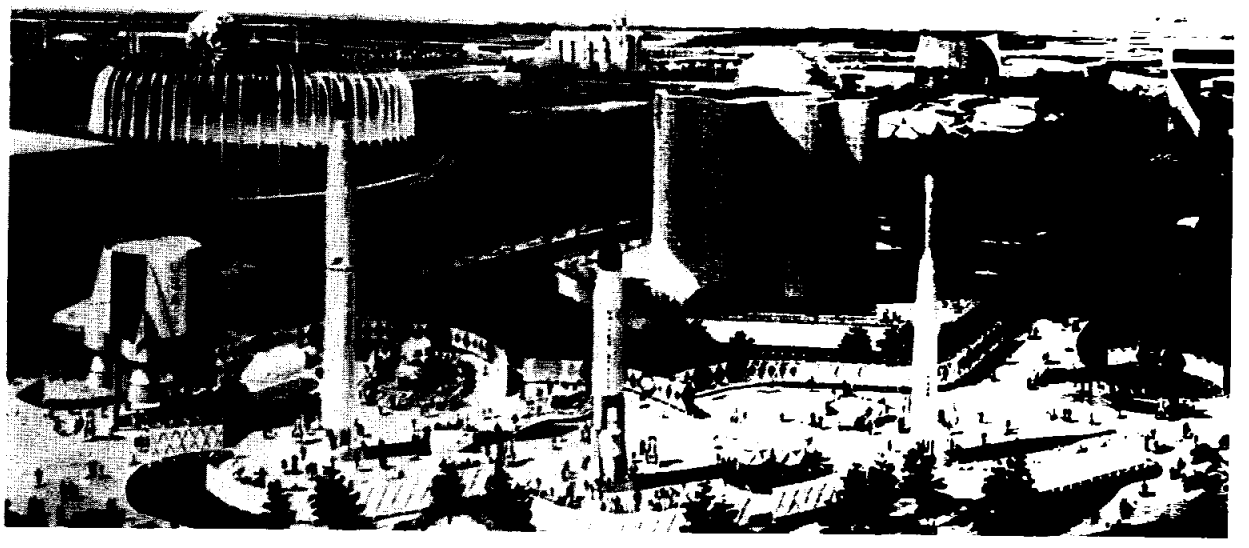
Military version of the astronaut emblem are emblazoned over conventional pilots' wings - silver for Air Force and gold for Navy space fliers.

The device was adopted late in 1963 by the astronaut team when it was evident that the Mercury "7" lapel pin, awarded to Mercury pilots, excluded new astronaut team members. A get-together was held, sparked by Astronaut Walter M. Shirra, and the pilots decided on one emblem for all present and future members of the team.

Astronaut M. Scott Carpenter recently presented a gold pin to John Glenn, the first of America's astronauts to orbit the earth.



SUCCESSFUL PARASAIL TEST- The first successful, full-scale controlled test of the parasail was completed April 29 by engineers at MSC. The deployed parasail and Gemini boilerplate spacecraft are shown just before landing in Trinity Bay after being dropped from an Air Force C-119 cargo plane at 11,000 feet.



THE UNITED STATES SPACE PARK, sponsored jointly by NASA, the Department of Defense and the New York World's Fair, will include the most imposing array of full-scale Air Force and NASA rockets and spacecraft ever assembled outside of Cape Kennedy. Highlighting the Park will be a full-scale "boattail" section of the massive Saturn V rocket which will carry American astronauts to the Moon. The model will be 85 feet tall and 33 feet in diameter. Towering over the two-acre exhibit will be a Titan II-Gemini launch vehicle and spacecraft. The Titan II booster, 110-feet high, will stand vertically with the Gemini capsule mated on top just as it would be on the launch pad at Cape Kennedy. Surrounding the Titan II-Gemini will be fullscale models of the Apollo Command and Service Modules, the Lunar Excursion Module, Gemini spacecraft and the actual Mercury capsule which carried Astronaut Scott Carpenter during the second U. S. manned orbital flight. Other full-scale exhibits in the Park will be the Mercury-Atlas and Thor Delta launch vehicles, and X-15 rocket-powered research aircraft and the Agena space vehicle. Space and utilities for DOD-NASA participation in the Fair are being provided at no cost to the government, and no separate admission charge will be made for the Space Park exhibits.