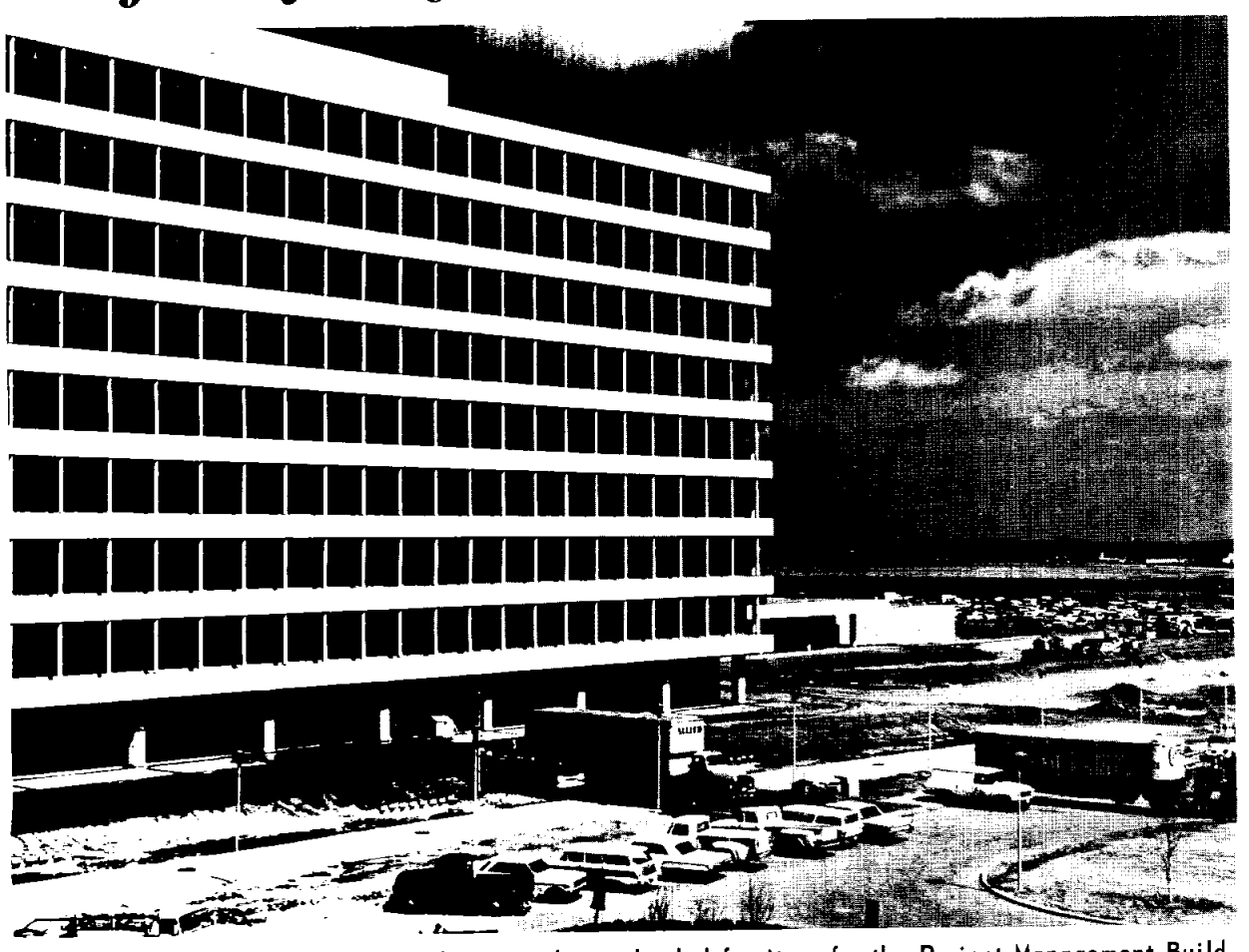
Space News ROUNDUP!

VOL. 3, NO. 11 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS MARCH 18, 1964

135 PERSONNEL FROM ASTD TO MOVE FRIDAY

Majority Of MSC Personnel Relocated At New Site



MOVING DAYS – Moving vans are shown as they unloaded furniture for the Project Management Building (Bldg. 2) during the recent move of Dr. Robert R. Gilruth, director, MSC, his staff and other occupants of the nine story headquarters building.

This past week an additional 225 personnel of the Manned Spacecraft Center vacated temporary quarters in Houston and joined some 1700 other MSC employees at their new permanent home at Clear Lake.

Since February 20, nearly 1500 MSC employees have moved into the new NASA site where scientists and engineers will plan, execute and control future American space flights, including long duration and rendezvous missions in orbits around the earth and flights to the moon.

The next group scheduled to move into new quarters here at Clear Lake are personnel from the Advanced Spacecraft Technology Division. About 135 will be in this group which will move this Friday from the Franklin Development to Bldg. 16 here at the site. With the completion of this move, over 2000 will have moved to the Clear Lake site.

Those moving since February 20 have included the Apollo Spacecraft Program Office, Procurement and Contracts Division and the Public Affairs Office. They were followed on February 28 by the Personnel Division, Small Business Office, the Program Analysis and Resource Management Division, Facilities Division, the Center Medical Operations Office, Legal Office, Office Services Division, Safety and Occupational Health Branch, and additional elements of the Technical Services Division.

On March 6, Dr. Robert R. Gilruth, director, MSC, and more than 500 other center workers moved into new offices here at the site. Included in this move were the Crew Systems Division, Gemini Program Office, the Astronaut Office and the top management staff. They occupied offices in the Pro-

(Continued on page 2)

Dr. Charles A. Berry Appointed Chief New Center Medical Programs Office

The appointment of Dr. Charles A. Berry, as Chief of Center Medical Programs for the NASA Manned Spacecraft Center was announced by Dr. Robert R. Gilruth, MSC director.

The promotion to the newly established position places Dr. Berry in charge of all medical matters concerning MSC. He will advise the director on medical and physiological questions influencing mission plans or hardware design.

In his new post, Dr. Berry will be the senior medical officer present and serve as the director of Medical Operations during manned flight; review for the director all MSC aeromedical development programs; establish procedures for Center representation at meetings and conferences with medical organizations, and approve speakers and their medical presentations for these organizations.

Dr. Berry will also establish MSC medical standards and policies governing the selection of flight crews; develop criteria governing the appointment of crews to specific manned spaceflight missions; establish standards governing the assignment or personnel to hazardous testing, and retain overall responsibility of the safety programs for all Center workers.

Promoted into the position vacated by Dr. Berry is Dr. D. Owen Coons, formerly the deputy chief.

Dr. Berry has been with the National Aeronautics and Space Administration since July 1, 1962. At that time he was on loan from the United States Air Force where he held a commis-

(Continued on page 2)

Study Says Sun Best Source For Space Station Electricity

Look to the sun to supply electrical power and lights aboard America's initial 18 to 24-man space stations, Lockheed - California Company engineers advised recently.

In a study for the National Aeronautics and Space Administration, Lockheed engineers recommended using arrays of two to four million photoelectric-like cells to absorb sunlight for generating electricity aboard the earth - orbiting space station.

This solar photovoltaic system to convert light energy into electrical energy would be the most reliable and earliest available, the engineers reported to NASA's Manned Spacecraft Center. More than a dozen solar, nuclear, and chemical electrical power systems were compared and evaluated.

A space station's typical

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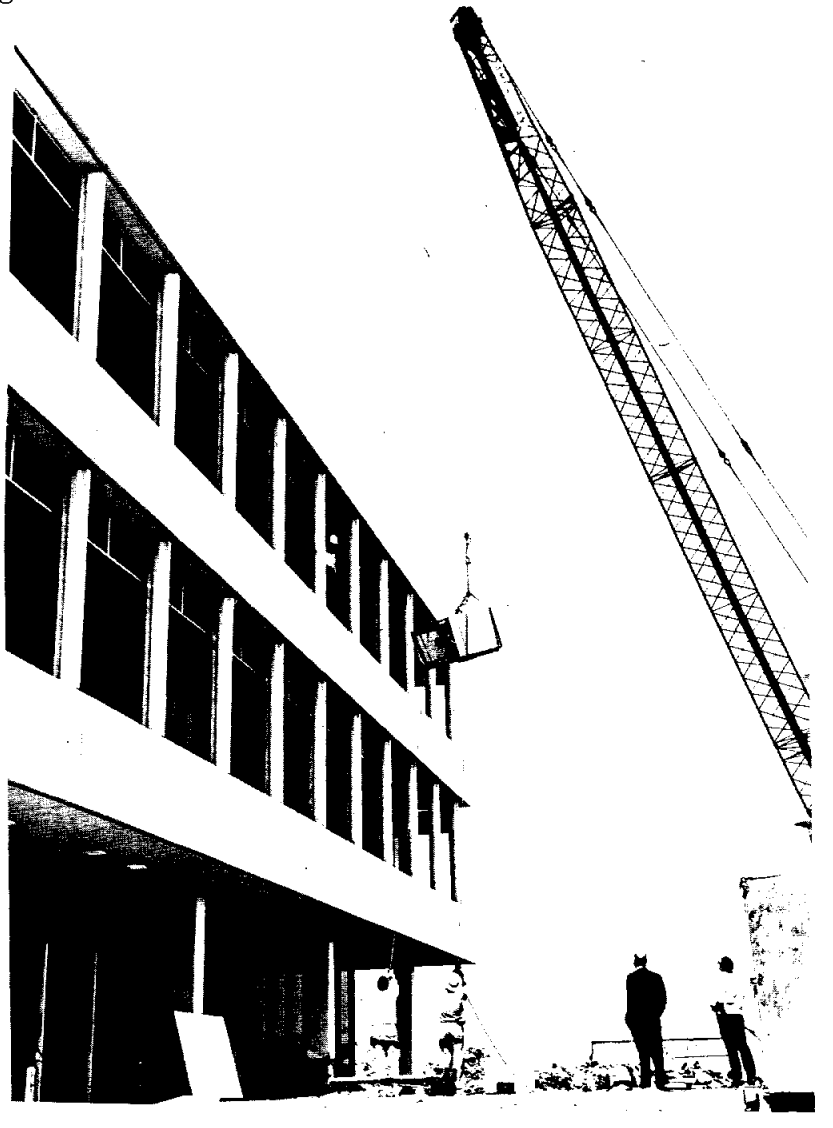
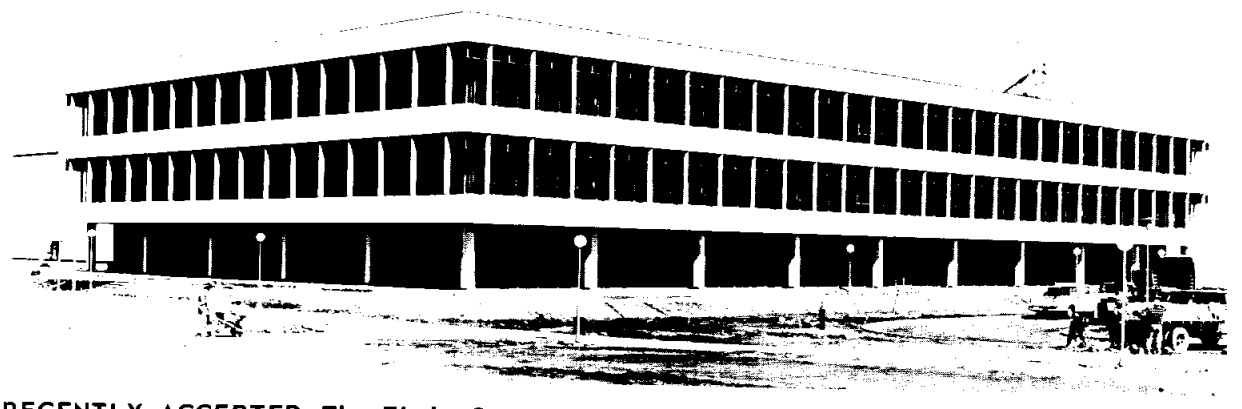


