Space News
NASA ROUNDUP!
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Grumman Selected To Build Excursion Module

Bids Open On Phase 3 Of Center Construction

Seven construction firms last week submitted bids on Phase Three of the Clear Lake construction work. The contract is expected to be awarded within the next 10 days, and work on the "big package" is expected to begin immediately thereafter.

Apparent low bidders as the Roundup went to press were C. H. Leavell and Company of El Paso, Morrison-Knudson Company, Inc. of Boise, Idaho and Paul Hardeman, Inc. of Stanton, Calif. in a joint venture. Their base bid was $18,144,934.75.

Phase Three includes 11 office and lab buildings and the temperature and humidity control machinery for the site.

The buildings are the nine-story project management building, the auditorium, a cafeteria, the flight operations and astronaut training building, the life systems laboratory, the technical services office building, tech services shop building, systems evaluation lab, Systems Evaluation and Development Division lab and office building, a spacecraft research lab and office building, and the data acquisition building.

Seven alternate additives were attached to the base bid. Alternate Number One, which includes a shop and warehouse building, was also bid on by the three firms. Their figure for the basic buildings plus Alternate One was $18,700,-879.12.

Bids were opened last Wednesday by Col. Francis P. Koisch, newly appointed Fort Worth district engineer of the U. S. Army Corps of Engineers, in the ballroom of the Rice Hotel. Col. R. P. West, former holder of that post, retired from the Army engineers to become president of Paul Hardeman International, owned by the Hardeman Corporation.

Phase Three construction is expected to begin shortly after the contract is finalized. Construction time is an estimated 450 calendar days.

NASA has $18,969,552 in available funds for Phase Three this fiscal year. The apparent low bidders' figure for the basic construction plus Alternate One was within that limit. Should additional funds become available some of the other alternates will become possible, Col. Koisch said.

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ATTENDANCE WAS HEAVY at the correspondence and offices practices training course hold for MSC secretaries at East End State Bank Building classroom last Tuesday and Wednesday. The course covered the new correspondence manual.

L. Gordon Cooper

Alan B. Shepard, Jr.

Cooper To Fly MA-9; Alan Shepard Is Backup

Project Mercury Astronaut L. Gordon Cooper has been designated the pilot for the next United States manned orbital space flight. The MA-9 flight, now scheduled for April, 1963, will be an attempt to extend the duration of U.S. manned orbital flight to about one full day.

Cooper, a 35-year old Air Force major, acted as backup pilot and technical advisor for Walter M. Schirra, Jr., during preparations for the six orbit flight of the Mercury Sigma 7 spacecraft on October 3. Astronaut Alan B. Shepard will act as back up for Cooper for the MA-9 flight.

The MA-9 flight will be an attempt to accomplish the sixth manned space flight of the continuing United States manned spaceflight research program directed by NASA. The MA-9 spacecraft has already been delivered to Cape Canaveral where it is now undergoing preliminary tests and checkout by NASA's Manned Spacecraft Center POD.

The flight has been planned for April because unfavorable weather conditions in the Cape Canaveral—Atlantic area normally extends through the first quarter of the year.

On May 5, 1961, Shepard piloted the Mercury-Redstone 3 "Freedom 7" spacecraft on the first manned space flight of the United States. MR-3 was a sub-orbital flight following a ballistic trajectory. The flight attained an altitude of approximately 116 statute miles and the spacecraft traveled about 254 statute miles down the Atlantic Missile Range.

Cooper, was born March 6, 1927 in Shawnee, Okla. He was assigned to the MSC in April 1959 after his selection as a Project Mercury Astronaut.

He entered the Marine Corps in 1945 and later attended the Naval Academy Preparatory School. He was a member of the Presidential Honor Guard in Washington until his discharge in August, 1946.

Cooper attended the University of Hawaii, Honolulu, for three years before receiving a commission in the Army. He transferred this commission to the Air Force and was recalled by that service for extended active duty in 1949 for flight training.

Upon completion of his training, Cooper was assigned to the 86th Fighter Bomber Group in Munich, Germany, where he flew F-84's and F-86's for four years. While in Munich, he attended the European Extension of the University of Maryland Night School for one year. He attended the Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio, for two years, where he received a bachelor's degree in

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Prime Contract Is Worth Some $350 Million

Grumman Aircraft, Inc., of Bethpage, N. Y. will build the spacecraft which will actually touch down on the surface of the moon when the first American lands there.

The announcement came last week from Washington Headquarters of the National Aeronautics and Space Administration. If negotiations are successful, NASA said, Grumman will become prime contractor for the $350 million lunar excursion module (LEM).

Grumman was one of nine companies competing for the development of the lunar landing vehicle.

It is the final major segment of the three-module Apollo space vehicle and its Advanced Saturn (C-5) booster to be put under contract.

The command module and the service module, which will house mid-course correction and return-to-earth propulsion, are to be built by North American Aviation of Downey, Calif.

Prime contractors for the multi-million pound thrust Saturn C-5 are Boeing Company of Seattle, Wash., North American, and Douglas Aircraft of Santa Monica, Calif. Boeing will build the S-1 stage, North American the S-2 stage and the F-1 and J-2 engines for all stages, and Douglas will build the S-4 stage. Saturn systems engineering assembly and guidance are under the direction of Marshall Space Flight Center, Huntsville, Ala.

Grumman will design, manufacture and support flight operations of the LEM under the management and technical direction of Manned Spacecraft Center.

Webb Reaffirms LOR

"In taking this procurement action," NASA Administrator James Webb said last Wednesday, "We are affirming our tentative decision of last July . . . to base our immediate future planning . . . on the use of the advanced Saturn, using lunar orbit rendezvous (LOR) as the prime mission mode for

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Goddard Awards Contracts For Tracking Net Changes

Award of contract totaling approximately $12,000,000 for the modification of NASA's tracking network in support of future manned space flights was announced Nov. 5 by the NASA's Goddard Space Flight Center.

Long duration manned space flight to develop rendezvous-docking technique will require a more complex ground support system than that used for previous manned space flights. The technical requirements for tracking two space vehicles simultaneously with great accuracy dictate more comprehensive tracking equipment. Manned long duration flights require improvements in data acquisition, communications and command capabilities.

The four contracts included in this award will provide various world-wide NASA stations, tracking acquisition aids and digital radio frequency (RF) command systems.

Equipment and services to be provided are:

Tracking antenna acquisition aid system—Canogo Electronics Corporation of Van Nuys, California, $1,045,500.

Digital command encoders — Radiation, Inc. of Melbourne, Florida, $1,950,000.

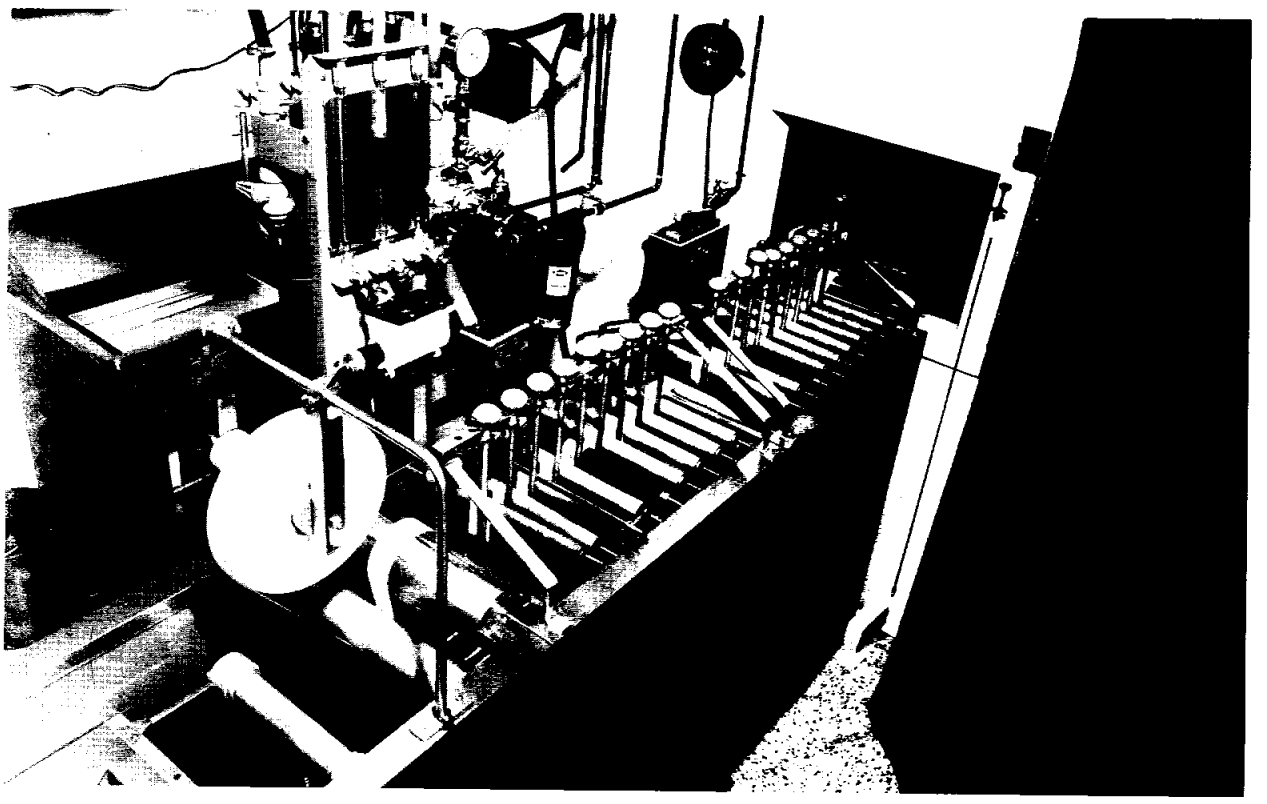
RF command systems — Collins Radio Corporation of Dallas, Texas, $1,725,000.

