Space News ROUNDUP!

VOL. 3, NO. 24 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS SEPTEMBER 16, 1964

Launch Scheduled No Earlier Than Friday—

SA-7 Flight To Further Test Apollo Spacecraft/Launch Vehicle

The launching of the seventh Saturn I vehicle, which will put an Apollo boilerplate spacecraft into earth orbit, is scheduled from Cape Kennedy, Fla., no earlier than Friday.

Objectives of the flight are to further test the propulsion, structural, guidance and flight control systems of the two-stage Saturn I; further test the structure and design of the Apollo spacecraft during flight through the atmosphere; and demonstrate physical compatibility of launch vehicle and spacecraft and test jettisoning of the spacecraft launch escape system.

Originally the launch date was scheduled for Thursday but because of time lost in preparation and checkout of the rocket during the alert for Hurricane Dora, the one day postponement was necessary.

The top 80 feet of the 190 foot tall vehicle consists of the Apollo command and service modules, instrument unit, and the S-IV stage which will give the final big boost to put the package into orbit.

An orbit ranging from 115 to 135 miles and a period of 88.4 minutes is expected. This orbit closely approximates the "parking" orbit for later manned lunar exploration mission.

Re-entry is expected at the end of the third day, as did the SA-6 payload.

At ignition, the 190-foot tall vehicle will weigh 1,140,000 pounds. Liftoff usually takes place about three seconds after ignition and some 14,000 pounds of fuel are consumed during this period.

The total weight that will go into orbit some 1,300 miles down range, at T plus 620 seconds, will be 36,700 pounds.

This will consist of the Apollo

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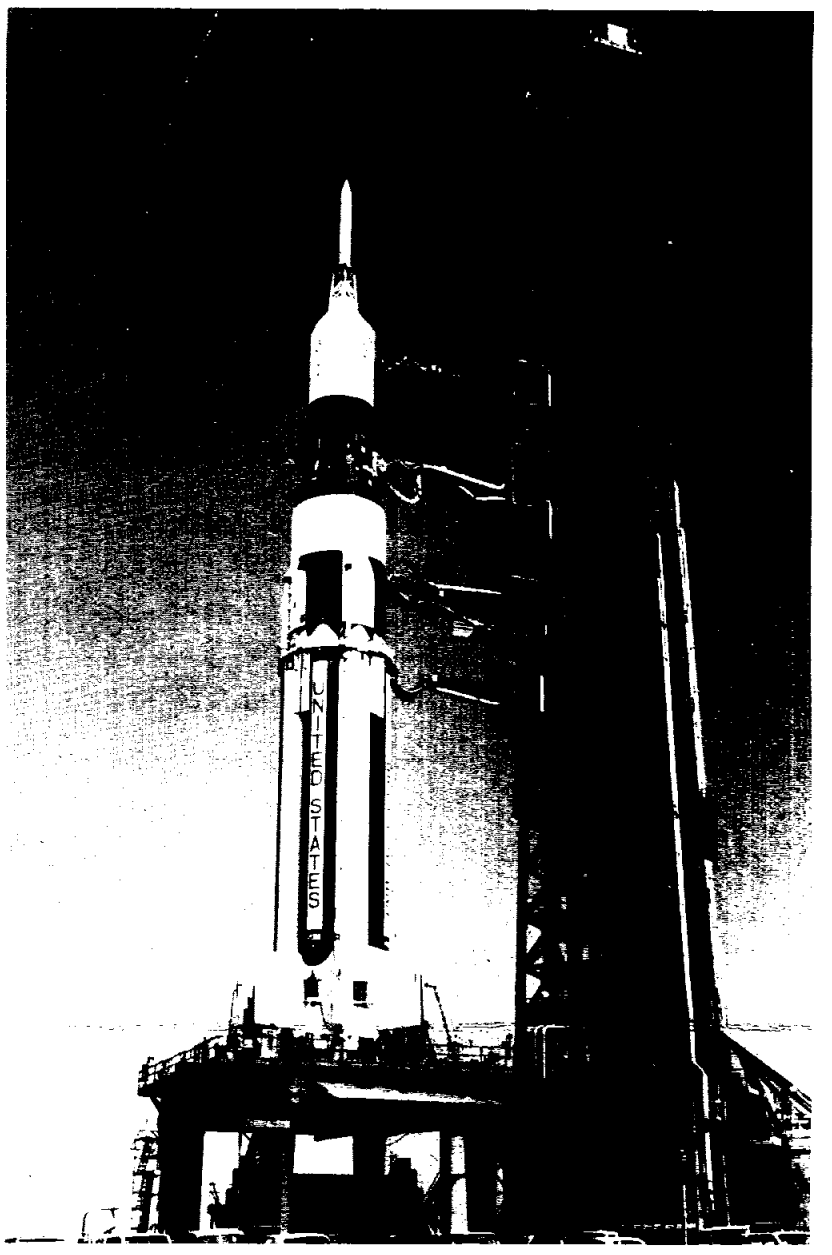


SATURN/APOLLO TEST VEHICLE—The full configuration of SA-7 is shown undergoing launch preparations at Cape Kennedy Launch Complex 37. This seventh launching in a series of tests of the Saturn I, will be the second such test including a boilerplate model of the Apollo spacecraft.

NASA Signs $496-Million Apollo Contract Extension

The National Aeronautics and Space Administration has signed a nine-month extension of its Project Apollo Spacecraft contract with North American Aviation's Space and Information Systems Division, Downey, Calif.

The $496-million extension calls for five additional Apollo command and service modules, three additional flight boilerplate spacecraft, and one more full scale mockup to be built at the Downey Plant. The extension also covers the building of nine adapters at NAA's Tulsa, Okla. plant to house Apollo Lunar Excursion Modules aboard Saturn V launch vehicles.

The overall contract now extends through Feb. 15, 1966. It will provide NASA's Manned Spacecraft Center, with 16 spacecraft, 18 boilerplate spacecraft, 11 full-scale mockups, five engineering simulators and evaluators and two mission simulators.

It also provides for test fixtures, test operations, monitoring and analyzing flight and test information and other engineering and management tasks necessary for manufacturing, testing and check-out operations at Downey, Tulsa, White Sands, and Cape Kennedy.

NAA was selected by NASA as the contractor for the Apollo Command and Service Modules in December 1961. Value of the contract with the extension is $1.436 billion.

Additional Flight Directors Named For Future Missions

Three additional flight directors have been named by the National Aeronautics and Space Administration Manned Spacecraft Center to serve during Gemini and Apollo spaceflight missions.

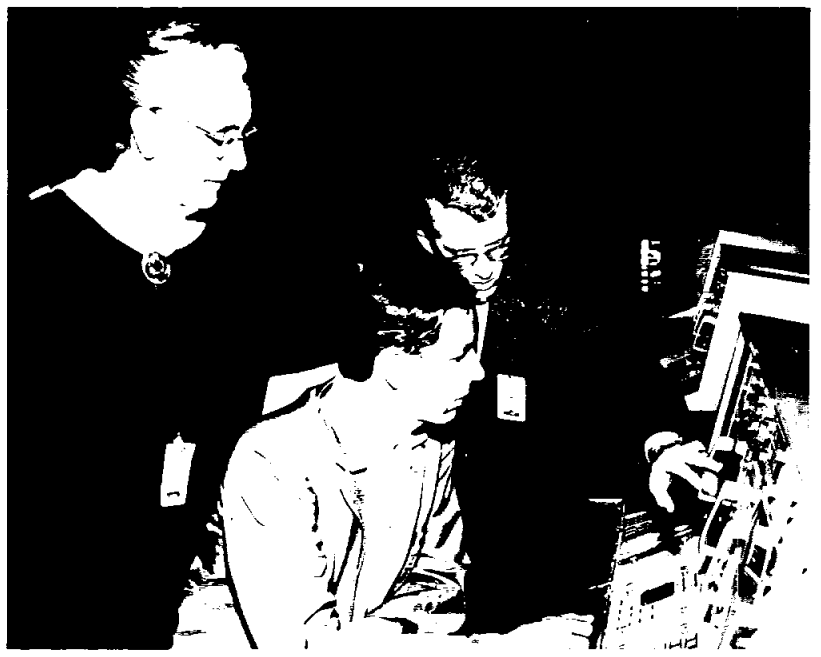
The new flight directors are John D. Hodge, Eugene F. Kranz, and Glynn S. Lunney.

Assignment of the three men brings to four the number of flight directors with the task of managing flight control operations in the Manned Spaceflight Control Center, Houston, and throughout the world-wide Ground Operational Support System. Long-duration missions will require manning the Control Center in three shifts.

Christopher C. Kraft, assistant director for Flight Operations, was flight director for all missions of the now completed Project Mercury. Hodge shared flight director responsibilities with Kraft during the 22-orbit, 34 hour flight of Astronaut L. Gordon Cooper in May, 1963.

The three flight directors named are all managers in Kraft's organization. Hodge is chief of the Flight Control Division; Kranz is chief of the Flight Control Operations Branch; and Lunney is chief of the Flight Dynamics Branch.

During missions, flight directors are responsible not only for making operational decisions involving spacecraft performance, but also for seeing that flight plans are followed and that crew safety is assured.