THROUGH THE WINDOW – An unwieldy piece of equipment for the Flight Crew Operations Offices Building, too large for elevator or stairway, is hoisted by a crane through one of the windows on the third floor. The Flight Crew Support Division personnel moved into the building last week.



RECENTLY ACCEPTED--The Flight Crew Operations Offices (Bldg. 4), a three story building, is the latest to be accepted by the Manned Spacecraft Center from the contractor. Personnel occupying the building will be the Flight Crew Support Division, Crew Systems Division, astronauts and others associated with planning and operational supervision of flight crews.

New Site

(Continued from page 1)

ject Management building and the Flight Crew Operations Offices and the Life Systems Laboratory.

The Flight Crew Support Division comprised the bulk of the group of 225 personnel who make the most recent move to the site. Others in this group included Office Services Division personnel, Audio-Visual Branch of the Public Affairs Office and the Management Analysis Division.

Of the 60 facilities that ultimately will comprise the space center, 19 are complete and the balance are in various stages of construction or awaiting budget action by Congress. Through fiscal year 1964, more than $147 million has been authorized for plant construction and a $25,-166,000 construction request for fiscal year 1965 is pending.

The Flight Crew Operations Offices building, a three story building, is the latest to be accepted from the contractor.

Containing more than 97,-700 square feet of laboratory and office space, the flight building is 245 feet long by 133 feet wide. As in nearly all Center construction, solar gray window panels are a feature of the new structure.

The building was constructed for personnel of the Flight Crew Support Division, the Crew Systems Division, astronauts and others associated with planning and operational supervision of flight crews.

Several life support test labs are on each of the floors. Included are physiological, biochemical, life support, stress test, hemotology and histology facilities. A digital computer area also is located in this building.

The flight building is the tenth accepted out of 13 facilities programmed for construction under the Phase 3 contract. It cost $2,025,300. Leavell, Morrison-Knudson and Hardeman Company of El Paso, Tex., is the prime contractor.

Electrical Source

(Continued from page 1)

27-kilowatt system--about what is required for a 20-home tract--would be powered by 2.7 million silicon solar cells. Rechargeable sealed silver-cadmium batteries would be used for storage of energy. The space station's power system would weigh about 13,-000 pounds.

The solar photovoltaic system is roughly comparable to an automobile's electrical power generating system.

Instead of gasoline, the fuel is sunlight. Solar cells generate electrical power for the space station's functions. Electricity is stored in batteries which are recharged by the solar cells when the space station is in the sunlight.

For more than one-third of its approximate 90-minute orbit, the space station --at a 200- to 300-mile altitude--will be in darkness, in the earth's shadow hidden from the sun. During the dark periods the batteries will provide all necessary on-board electricity.

Continuous electrical power is required for subsystems that help sustain life in the space station as well as for normal "housekeeping" operations and experimental programs.

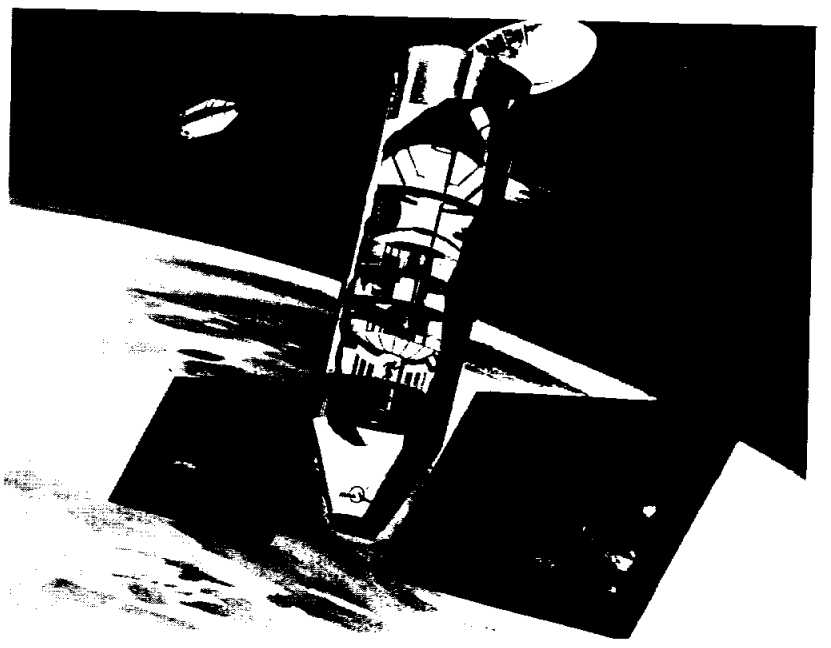
On-board electrical power is necessary for internal atmosphere and temperature control, communication, navigation and guidance, stabilization control, instrumentation, research experiments and other applications.

The solar photovoltaic system for a multi-manned station could be fully developed for operational use as early as 1968, according to Lockheed spacecraft organization engineers. It would have an operating life of from one to five years.

Most likely electrical power concept for later space stations may be a nuclear thermionic system, Lockheed engineers believe.

This system produces current when heat drives electrons out of metals. The heat is actually turned into electrical power by a thermionic converter which operates like a radio vacuum tube.

However, the low weight, long-life, highly reliable nuclear system may not be possible until the middle 1970s, say the Lockheed engineers.



ORBITAL LAB – Artist's concept of a proposed zero-gravity orbital research laboratory currently being studied and evaluated by MSC's Space Station Study Office.

Dr. Berry

(Continued from page 1)

sion as lieutenant colonel. When the post of chief of the Medical Operations Office was established as a civil service position in August 1963, Dr. Berry

DR. BERRY DR. COONS

was offered the job and he accepted the appointment, resigning his commission for that purpose.

The new chief of the Medical Operations Office, Dr. Coons, is originally from Canada and joined MSC in August 1963. Prior to joining the Center staff, he held the rank of wing commander in the Royal Canadian Air Force.

General Precision's High Resolution TV Selected For MCC

GPL Division of General Precision's Aerospace Group announced last week its new Precision 820 television cameras have been selected by Philco Corporation to be used in the Mission Control Center here at the Manned Spacecraft Center.

Precision 820 television camera systems have 675 lines of vertical resolution and 800 lines of horizontal resolution, providing precise television pictures with nearly three times the clarity of standard home television units.

These cameras will televise technical information to space mission directors upon demand, eliminating file clutter and information storage problems while improving rapid information communication techniques.

Artist's MA-9 Interpretation Presented Astronaut Cooper

Astronaut L. Gordon Cooper was presented a folio of lithographs this past week by Dr. Robert R. Gilruth, director, MSC, on behalf of the people of Solna, Sweden.

The lithographs entitled "The Ball" by Swedish artist Thorsten Renqvist, professor at the Valand School of Art, Gottenberg, Sweden, is an artistic interpretation of Cooper's flight through space.

As part of the International People to People Program, the lithographs were displayed recently in Burbank, Calif.

MA-9 ARTISTIC INTERPRETATION – Dr. Robert R. Gilruth, director, MSC (right), and Astronaut L. Gordon Cooper examine one of the lithographs that Cooper received from the people of Solna, Sweden. The folio of lithographs entitled "The Ball" is an artistic interpretation of Cooper's MA-9 flight.

Arizona's Mile Deep Grand Canyon Scene Of Astronaut Geology Training

Eighteen astronauts descended into Grand Canyon, Ariz., early this month to learn geology in one of nature's most spectacular classrooms, which in many places goes a mile deep into the earth.

They studied rock formations whose hundred of layers retell the geological history of the earth.

It's all part of a course in geology that NASA Manned Spacecraft Center and the U. S. Geological Survey began for astronauts three weeks ago. Between now and July 1, the astronauts will undergo about 58 hours of classroom instruction, and make several more field trips.

The purpose is to equip them with geological knowledge so they can selectively obtain samples of the lunar surface to help shed knowledge on the origin and history of the moon. The United States intends to land men there in this decade.