PCM systems—Electro Mechanical Research Corporation of Saratota, Florida, $7,376,379.

Contract costs for all new systems include manufacture, installation, documentation, and training of personnel.

The PCM systems will be used to receive, in "realtime" the instrumentation measurement sent to the ground station from the spacecraft and vehicle. The new digital command encoders and RF command systems will enable each station to transmit information and commands to the spacecraft.

The Goddard Space Flight Center is responsible for the technical direction, maintenance and operation, of NASA's world wide manned space flight tracking and ground communications network.



HUNDREDS OF DUPLICATE prints can be turned out automatically at the touch of a button on the division's automatic contact printer and automatic enlarger. The processing of these prints, made on continuous 1,000-foot rolls of paper, is just as streamlined. Here they follow a series of rollers in an out of developer, shortstop, hypo and washing mechanism in turn, as metered feed controls keep each mixture at the right strength. The strip exits through the light-proof wall opening at right to the dryer (bottom picture on page 3).

MA-8 Pilot, Date Announced

(Continued from Page 1)

aeronautical engineering in 1956.

After graduation from AFIT, Cooper was assigned to the Air Force Experimental Flight Test School at Edwards Air Force Base, California. He graduated from this school in April 1957 and was assigned to duty in the Performance Engineering Branch of the Flight Test Division at Edwards. He participated in the flight testing of experimental fighter aircraft, working as an aeronautical engineer and a test pilot. Cooper has 2,600 hours flying time, 1,600 of which are in jet fighters.

His hobbies are flying, photography, woodwork, hunting, fishing and boating.

Alan B. Shepard, Jr., a commander in the U.S. Navy, was born November 18, 1923, in East Derry, New Hampshire.

Shepard graduated from the Naval Academy at Annapolis, Md. in 1944. He was graduated from the Naval War College, Newport, Rhode Island in 1958.

He saw service on the destroyer COGSWELL in the Pacific during World War II. He then entered flight training at Corpus Christi, Tex., and Pensacola, Fla., and received his wings in 1947.

He went to the U.S. Navy Test Pilot School at Patuxent River, maryland, in 1950 and served two tours in flight test work there.

During his second tour of flight test work, Shepard was engaged in the testing of the F3H Demon, F8U Crusader, F4D Skyray, and F11F Tigercat. He was project test pilot on the F5D Skylancer. His last five months at Patuxent were spent as an instructor in the Test Pilot School. After his graduation form the Naval War College he joined the staff of the Commander in Chief, Atlantic Fleet, as aircraft readiness officer. He has 3,000 hours of flying time, 2,000 in jet aircraft.

Eugene H. Brock will serve as Acting Assistant Director for Information and Control Systems during any absence of C. Barry Graves, Jr. in November and December, 1962. Brock is located in Room 201, University of Houston Building, telephone extension 3171.

Transco Products Will Develop An Antenna System

Transco Products, Inc., Venice, Calif. has been selected by North American Aviation's Space and Information Systems Division to design, develop, and produce the research and development telemetry antenna system for the Apollo spacecraft.

The complete antenna system includes antennas, multiplexers and cables. The system will be developed and produced in Transco's new $1 million facility in Venice, Calif. Antenna pattern and environmental testing will be done at the new plant.

North American's Space Division is principal contractor on the Apollo command and service modules.

Grumman To Be Prime Builder

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the initial manned lunar flight."

Webb said studies of several alternate approaches, using smaller spacecraft than the current Apollo, had been completed since July and the results "make us confident that our present course is the proper one."

"New knowledge gained tomorrow, next month, next year or whenever, may require that we modify or alter major program decisions like this one. But that possibility does not permit us to delay vital decisions needed now to obtain our national objective to make the United States second to none as a space-faring nation."

In recommending LEM procurement and the lunar orbit rendezvous method, NASA Director of Manned Space Flight D. Brainerd Holmes said "In a little over a year, more than a million manhours of some 700 scientists, engineers and researchers in government, industry and universities have gone into studies of this mission." Holmes said the results of these studies added up to conclusions that LOR is the preferable method to undertake. "In moving forward on this mission we will at the same time be expanding our national space capacity as rapidly as possible."

Present Plans

Under present plans, the Apollo mission by LOR would require a single launch of the three-stage Saturn C-5, which will weigh six million pounds at launch.

Topping the 325-foot tall Saturn would be a five-ton command module housing a crew of three. Beneath this would be a service module, weighing 25 tons, to provide mid-course correction and return to earth propulsion. Beneath that, housed by an adapter joining the top stage of the booster, would ride the 12-ton LEM.

The booster would be jettisoned after it had been spent. Enroute to and in orbit around the moon, the Apollo crew would detach the LEM and lock it to the nose of the command module.

Two crewmen would enter the craft, leaving a third man behind in the mother craft to provide a back-up for the intricate lunar landing, take-off and subsequent lunar rendezvous and docking with the mother craft.

With the two crewmen back on the command module, the LEM would be left in lunar orbit while the command module, powered by the engines of the service module, returned to earth.

Current estimates indicate the LEM will look something like the cab of a two-man helicopter, measuring 10 feet in diameter and standing about 15 feet tall on its skid-type legs. The legs and touchdown engine assembly will serve a dual function, acting also as a gantry for lunar take-off and remaining on the moon as the rest of the LEM rises to rendezvous with the command module.

The development of the LEM engines represents one of the most difficult development items. This work will be sub-contracted by Grumman. Both the lunar let-down and the lunar take-off engines will burn storable hypergolic fuel, and each will be designed to burn for 8 to 10 minutes.

The touchdown engine will be throttleable over a thrust range of from 1,000 to 10,000 pounds. It may be fixed with cabin control jets regulating attitude control, or it could be mounted on gimbals.

The lunar take-off engine will have about 4,000 pounds thrust, all that is needed with light lunar gravity.

As the lunar excursion module leaves the mother craft for lunar touch-down, fully fueled, it will weigh about 12 tons. When it leaves the moon's surface it will weigh about four tons. For safety and redundancy, onboard LEM instrumentation will parallel that of the command module as far as is possible.

Cape Building

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plus checkout and assembly area for the spacecraft.

Astronaut quarters including final training facilities will be on the upper floors of the giant building.

Assembly and test area of the structure will be 104 ft. high—the equivalent of an 8-story building—and will boast several heavy hooks for handling the spacecraft during assembly and check-out.

The successful bidder will be required to start work early in February and complete the test section of the building by Nov. 30, 1963, and the entire structure by Feb. 28, 1964.

Because of the national emergency nature of the building and tight construction schedule, only pre-qualified bidders will be permitted to bid on the work.

Bids Opened

(Continued from Page 1)

Letting of the contract for Phase Three will take MSC through roughly half of the FY 1962-63 budget for construction. The other major contract using this year's allotment is that for the environmental control test laboratory.

Included in the budget for next year will be the mission control center, the centrifuge and a "mechanical area" including a second cooling tower, refrigeration building, etc.

Photo Services Sets Up For Streamlined Operation

Building 122 at Ellington Air Force Base doesn't look like much from the outside.

A visitor stepping inside for the first time therefore comes in for quite a shock. Because Building 122 houses a lab full of fantastic equipment, a trained crew to run it, and a rigidly streamlined, quality-controlled operation which functions with a minimum of waste motion.

This is MSC's Photographic Services Division, headed by John R. Brinkman. Justifiably proud of his shop, Brinkman is anxious to have the Center's staff members make the best possible use of it. "I don't think all of our people realize what we have out here—what we can do," he said.

A look at production figures illustrates his point. During one recent sample month, picked at random, the lab processed 75,000 black and white prints, a figure which Brinkman says could be doubled shortly. Some 800 glass-bound lantern slides and 2,000 color still prints were turned out; the lab could handle twice both figures without overloading, Brinkman says. This is in addition to processing still film both black-and-white and color, duplication work, copy work, and thousands of feet of black-and-white movie film and color or black-and-white motion picture printing in 16, 35 and 70-mm sizes.

Work Keeps Moving

"We try very hard not to let anything lie around here undone," Brinkman said. "Work normally flows through in a maximum of three working days—most of it can be gotten out in about half that time, unless there are special problems. Rush work always gets priority."

How a large volume of photo work gets done that fast is a story in itself. A tour of the shop begins in the copy room, which handles small studio work such as slides of topic charts and space models, passport photos, and detailed copy work. There is a 50-degree cold storage room for photo supplies, a traffic control center which logs work in and out and keeps production records, and a storeroom where photoequipment for the entire Center is stored to be issued as needed.

Still in the "outer offices" the visitor runs across the first of many modern gadgets — an ultrasonic film cleaner which uses high frequency sound to clean either film or recording tape.

Old Commissary

Building 122 used to be an Air Force commissary, but nobody would recognize it now. The old meat storage area has been turned into a chemical mixing and supply area, handling massive amounts of 50 different solutions. When the system of plastic plumbing has been fully installed throughout the building, every developing and printing operation in the lab will be fed from this center, where one specialist will handle all the mixing.