SWISS VISITOR TO MSC—Jacques Piccard (seated at console), Swiss designer and builder of deep sea exploration vessels, listens to Joel W. Moor, Flight Support Division, as he explains the operation of the Network Controller Console in the Manned Spaceflight Control Center. Dr. J. Piccard (standing), consultant to MSC management, looks over her nephew's shoulder.

$47,848 MSC's Quota For United Fund Drive

A quota of $47,848 has been set for the United Fund campaign among NASA employees here at the Manned Spacecraft Center.

This would be exceeded easily, says Elwyn (Tony) Yeater, the United Fund chairman at the Center, if each employee would give just the price of one package of cigarettes for each week of the year.

And a contributor who does give this amount, $18.20, is giving just about enough to feed one homeless child at DePelchin Faith Home for a month.

He would have to give $1 a week in order to provide that child's clothing for a year . . . 62c a week to provide funds to research and select a hearing aid for a needy deaf child at Houston Speech & Hearing Center. It would take 68c a week for 52 weeks to send a Visiting Nurse to the bedside of a sick child each day for a week.

NASA employees aren't being asked to give that much, however; you can consider yourself a good citizen for just the price of one package of cigarettes a week for 52 weeks—and that you can pay in periodical payments during the year if that is more convenient for you.

If you live outside Harris County, you can designate on the pledge card the county you wish your United Fund gift to go to.

Informed citizens of this community know that giving through United Fund saves us money in several ways.

In the first place, it combines 65 major appeals into one economical, efficient, once-a-year drive—thereby cutting down on the parade of costly separate drives. In no other way can a person help so many in so many ways.

Then, too, the study of agency

(Continued on Page 2)

NASA GROUP ACHIEVEMENT AWARD—Dr. Robert R. Gilruth (left), director of the Manned Spacecraft Center, presents replicas of the NASA Group Achievement Award to (l. to r.) Richard E. Day, Flight Crew Support Division; Astronaut Neil A. Armstrong, Astronaut Office; and Gareth Jordan, Apollo Spacecraft Program Office. The award, one of NASA's highest, was presented for their "outstanding contributions during the X-15 Flight Research Program, from it's first flight, June 8, 1959, to its 100th flight on January 28, 1964."

SINGLE COMPUTER TO COMBINE—

Analog And Digital Techniques To Simulate Space Flights

A contract in excess of $1-million from the National Aeronautics and Space Administration for an analog-digital computer system to simulate the actual conditions of space flight was awarded recently to Beckman Instruments, Inc., and Scientific Data Systems, Inc., with plants located in Richmond and Santa Monica, Calif.

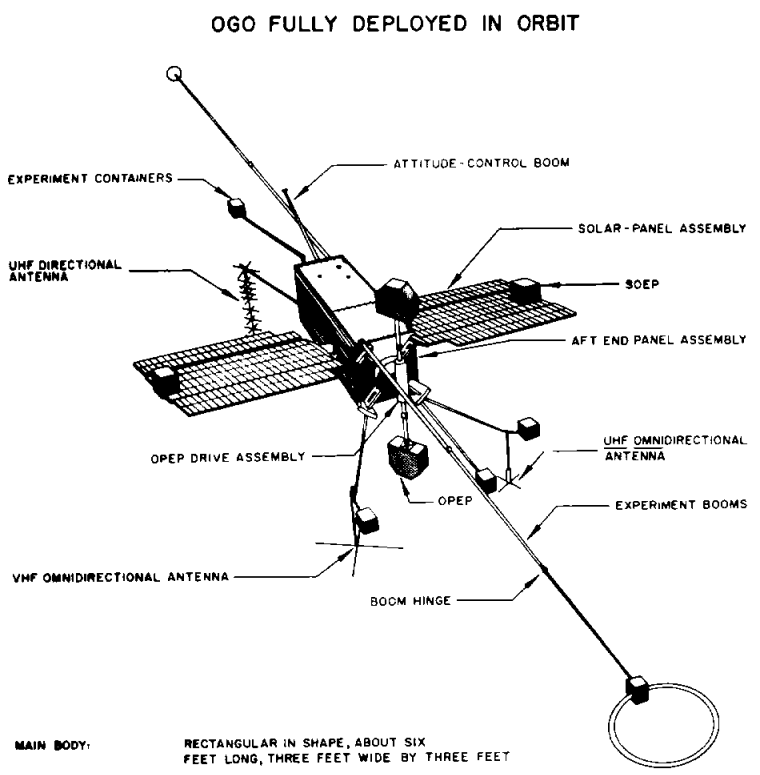
The new Beckman/SDS Integrated Computer System, the first commercial solid-state system to combine analog and digital techniques into a single computer, will be used in a wide range of NASA's space programs, including those of Project Gemini and Apollo.

The computer system, to be assembled at Beckman's Richmond facility, is scheduled for delivery to NASA's Manned Spacecraft Center early in 1965. Beckman has prime responsibility for development of the system, which will include a Beckman 2200 analog computer and SDS 9300 digital computer linked with a standard interface.

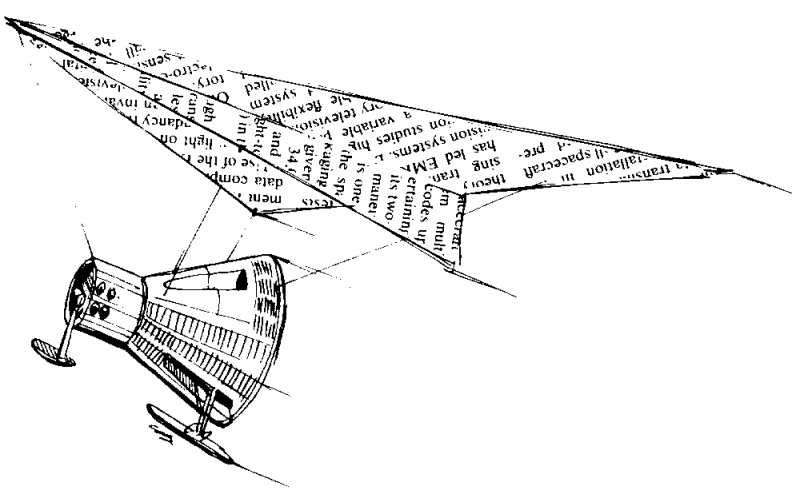
The computer will be used for the "real time" simulation of orbital trajectories, the study of interplanetary space probes and to simulate the physiological reactions of astronauts while traveling in space.

In the Beckman/SDS computer system, the analog computer emphasizes simulation capabilities, with the digital computer stressing storage, arithmetic and control capabilities. A programming system instructs the system in how to analyze the problem and determine which part can best be solved with analog or digital techniques

OGO Orbits Earth Every 63.5 Hours



STREETCAR SATELLITE—Artist's drawing shows NASA's Orbiting Geophysical Observatory (OGO), fully deployed in orbit. The first 1,073 pound OGO-A spacecraft, carrying 20 scientific experiments weighing 172 pounds, was launched by an Atlas-Agena B vehicle into an eccentric Earth orbit with a perigee of about 170 miles, an apogee of 92,000 miles and a period of 63.5 hours. Nineteen of the 20 scientific experiments carried by OGO have been turned on and successfully transmitted data.



United Fund

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programs and line-by-line scrutiny of their budgets by the United Fund budget committee further assures us that each contributor gets 100 cents worth of community service for each dollar invested through United Fund—actually *more* that 100 cents worth, thanks to the unpaid work of many agency volunteers.

And, above all, United Fund agencies concentrate on the economical "ounce of prevention" that prevents people from becoming dependent, children from becoming deliquent, illness from becoming chronic, the troubled from becoming hopeless. It costs less, much less, to prevent than to cure, and it is far more humane.

Speaking of humanity, that basically is what the United Fund is all about. Remember that, when you are asked to give in this year's campaign.

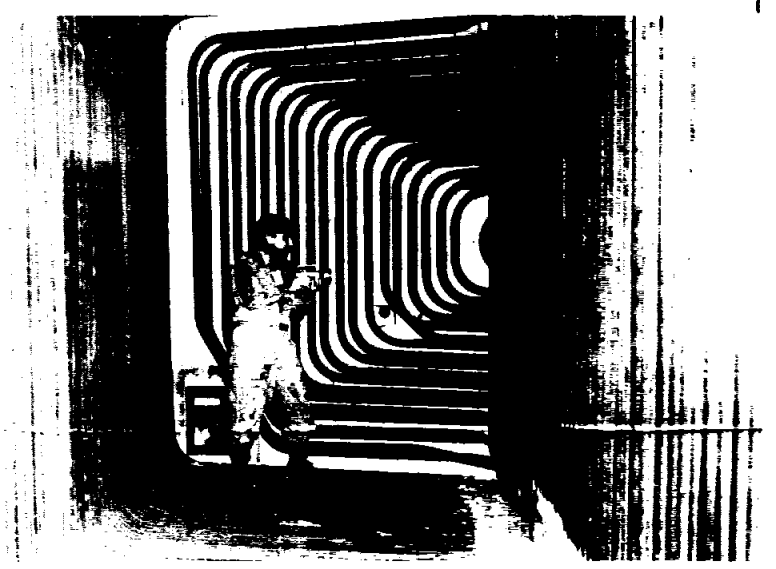
Space Research Tasks Totalled

The National Aeronautics and Space Administration has more than 3,000 research tasks under way, according to Dr. Robert C. Seamans, associate administrator.