Only half the earth's history--back about two billion years--is reflected in rock formations throughout the more than 5,000-foot depth of Grand Canyon. But scientists here feel the moon may be able to shed more light on the origin of the earth-moon system which dates back 4-1/2 billion years. They believe the moon's crust contains many elements found on earth.

The course emphasizes the study of impact features and volcanic rock because of the probable importance of these phenomena on the structure of the lunar surface.

For years most scientists thought the moon was pock-marked by volcanoes which formed huge craters. Later, other opinions, such as the impact theory, came to light. Many scientists believe that meteors created the larger craters on impact, and that ejected lunar material falling back to the surface caused the smaller craters.

But the truth is that no scientist on earth knows for sure.

Nor does science know whether the moon's surface is coated with dust, large rocks or an asphalt-like crust.

Only a thinking man, capable of selecting the most valuable surface samples, photographing the most significant objects close-up, can bring back the answers.

And he must be trained to avoid returning from the moon with samples of meteoroid material available right on earth.

This is one reason men are going to the moon.

Earth-bound scientists have yet to see a feature of the moon smaller than a tenth of a mile in diameter, even through the most powerful telescopes.

One portion of the course, covering "Principles of Terrestrial and Lunar Geology," is supervised by Dr. E. Dale Jackson of USGS. It covers geologic processes, stratigraphy, earth and moon structures and land forms, geologic mapping and geophysical properties of the earth and moon.

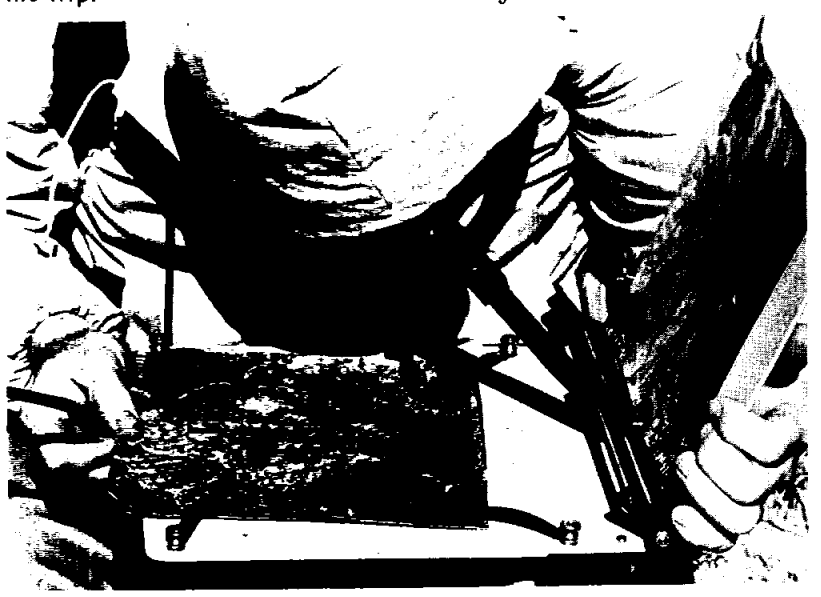
The other part, "Elements of Mineralogy and Petrology," is taught by three NASA geologists of the Lunar Surface Technology Branch at MSC: Dr. Ted H. Foss, Uel S. Clanton and Elbert A. King Jr. It deals with the study of minerals and rocks expected on the lunar surface, and trains the astronauts to recognize the most significant samples to bring back from the moon for analysis.

Astronauts participating in the Grand Canyon field trip were: M. Scott Carpenter, Alan B. Shepard Jr., Neil A. Armstrong, Elliot M. See Jr., Edwin E. Aldrin Jr., William A. Anders, Charles A. Bassett II, Michael Collins, Theodore C. Freeman, David Randolph Scott, Donn F. Eisele, Alan L. Bean, Eugene Andrew Cernan, Roger B. Chaffee, Richard F. Gordon Jr., Clifton C. Williams Jr., R. W. Cunningham and Russell L. Schweickart.

SNOW AND ROCKS – Astronaut trainees make a few rock and snow observations during the geological studies at the Grand Canyon in Arizona.

ASTRONAUTS Michael Collins (left) and Roger B. Chaffee (right) discuss rock craters with NASA Geologist, Elbert A. King (center) during the geological studies at the Grand Canyon in Arizona.

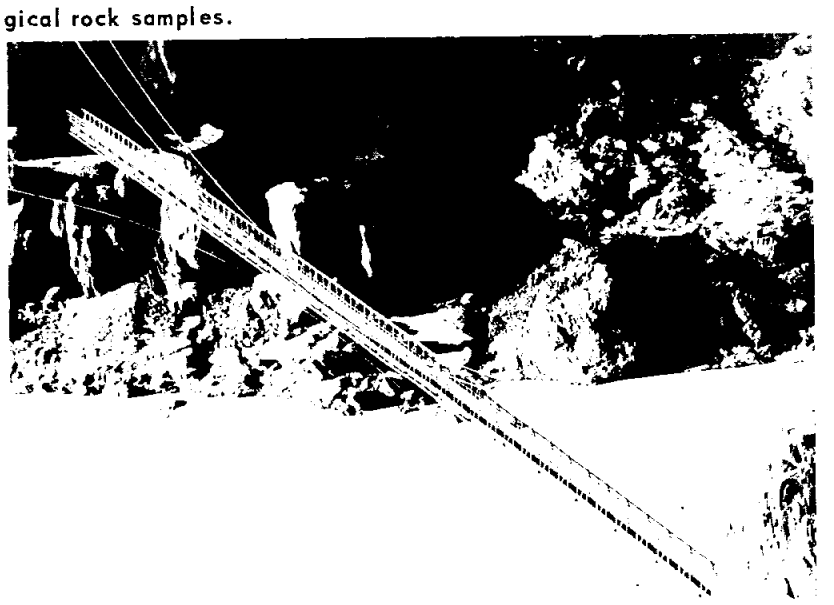
TRANSPORTATION – Astronaut Charles A. Bassett II, with corncob pipe in mouth, sits astride a Grand Canyon mule while on the trip.



GETTING BEARINGS – A member of the party steroscopically examines a photo map of the Grand Canyon to determine the location of the group.

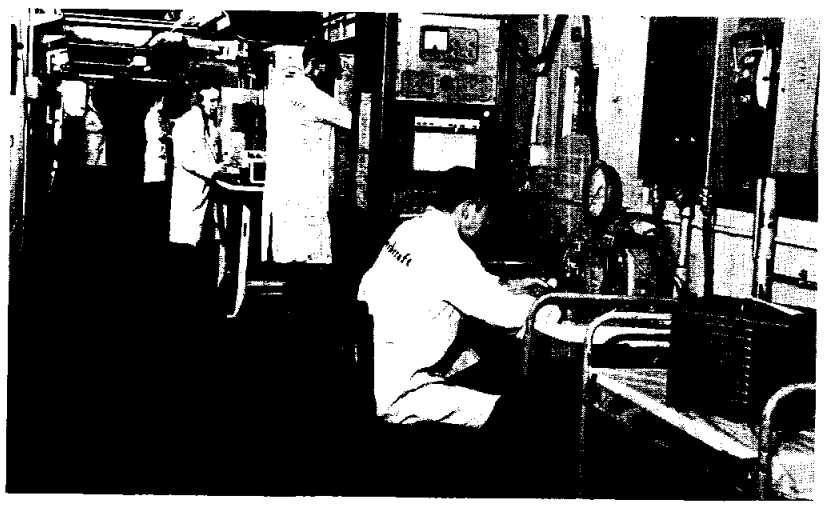
NASA GEOLOGIST, Dr. Ted Foss (left), explains rock structure to Astronaut Alan B. Shepard Jr., and William A. Anders in the Grand Canyon.

TAKING SAMPLES – In the Grand Canyon (l. to r.) Astronauts M. Scott Carpenter, Eugene A. Cernan, and David R. Scott take geological rock samples.



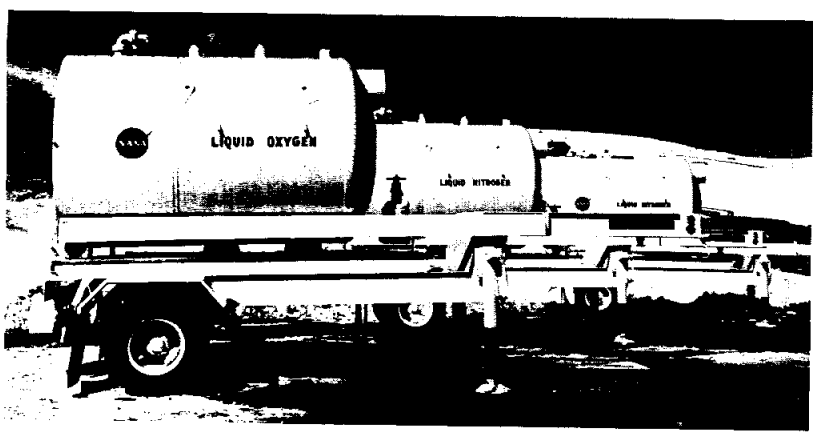
FOOTBRIDGE used in crossing the Colorado River in the depths of the Grand Canyon.

Beech Aircraft To Furnish Cry



APOLLO TEST COMPLEX control corridor at Beech Boulder Division where engineers operate and monitor wide range of environmental tests on cryogenic storage subsystem components. Individual test chambers in this multipurpose facility simulate shock, vibration, acceleration, vacuum, temperature extremes, explosions and other alien environments.

PRESSURE VESSELS that form core of Apollo cryogenic storage susbystem shown nearing completion at company's Boulder Division production facility. Tanks in foreground are ready for insulation.



BEECH-BUILT DEWARS, mobile storage containers for liquid gases, will form a part of the Gemini propellant loading system which the firm is producing under subcontract to McDonnell Aircraft.

Back in 1954, three years before history's first earth satellite hurled into orbit, Beech Aircraft Corporation started preliminary studies of ways to contain a new rocket propellant -- liquid hydrogen.