A quality control room — each of the automatic machines is checked daily for quality—houses a sensitometer, which checks pre-exposed film strips with inhuman accuracy. Next door is the slide binding and printing darkroom.

In the black and white printing room, things get down to the ultra-streamlined. Here a contact printer and an automatic enlarger can turn out from one to 400 prints successively on 1,000-foot rolls of paper at the push of a button. Once a test run determines the proper exposure and settings for a given negative, the operator can start the run and go on about his business. The contact printer can handle still negatives from 35-mm to 8 by 10 cut film; the enlarger from 35-mm to 4 by 5 cut film.

From here, still on a continuous roll, the prints are started through a marvel of automation which dips each of them, at carefully regulated speeds, into developer, short-stop, hypo, and wash water. Solutions are kept at optimum strength by automatic metered feed. The roll of prints travels through a light-proof opening in one wall to the dryer next door, and is taken from there to an automatic cutter which separates prints and drops them into a neat stack. Work orders for 10 or less prints from one negative are usually done manually, but this operation too is partially automated.

Special sizes and aerial photo printing are handled in the main enlarging room, where a monster Saltzman enlarger can turn out prints up to 40 by 72 inches. These are developed in sinks the size of bathtubs. Across the room is the Saltzman's opposite number, a micro enlarger than can blow 35 mm shots up to 30 or 40 diameters for very fine definition work.

Film Processing

Working back to film processing, the visitor finds the only cut film processor in NASA. The pictures on this page went from the photographer's camera film holder to finished negative in six minutes while the photographer stood in a brightly lighted room and watched.

Cut film, anything from 35-mm to 8 by 10-inch sizes, is fed into the machine from a darkroom, through a wall opening. That's all there is to it. The enclosed, light-proof processor feeds itself fresh chemicals and runs the negatives through all by itself. They emerge at the other end untouched by human hands—and without fingerprints or scratches.

Color cut and roll film processing, both Eastman and Ansco, is similarly automated, although color film must go through eight processes in developing each color variation. The lab can handle 35-mm or 3¼ by 4-inch glass bound lantern slides; 4 by 5 through 8 by 10 color negatives and inter-negatives; 4 by 5 through 8 by 10 Ektachrome and Anscochrome' color film; and 35-mm through 5½ inch aerial roll processing of Kodacolor, Ektacolor, Anscochrome and Ektachrome. Kodacolor, Ektacolor and Ektachrome duplication can be done in 35-mm through 8 by 10-inch sizes; Ektacolor prints (transparancies) made from color negatives; and Eastman color prints from 4 by 5 through 20 by 24 inch sizes made.

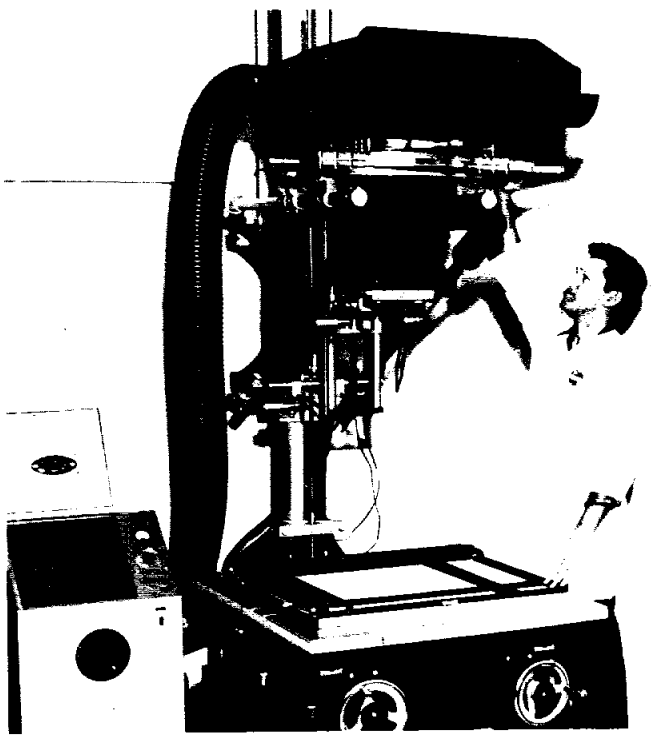
Developing solutions for color work are already "tubed in" from as much as 100 feet away, and all color processing uses automatic gas burst agitation.

In motion picture services, the lab is already using automatic machinery for processing black and white movies in 16-mm reversal, reversal duplication, negative, and positive work; 35-mm negative and positive work, and 70-mm negative and positive movie film processing. Photo services can do 16-mm contact printing, negative, positive or duplicating reversal.

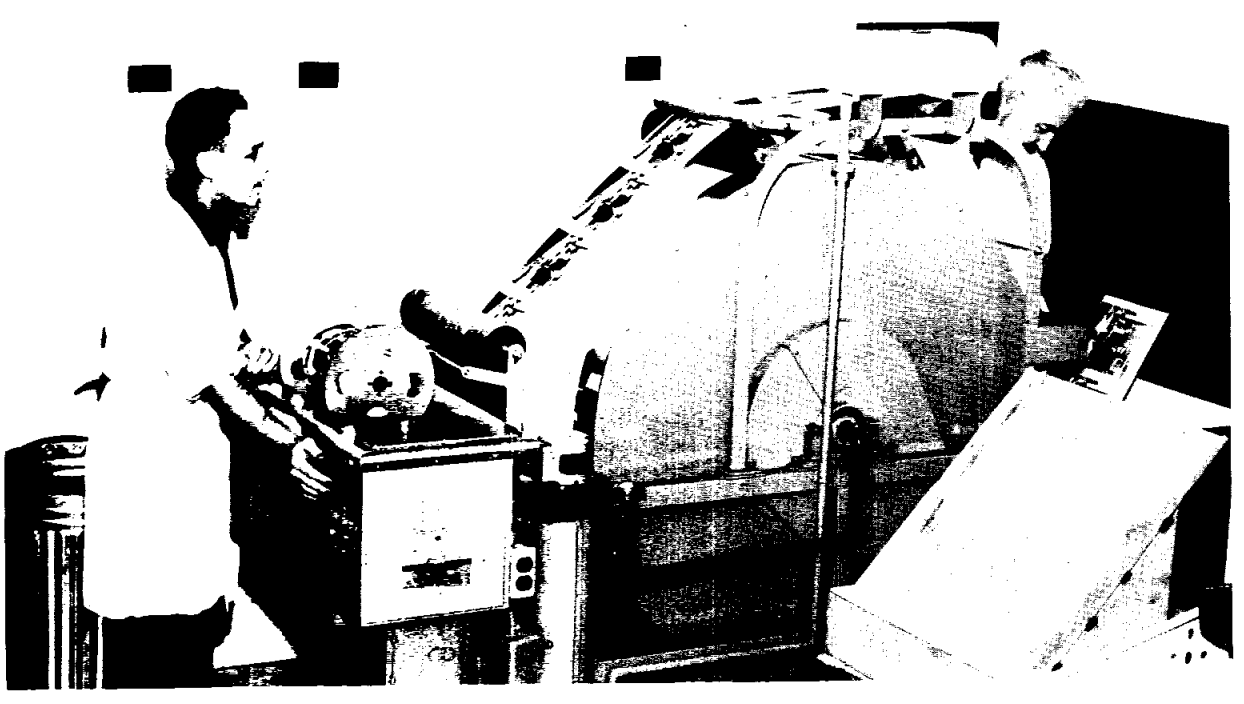
There is a fantastic gadget which does 16-mm contact movie prints with scene to scene color correction between each frame and special effects such as skip frame printing, fades, disolves, reverse or zoom action. The printer works automatically from a pre-punched programming tape. In addition to the special effects movies it can turn out, it has an attachment called a wet gate which either eliminates or drastically reduces the scratches which often mar movie film. (For instance, have you ever seen an old movie on television?)

In another two months, the same process will be available for 35 and 70-mm movie prints.

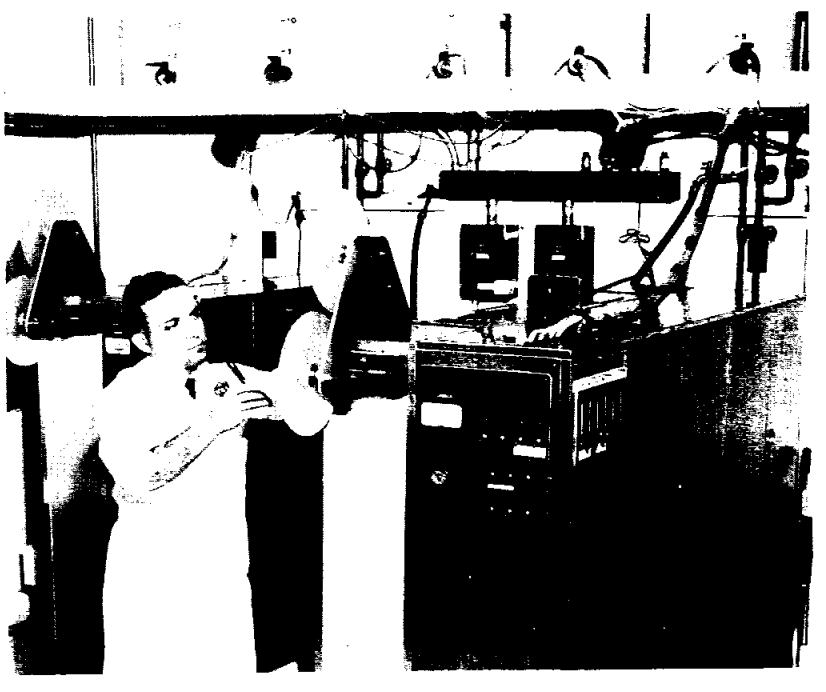
Also in the process of being set up are capabilities for color movie film processing in 16, 35 and 70-mm, using commercial Ektachrome and high speed Ektachrome ER processes, to be available by Jan. 15.