Projects vary from exploring the possibility of life on Mars to the study of solar storms.

MSC FAMILY PICNIC, Sunday, September 27, from noon to sundown at the Galveston County Park. Buy your tickets NOW!

Steam Generator For MSC's Heat



STEAM GENERATOR—Carl A. Romero, mechanical engineer, Facilities Division, Operations Management performs a technical inspection of the inside of a steam generator at the Central Heating and Cooling Plant. When fired, the furnace generates 60,000 lbs. of steam per hour at 600°F and 425 psi. Shown is one of four steam generators of equal capacity presently installed with two more planned for the future. These steam generators serve all the buildings in the main complex of the Manned Spacecraft Center through steam lines in the underground utility tunnels.

TEXAS SIZE CRITTERS—Ted Leech of the Crew Systems Division here at MSC displays a couple of the creations that he designed and built in his spare time. He holds a Texas size chigger while "Slam," the super-sonic low-altitude mosquito (hypodermic and pipe cleaners), makes a three-point landing on his shoulder. Leech said that these two critters are an engineer's personification of the intense dislike for their living counterparts.

LITTLE JOE II FLIGHT SIMULATOR—Engineers in the Guidance and Control Division make a test run of a Little Joe II flight on simulation equipment. Frank Elam (left) monitors vehicle motion on a strip-chart recorder, while Orval Littleton monitors the auto pilot performance on the Little Joe II logic and control unit by means of an oscilloscope. The three-axis servo table is in left foreground.

Little Joe II Vehicle Launchings Occur Almost Every Day In Bldg. 16

Little Joe II launch vehicles take off from a table in Building 16 here at the Manned Spacecraft Center every day of the week.

Of course the flights are only simulated and if the "vehicle" doesn't perform as scheduled no serious losses are incurred and the flight can be rescheduled.

The table, a three-axis servo table, is a precision electro-hydraulic device which dynamically simulates the angular flight motions of missiles, aircraft, or space capsules.

Engineers in the laboratory of the Control System Development Branch of the Guidance and Control Division, perform these simulated Little Joe II flights in the development and evaluation of the attitude stabilization and control system.

The table, in conjunction with an analog computer, dynamically simulates the vehicle motions of a Little Joe II launch vehicle in real times, allowing guidance systems and components to be tested and evaluated under realistic flight conditions.

This system provides a convenient method for performing simulated vehicle flights using actual flight hardware. The table was built by Carco Electronics of Menlo Park, Calif.

Other similar tests, related to Apollo and Gemini, are being planned for the table flight simulator.

Dr. George E. Mueller Cites Apollo Electronics Reliability

Dr. George E. Mueller, head of the National Aeronautics and Space Administration's manned space flight program, today commended the American electronics industry for its response to stringent quality control requirements for the Apollo spacecraft, launch vehicle and ground support systems.

The Apollo Electronics panel at the Institute of Electronics and Electrical Engineering Western Electric Show and Convention in Los Angeles, were told by Mueller that without the amazing growth of electronic knowledge and techniques since World War II, the goal of Project Apollo—manned exploration of the Moon—could not have been conceived, much less achieved.

He pointed out that Apollo mission and reliability requirements made it necessary to be conservative in designing Apollo electronic systems, but at the same time NASA had "not lost sight of rapid developments in electronics state of art." The Apollo guidance computer, central timing, communications equipment and measuring of cryogenic propellants are among advanced electronic techniques employed in the system.

He said other space programs which have contributed to development of Apollo electronic technology are: Navy Polaris guidance system to Apollo guidance and navigation system; Air Force Minuteman high reliability parts program to Apollo components and electronic systems; Mercury and Gemini voice communication systems to Apollo systems; Mercury and Gemini voice communication systems to Apollo systems; NASA deep space tracking network to Unified S-band Apollo system and the Army Redstone and Jupiter electronics to Saturn V vehicle electronics.

In emphasizing crew safety and reliability, Mueller said, "Each critical system is designed with flexibility to provide the crew with at least one alternative mode of operation in case of primary mode failure."

He said that future space programs will depend on the electronics industry to meet and exceed new goals for reliability and quality.

Other NASA officials who presented detailed papers on the Apollo electronics systems were: Dr. Joseph F. Shea, Manned Spacecraft Center — Spacecraft Electronics; Dr. Robert C. Duncan, Manned Spacecraft Center — Guidance and Navigation System.

SA-7

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command module, service module, insert/adapter, and ballast, 17,200 pounds; spent S-IV stage, 14,100 pounds; and the instrument unit, 5,400 pounds.

At T plus 160 seconds the launch escape subsystem, weighing about three tons, and consisting of three live motors (pitch-control, launch-escape and tower jettison), will be jettisoned.

Three NASA centers are involved in this flight: Manned Spacecraft Center, spacecraft developer; Marshall Space Flight Center, Huntsville, Ala., launch vehicle developer; and Kennedy Space Center, Fla., launching organization.

Some 133 measurements will be telemetered to ground stations from the spacecraft. The

Recovery Force Trains For Gemini

The National Aeronautics and Space Administration says the recovery force which exercised so much care in Project Mercury is in training for Project Gemini.

Some 18,000 personnel manning ships, aircraft and recovery and medical stations throughout the world will be ready for the first manned flights.

MSC FAMILY PICNIC, Sunday, September 27, from noon to sundown at the Galveston County Park. Buy your tickets NOW!

booster will carry eight motion picture cameras and one television camera to view interiors and exteriors of the vehicle and then be ejected and recovered. The TV camera will not be recovered.

$4.2-Million Apollo WSO Contract Awarded Grumman

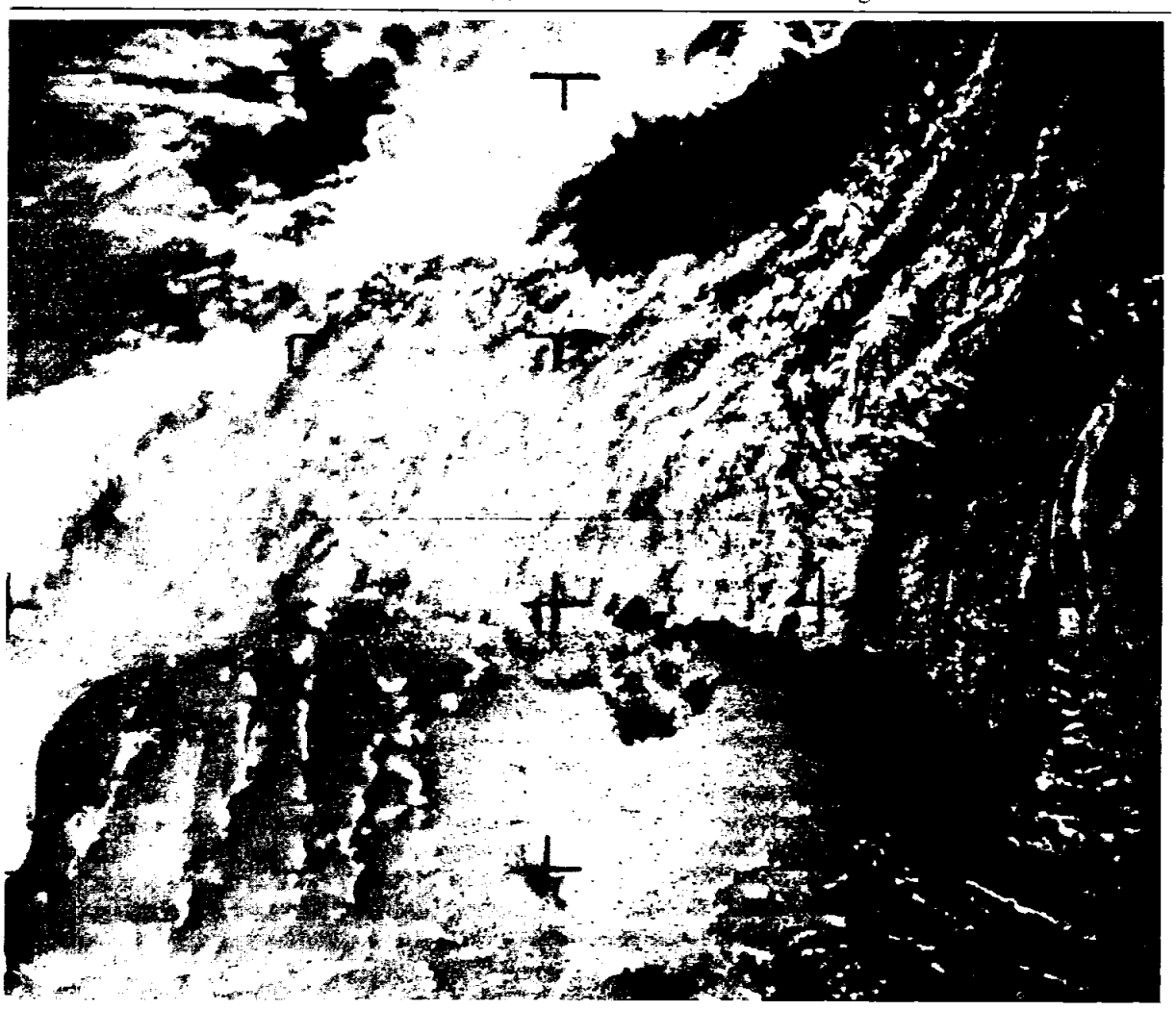
The NASA Manned Spacecraft Center has awarded Grumman Aircraft Engineering Corp., Bethpage, N. Y., a $4.2 million contract to cover the design and installation of data acquisition equipment at the Apollo Propulsion Systems Development Facility at White Sands, N. M.