The work performed under a classified USAF contract, involved insulation development, component evaluation and material compatibility. They called it cryogenic engineering.

Cryogenics is the realm of supercold where the temperature range begins at about -200 degrees F. and descends to absolute zero - or -459 degrees F. Over the past decade what happens physically at these low temperatures has grown from a purely scientific interest to a practical technology.

Founded in 1932 at Wichita, Kan., Beech is traditionally known as a leading builder of business and utility aircraft. Yet today it is also widely known as a major participant in some of the nation's most advanced space programs, such as Apollo and Gemini.

As a result of its liquid hydrogen investigations ten years ago, Beech became one of the first aircraft companies to develop cryogenic systems for space vehicle applications. And it has continued to expand its capabilities in the space sciences, notably in cryogenics, ever since.

To vigorously pursue diversified projects relating to rockets, missiles and space exploration, Beech in 1955 established a new division at Boulder, Col. This division now employs nearly 400 specialists and maintains a fully integrated space systems research, engineering and production complex on some 15,000 acres of Beech-owned property four miles north of Boulder in the Rocky Mountain foothills.

Boulder facilities have a total capability for the design, development, fabrication and testing of spacecraft systems, components and ground support equipment. The division also utilizes the engineering and manufacturing resources of main plants in Wichita. (Total Beech personnel tops 7,000.)

MRS. O. A. BEECH
president and board chairman, Beech Aircraft Corporation.

A broad background in cryogenics proved a key factor in selection of Beech by NASA and North American Aviation's Space and Information Systems Division for the development of Apollo's "cryogenic storage subsystem."

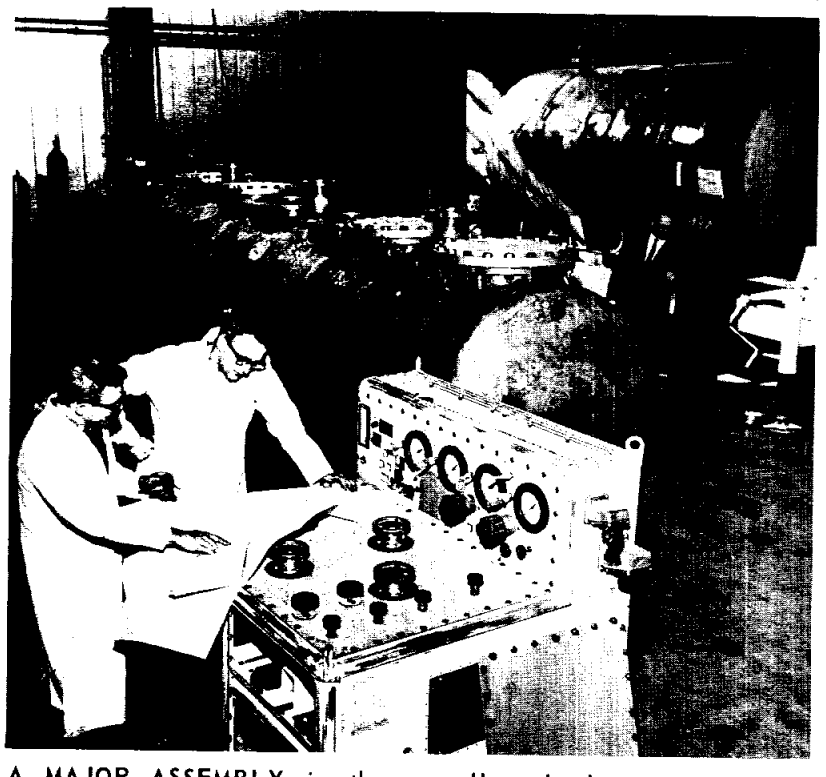
Forming the heart of the Apollo environmental control and electric power systems, Beech's subsystem installs in the spacecraft's service module. It consists of four storage vessels and the required flow lines for supplying the gases used to generate electricity and to provide the three astronauts with breathing oxygen during long Apollo missions.

North American awarded Beech its Apollo contract in July, 1962. The task includes the design, development, evaluation and manufacture of the complete cryogenic storage subsystem. The Beech Boulder Division is performing the bulk of the work, with support from the main plant in Wichita.

The subsystem's four spherical tanks, each about two feet in diameter, contain hydrogen and oxygen at 300 to 400 degrees below zero and at pressures as high as 1,000 pounds per square inch. The amount of gas in the four tanks would occupy 20,000 cubic feet at room temperature and normal pressure -- or

FRANK E. HEDRICK
executive vice president, Beech Aircraft Corporation

EDITOR'S NOTE: This is the twenty-third in a series of articles designed to acquaint MSC personnel with the Center's industrial family, the contractors who make MSC spacecraft, their launch vehicles and associated equipment. The material on these two pages was furnished by the Public Relations Department, Beech Aircraft Corporation.



A MAJOR ASSEMBLY in the propellant loading system being built by Beech for the Gemini program is this control console in foreground, which will install in the "white room" atop the service gantry at Cape Kennedy. Large tanks under construction in background will store and transport cryogenic fluids.

For Manned Spacecraft Center, Beech is performing research and development work on positive expulsion systems, including this experimental assembly being prepared for tests in the company's "clean room" at Boulder, Colo. Project is concerned with developing practical method of delivering cryogenic fluids in zero gravity environments.

The Spotlight On MSC Secretaries....

The secretaries for this issue of the Roundup represent three divisions which have recently moved to the Clear Lake site and one at Ellington.

JANE D. BRAUN, (upper left) secretary to Joseph S. Algranti, chief, Aircraft Operations Office, joined NASA in November of 1955 at the Langley Research Center as a math aide in the Aerospace Mechanics Division. In 1958 she joined the secretarial ranks of NASA and in October, 1962 accepted her present job. Jane was born in Hazelwood, Penn. and attended Allegheny High School. Prior to going into government service she worked for a Newport News, Va. shipbuilding company. Her husband, Alois Braun Jr., is also with MSC in the Instrumentation and Electronic Systems Division. The couple has three children: Carol Jane Braun 23, Lewis Russell 21, and Russell William 9, and reside in Houston. Jane said her favorite outside interest was bowling in the NASA couples league.

JOYCE KOPLIN (lower left) joined NASA in June 1961 at Langley, Va., as secretary to the supply officer. She is now secretary to Hazen L. Walker, chief, Logistics Division. She was born in Pennsylvania and was graduated from the Hegins, Penn., Township High School. Previous jobs include seven years with the Department of Navy in Washington, D.C. Her husband, MSgt James Koplin, USAF, is assigned to the Manned Spacecraft Center on military detail as military liaison for Department of Defense personnel. The couple has two children: a son 11, and a daughter 8 years. The family resides in Houston. Joyce includes bowling, dancing and sewing as her main free time activities.

ELIZABETH J. HILL (upper right) is secretary to Charles M. Grant Jr., chief, Technical Information Division. She joined the NASA Manned Spacecraft Center in October, 1962 in her present position. Elizabeth was born in Los Angeles, Calif. She is a graduate of Lamar High School in Houston and attended the University of Houston. She is presently attending night and Saturday classes at the University of Houston with English as her major field of study. Previous jobs included five years with Tennessee Gas Transmission Company in Houston and just prior to joining MSC, she and her 14-year old daughter, Lesley Elizabeth, made a trip to Europe to visit relatives in the military in France and Luxembourg. She said her interests are mostly those shared with her daughter, such as, traveling, studying the French language and history, music (not the "Beatle" variety), costume making, camping, scouting, swimming, and etc.

DOROTHY D. SWANNER (lower right) is secretary to Dr. William A. Lee, chief, Operations Planning Division, Apollo Spacecraft Program Office. She joined MSC in April, 1962 as secretary to the chief of the Financial Control Branch, Planning and Resources Division, ASPO. Dorothy was born in Chickasha, Okla. and attended the Hockaday School for Girls, Dallas, Tex., and Kidd-Key College, Sherman, Tex. Prior to joining MSC, she was a professional interior decorator, manager of a business and professional men's club in Pasadena, and manager of the Ellington AFB Officers Club. Her husband Ray E. Swanner is general manager of the Nassau Inn and The Small World Club. They have two sons, Walter and Jimmy, both in the U.S. Navy, and the couple resides in Houston. Her prime outside interest is in art (painting) and her hobbies include golfing and gardening.

EAA Schedules Spring Dance For Employees

The Employees Activities Association will sponsor a Spring dance for MSC employees from 8 p.m. to midnight on April 3, in the State Ballroom of the Hotel America, it was announced by EAA officials this week.

Admission will be $3 per person, which includes set ups (BYOB). For more information and tickets, contact your EAA district representative.

WIDE OPEN AND WINDY – This is one of the recent scenes on a windy day at the Manned Spacecraft Center Clear Lake site. Most of the girls at MSC don't have to venture out of their offices on windy days except for the "run" to the cafeteria. . . then it's "hold on to your hat" when you round a corner of a building or cross the open expanse between the buildings.

MSC BOWLING ROUNDUP

MSC COUPLES LEAGUE

Standings as of March 3.

Team	Won	Lost
Lame Ducks	18	6
Ridgerunners	18	6
Shucks	14	10
Goofballs	12	12
Hackers	11½	12½
Bowlernauts	10	14
Schplitz	10	14
Piddlers	10	14
Four Aces	9½	14½
Spare-O's	7	17

High Game Women: C. Clyatt 198, M. Jordan 191.
High Series Women: C. Clyatt 515, V. Lantz 500.

High Game Men: H. Maples 245, G. Sanders 223.
High Series Men: H. Brasseaux 564, H. Maples 560.

MSC MEN'S LEAGUE

Standings as of March 5.

Team	Won	Lost
Lunar Lights	21	7
Pseudonauts	21	7
Turkeys	19	9
Spastics	17	11
Overshoots	12	16
Fizzlers**	10	14
Asteroids	10	18
Tecnics**	10	14
Whirlwinds	8	20
Cosmonuts	8	20

**Postponed match.

High Game: J. Garino 266, B. Harris 263.
High Series: J. Strickland 621, J. Garino 616.
High Team Game: Turkeys 940, Cosmonuts 883.
High Team Series: Fizzlers 2673, Spastics 2488.