MAKING A BIG PRINT out of a little negative, Carmelo Sustaita operates the giant Salzman enlarger which will handle everything from 35-mm to 9½-inch aerial roll film and make prints up to 40 by 72 inches. "Dodging" is accomplished by means of 29 separate lights, shown on the control panel at left.

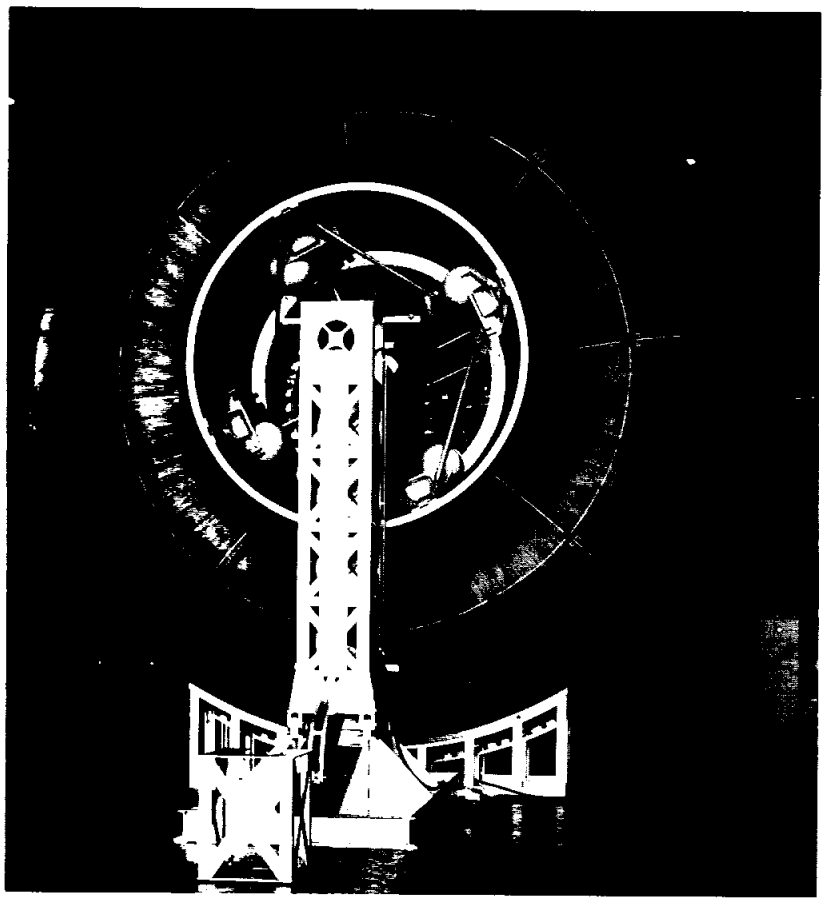


ONCE AROUND the dryer and the long strip of duplicate prints is ready for the automatic cutting machine, just out of sight to the left of the picture, where they will be cut apart and stacked. Technicians are Charles Shrimplin (left) and Ludy T. Benjamin. A tiny graphite dot placed on the back of the prints tells the cutting machine where to separate the prints.



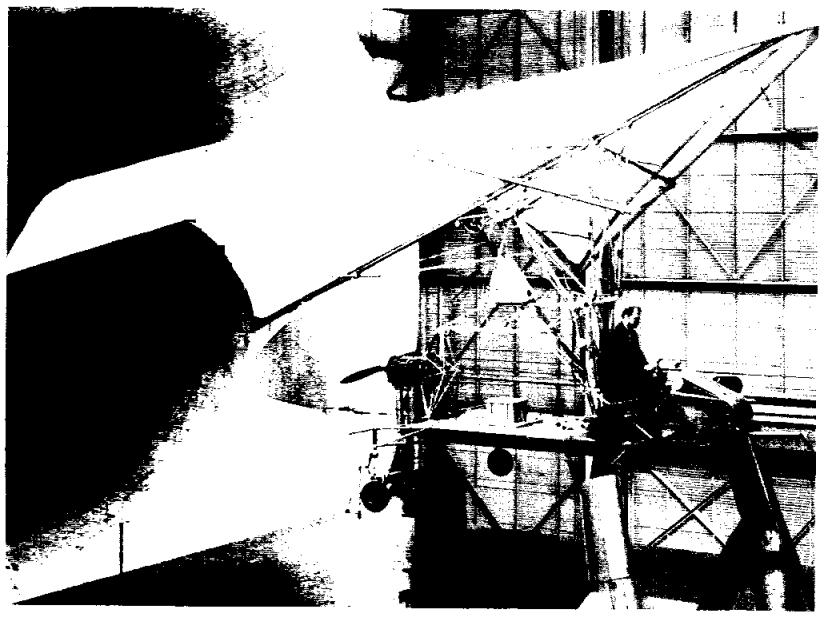
MOVIE FILM is an important part of the photo lab's output. Here Jose L. Cambiaso operates a highly automatic 16-mm reversal processor, which uses chemicals fed from the tanks on the shelf above. Behind is a 16 and 35-mm negative-positive processor.

Langley Research Center Hails the Space Age With

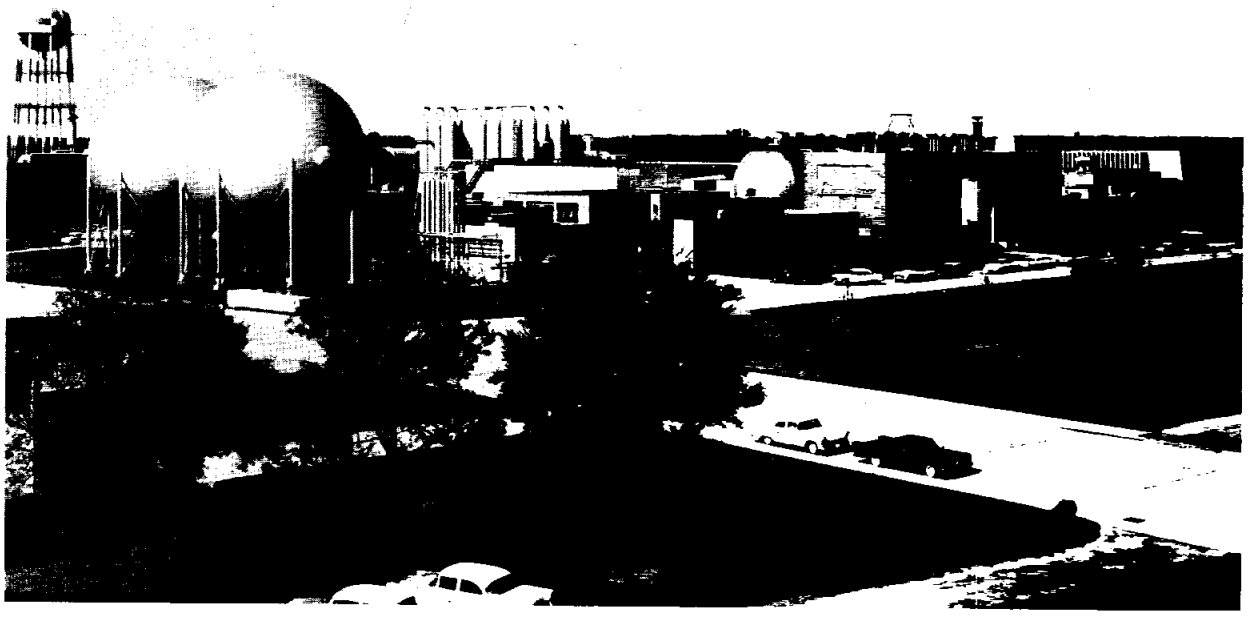


WOULD AN INFLATABLE SPACE STATION be feasible? Langley is studying the problems encountered in the erection of such a station. This is one of several concepts. The central rigid hub would contain inflation and life support systems. A slow rotation would provide artificial gravity.

AN APOLLO-TYPE spacecraft and Saturn launch vehicle model are combined for tests in Langley's unitary plan wind tunnel to determine stability, control and other aerodynamic characteristics during the early portion of atmospheric flight.



FULL SCALE RYAN FLEXWING airplane, based on the paraglider concept developed at Langley, is shown installed in the full-scale wind tunnel for a series of force tests. A number of possible uses include the recovery of spacecraft and early booster stages, and as a reentry vehicle capable of gliding to a chosen site and making a safe landing at low speeds.



LANGLEY RESEARCH CENTER is undergoing a "space face lifting" characterized by improvement and expansion of established research facilities and addition of new space research facilities. At left, two 60-foot vacuum spheres receive helium from nearby storage bottles to produce speeds of Mach 24 at the 22-inch helium tunnel which investigates properties of spacecraft returning from earth orbit. A modification will enable scientists to simulate speeds to Mach 40.