Grumman is responsible for the design and installation of digital and analog recording equipment at three engine test stands at White Sands where ground tests will be conducted on the engines of the Lunar Excursion Module—the spacecraft destined to land two American astronauts on the moon's surface and return them to their command module for the return trip to earth.

The recording equipment will provide engineering information from a sea level test stand to be used for testing both the ascent and descent engines of the LEM, and from two vacuum chamber test stands where the engines will be fired under simulated space conditions.

It is expected that the work will be completed by the end of this year.

The award is actually an amendment to Grumman's original contract calling for the manufacture and testing of Lunar Excursion Modules. Total value of the contract with this change is $394.4 million.



GULF COAST VIA NIMBUS I—This is the first Automatic Picture Transmission (APT) photograph from Nimbus I showing a region including East Texas, Louisiana, Alabama, Mississippi, and the fringe of hurricane Cleo over northwest Florida and Georgia. Brownsville, Tex., is at bulge of S-shaped coastline at left. Cross at center is over Baton Rouge, La. Tallahassee, Fla., is at edge of Cleo cloud swirl, right center. Photo was taken at 12:17 p.m. EDT at an altitude of 558 miles on the sixth orbit of Nimbus I, on August 28. Launch was at 3:57 a.m. EDT from Vandenburg Air Force Base, Calif.

MSC-Florida Operations Engineer Fights Spacecraft Contamination

Housewives battling the perennial problem of dust, dirt, and other contamination can sympathize with Manned Spacecraft Center-Florida Operations engineer Charles F. Warnock.

Keeping Gemini and Apollo spacecraft systems free of contamination can provide the margin of success for astronaut crews, who depend on a near 100 percent reliability of these systems to accomplish their mission.

Warnock, head of the Malfunction Investigation Section, and his group maintain constant surveillance for contamination in Gemini and Apollo spacecraft systems.

At Cape Kennedy, Warnock investigates corrosion and degradation of spacecraft materials and coordinates the analytical work of laboratories supporting spacecraft materials and malfunction investigations.

Warnock stresses that "effective contamination control requires not only a knowledge of the adverse effects of minute particles of dirt, but also an acute awareness of the effects of contaminants at zero g." Such particles, retained in crevices and voids, may cause no harm when under the influence of earth's gravity, but float freely in gases and liquids when no longer subject to this force. Gyros, valves, and orifices on being exposed to these contaminants may malfunction, and thereby seriously degrade system reliability.

In some Gemini and Apollo flights electrical power will be provided by fuel cells rather than by conventional batteries. The hydrogen and oxygen sources for the fuel cell must be pure, since fuel cell efficiency is a function of the purity of the incoming gases, Warnock said.

He explained that purity of the oxygen and hydrogen is to be maintained at 99.5 and 99.95 percent, respectively. A reduction in purity would require additional purging, thus diminishing the critical volume with a contingent reduction in total operating hours of the fuel cells.

The Apollo guidance system is another area in which control of contamination is critical. Gyro mechanisms in this system operate on bearings with tolerances on the order of 20/millionths of an inch. With these astringent tolerances, only infinitely small amounts of contamination can be tolerated.

What is the Manned Spacecraft Center doing about these problems? Warnock outlined a six-point program that MSC-Florida Operations has underway to control contamination.

First, all components in liquid and gaseous systems are cleared by contractor process to fixed maximum levels of contamination as measured by sample extraction and filtration.

Second, screen filters are built into systems to trap contaminants before they reach critical locations.

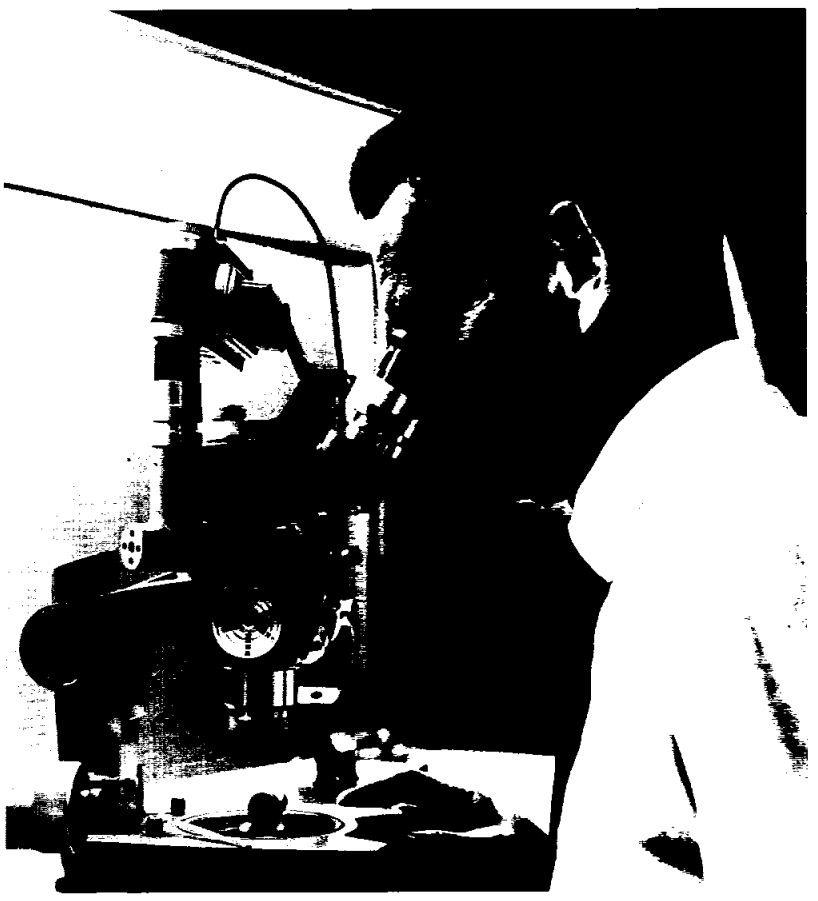
The third point specifies that fluids and gases are filtered prior to loading a spacecraft and prior to preflight testing.

The fourth point covers MSC-Florida Operations contractor cooperation in establishing cleanliness requirements for spacecraft systems.

Point five is the establishment of cleaning facilities at the Merritt Island Launch Area (MILA) in a joint effort of MSC-Florida Operations and the John F. Kennedy Space Center. These facilities will meet cleanliness levels for systems and components that require recleaning after testing.

The last point also involves the joint effort of MSC-Florida Operations and the John F. Kennedy Space Center. Clean room facilities for inspection and test purposes are being provided at MILA. At least two Class-100 rooms will be available, in which the particle count will not exceed a total of 100 particles, 0.5 microns and larger, per cubic foot.

Warnock believes that "control of contamination, regardless of the source, can be accomplished only if the people involved realize the importance of the problem."



CLOSE EXAMINATION—MSC-Florida Operations Malfunction Investigation Engineer Charles F. Warnock uses an American Optical Spencer Stereo Microscope to examine stem from a Gemini spacecraft system high pressure regulator.

Spacecraft Test Engineer Is Sail Plane Enthusiast

What does a NASA spacecraft test engineer do on his day off? Al Branscomb, Manned Spacecraft Center-Florida Operations (MSC-FO), prefers to leave terra firma for the uninhibited expanse of the upper atmosphere.

During a day off from testing Gemini spacecraft, Branscomb can be found climbing into the cockpit of a sail plane, ready to enjoy the exhilarating experience of unpowered flight.

Branscomb and his extremely light but rugged aircraft are towed to altitudes up to 3,000 feet, cut loose, and are then strictly on their own. The altitude and maneuverability depend on thermal currents of rising warm air. These thermal air currents vary with the topograpical location.

An experienced pilot who holds a single engine license, Branscomb sees radical differences between powered and unpowered flight. "You literally fly by the seat of your pants," says Al. "Unlike a conventional airplane, with the glider there is a complete absence of noise and a terrific sense of freedom. The tremendous feeling of accomplishment in being up there alone and on your own is indescribable," continued Al.