MSC MIXED LEAGUE

Standings as of March 10.

Team	Won	Lost
Alley Oops	67	33
Eight Balls	63½	36½
Snap Shots	60½	39½
Celestials	58	42
Five Flushers	57½	40½
Pricers	54½	45½
Little Splits	51½	48½
Space Mates	51	49
Virginians	50	50
Aborts	45	59
Core Dumps	42	58
Hardley Ables	40½	59½
Decigones	31	69
Gabs	29	71

High Game Women: C. Barnes, 213, 213, M. Lewis 211.
High Game Men: A. Farkas 246, B. Harris 240, Pavlosky 236.
High Series Women: C. Barnes 554, 545, 545.
High Series Men: P. Peterson 640, A. Chop 632, 606.
High Team Game: Alley Oops 984, 938, 930.
High Team Series: Alley Oops 2658, 2636, 2597.

NEBA Premium Not Past Due As Notice Said

It was all a "misteak." The reference is to the dates on the NASA Employees Benefit Association group insurance premium notice delivered last week with the pay checks.

The due date and grace period dates of 3-1-64 and 3-20-64 respectively were exactly one month off and should have been, due date 4-1-64 and the grace period date should have been 4-20-64.

Premium remittances should be sent to Marie Storey, Rm. 117, Bldg. 2, Site 1.

Toastmaster Group Holding Meetings To Reactivate Club

The Toastmasters International Club number 3116-56 is being reactivated, it was announced this week, and interested MSC personnel along with old members are invited to join.

Luncheon meetings will be held each Wednesday at 11:30 a.m. in the Ellington AFB Officers Open Mess.

More information on the club may be obtained by calling Robert N. Townsend, club secretary and treasurer at HU 3-7663.

Health Agencies MSC Chairman Receives Award

The Federal Service Campaign for National Health Agencies' Awards Service Luncheon was held last Wednesday in Houston to present awards for "a job well done."

Representing the Manned Spacecraft Center and receiving an award was Grace Winn of the Public Affairs Office. She served as last years campaign chairman and is serving again this year in the same capacity.

A total of $1,064.50 was contributed last year by 209 MSC employees.

EAA Sponsored World Fair Trip To Be In June

The proposed trip to the New York World Fair sponsored by the EAA has become a reality and the trip has been scheduled for sometime in June.

EAA officials stated that a tremendous amount of interest has been shown by employees regarding the proposed trip and if there are enough interested parties, a second trip will be planned for this fall.

An announcement will be made soon by the EAA as to when and where the "Kick-Off" meeting will be held for the trip.

FIRST PLACE TEAM – The MSC Basketball League championship was decided March 4, when IBM won the first two games in a best two out of three game series with the Guidance and Control team at the Ellington AFB Gym. The winners with the first place trophy above are (front row l. to r.) Sam Jones, Nick Moraitis, Mel Hettervig and Hank Howell, (back row l. to r.) Merrit Jones, Terry Anderson, Jerry Ebker, John Broughton, and Ed Berry.

PERSONNEL NOTES:

(EDITORS NOTE: The messages in this column are being presented by the MSC Personnel Office.)

NEW REQUIREMENTS FOR STENOS, TYPISTS

Tougher requirements for stenographers and typists seeking Federal employment went into effect January 7 according to Harry H. Jones, executive secretary of the MSC Board of U.S. Civil Service Examiners. In general, the new requirements call for high school graduation or appropriate experience to qualify for typist, GS-2, and stenographer, GS-3. To qualify for typist, GS-4, applicants must have a year of training beyond high school--such as business school, junior college, or college--or appropriate experience. Also, the Civil Service Commission has increased the scope of its written test which measures verbal and clerical skills, and will require increased typing proficiency.

EMPLOYEE HONORARY SERVICE AWARDS

The Personnel Division has announced that 299 employees of the Center became eligible for honorary service awards during the months of October through December 1963. The awards for one, 10, and 15 years' service have been delivered to division and office chiefs for presentation.

Congratulatory letters from Dr. Robert R. Gilruth were also delivered for those employees who became eligible for 20-year awards. The employees who received congratulatory letters will be presented the 20-year emblem and certificate of service at the annual awards ceremony, expected to be held in October.

The one-year award consists of a bronze lapel emblem depicting a replica of the NASA insignia. The 10-year service emblem is finished in silver and the 15-year emblem in gold.

Emblems for 10 and 15 years' service will be accompanied by certificates of service, signed by the Center director.

Eligibility for service emblems and certificates is based on a minimum of one year of satisfactory service with NASA, plus any additional full years of Federal service to an employee's credit. The awards are distributed to eligible employees on a quarterly basis.

TREASURY RENEWS SAVINGS BOND OPTION

The Treasury is again offering taxpayers the option of taking income tax refunds in U.S. Savings Bonds. The savings option, first introduced last year, is in addition to the two standard options of taking tax refunds in cash or applying them to the next year's tax.

By electing to take your tax refund in Series E Bonds, you hold onto your money conveniently through a secure, risk-free investment which pays interest at a guaranteed rate.

Taxpayers taking their 1962 refunds in Savings Bonds swelled the 1963 bond sales by $19.2 million and raised the number of bonds issued by 237,455. The Treasury hopes the plan will further increase the sale of Savings Bonds and encourage more citizens to develop regular savings habits.

To take your tax refund in Savings Bonds, all you need to do is place a check mark in the Savings Bonds block on either tax form 1040 (long) or 1040A (short). The tax instructions give all the information you need.

RUNNER-UP TEAM – The second place team in the EAA-MSC Basketball League was Guidance and Control. Shown with their trophy are (front row l. to r.) Ragan Edmiston, James R. Smith, John W. Dale, Dannie C. Barclay, and F. R. Frisbie, (back row l. to r.) Paul F. Horsman, J. O. Boese, and Claude Edmiston. Basketball league play is scheduled to be resumed in October.

ogenic Storage Subsystem For Apollo Service Module

enough volume to fill two average size five-room houses.

To keep the hydrogen and oxygen ultracold, and thus in a fluid state, the tanks or pressure vessels are insulated with Beech-designed material, a special form of fiberglass interspersed with layers of aluminum foil.

Space available for the insulating material between inner vessel and an outer sphere is less than an inch and a half. If the glass fibers in this insulation were placed in a straight line they would reach from the earth to the moon. Also, all air is removed from the insulation in much the same way as in a vacuum bottle.

The vacuum must be so hard that for every 75 million molecules of air between inner and outer spheres, 74,999,999 must be removed. And to maintain this vacuum, the tanks must be built so perfectly that it would take more than 65 years for a thimbleful of air to leak in.

Put still another way, if the tanks were filled with boiling coffee, the insulation would keep the beverage too warm to drink for at least nine months or more of storage.

Beech has achieved several significant technical breakthroughs in connection with subsystem development. One involves a small electric motor that will operate in temperatures as low as -425 degrees F. and at pressures as high as 1,000 psi. Tests indicate the motor would be capable of running on the planets Jupiter and Saturn.

Boulder Division technicians have also successfully developed a method of electronic beam welding similar to the principle used in projecting pictures on home television tubes.

Additionally, they have perfected new techniques for welding different metals, such as aluminum to titanium.

Last December, Beech shipped to North American the first oxygen and hydrogen assemblies. Concurrently with hardware production and deliveries, the company is conducting rigid qualification testing at Boulder, including evaluation of each individual component part of the entire subsystem. Reliability goals far exceed the standards for most aerospace projects.

Beech is also involved in other important work for NASA. Under a research and development contract with the Manned Spacecraft Center, the firm is investigating positive expulsion systems for delivering cryogenic liquids in zero gravity environments. For NASA's Launch Operations Center, it is performing cryogenic engineering studies and design verification of spacecraft launch systems.

Advanced insulation evaluation studies of quarter-scale Saturn S-II boost stage tanks are in progress at Boulder under subcontract to North American. This activity is being carried out in the company's thermodynamics facility.

For McDonnell Aircraft, Beech is building the propellant loading system for the Gemini launch complex at Cape Kennedy. Beech has also been engaged in flight qualification testing of major Centaur cryogenic systems components for General Dynamics/Astronautics.

With ten years of experience in cryogenics, Beech technical innovations in a number of areas have immeasurably advanced the state of the art.

The company designed and built the nation's first non-refrigerated liquid hydrogen dewar (a double-wall vessel for storing and transporting cryogenic fluids) and the first all-aluminum liquid oxygen dewar. It constructed and tested the largest titanium assembly ever built, a 460-pound tank designed to hold 7,000 gallons of pressurized liquid hydrogen.

For Titan II, first missile to use storable propellants, Beech has been active in development and reliability programs on various systems. The firm also performed literally thousands of environmental tests on both Titan I and Atlas ICBM propulsion system components. It built fuel transport trailers for Titan missile sites and liquid oxygen "topping units" for the Atlas.