Construction of new facilities, the modernization of existing structures, and the addition of engineers, scientists, and other personnel are combining to enable NASA's Langley Research Center to play an increasingly important role in the lunar mission and manned flights beyond the moon.

Located at Langley Station in Hampton, Virginia, next to Langley Air Force Base, LRC was a parent organization of Manned Spacecraft Center in that the original 35 personnel who formed Space Task Group in November of 1958 were drawn from LRC ranks.

Current construction, including several facilities now underway and others which were finished recently, represent an investment of more than $41 million—sending the estimated plant value of the Center to nearly $250 million. Future projects under consideration by Congress as of last June totaled another $20,472,000.

One of the largest of the nine NASA centers, Langley had 3,764 employees at the end of the last fiscal year, with a payrole more than $26 million annually. By the end of this fiscal year the figure is expected to grow to 4,000, a 25 per cent increase since June of 1958.

Since MSC moved from Langley AFB, where it was located on the opposite side of the airfield from LRC, to Houston, the Langley Center has reoccupied the east area office, shop and laboratory buildings which were home to MSC for three years.

Future Plans

Among new projects either underway or planned for future construction are a space radiation effects laboratory for simulating space radiation in research investigations (cyclotron); a vehicle antenna test facility for advanced research on space antenna systems; and additional equipment for research on magnetoplasmadynamics.

Magnetoplasmadynamics is a science dealing with the motion of a gas, or plasma, which conducts electricity in the presence of magnetic or electric fields. This has applications in long-distance space communications, ultra-high velocity wind tunnels for reentry research and propulsion and power generation.

Also planned are an environmental research facility for studying spacecraft components and their materials; a stabilization and control equipment lab for testing under simulated space conditions; and a particle accelerator lab for simulation of micrometeoroid impact.

Floyd L. Thompson
Director, LRC

The Center awarded a contract to a California firm last summer for developing an inflatable paraglider, based on the Rogallo concept, for use in studying the characteristics of micrometeoriods.

The paraglider will be used in the Langley program to measure miscrometeoroid flux in the lower regions of space (up to 700,000 feet) in tests in New Mexico in mid-1963.

Purposes of this experiment are to check out a sensor system which telemeters signals to the ground whenever the paraglider is penetrated by micrometeoroids, and to provide information on the paraglider as a controllable recovery device for re-entry from space.

Lunar Landing Research

Already under construction are a three-and-a-half-million dollar lunar landing research facility, a space vehicle rendezvous and docking simulator, low-frequency environmental noise facility, high vacuum space structures facility, and a hypersonic aerothermal dynamics facility.

Here's an idea of what these projects will do.

The lunar landing research facility is an outdoor gantry-type structure to support a pilot's compartment, mounted on top of a propulsion module. The latter will contain retrorocket motors, used to slow the vehicle for a final descent to the moon's surface, a system of small maneuvering jets and a fuel supply for both. The vehicle will be supported by a gimbal system to provide maneuvering freedom.

As a means of simulating the one-sixth gravity on the moon, a special hoist will be mounted underneath the facility's traveling bridge crane and be capable of supporting five-sixth's of the vehicle's weight at all times. The facility will be used to obtain basic information on the rocket-powered vehicle.

The facility will be built near the landing loads track and is expected to be in operation by late 1963.

Docking Simulator

The space vehicle rendezvous docking simulator; to be built within the present NASA Hangar, will provide three degrees of rotational freedom and is designed to operate in a 200-foot-long area in conjunction with a ground-based mock-up of another space vehicle.

The facility will be used to provide basic information in the major problem areas of the rendezvous docking operation in space. The facility is expected to be in operation late this year.

The intense low-frequency noise generated by lunar launch vehicles will some day affect the booster structure, payload, astronauts and those

onstruction of Massive New Facilities, Improvements

LUNAR SURFACE, COMING UP! Scientists at Langley use this simulator to conduct tests on human ability to control braking maneuvers for lunar landings, part of an extensive program for guidance and control of lunar spacecraft. The pilot operates a hydraulic analog simulator as though it were a vertical-landing spaceship, while a slide of the lunar surface is projected upon a curved background. Simulated moon altitude is about 25 miles.

personnel in the vicinity of this country's lunar launching sites.

To study the problem, a low-frequency environmental noise facility is being built. It consists of a test chamber about 20 by 25 feet, and 20 feet high. One wall will be movable, so that it can be placed a various distances from a 15-foot diameter loud speaker in the opposite wall. (For comparison, the "woofer" in your hi-fi set is *about 12 inches in diameter.*)

This facility will permit a study of noise problems through exposure of a full-scale spacecraft or large sections of space vehicles to the deep, thundering rumble of large boosters.

High Vacuum

The high-vacuum space structures facility will make it possible to simulate the high vacuum, freezing cold and blistering heat that will be experienced by space vehicles traveling between planets. Of particular interest to scientists are the effects of the space vacuum on those structural properties known to be sensitive to surface conditions. This facility will be located in the present four-foot supersonic tunnel and is expected to be finished late next year.

The hypersonic aerothermal dynamics facility will go into operation in early 1964. Two main systems, one using helium as a test medium and the other using air, are being built. The air system will include an arc-heater to simulate reentry heating conditions, so that vehicles can be tested on the ground at temperatures and gas pressures that will be encountered by a space vehicle reentering our atmosphere from a lunar mission. It will be located in the gas dynamics lab.

Five projects totaling more than $25 million are nearing completion or already in operation. They include a $4 million dynamics research lab, an eight-foot high temperature structures lab, a high temperature materials lab, a hypersonic continuous flow facility and an arc-jet facility in the hypersonic physics test area.

The hypersonic continuous flow facility is a wind tunnel having a 31-inch-square test section and capable of testing at Mach 10 and Mach 12 through use of two interchangeable nozzles. The tunnel is a hypersonic, continuous flow, resistance heated facility, and represents the latest advance in this type. When it is put into operation, it will be the only continous flow hypersonic tunnel in this country capable of reaching

Charles J. Donlan
Associate Director, LRC

Mach 12. The facility was constructed in existing space in the unitary wind tunnel.

Research apparatus in the 8-foot high temperatures structures tunnel will be capable of generating 4,000-degree F. temperatures and Mach 7 speeds, making it possible to test larger models of spacecraft at higher temperatures and heating rates than is now possible. The facility is designed for use in studying problems of large test specimens under the combined influence of aerodynamic loads and high temperatures.

The high-temperature materials laboratory, including an arc jet and other experimental equipment for use in research having application to the ultra-high temperature problems of missiles and other spacecraft during reentry, is located near the gas dynamics laboratory.

Dynamics Research

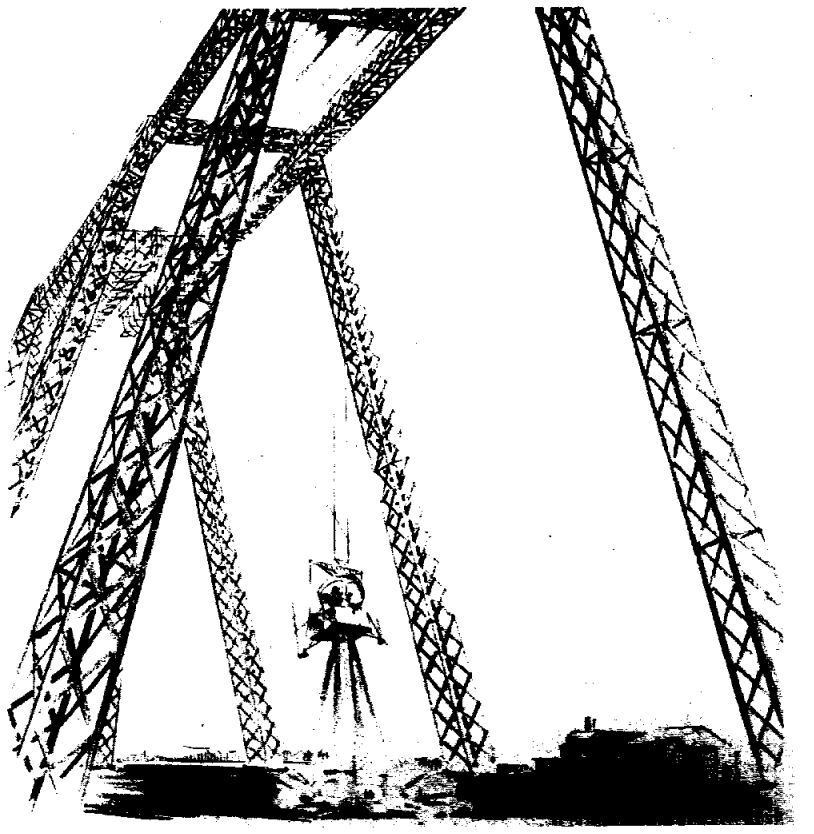
The Dynamics Research Laboratory will include a variety of equipment, such as a vacuum sphere 60 feet in diameter, and a vacuum tank 54 feet in diameter and 60 feet high, to study dynamics problems of high performance aircraft, missiles, space vehicles, space stations, and satellite packages in simulated density, temperature, acceleration, and vibration environments.