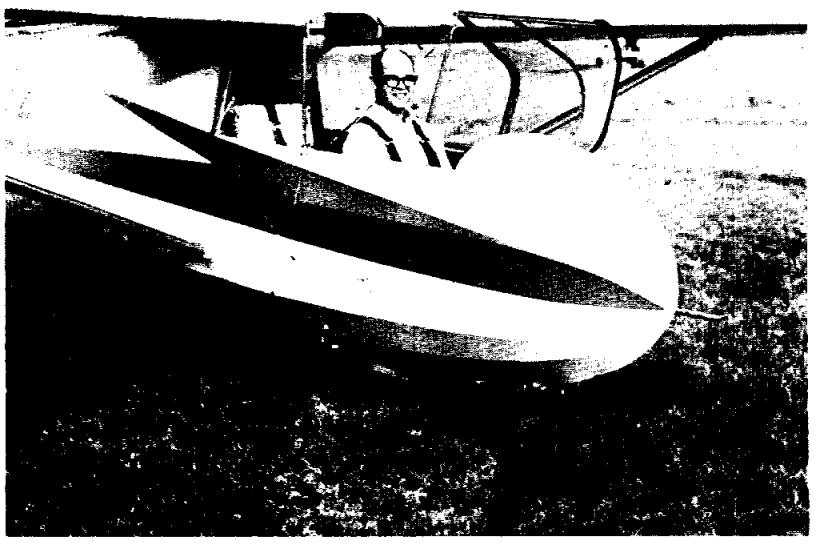
Branscomb was awarded a "C" Badge from the Soaring Society of America, in recognition of his attaining an altitude of 2,500 feet and remaining aloft for 33 minutes from a release altitude of 1,000 feet (The minimum requirement is five minutes above release altitude).

A skeptic at first, Branscomb is now a convert and plans to spend much of his spare time at Bartow, Florida, where he can rent sailplanes. He hopes eventually to buy, or perhaps build, his own plane.

Branscomb, who works out of the MSC-FO Mechanical Branch, Mechanical and Propulsion Systems Division, soloed last month. After 27 student flights, he was awarded his FAA glider license.

He was introduced to the sport by McDonnell Florida Operations engineer Chuck Bellanger, who is an accomplished sailplane pilot and acted as tow pilot for Al's solo flight.

Those people who don't know what to do in their spare time might take a tip from Al Branscomb. "There's nothing else quite like the sport of soaring. Not only do you find complete relaxation, but the mental process is accelerated. I'd advise everyone to give it a try. They'll like it," concludes Al.



PERFECT LANDING—Sail plane enthusiast Al Branscomb, MSC-Florida Operations engineer after perfect landing at Florida airport. Branscomb's unpowered aircraft was towed aloft by a Piper Super-Cub airplane.

New Look At 24-Hour Day

Will Astronauts In Space Borrow From Tomorrow?

Would man in space adhere to the 24-hour cycle that characterizes his life on Earth? Or—living in an environment where there is no difference between night and day—would he adapt to a new cycle more compatible with his particular tasks?

Evidence supporting the latter was found by three life science "astronauts" during a 72-hour test in General Dynamics Astronautics' Manned Space Station Simulation in San Diego, Calif. The experiment was part of a continuing study by the National Aeronautics and Space Administration on how men live and work under simulated space conditions.

The top compartment of the three-story simulator provided the work area. Such life support activities as eating, exercise and recreation were carried out in the center compartment. The lower compartment served as sleeping quarters. The test astronauts performed operational tasks, consumed space rations, kept biomedical and environmental records, and in general lived much as they would under an actual physiological well being, or operational capability.

Despite exhausting exercise periods, the subjects found a six-hour sleep period adequate for complete rest. None of the subjects slept through entire six-hour periods allotted them.

Although the sleep pattern was shortened by two hours, the 12-hour work period did not create unusual fatigue; thus the astronauts fell into a normal 18-hour day. On this schedule, time appeared to move faster, reducing boredom.

The 18-hour schedule enabled the astronauts to live through four work-rest cycles, as measured against life on the 24-hour day. In effect, the spacemen "borrowed" from tomorrow.

And they did it with little or no detriment to morale, physiological well being, or operational capability.

New Heat Shield Material Developed; Does Better Job

Scientists at NASA's Langley Research Center have come up with a material for spacecraft heat shields which is better than the substance used successfully on the Project Mercury spacecraft.

The material provides charring ablator heat shields which protect a spacecraft by a complex physical-chemical process. At first they begin to decompose chemically, absorbing some reentry heat in the process. During decomposition, gases develop, forming an insulating blanket as they pass over the heat shield surface.

Finally a charred layer of coke-like material develops and at very high temperatures radiates heat away from the spacecraft.

Duncan To Address Houston Engineers

Dr. Robert C. Duncan, chief of the Manned Spacecraft Center Guidance and Control Division, will address the September 24 meeting of the Houston Engineering and Scientific Society.

The meeting will be held beginning at 8 p.m. at 2615 Fannin St. in Houston and Duncan will speak on "Apollo Guidance and Navigation Electronics."

All interested MSC employees are invited to attend the meeting.

Space Pack May Enable Astronauts To Move Independently In Orbit

Ling-Temco-Vought is developing a compact space pack which promises to convert an astronaut in a pressure suit into a one-man space vehicle for assembling and servicing spacecraft in orbit, transferring from one vehicle to another and performing numerous other tasks in space—all independent of his parent spacecraft.

The space pack, to be developed under contract to the Air Force Systems Command, will enable an astronaut—for the first time in the nation's space program—to be completely detached from his orbiting spacecraft and perform useful missions on his own in the weightlessness of space. It will see its first use with the National Aeronautics and Space Administration's two-man Gemini program as part of Air Force Experiment D-12.

In its Gemini mission, the pack will be used along with a smaller chest pack being developed by the National Aeronautics and Space Administration. These two units or modules make up what is called a Modular Maneuvering Unit or MMU—a two-piece assembly which the astronaut will use in conjunction with his space suit to perform "extravehicular" missions after leaving his spacecraft.

The MMU will equip the astronaut with a complete propulsion system for limited space excursions, an automatic stabilization system to hold him in the desired altitude when there's no gravity to keep him in place, a two-way communications system linking him to his parent craft and ground stations, plus oxygen, pressure and temperature systems to keep him alive and comfortable in the extreme temperatures and harsh vacuum of space.

"We feel the MMU will herald a brand new era in American space achievements—one which will see the astroanut or crewman liberated from his spacecraft to assemble space stations, assist in the docking and servicing of space vehicles, perform space rescue or emergency repairs and accomplish many other space missions currently beyond man's reach," Gifford K. Johnson, LTV president, said.

Johnson described the MMU back pack as a direct descendant of an Astronaut Maneuvering Unit or AMU which the company began developing in 1959 and pointed out that a considerable amount of development work toward a space-operating MMU already has been accomplished.

A control system model of the earlier AMU already has logged more than 3,500 seconds of weightless performance in flights by LTV engineers, NASA astronauts and Air Force pilots aboard a specially-equipped KC-135 jet aircraft flying ballistic trajectories to achieve brief periods of zero-gravity.

Working in this new area of space technology for the past four years, the company also has done development work on an unmanned, television-equipped, Remote Maneuvering Unit (RMU) which has performed zero-G flights under radio control aboard the KC-135. LTV development programs also have extended to many other facets of extravehicular space operations by man.

Air Force officials said objective of Experiment D-12 is to develop the hardware and techniques required for man to maneuver and operate in free space and to evaluate these operations in an actual space environment using the Gemini spacecraft.

A minimum of two flights are anticipated in this program—the first with a 200-foot tether and the second possibly a free flight.

In the Gemini mission, the MMU back pack will be carried aloft in the spacecraft's equipment adapter section located outside the crew compartment in the aft portion of the capsule. The chest pack and spacecraft umbilical, to be stowed inside the crew compartment, will be used by the astronaut for life support while he obtains and puts on the back pack.

Experiments will be scheduled for about 50 minutes to take advantage of the approximately 52 minutes of daylight Gemini will have available on each orbit of the earth. The MMU, however, will be capable of operating for a considerably longer period.

Once the astronaut leaves his spacecraft he will use a small set of controls located at the base of the chest pack to travel in the desired direction, to maneuver and to stop. Once he releases the controls, the automatic stabilization system holds him in the position he's selected, prevents him from tumbling and allows him to use both hands for space work.

Both systems are powered by hydrogen peroxide firing through various combinations of reaction jets located at corners of the pack.

In designing the back pack, LTV has taken every precaution to assure the astronaut's safety, company engineers said. They listed among these:

In addition to its large life support reserve, the LTV pack has two independent reaction control systems—one for emergency—to assure the astronaut's safe return to Gemini.

Lighted displays mounted on the upper portion of the chest pack within the astronaut's view show how much fuel and oxygen the astronaut has at all times.

Should any of the systems in the MMU malfunction, an abort-alarm system in the back pack activates warning lights in the display and sounds an audible signal.

Although the untethered range envisioned for the D-12 experiment is within a radius of 1,000 feet of Gemini, voice communications and telemetry will be provided for ranges up to twice that distance.

To help the astronaut in Gemini keep track of his companion, the pack will have position lights which will be visible to the astronaut in the parent spacecraft.

Development of the back pack will be under direction of the Research Technology Division at Wright-Patterson Air Force Base, Ohio.

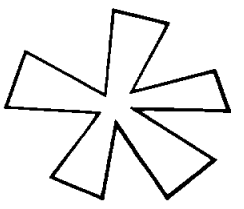
LTV is scheduled to deliver three flight models of the pack to the Air Force in October of 1965.

Flight tests will be conducted in Aeronautical Systems Division aircraft at Wright-Patterson Air Force Base to determine the operational characteristics of the MMU under weightless conditions before it is tested with the Gemini capsule.

Flight tests of the MMU will begin at ASD about February 1965. First flight test of the MMU on the Gemini mission is scheduled for mid-1966.