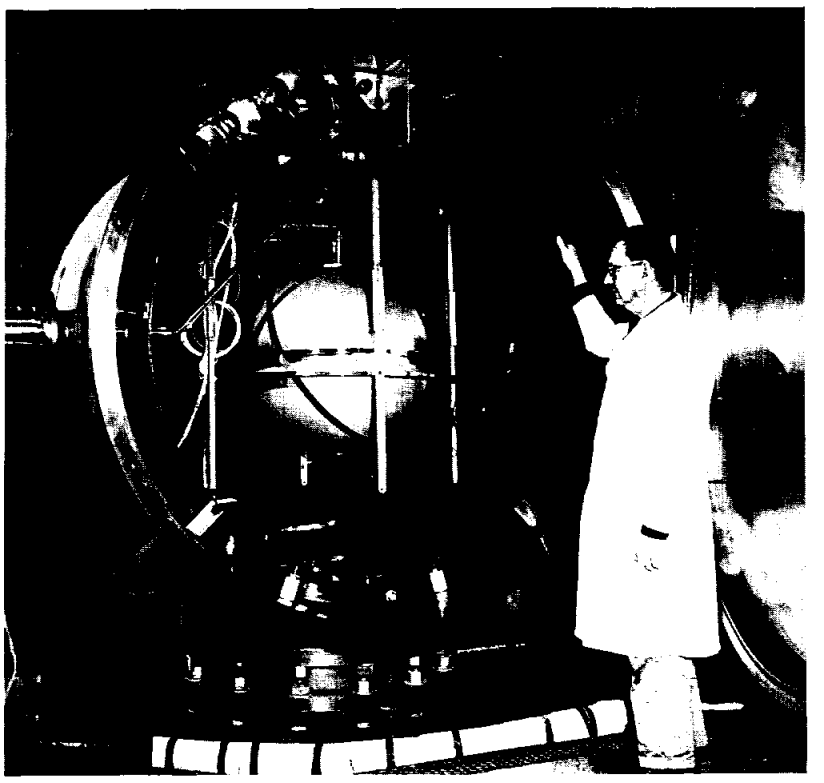
Boulder engineers have also turned liquid hydrogen into icy slush. These experiments were aimed at determining the feasibility of further reducing hydrogen volume and thus increase fuel loads without increasing tank sizes and weights. Other creative engineering efforts are exploring new concepts for long-life spacecraft systems and subsystems.

Beech also specializes in systems management services, including those associated with spacecraft launch operations. And its well-equipped testing facilities at Boulder simulate solar radiation, shock, vibration, high G forces, temperature extremes, explosions and the hard vacuum of deep space. Such capability enables engineers to duplicate on earth the alien conditions anticipated on flights to the moon and beyond.

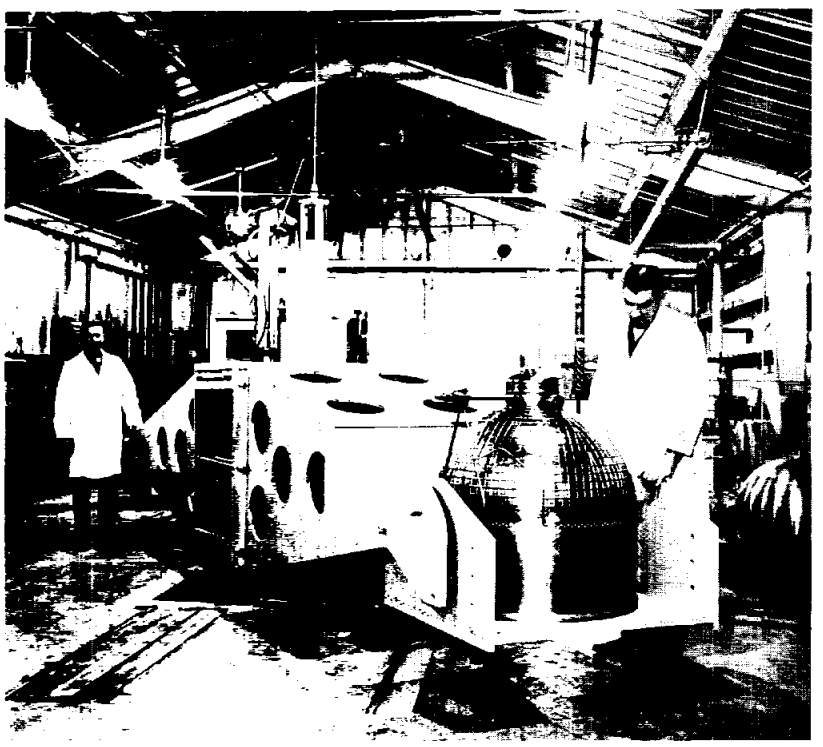
Already making vital contributions to America's goals in space, Beech will intensify its activities in these challenging areas as man continues to push the limits of his environment.

THE CRYOGENIC STORAGE subsystem in Apollo service module is shown. Gases contained in the four tanks supply the fuel cell and environmental control system. They have as much stored energy as 400 pounds of TNT. The tanks hold enough gas to provide breathing oxygen for three astronauts for two weeks – and to generate all the electricity required by a lunar mission, or enough to keep a porch light lit for two years.

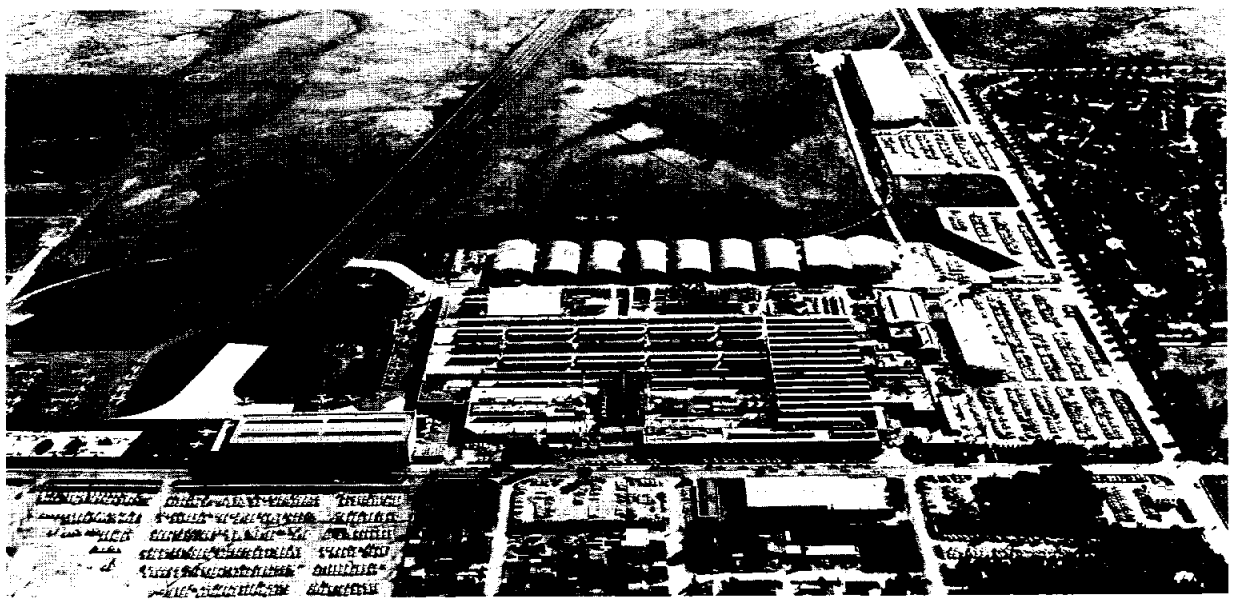
SEYMOUR COLMAN
Apollo program manager,
Beech Aircraft Corporation.



THIS HARD VACUUM chamber in Apollo test complex at Beech Boulder Division is ready for heat testing of cryogenic storage subsystem vessel.



THE APOLLO LIQUID hydrogen storage tank is mounted on centrifuge for measuring effect of high G loads created by rapid acceleration.



BEECH AIRCRAFT has three main facilities in Wichita, Kan., Plant I in foreground, Plant II at top, and Plant III centered between at right. It also operates fully integrated divisions in Liberal, Kan., and Boulder, Colo., site of the company's space research and development center.

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

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

On The Lighter Side

"HONESTLY, I DO WORK HERE!"

$2-Million Data Reduction Complex Follow-On Contract Awarded Lockheed

A follow-on contract to build a Data Reduction Complex for the Manned Spacecraft Center has been awarded to Lockheed Missile and Space Company, Sunnyvale, Calif.

The computer system is scheduled for completion in late 1964, and Lockheed will have approximately 100 people engaged in its development at the Clear Lake site.

Total cost of the assembly and programming for the complex is slightly less than $2-million. NASA will purchase and provide the equipment to be installed by Lockheed.

Under an earlier contract, Lockheed completed last summer a design of the computer system, which will process data resulting from test activities at the center and from actual Gemini and Apollo spacecraft missions.

This design includes many advanced techniques in which most of the tasks previously accomplished by skilled technicians will be done by the computer. Thus a larger quantity of work can be done with less personnel in a shorter time.

ON THE CARPET – Dr. Charles A. Berry, chief, Center Medical Programs at MSC, sits at his desk in the hall on the eighth floor of the Project Management building and shakes a scolding finger in jest at Ed Campagna, deputy chief, Facilities Division, for not having his office ready for occupancy. The late delivery of material for completion of the office interior caused the inconvenience. However, the office was shipshape in record time and all is well.

WELCOME ABOARD

During the period February 2 to March 2, a total of 104 new employees joined the Manned Spacecraft Center. Of these, 21 were assigned to MSC-Florida Operations at Cape Kennedy, Fla., three to the White Sands Missile Range in New Mexico, and one to Washington, D. C., the remaining 79 here in Houston.

MSC - FLORIDA OPERATIONS (Cape Kennedy, Fla.): Laura M. Thaxton, Harrison F. Shoemaker Jr., Jack A. Waldrep, Guy H. Manning, John M. Gerding, William E. Dempsey, Donald W. Cole, Carl G. Planck Jr., James E. Keck, Walter J. Wallis, Charles W. Stevens, Woodrow W. Smith, Jackie E. Smith, Cyril J. Petrick, Stanley S. Ewing, George T. Ragan, Joan M. Markulin, Jerry F. Ellzey, Martha W. Blomquist, Jo Anne Greenlee, and Alfred G. Baczynski.

PROGRAM ANALYSIS AND RESOURCES MANAGEMENT DIVISION: Joseph C. Shade, and Anselm M. Pepp.

WHITE SANDS MISSILE RANGE (New Mexico): Reuben Sanchez Jr., Teddie C. Bruce, and Glenda C. Davis.

RECOVERY OPERATIONS DIVISION: Royce L. McKinney, and William K. Stephenson.

FLIGHT CONTROL DIVISION: David V. Massaro, Joyce C. Chappell, and John A. Lavender.