This laboratory will provide the capability for study of both the structural dynamics of the vehicles and their components, and the freebody dynamics with respect to space orientation control, guidance, and navigation. Located about one block from the NASA West Gate, this facility will be completed in early 1963.

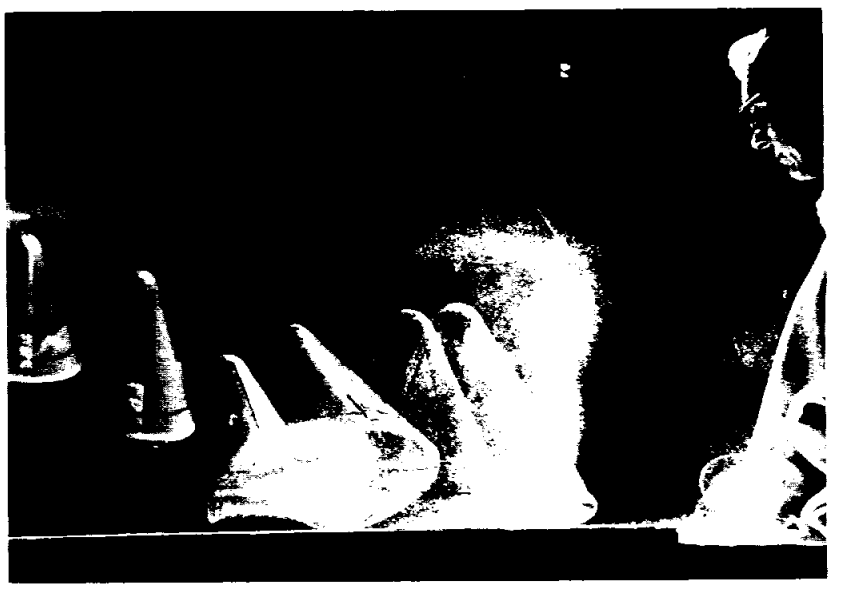
The major new facility in the hypersonic physics test area is an arc-jet test apparatus for the scientific investigation of various materials. The test section be 20 inches in diameter and test temperatures up to 10,000 degrees F. will be obtained. This facility is complete.

Also recently completed were an extension of the test range of the nine by six-foot thermal structures tunnel, conversion of a test cell to provide two sources of very intense noise for noise test research purposes, and a cereamic research heater to provide test velocities of Mach 13 and temperatures to 4,000 degrees at the gas dynamics lab.

Editor's Note: This is the fourth in a series of feature articles about the activities of other NASA installations. The information concerning Langley Research Center, its major projects and its facilities was supplied by the Langley Public Information Office.



ARTIST'S CONCEPTION of lunar landing research facility now under construction at Langley, to be in operation late next year. This will study the techniques for landing a vehicle on the moon's surface, with the gantry supporting most of the vehicle's weight to simulate low lunar gravity.



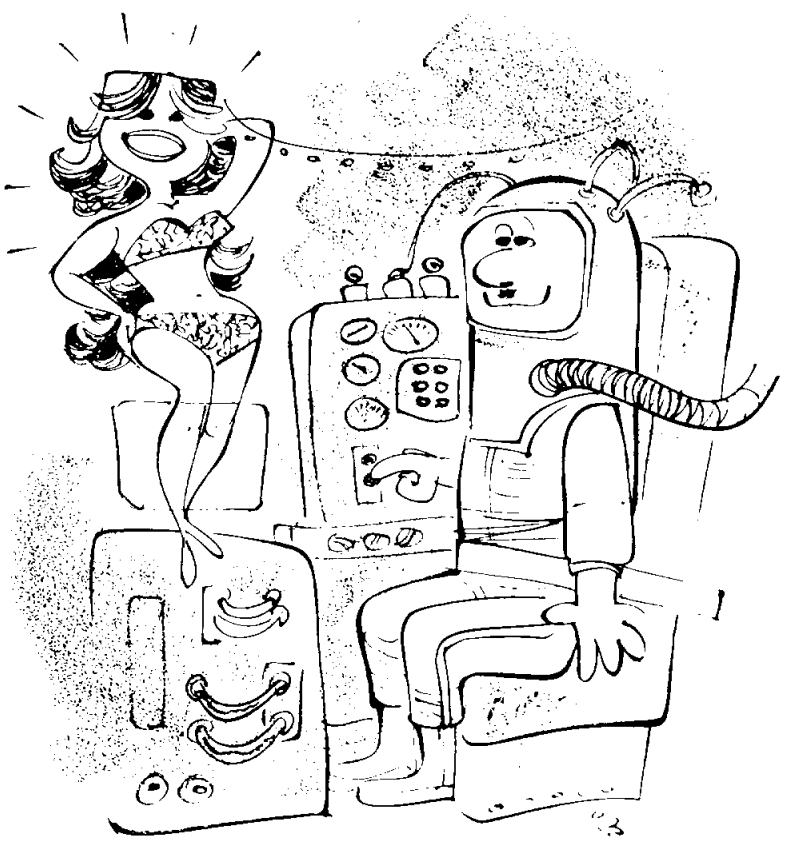
LANGLEY CONDUCTS tests on a one-tenth scale model of an Apollo-type spacecraft on the sand at the impacting structures facility. Using vertical and horizontal velocities of 30 feet per second, the tests simulate parachute letdown to landing.

A MODEL of the paraglider is checked prior to wind tunnel tests which will lead to the development of a full-scale vehicle. The latter will be rocketed into space in mid-1963 to obtain information on frequency and size of micrometeorites on the paraglider as a controllable reentry vehicle.

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 . . . . . John A. Powers
Chief, Internal Communications . Ivan D. Ertel
Editor . . . . . Anne T. Corey

On The Lighter Side



Lunar Lunacy

First guy with a rocket-powered couch will make a fortune in space psychiatry.

Kenneth J. Hartman, experimental psychologist for the Space Biology Department at Aerojet-General Corporation, predicts the need for psychiatric help in space probably will be far greater than on earth.

The space demon that will cause much of the trouble is a thing called "sensory deprivation," the fact that man will be isolated from all the sights, sounds and other senses he has had on earth.

Scientists have known about some effects of sensory deprivation for many years, in cases of persons isolated from normal sights and sounds for various reasons, such as shipwreck, lonely military duty or even head or eye surgery.

And in tests, they found that the person gets lonesome, bored, hostile—and gets serious and bizarre hallucinations. Here are just a few hallucinations reported after some Air Force tests:

"The r.p.m. indicator seemed to have a little man, showing head and shoulders, in a sombrero, holding an umbrella overhead," "The place where the needle was connected began to look like little people." "I saw a miniature Spanish soldier in a silver helmet and yellow blouse and pantaloons."

So there is a predictable probability that the Spaceman will wind up on the psychiatric couch to report, "I dreamed I was a Martian in my made-in-America pressurized space suit."

And he'll be told, "You're not sick, you're just in space."

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

Welcome Aboard

Manned Spacecraft Center acquired 83 new employees between October 14 and October 30. They included four stationed at Cape Canaveral and one at White Sands, N. M. The rest are here in Houston.

Gemini Project Office: Christine M. Bach.

Apollo Project Office: William E. Rice, Charles A. Hotar, Zelton Eubanks, Donald R. Segna, John J. Hermann, Charles R. Haines, Edward J. Schlei.

Spacecraft Tech. Div.: Roger M. Davidson, and Raymond L. Nelson.

Mgr. of Center Service: Charles A. Dillingham, Calissa B. Fleming, Elizabeth Hill, Joyce Landreneau, Vera J. Allen, William R. Smith, Dora G. Clingan, and Frank T. Knutkowski.

Flight Operations Div.: Louis A. DeLuca, Daniel S. Hunter, James L. Strickland, Ted A. White, Richard L. Holt, William C. Lamey, J. O. Sayler, Ernest L. Dickson, Richard D. Tuntland, Sue Shaper, Richard E. Sansom, Elden G. Clayton, Charles L. Hyle, Weldon B. McCown, Joe Fowler, Robert E. Boykin, and Alan J. Moore.

Office of the Director: Orville G. Lindquist.

Aerospace Med. Opr. Div. Cape Canaveral: Nelson Parsons.

Administration Office, Cape Canaveral: Ruth Ann Adams, and Virginia W. Johnson.

Preflight Operations Div., Cape Canaveral: Haywood E. Matthews, Jr.

Procurement & Contracts: Daphne A. Becker, Joseph T. Davis, Anne F. Libby, Barbara A. McKee, Betty L. Stephens, William Vandervoort, Henry W. Brady, Samuel D. Walker, And Robert C. Liounis.

Systems Eval. & Devel. Div.: William L. Green, Clyde J. Stoker, and Dillard J. Murrell.

Personnel Div.: Betty J. Holt, E. Frances Kennedy, Floyd M. Gray, F. Joanne F. Nerdian, Garnette M. Bach, and Geneva L. Smith.

Security Division: Dinah E. Lunsford, Barbara G. Adams, and Sharron J. Tipton.

Flight Crew Opr. Div.: Joe David Garino, and Milton Contella.

Office of Systems, Manned Space Flt.: Charles A. Heubner.

Computation & Data Red. Div.: Welby G. Ward, Sandra S. Yates, Gary L. Walker, Donald R. Lacombe, Carl P. Johnson, and Ralph K. Everett.

Mercury Project Office: Joseph B. Williams.

Crew Systems Division: Stig Fkeroot, and Robert A. Hanz.