Moon Motor Testing To Begin

MOON MOTOR—About to be hoisted into position in Service Module Static Test Stand No. One at NASA Manned Spacecraft Center's White Sands Operations site at Las Cruces, N.M., this Project Apollo rocket motor will soon fire up for the first time. The 22,000-pound-thrust service module engine will provide power for mid-course guidance corrections to and from the moon and will put the Apollo spacecraft into and take it out of lunar orbit. An extensive series of tests at White Sands Operations is programmed for the engine, which is built by Aerojet-General at Sacramento, Calif., for Apollo spacecraft prime contractor North American Aviation.



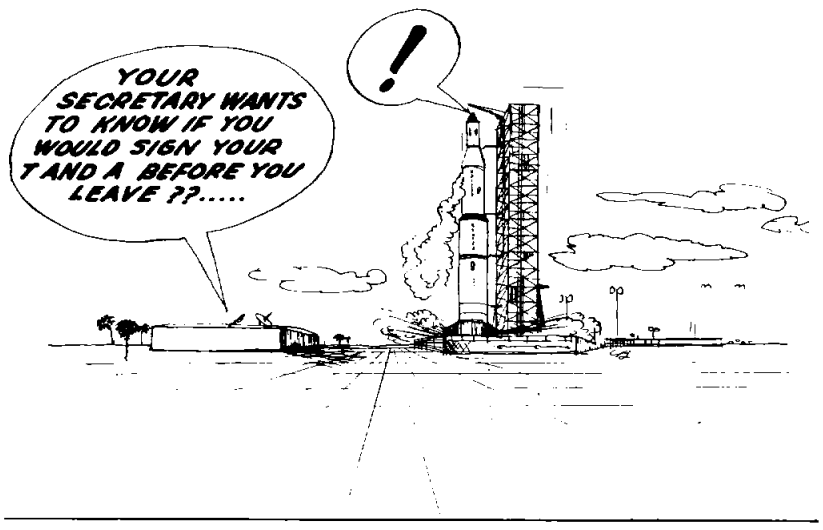
MSC FAMILY PICNIC, Sunday, September 27, from noon to sundown at the Galveston County Park. Buy your tickets NOW!

SPACE-AGE APPRENTICES—Twenty young apprentices who began their four-year apprentice training course at the NASA Manned Spacecraft Center September 1 are shown during their first day orientation. Seated, left to right, are: Jerry D. Allen; Don Andrews; Campbell P. Canup; Jack Kinzler, chief of MSC Technical Services Division; Joseph V. Piland, chief of the MSC Office of Technical and Engineering Services; Bob Senter; Apprentice Program training supervisor; Fred T. Simon; Robert G. Lauhon; and Percy H. Alison. Standing, left to right, are: James M. Peterson; Craig Pemberton; Lawrence A. Hayman; Clarence J. Fisher Jr.; Allan Manning; Max Barnett; Marvin Williams; William H. Sigafoose; Joseph M. Schmitt; Jesse T. Adkins Jr.; Charles A. Moore; Donald M. Jordan; Garland B. Moreland; and Melvin L. Patrick. Kinzler and Piland are members of the Training Program Board of Governors.

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

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

On The Lighter Side



Administrator James E. Webb Says:

Lunar Goal In This Decade Continued 1966 Mars Mariner Mission Cancelled

The following is a statement by James E. Webb, Administrator, National Aeronautics and Space Administration, in response to queries on the effect of the Independent Offices Appropriation Act which included funds for NASA and was signed by President Johnson on August 30, 1964.

The appropriation for FY65 of $5.250 billion for NASA is further congressional recognition of the vital importance to this nation and the free world of the increased aeronautical and space efforts which have gone forward under three administrations. This program can give this nation preeminence in space and continue its aeronautical superiority.

The Congress understands this. Its support has been bipartisan every year since it was started.

This appropriation comes six years after NASA was established and at the midpoint of the 10-year, $35-billion program which was adopted in 1961 to challenge the then clearly dangerous Russian lead in space. NASA will utilize these funds to maintain the basic momentum and direction of the program as presented to Congress but will make a number of adjustments to meet the Congressional reduction of $195 million, to effect those specific changes directed by Congress, and to take advantage of experience gained from operations conducted during the nine months since the budget was submitted.

Although these adjustments will affect launch schedules and program milestones, Dr. Dryden, Dr. Seamans, and I are convinced that it is best to make a maximum effort to gain operational leadership in manned space flight and that the manned lunar landing should continue to be targeted within this decade.

This will stretch NASA and its contractors to the limit, but we have advised the President that we are not at this time willing to give up this goal which is so challenging and which is so important as a focus for the efforts we must continue to make in all our programs.

In this decision we are taking the most effective steps we can to make sure we are not again set back by some new breakthrough such as Sputnik or Vostok arising from the continued very active space program of the Russians.

In space, the obstacles are great and the lead times long. Time lost cannot be made up. The target date is only five years away. Our assurance that it can be met is less than under President Johnson's budget, but we still hope that with hard work, dedication, continued successes, and continued support we can meet it. We are going to make a hard try.

This decision does not involve the transfer to manned space flight of funds from space science and applications programs or advanced research and technology programs. These programs will require some adjustments, but will not be drastically reduced as would be necessary if funds were reprogrammed to benefit manned space flight.

In the program for unmanned planetary exploration, the combination of a heavy workload at the Jet Propulsion Laboratory, the short lead time available, and the importance of applying our resources to a major advance beyond the limited Mariner make it unwise to undertake a Mars mission in 1966 with the current Mariner-type spacecraft. The development of a spacecraft with much greater scientific promise for launch to Mars in 1969 is being initiated.

In close association with the aeronautical and space committees of Congress, all programs will be kept under constant review to take advantage of every development and every means to maintain the momentum and progress toward preeminence in space.

100 Universities Do Space Work

The National Aeronautics and Space Administration is now supporting research at about 100 colleges and universities in the nation, according to the head of the space agency.

NASA Administrator James E. Webb says research projects are being conducted at 20 first-rank schools such as MIT, Michigan, Texas and California.

The balance is distributed among other schools centering around outstanding individuals, or "islands" of special competence of particular value to the space program.

Welcome Aboard

Sixty-eight new employees joined the Manned Spacecraft Center during the last reporting period. Sixty-six were assigned here in Houston, one to White Sands Operations in New Mexico, and one to St. Louis, Mo.

RESOURCES MANAGEMENT DIVISION: James W. Schlegel, and Gaynor I. Yancey.

SECURITY DIVISION: Robert S. Cooke, and Hugh W. Ward.

OFFICE OF TECHNICAL AND ENGINEERING SERVICES: Michael W. Griffith.

ENGINEERING DIVISION: William T. Jackson and Ronald E. Womack.

MSC-WHITE SANDS OPERATIONS (New Mexico): Sheldon Von Jennings.

ASTRONAUT OFFICE: Sherry Y. Green, Diane C. Shirley, Tessa L. Slager, and Audrey M. Williams.

FLIGHTCREW SUPPORT DIVISION: Brantley C. Booe, Thaddeous W. Pool, and Bennie J. Shields.

INFORMATION SYSTEMS DIVISION: Sherwood H. Anderson, Willaim J. English, John S. Gorman Jr., H. Larry Shaefer, Robert A. Sheely, Robert D. Shelton, and Gerald Wood.

CREW SYSTEMS DIVISION: E. Jimmy L. Frazier, Paunee M. Greer, Joe L. Saunders, George H. West and Rodney W. Windham.

COMPUTATION AND ANALYSIS DIVISION: Gary R. Barron, Lester L. Dixon, Sean S. Gayle, Anna M. Harkins, and Carole A. Montgomery.

INSTRUMENTATION AND ELECTRONICS DIVISION: Sherry L. Drew, Harvey L. Golladay, James F. Harrison, Clanton E. Mancill, Julie Ann Noble, Roger A. Patterson, and Keith B. Ward Jr.

GUIDANCE AND CONTROL DIVISION: Stephen S. Bayliss, Phillip Bruce, David E. Claridge, Douglas A. Cope, Alden J. Gray, Sandra L. Kinney, William L. Nicks, and Donald C. Raschke.

PROPULSION AND POWER DIVISION: Eugene Damron, Charlotte L. Eberwein and Gordon K. Harris.

FLIGHT CONTROL DIVISION: Paul M. Joyce, W. Merlin Merritt Jr., Granville E. Paules, Eugene C. Strycula, Claude D. Sykes, Briggs N. Willoughby and Ernest W. Starling.

LANDING AND RECOVERY DIVISION: R. Wayne Empey.

MISSION PLANNING AND ANALYSIS DIVISION: David W. Heath, Charles A. Lander, and Ogden Stokes.

FLIGHT SUPPORT DIVISION: Donald L. Anderson, Leonard R. Haugen, Henry E. Leech, and Eugene L. Wright.

GEMINI PROGRAM OFFICE (St. Louis, Mo.): George R. Middleton.

APOLLO SPACECRAFT PROGRAM OFFICE: Cecil G. Jenkins.

TECHNICAL SERVICES DIVISION: Donald M. Jordan.

MSC PERSONALITY

Outstanding Recognition Given MSC-FO's Sam Beddingfield

The 1965 edition of *Outstanding Young Men of America*, the who's who of the National Junior Chamber of Commerce, will include NASA Engineer Samuel T. Beddingfield, Manned Spacecraft Center-Florida Operations.