FLIGHT CREW SUPPORT DIVISION: James A. Martin Jr., Ray C. Malone, C. Kenneth Land, Francis J. DeVos, and Kenneth I. Mansfield.

OFFICE OF DIRECTOR (Washington, D. C.): George M. Low.

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION: Patsy V. Hogan, Leo G. Monford, Richard M. Dickerson, William W. Seibert, William R. McConnell, and Annetta J. Kuhn.

PHOTOGRAPHIC DIVISION: Thomas L. Guynes Jr.

TECHNICAL SERVICES DIVISION: Charles J. Gardner, Ralph W. Scarborough, James M. Sackett, Joseph Rogers, Luther R. Railey, John S. Quinton, Rodney Z. Pyle, Warren D. Palmer, James L. Moncrief, Melvin W. Dockrell Jr., John L. Davis, Lee N. Bulgier, Lawrence I. Andress, Howard C. Hanson III, Frank Perhne Jr., Albert F. Bucknell, Armistead Sanders, and Don Andrews.

STRUCTURES AND MECHANICS DIVISION: Leo R. Dickson, Carolyn A. Appel, and Florus A. Hannsz.

PROPULSION AND ENERGY SYSTEMS DIVISION: Dorothy M. Chaudoin, Lars I. Wind, Merlyn F. Lausten, and Larry R. Rhodes.

ENGINEERING DIVISION: Lawrence A. Camp, Avery L. Howell, and Gerald W. Crum.

GUIDANCE AND CONTROL DIVISION: Frank E. Trlica Jr., John O. Boese, Robert H. Kidd III, Dennis W. Hoorn, and Raymond A. Arehart.

PERSONNEL DIVISION: Wilma D. Tholen, and Stella G. Eastman.

COMPUTATION AND ANALYSIS DIVISION: Steven C. Nance.

MISSION ANALYSIS DIVISION: Scott S. Morris, Barbara A. Ward, Lois M. Painchaud, David R. Read, and Gary H. Pollan.

SECURITY DIVISION: Patricia A. McHan, Gloria J. Green, and Freda B. Adams.

ADVANCED SPACECRAFT TECHNOLOGY DIVISION: Charles N. Johnson, and Courtney W. Burkhard.

CREW SYSTEMS DIVISION: Robert E. Heyer, Phillip E. Gainer, and Thomas J. Ballentine.

PUBLIC AFFAIRS OFFICE: Paula A. Dennis.

OFFICE OF TECHNICAL AND ENGINEERING SERVICES: Lorayne C. Cassady.

TECHNICAL INFORMATION DIVISION: Byron A. Brown.

APOLLO PROGRAM OFFICE: Sherry B. Harris.

PROCUREMENT AND CONTRACTS DIVISION: Carey W. Green Jr., Lyle D. Ferguson, Jeffrey L. Vyner, and Lera L. Hansen.

OFFICE SERVICES DIVISION: Sandra L. Sage.

GEMINI PROGRAM OFFICE: Jack F. DeMoss.

AUDIT OFFICE: Glenn W. Loggins.

MSC PERSONALITY

Dr. George Smith And Staff Help Keep Astronauts Healthy

The health and general welfare of the 29 astronauts at the Manned Spacecraft Center is one of the areas of responsibility assumed by Dr. George B. Smith Jr., chief of the Flight Medical Branch of the Center Medical Office.

Dr. Smith, a major in the Air Force Medical Corps, is on loan to NASA from the Department of Defense. He assumed his present duties with MSC in February 1962.

Other duties performed by Dr. Smith include participation in the selection, care and training programs of the astronauts. He is also part of the team that provides medical inputs for flight plans as well as reviewing in-flight medical tests. Another duty includes providing medical support for the tracking network and recovery forces by briefing and coordinating the efforts of the medical personnel assigned to these areas.

Dr. Smith was born in Columbia, S. C., and spent his early life in Greenville, S. C., where he completed his high schooling. He was graduated from Duke University with an A. B. degree in 1947 and received his M. D. degree from the Duke School of Medicine in 1952.

DR. GEORGE B. SMITH JR.

In 1952 he was commissioned as a first lieutenant in the USAF Medical Corps and did his internship at University Hospital in Baltimore, Md. This was followed by a primary course in aviation medicine at Randolph AFB in 1953.

The next three years he served successively as squadron flight surgeon, hospital commander, and chief of professional services with USAF troop carrier and jet fighter units in the U.S.A., France and Germany.

He entered the Aviation Medicine Speciality Training Program in 1956 and attended John Hopkins University School of Hygiene and Public Health, graduating with a M. P. H. (masters public health) degree in 1957.

Dr. Smith is certified by the American Board of Preventive Medicine in Aviation Medicine. As a flight surgeon, he has accumulated about 1,000 hours of military flying time.

Dr. Smith holds membership in Alpha Omega Alpha, Aerospace Medical Association, American Medical Association, and the American College of Preventive Medicine.

He is married to the former Peggy Sims of Pelzer, S. C., and they have three children: Tommy 11, Susan 9, and Cheryl, 7. The family is presently residing in San Antonio which was the former duty station of Dr. Smith.

Apollo Boilerplate Arrives At WSMR For Launch Escape Test

The Apollo spacecraft boilerplate command module and related equipment, which will be used in the first full-scale test flight of the Apollo spacecraft launch escape system, arrived early this month at the NASA Manned Spacecraft Center facility, White Sands Missile Range, N. M.

Previously delivered were the Little Joe II launch vehicle, the boilerplate service module and the launch escape system. The total test configuration will weigh over 28 tons.

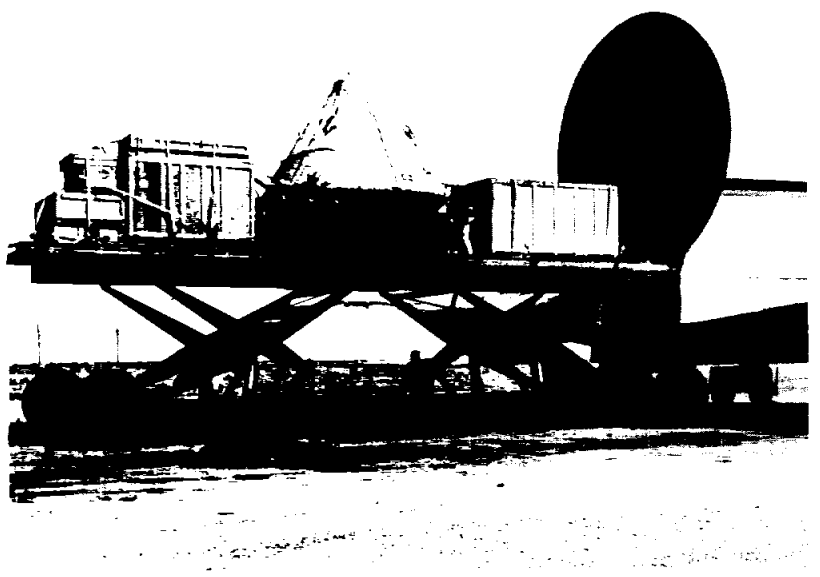
The purpose of the test flight will be to demonstrate the operation of the launch escape system at high dynamic pressure in the transonic speed range. Maximum loads are predicted in this speed range, during the trajectory of the launch escape vehicle, subsequent to abort initiation. The conditions at abort initiation will duplicate conditions predicted for a Saturn S-II boost trajectory.

Launched by the ignition of all Little Joe II motors simultaneously, with nearly 300,000 pounds of thrust, the vehicle will ascend to approximately 22,000 feet in slightly more than 30 seconds.

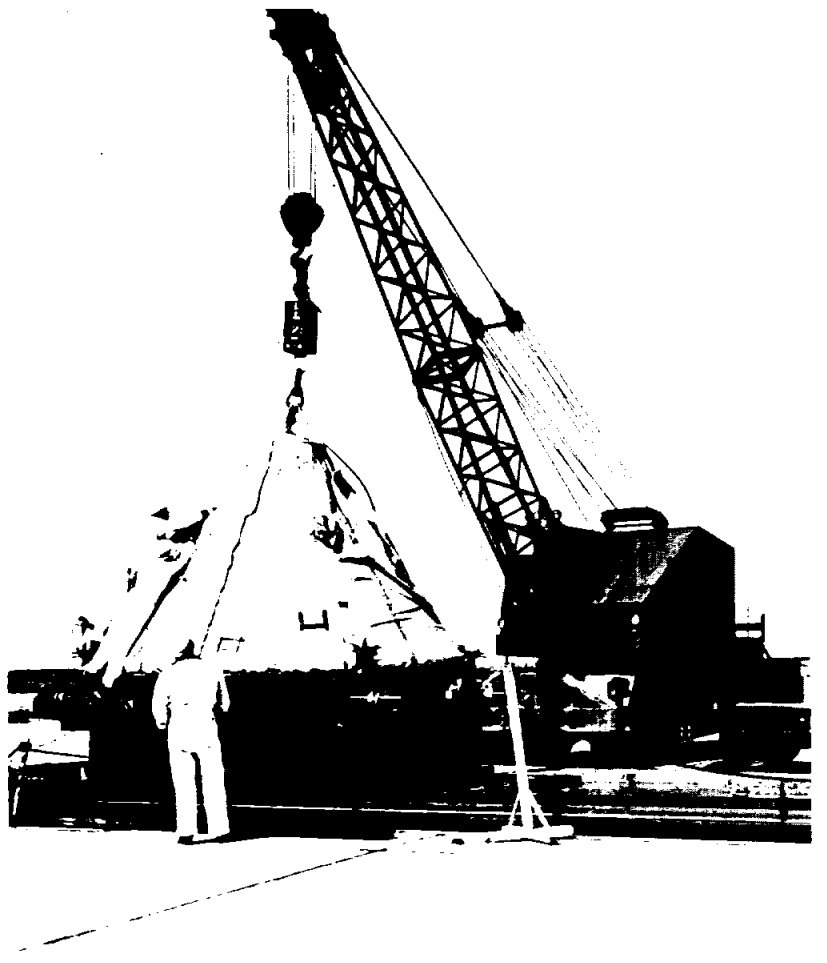
The abort will be initiated and the command module, which would house the three-man crew in a manned Apollo mission, will separate from the service module.