Financial Management: William R. Waters, Paul A. Harrelson, Madelone B. Kline, John R. McDowell, and Ennis R. Walker.

Asst. Dir. for Admin., White Sands: Betty J. Sowell.

Astronaut Activities Office: Estelle G. Jackson.

MSC PERSONALITY

'High Sheriff' Donald Blume Heads MSC Security Division

For a man who majored in social science education, holds a life teaching certificate from Missouri, and began his career as an aerial map maker, Donald D. Blume has spent the better part of his working life in a strange occupation.

Sometimes referred to as the "High Sheriff" of Manned Spacecraft Center, Blume is chief of MSC's Security Division. Included among the division's responsibilities are personnel security clearances, badge and pass issuance, physical security and the Center's guard patrol.

Donald D. Blume

Blume was born and grew up in St. Louis, Mo., finished Blewett High School there and entered the University of Missouri at Columbia in September of 1945. He finished his first year before military service interrupted his education, and he spent 18 months in the Army Transportation Corps, a good part of it supervising 600 Korean laborers in rebuilding a railroad bridge over Korea's second largest river.

Returning to school in 1948, Blume majored in political science, history and geography, got his BS in Education in June of 1951, and received a certificate to teach.

The following fall he went to work as a cartographic aid at the USAF Aeronautical Chart and Information Center in St. Louis, preparing and compiling information for aerial maps from photographs, determining elevation heights and contours, and otherwise using his knowledge of geography and topography.

In November of 1952, however, he spotted a higher-paying job with the Civil Service Commission's Regional Investigations Department, and accepted duty as a general investigation trainee in St. Louis. He spent the next six years as a Civil Service investigator in Oklahoma City, Albuquerque, N. M., and Boulder, Colo., with temporary details in Kansas City, Los Angeles and Seattle, Wash.

In this capacity Blume conducted full field investigations of Civil Service applicants for numerous Federal agencies, and investigated cases of fraud and collusion. He prepared investigative reports, conducted hearings to resolve derogatory and discrepant information, investigated complicated appeals under the Veterans Preference Act of 1944, and trained new investigators.

In August of 1958, Blume transferred to McDonnell Aircraft in St. Louis with the Bureau of Naval Weapons Representative Office as an industrial security specialist. Here he administered the Department of Defense industrial security program for McDonnell and for Whirlpool Corporation in Evansville, Ill., at which plants some 9,000 employees held government-granted security clearances. He also had responsibility for internal security in BWR offices at St. Louis, Evansville and the Pioneer-Central Division of Bendix Aviation at Davenport, Iowa, employing some 125 civilians.

He was in charge of security education, employee clearance, internal control procedures for classified information, and visit clearances, and acted as local security representative for NASA and NATO on contractor installations, performing delegated functions for those agencies.

Two years later, in August of 1960, Blume accepted a position as industrial security officer attached to the Project Mercury director's office at Langley AFB, Va. Originally working under Goddard Space Flight Center's Manned Satellite program, he was reassigned to Space Task Group in the mass change effective January 1, 1961.

His title was changed to security officer the following April, and to chief of the Security Division, MSC, when the division was organized. He transferred to Houston in October of last year.

Since 1951 Blume has had two years of graduate work in public administration taken at the University of Colorado in Boulder and at St. Louis University during the periods he lived in those cities.

He is married to the former Elizabeth Ann Reitter of St. Louis and the couple has a son, Jim, 12 years old and now a student at Johnston Junior High School in Houston.

Blume says his hobbies are football and baseball, both as a participant and spectator. A question about the recent World Series brought a sad sigh. "Anybody that grew up in St. Louis hates the Yankees," he commented.

MSC Space Week is being held this week, which also National Education Week. Space Week centers around a week long program of displays, films, speakers, and special events at Houston and Harris County schools. The highlight of the week will be the announcement of an essay contest for junior and senior high school students. MSC Space Week will also be the start of a comprehensive tour by an MSC Space Exhibit Trailer to most Houston and Harris County schools.

Space Center To Get City Delivery

Houston Postmaster Granville W. Elder announced Friday that immediate steps would be taken to extend city delivery mail service of the U. S. Post Office to include the Manned Spacecraft Center which is now under construction.

According to Elder, surveys will be started this week to determine the immediate and long-range needs of this fast-growing area.

Gemini Astronauts To Do Work With Docking Simulator

Gemini Astronauts will receive rendezvous and docking training in a simulator being built by McDonnell for NASA under the technical direction of the Manned Spacecraft Center.

With all lights extinguished in the room, the astronauts will "fly" their simulator through the space-like darkness to contact the distant Agena model just as they will in space.

Classes in ballroom dancing especially for NASA personnel will begin again next Tuesday night.

The meeting place has been changed from the Ellington Officer's Club to the Ellington NCO Club because of the large number of persons taking the course. Those desiring further information should call Carl Rentz at JA 3-5260 or JA 9-8958.

Westinghouse To Build AC Converter Unit

The Aerospace Electrical Division of Westinghouse Electric at Lima, Ohio, will build the power conversion unit for the electrical system of the Apollo spacecraft.

The company was selected for the project by North American Aviation's Space and Information Systems Division, principal contractor on the spacecraft. Cost of the work is still being negotiated.

Called a static inverter conversion unit, the component will be used to convert the electrical power output of the Apollo's fuel cells and batteries from DC to AC power.

Beckman, Inc. Delivers Gas Chromatograph

Beckman Instruments, Inc. has delivered a spaceborne gas chromatograph to the Manned Spacecraft Center under the terms of a $240,000 contract. The instrument, designed for use in future NASA vehicles, is intended to monitor the closed atmosphere of a manned spacecraft. The total package, consisting of the analyzer unit, panel readout, and helium storage tanks, weighs 12 pounds and consumes only a few watts of power.

Walter Donner, manager of Beckman's Space Engineering Group, says that the instrument is designed to separate and identify individual components in the atmosphere of space vehicles such as Gemini, Apollo, or space stations.

The American Medical Association has presented a special honor citation in Aerospace Medicine to Dr. Charles A. Berry "for outstanding service to the citizens of the United States of America, and the successful orbital flights of its astronauts."

"The age of space can only progress to its destiny by the participation of medicine with her sister arts and sciences to sustain the men who fly in space," the award said.

Mariner Passes 13 Million Miles

The following report on the progress of Mariner II was released last week by the National Aeronautics and Space Administration. Mariner II, launched Aug. 27, is expected to pass within 20,000 miles of Venus Dec. 14. Mariner as of Sunday: Distance from earth—13,087,217 miles. Distance from Venus—15,037,838 miles. Radio signal: Good.

Next regular meeting of the Federal Government Accountant's Association will be Tuesday at the Holiday Inn, Wayside and Gulf Freeway. The meeting will open at 6 p.m. with dinner being served at 7:15.

Reservations can be made through Gerald L. Grefes, ext. 5227, Dexter Haven at 5376, or John F. Vittone, at 7707.

Lindquist Named

(Continued from Page 7)

Lindquist was born in Ottunwa, Iowa, on November 26, 1909, He graduated from Sherrard, Illinois, High School and attended the University of Iowa, majoring in business administration and public relations. He came to Texas in 1930 and to Houston in 1933.

He is married to the former Evelyn Hickman of Mingus, Texas, and they have two children, Donald Gene, 25, and Linda Diane, 11.

DR. GRANDPIERRE, director of the Center of Space Research in Paris and President of the International Academy of Aviation Medicine, presents a medal to Dr. White for the medical team connected with Project Mercury flights. Looking on is Dr. Allard, chief physician of SABENA Airlines, president of the I.A.T.A. and secretary-general of the Academy.

Dr. Stanley C. White Accepts Medal, Speaks To IAAM, Belgian Royalty

At the moment MA-8 Pilot Walter M. Schirra completed his first orbit around the earth last month, he unknowingly provided the perfect introduction for the chief of MSC's Life Systems Division.

Dr. Stanley C. White was just rising to address the King of Belgium and an audience of distinguished scientists.

The group applauded heartily.