Beddingfield's picture and biography will appear along with those of other distinguished young Americans. From this group will be selected the 10 outstanding young men of America. Former winners include the late John F. Kennedy, Leonard Bernstein, Dr. Tom Dooley, Astronaut Virgil I. (Gus) Grissom, and Nelson Rockefeller.

Beddingfield was awarded a certificate from the Advisory Board which read "This is to certify that Samuel T. Beddingfield has been selected to appear in the 1965 edition of Outstanding Young Men of America in recognition of his outstanding ability, accomplishments, and service to his community, country, and profession."

Beddingfield is past vice-president of the Titusville Jaycees, president of the Titusville Flying Club, and an active member of the American Institute of Aeronautics and Astronautics.

Chief of the Mechanical Branch, Mechanical and Propulsion Systems Division, Beddingfield is responsible for the flight readiness of ordnance, solid rockets, structures, recovery systems, and associated mechanisms and structures for manned spacecraft including Gemini and Apollo.

Formerly assigned to the Mercury program as an ordnance and landing systems engineer, he was responsible for the explosive devices and parachute systems used on Mercury spacecraft.

SAMUEL T. BEDDINGFIELD

Each year, the Jaycee Advisory Board selects, upon recommendation by local Jaycee chapters, young men throughout the country who are cited for outstanding accomplishments in various fields of endeavor. The purpose of this special Jaycee publication is to recognize and honor these men.

Beddingfield resides in Titusville, Fla. with his wife Barbara and two daughters Nan 4 and Beth 3.

SPACE QUOTES

"The accumulation of knowledge is one of the most, if not the most, compelling reasons there are for space exploration, for this multi-billion dollar investment in space.

"What the American people may not generally or widely realize is that they have a going, operating, existing space industry that, except for production of military items, is bigger than anything this country has ever seen . . .

"The pay off for such an investment is not going to come this year or even this decade. But there are many working in this space field, government official, businessman, scientist, and engineer, who are convinced that the 'fallout' from space exploration is eventually going to be awesome and profitable . . .

"But of one thing they are sure; it may have had a very brief past, but it is going to have a tremendous future. Just the other day Dr. Dryden observed, commenting on the emphasis being put on reaching the moon: "'Actually the moon is only the first way station on a journey soaring outward into infinity.'"

Neal Stanford, *The Christian Science Monitor.*

Study Would Double Or Triple Saturn Payload

Ways to almost double or even triple the payload capability of the powerful Saturn IB space booster for missions which may evolve in the late 1960s are under study at the Douglas Space Systems Center in Huntington Beach, Calif.

Two separate approaches are being looked at, under contracts awarded recently by the National Aeronautics and Space Administration's Marshall Space Flight Center as part of a broad investigation of possibilities for improving Saturn.

In the nine months the contracts will run, Douglas experts must determine – on paper – the hundreds of problems that will develop in any major engineering effort such as the Saturn uprating. Then – still on paper – they must figure out the most likely solutions.

NASA's over-all study covers eight areas, ranging from use of more powerful rocket engines and the addition of strap-on solid propellant rockets for extra thrust to the possibilities of an extra upper stage.

Various uprating plans could increase the payload for Saturn IB – the version designed to carry the Apollo moonship into earth orbit – from 34,000 pounds to 60,000 pounds. Payload capability might even go as high as 100,000 pounds with maximum improvements, according to Douglas engineers.

One of the Douglas studies explores the use of a solid propellant first-stage booster rocket for Saturn, combined with the S-IVB upper stage now being developed.

The other study covers ways of improving the S-IVB and is itself divided into two approaches: uprating the stage in its present configuration and enlarging the stage, with major structural changes.

In the solid booster study, Douglas engineers must first "make a stage" out of the 260-inch diameter rocket motor which will be prescribed by NASA. This is essentially done by devising a control system for it and then coming up with plans for mating it to the S-IVB.

Their primary goal is to determine what problems might arise in the S-IVB stage as a result of a change from a liquid-fueled first stage to a solid-fueled first stage and decide – on paper-how to solve them.

Will the higher lift-off speed of the solid motor require strengthening of the S-IVB to meet higher stress? How much, and how to do it? What will be the effect of higher air pressures exerted on the S-IVB during flight by the faster acceleration? Will the stages separate cleanly in space at the higher dynamic pressures generated by the solid booster? If not, what can be done?

WILDERNESS TO ROCKET BASE – In the heart of the wilderness, the first tree felled about 16 months ago began the birth of the National Aeronautics and Space Administration's rocket testing base in Mississippi. Present development of the area is shown in the above photo. Boat harbor serves barges bringing steel from Pittsburgh, Chicago, and Birmingham right up to the dock that once was a dense thicket. NASA's Mississippi Test Operations will employ 2,600 persons to checkout the nation's huge lunar rockets before shipment to Cape Kennedy, Fla.

From A Dense Swampy Wilderness, A Base For Testing Moon Rockets

About 16 months ago a dozen workers began chopping away in a dense swamp one and one-half miles from the historic old town of Gainesville, Miss., on the East Pearl River.

Their felling of the first tree began one of the largest construction projects in this country – the building of NASA's Mississippi Test Operations in Hancock County.

Since a chain saw felled that first cypress tree in May, 1963,

Since a chain saw felled that first cypress tree in May, 1963, the face of the land has changed.

Where only a dozen men worked a year or so ago, now 1,424 persons are developing a space facility to test rockets to take Americans to the Moon. That first clearing project was to make way for a boat harbor and construction dock.

Today, barges carrying steel from Pittsburgh, Chicago, and Birmingham tie up to a dock that was once a dense thicket.

Since construction started at the Marshall Space Flight Center's Mississippi Facility, 13 projects have been completed at a total cost of $2,335,590.

Now under way are construction jobs amounting to $61,612,909. Another $10,848,998 in procurement and construction contracts out for bid, or awaiting award, total $20,572,000.

The brick-and-mortar cost of carving a Moon rocket-testing base out of this south Mississippi wilderness will be about $270 million.

But, in 1966, when the chain saws, tractors, cranes, earth movers, and pile drivers are finished, some 2,600 permanent employees will be engaged in testing giant Saturn rockets.

Space News Of Five Years Ago

September 16, 1959 – The Langley Research Center was in the process of conducting ablation heat-shield tests on nine model shields in support of Project Mercury. However, the Big Joe test of the previous week demonstrated the feasibility of the ablation heat-shield concept for reentry and verified the suitability of the materials selected for such purposes.

September 17, 1959 – The first powered flight of the X-15 (No. 2) research airplane, was released from its B-52 mother ship approximately 36 minutes after takeoff with A. Scott Crossfield as pilot.

September 19, 1959 – An air launch of a Mark II parachute (drogue) test vehicle was conducted by the NASA Flight Research Center. This test, the 15th in the series, concluded the Project Mercury drogue parachute development and qualification tests.

During September – Dr. Hugh L. Dryden, deputy administrator of NASA, took part in a number of discussions with the European scientific community to assess space interest there and to indicate NASA's desire to work out possible cooperative space research programs.

– An operational analysis study report of possible recovery forces required for a three-orbit Mercury mission was received by the NASA Space Task Group from the Grumman Aircraft Engineering Corporation. By using this document, the STG was continuing to refine recovery requirements for all Mercury flights.

Meteoroids Space Puncture Rate Surveyed

Information from the National Aeronautics and Space Administration's Explorer XVI satellite indicates that the rate of puncture of very thin metal by meteoroids is considerably less than had been anticipated on the basis of ground observations.

Further confirming information will become available when larger meteoroid-detecting satellites are orbited on the eighth, ninth and tenth flights of NASA's Saturn I.

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Madagascar Gemini Tracking Station Being Expanded

A relocation and expansion of the National Aeronautics and Space Administration's tracking station on Madagascar has been agreed to by the Malagasy Republic and U. S. government.

The station, previously located at Majunga in the island republic, is being relocated in the vicinity of Tananarive and expanded to include equipment for monitoring and communicating with Project Gemini astronauts, and for tracking and recording data from scientific satellites.

Construction on the site was scheduled to begin around September 7.

Water And Sewer Association Tours MSC Treatment Plant

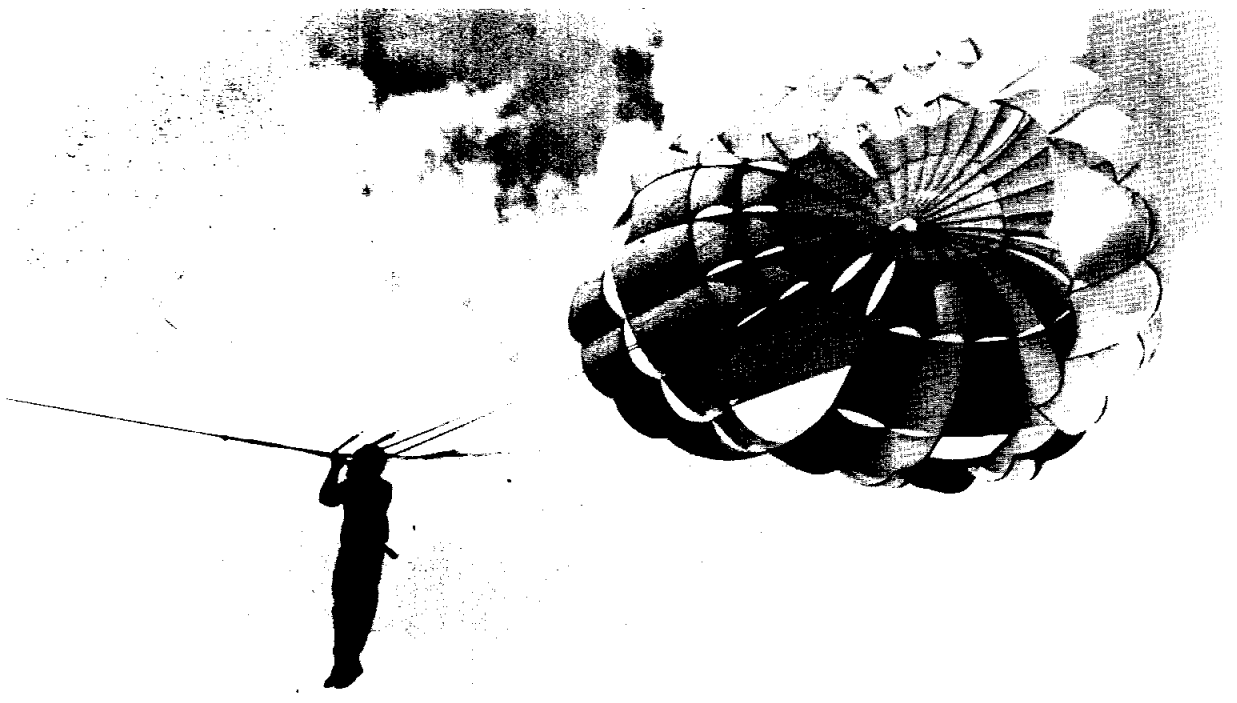
Approximately 100 members and guests of the Gulf Area Water and Sewer Association were conducted on a recent tour of the Manned Spacecraft Center's sewage treatment plant.

Leo T. Zbanek, chief, Facilities Division, greeted the visitors and conducted the tour. The visitors were given the opportunity of observing the plant in operation and reviewing the plant's performance.

Laboratory tests were graphically displayed for the group, showing biochemical oxygen demand (BOD), suspended solids and chlorine residual which were well within the minimums established by the Texas State Health Department.

The tour showed the visiting water and sewage men the contribution the Center is making to the control of water pollution in the Clear Creek basin.

SEWAGE TREATMENT TOUR – Leo T. Zbanek (center) chief of the Facilities Division, Manned Spacecraft Center, explains the MSC Sewage Treatment plant during a recent tour. The visitors, all from Galveston, are (l. to r.) Thomas L. Vollert, operator; E. W. Schwalm, superintendent, Galveston Water District; and far right, H. C. Deubner, sewage plant superintendent, Galveston.



TOWED TAKEOFF—One of the 14 newest astronauts is towed to an altitude of about 400 feet for a free descent flight under the Para-Commander parachute. The 14 are receiving parachute training as part of their training for space flight missions.

Space News ROUNDUP!

SECOND FRONT PAGE

Parachute Training Conducted For Newest Astronaut Group

Parachute training for the newest group of astronauts got underway this past week at Ellington AFB to prepare the flight crews for the contingency situation of using the personal parachute during a space flight mission.

The training started with a ground training exercise consisting of demonstrations, instruction, and practice in position, touchdown, roll procedures and securing the canopy. All 14 in the group took part in this first phase of training on September 8.

Towed and free descent flights were started last Wednesday with each astronaut making several "jumps."

The Para-Commander parachute used in the training, is towed with the astronaut, to an altitude of about 400 feet on the end of a towline.

How to manipulate the canopy to slip and turn for control of the parachute and how to fall when landing, are all part of the training.

The ground landing phase of the parachute training will be followed later with a water landing phase similar to that conducted last year for the other astronauts.

PARACHUTE TRAINING—Astronaut Russell L. Schweickart prepares to don his helmet for a towed flight under the canopy of the Para-Commander Parachute, during training exercises last week at Ellington AFB.

GEMINI AND APOLLO—

STL To Compute Mission Simulations

The NASA Manned Spacecraft Center has awarded a $4.6 million contract to Space Technology Laboratories, Redondo Beach, Calif., for mission analyses and trajectory simulation work in the Apollo and Gemini programs.

The new contract is a continuation of a Gemini Spacecraft analysis project begun in September 1963, and an extension of similar activities in the Apollo program.

Mission simulation in the two programs will cover a variety of phases, starting with booster launch and progressing to reentry and recovery of the spacecraft and astronauts. STL will be responsible for developing computer programs to represent actual flights when a broad variety of descriptive data are placed in the computer.

Typical of the information which would be included in the simulation are location of the launch pad and desired landing sites (on the Moon and on Earth for Apollo); characteristics of the launch vehicle and the spacecraft including weights, thrust, fuel utilization, and structural limits; atmospheric conditions including winds to be encountered in ascent and descent; the laws to be observed by the guidance system and limitations imposed for astronaut safety.

Data, together with the date of the expected launch, are then used to derive mission strategies, payload weight limitations, communication requirements and the many other features which must be explored before the first manned vehicle is launched.

Among the many aspects of the Gemini mission which must be analyzed are the maneuvers to be made by the Agena target vehicle and the Gemini spacecraft during rendezvous experiments. From each analysis will be derived the actual mission strategy which can be further tested by the simulation of flight events.

The Apollo studies will cover preparation for the Moon landing mission and also concentrate in detail on the manned exploratory missions, preparing computer programs to be used during the actual flights, and analyzing features of the mission. The options which will be available to the astronauts in case of abort anywhere during the flight will be investigated to determine the safest strategy.

White Sands Opens Cafeteria, Brown-Baggers Become Rare

Brown-baggers are becoming as rare as raindrops at White Sands Operations in Las Cruces, N.M., since the August 24 opening of the 250-seat cafeteria at the MSC White Sands site.

Operated by Pickett Food Services Inc. of Springhill, La., under the auspices of the five-man NASA Exchange Council at White Sands Operations, the cafeteria was opened officially with a luncheon hosted by WSO Acting Manager Paul Purser and his senior staff. Guests of honor were Maj. Gen. J. Frederick Thorlin, commander of White Sands Missile Range, and his deputy, Col. John C. Bane.

The Exchange Council, which establishes and oversees activities such as the cafeteria and the various refreshment vending machines at the site, is headed by Ben Ingels. Supervisor N. G. "Sandy" Sandoval, Treasurer T. C. Lorenz, and members R. R. Tillett and Carl Radwanski complete the council.

Prior to the cafeteria's opening, the nearest restaurant was seven miles from the isolated site.

WSO CAFETERIA OPENS—Discussing last-minute details for opening the 250-seat cafeteria at MSC White Sands Operations, N.M., are Supervisor N. G. Sandoval and Treasurer T. C. Lorenz of the NASA Exchange Council at White Sands, and cafeteria operator G. B. Pickett of Pickett Food Services Inc., Springhill, La.

ON WAY TO STATIONARY ORBIT—

Syncom Satellite III Crosses Path Of II

The National Aeronautical and Space Administration's synchronous orbit communications satellites, Syncoms II and III, crossed paths at the equator September 2 approximately 22,000 miles above the Pacific Ocean at about 162 degrees East longitude.

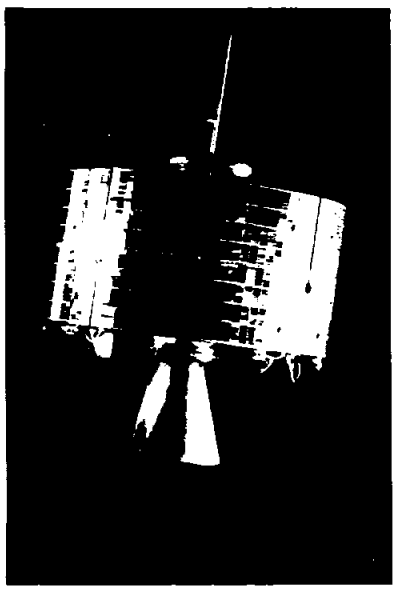
However the paths were hundreds of miles apart at the closest point.

Syncom III, launched into a synchronous equatorial orbit from Cape Kennedy, Fla., Aug. 19, was drifting toward the International Date Line at the rate of 3.3 degrees a day. Hydrogen peroxide gas jets aboard the spacecraft changed the drift rate from 7 degrees east per day Aug. 28. It was to have been on station about Sept. 9. The apogee is 22,538 miles, perigee 21,645 miles.

Syncom II was launched July 26, 1963. It moves in a figure eight pattern 33 degrees north and south of the Equator. Its apogee is 22,271 miles, perigee 22,223 miles.

Syncom III has been checked out from surface stations in the Philippines, Guam and Australia. Both transponders, transmitting and receiving equipment, are working and the 13 mc bandwidth transponder (wideband) was used for nine hours shortly after launch. NASA officials are satisfied that non-commercial quality TV can be transmitted through the satellite, provided ground stations in Japan and the United States function at their expected capability.

Television transmissions are expected to be adequate for short periods of viewing, but not as good as most people usually see on their TV sets.



SYNCOM SATELLITE