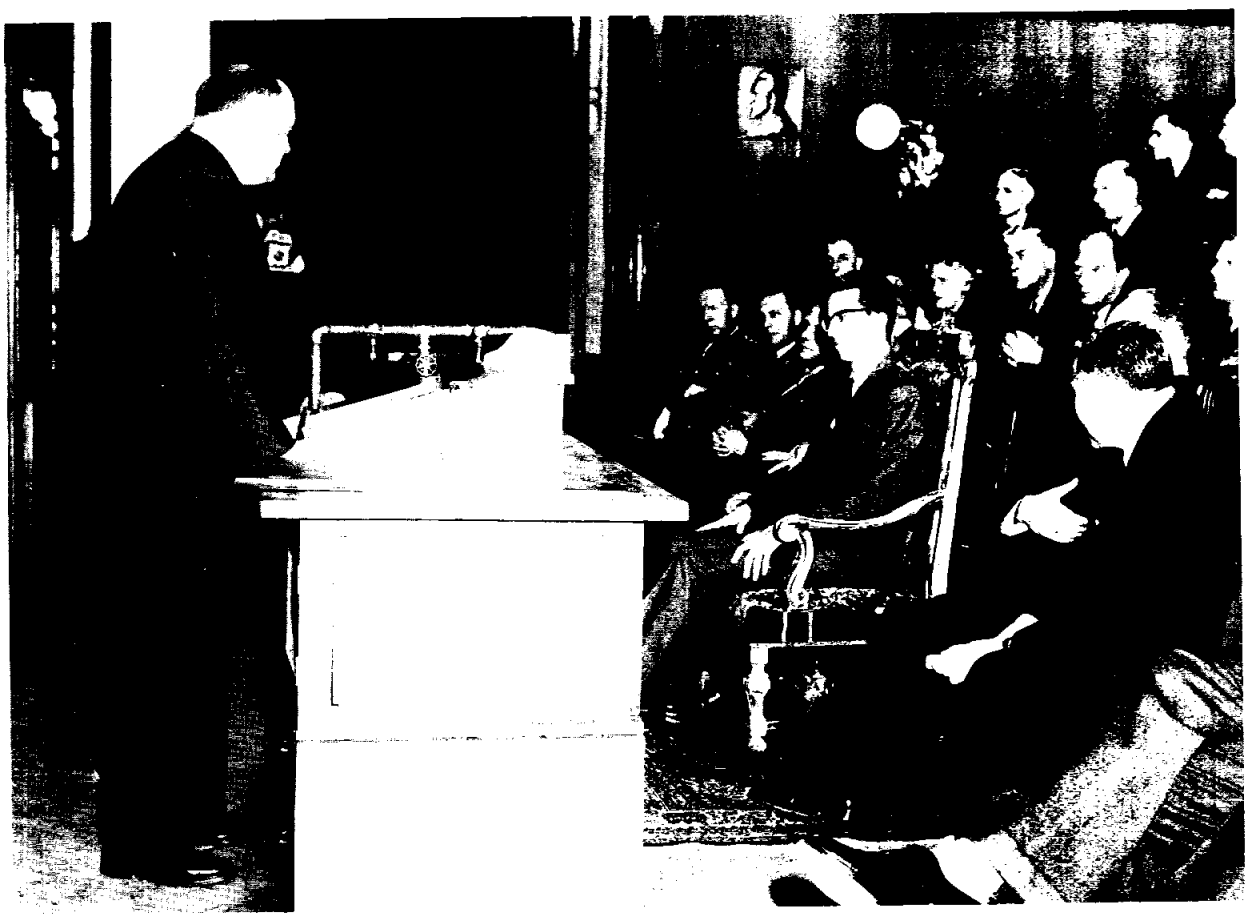
Dr. White was in Brussels to receive a medal award from the International Academy of Aviation Medicine, celebrating its first plenary meeting Oct. 3. The award was to the medical team associated with the support and launching of U. S. manned orbital flights.

Another invited award winner was not present at the meeting—Soviet scientist Professor Jazdovsky, whose award was accepted by the Soviet Cultrual Attache.

The plenary meeting and award ceremony followed a two-day session of conferences and talks, beginning with a press conference at the Brussels Press Club Oct. 1. On Oct. 3, Belgian ministers, high level government officials, internationally renowned scientists, diplomatic representatives and invited guests gathered at the Faculty of Medicine of the University of Brussels for the plenary session. Dr. White received his award from Dr. Granpierre, director of the Center of Space Research in Paris and president of the International Academy of Aviation Medicine.

In the afternoon of the same day, Dr. White addressed King Baudouin of Belgium and a distinguished group of scientists at the Medical Faculty and showed a NASA film on the status and plans of U.S. space projects.

He presented Baudouin a framed color photograph of a hurricane, taken from a U.S. spacecraft. Dr. White was no stranger to the King, inasmuch as he had briefed King Baudouin on the American space program when Baudouin visited the U. S. in the spring of 1959.



DR. WHITE ADDRESSED Belgian King Gaudouin (seated in arm chair) members of his household, and distinguished scientists of Brussel's University on the day of America's six-orbit flight.

AN AWARDS CEREMONY for Manned Spacecraft Center was held in Cullen Auditorium at the University of Houston Oct. 1, when 51 staff members received 20-year pins. Those not mentioned in the Roundup of Oct. 31 were Frank S. Kawalkiewicz, John R. Brinkman, and Ivan D. Ertel. In a repeat of the Oct. 25 NASA ceremony in Washington, D. C., Outstanding Leadership Medals were presented to Maxime A. Faget and Barry Graves, and Group Achievement Awards to Mercury Project Office, Flight Operations Division, Preflight Operations and Spacecraft Research.

Holmes To Take On New Deputy Administrator's Job Plus Old One

In a move aimed at adapting NASA's management structure to the Agency's rapid growth, Associate Administrator Robert C. Seamans, Jr., has named a second deputy associate administrator and realigned functions within his office.

Effective immediately, D. Brainerd Holmes assumes new duties as a deputy associate administrator to Seamans as well as retaining his program responsibilities as director of the Office of Manned Space Flight.

At the same time, Thomas F. Dixon, who for the past year has served as deputy associate administrator, assumes specific responsibility for NASA Headquarter's relations with field centers engaged principally in other than manned space flight projects.

Seamans characterized the move as another step in the evolution of NASA's emerging organization, reflecting the agency's increase in both the number and scope of projects and the resultant manpower growth.

Previously most field center directors reported directly to Seamans on institutional matters beyond program and contractual administration. Under the new setup, centers reporting on their institutional operations directly to Holmes will include Marshall Space Flight center, Huntsville, Ala.; Manned Spacecraft Center; and Launch Operations Center, Cape Canaveral, Fla.

Dixon's area will embrace operations at Ames Research Center, Moffet Field, Calif.; Lewis Research Center, Cleveland, Ohio; Langley Research Center, Hampton, Va.; Goddard Space Flight Center, Greenbelt, Md.; Flight Research Center, Edwards, Calif.; Jet Propulsion Laboratory, Pasadena, Calif. and Wallops Station, Wallops Island, Va.

Holmes will wear two hats, Seamans explained. "This is justified because of the nature and urgency of his manned space flight program. Working with other elements of my staff, Holmes and Dixon are to insure the implementation of standardized procedures, management systems, and reports to the administrator, deputy administrator, associate administrator and program directors.

Holmes, 41, joined NASA Nov. 1, 1961, as director of manned space flight. Prior to his appointment with NASA, Holmes was project manager for the Radio Corporation of America in building the Ballistic Missile Early Warning System (BMEWS).

Dixon, 46, came to NASA Sept. 18, 1961, as director of launch vehicle programs. Prior to that, he was vice president for research and engineering of Rocketdyne Division of North American Aviation, Inc.

NASA Expansion Building Begins On Merritt Island

Construction of a manned spacecraft building, the first structure to be built on Merritt Island in the newly acquired expansion of Cape Canaveral, will be started in February, according to the U. S. Army Corps of Engineers in Jacksonville.

Engineers today announced that bids will be opened Jan. 3 on the $12 million, 300,000-square-foot structure which will have portions six stories tall. It will be the second largest building to be erected on the rocket-missile test center, outranked only by the technical laboratory constructed several years ago at Patrick Air Force Base.

The spacecraft structure, which will become primary headquarters for the National Aeronautics and Space Administration's lunar landing program, will include administrative facilities, quarters for the astronauts, auditorium and cafeteria, service areas and a large open - space assembly area. The concrete frame building will be composed of three separate facilities under one roof—a two-story administrative facility, laboratory control section and the 6-story-

(Continued on Page 2)

Space News NASA ROUNDUP!

SECOND FRONT PAGE

O. G. Lindquist Is Named Assistant To Dr. Gilruth

O. G. Lindquist of Houston, has been appointed Assistant for Congressional Relations to MSC Director Robert R. Gilruth.

Lindquist will be responsible for coordinating matters involving Congressional relations and will serve as principal advisor to Dr. Gilruth and other members of the MSC staff on all Congressional matters.

He will also report to NASA Headquarters in Washington significant actions involving Congressional matters, will coordinate response at MSC to requests received from members of Congress, and will coordinate details of visits to MSC by members of Congress and other VIP visitors.

The new MSC official, formerly the administrative vice-president of T. J. Bettes Company in charge of mortgage loans, has been active in Texas business and civic circles for a number of years. Prior to his affiliation with the T. J. Bettes Company, he held positions as director of public relations for the North Dallas Bank and Trust Company; executive vice-president of Commercial Services of Texas, Inc.; president of the Acceptance Planning Corporation of Dallas; president and owner of the Lindquist Finance Corporation of Houston and other positions in the fields of finance and investments.

In Houston civic affairs, Lindquist has served as president of the Montclair-Sunset Civic Club; judge of Voting Precinct 177; president of the Greater Houston Finance Association; and treasurer of the Texas Automotive Finance Association. In 1951, he was co-

O. G. Lindquist

chairman of the Commercial Division of the United Fund in Houston and is this year serving as a captain in the division.

He is a life member of the Houston Professional Baseball Players Association; has been cited by former Texas attorney General John Ben Shepard and served as a member of his staff; and has received a Meritorious Award for Civic Activities on the local and state level from former Governor Alan Shivers.

He is the author of "Your Mortgage Contract," an article written for investors and customers of the T. J. Bettes Company.

(Continued on Page 7)

MISSES BONNIE AND REBA CHURCHILL, authors of the syndicated column "Youth Parade," present a scroll to Astronaut Gordon Cooper on behalf of the other astronauts. It represents the "Most Admired Men of 1962 Award" based on a newspaper poll of 800,000 readers, who "saluted these space pioneers for the humility and teamwork which make them down to earth . . . the training and courage which put them up in space."