At this time the escape motor and the Pitch control motor will be ignited, propelling the four and one-half ton command module to an altitude of over 24,000 feet. The launch escape system will then separate from the command module, the landing system will be actuated, and the command module will descend to the ground by means of three 88-foot ringsail parachutes at a rate of 24 feet per second.

APOLLO AIRLIFT – The "Pregnant Guppy" a modified C-97 cargo plane made two trips to Holloman AFB, Alamogordo, N.M. early this month to deliver the Apollo command and service module boilerplates from North American Aviation, S&ID, Downey, Calif. Holloman AFB is about 40 miles from White Sands Missile Range.

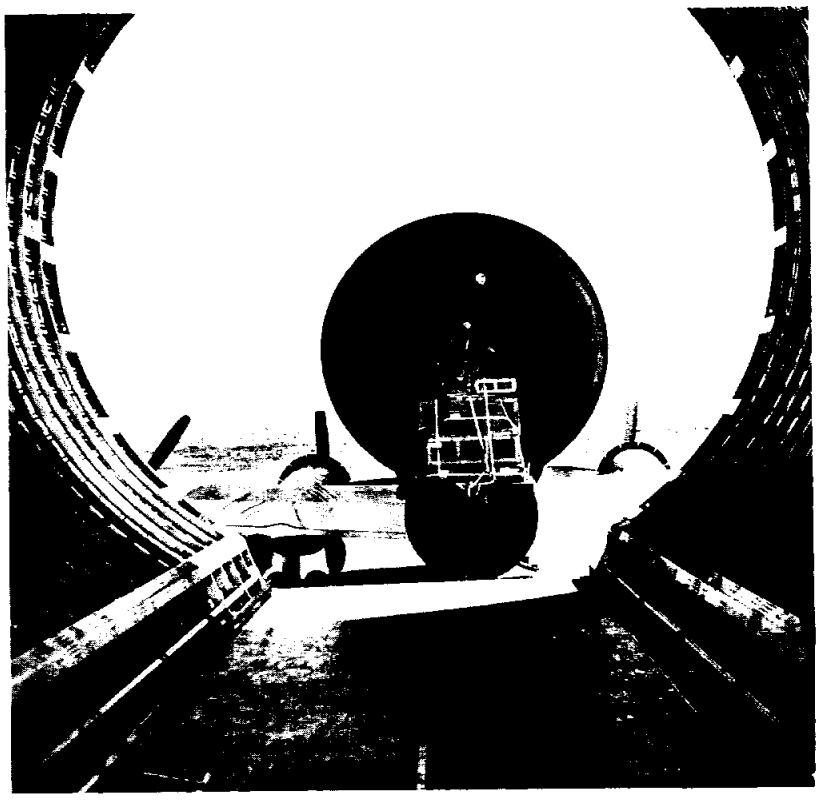


UNLOADING – The Apollo command module and related equipment are unloaded onto a special trailer from the cargo aircraft.



COMMAND MODULE – Workmen transfer the Apollo command module from unloading trailer to another trailer for transporting it to the MSC–White Sands Missile Range test area.

SEPARATION – The "Pregnant Guppy" separates into two sections to permit unloading of its spacecraft cargo. The Apollo service module is shown prior to unloading.



CARGO TUNNEL – Interior of the "Pregnant Guppy" after separation of the two sections shows the Apollo command module in the forward end of the cargo plane.

MSC-FO GARY WOODS RECEIVES $400 CASH AWARD

EKG Simulator Invention Used On Flights

Gary J. Woods of MSC-Florida Operations received a $400 cash award recently from the NASA Inventions and Contributions Board for his Electrocardiogram (EKG) Simulator invention.

G. Merritt Preston, manager, MSC-Florida Operations, presented the award to Woods for the intangible benefits of his invention to the United States Government.

The EKG simulator was designed and developed by Woods to simulate human and primate heart beats for calibration and testing of manned spacecraft instrumentation systems at the MSC-Florida Operations.

The simulator was first employed in preparing Astronaut Alan Shepard's spacecraft for the Mercury Redstone-3 flight--the first manned Mercury mission in May 1961.

Woods, who heads the Command and Monitor Systems Section of the Electronic Ground Support Equipment Division, determined the need for an EKG simulator during preflight preparations of the Mercury Redstone-2 spacecraft which carried a primate aboard the January 1961 ballistic space flight.

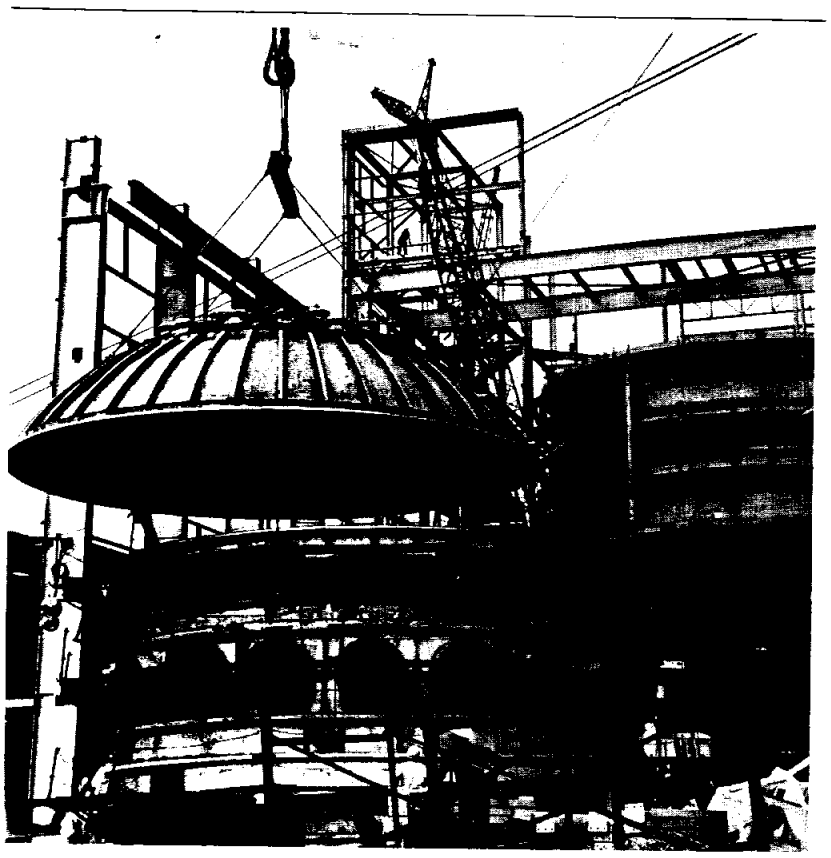
During MR-2 tests, calibration of the spacecraft instrumentation system required the availability of the primary for extended periods of time. The EKG simulator replaces the primate or human astronauts during these extended tests and calibrations.

Woods, his wife, Lois, and daughters, Virginia and Barbara, reside in Indian River City, Fla.

EKG SIMULATOR INVENTION – G. Merritt Preston, NASA manager, MSC–Florida Operations presents Gary J. Woods with $400 cash award for his EKG Simulator invention used to calibrate and checkout manned spacecraft instrumentation systems.

Space News ROUNDUP!

SECOND FRONT PAGE



CHAMBER CAPPED – The top on Chamber B of the Space Environment Simulation Laboratory was lowered into place last week by construction workers at the Manned Spacecraft Center. The stainless steel chamber is 42 feet long and measures 35 feet in diameter. Entrance will be made through the top. The larger Chamber A in the background can simulate an altitude of 75 miles and accomodate a full size Apollo spacecraft.

Proposal Received For Zero-Gravity 24-Man Orbital Research Laboratory

Design recommendations for a zero-gravity Orbital Research Laboratory that could accommodate 24 crew members in NASA missions lasting up to five years were announced last week by the Douglas Aircraft Company's Missile & Space Systems Division.

Details of the laboratory were outlined in a report submitted to NASA's Manned Spacecraft Center, climaxing a six-month study carried out by Douglas in conjunction with the Federal Systems Division of IBM Corporation.

Called LORL for Large Orbital Research Laboratory, the new spacecraft is the largest zero-gravity space station now under consideration by the United States, and was formerly known as "MOSS," (Manned Orbital Space Station).

According to the Douglas-IBM study, LORL could be developed without major technological breakthrough and could be operational as early as 1968. Its design takes maximum advantage of zero -g with crew stations and equipment located without regard to conventional concepts of up or down.

But its operational feasibility depends upon whether astronauts can survive and function properly without artificial gravity over long periods. If it is determined that they can, the zero-g concept offers important advantages in performances and design over alternative configurations.

The LORL would be launched unmanned by a two-stage Saturn V booster. Its own propulsion system would inject the cylindrical vehicle, 33 feet in diameter and 140 feet long, into an orbit of 260 nautical miles in a nose-toward-earth position. Huge paddle-like solar arrays then would unfold, catching the sun's ray to operate a solar-cell battery power plant.

Once aloft, the space laboratory would normally be manned by a crew of 24, but could support 36. Personnel would arrive by a six-man, Apollo-type logistical ferrycraft or via 12-man space vehicles either of the ballistic or lifting-body type.

From the structural standpoint, its development would be relatively simple, the study indicates.

In addition to its efficiently arranged interior and simplified structural design, its resupply requirements are fewer by virtue of better cabin sealing preventing altitude leakage. LORL would carry its own water and oxygen regenerating system, further trimming its load.

The habitable portion of the space station would be pressurized to a full-time shirtsleeve environment and would measure 70 feet in length, divided into living quarters and laboratory areas. These compartments would be separated by spherical-segment bulkheads and connected by an access tunnel running the length of the big cylinder at its core.

Although the space station is based on the zero-g concept, it would contain a 15-foot radius on-board centrifuge which could alleviate potential adverse effects of weightlessness on crew members. It also would precondition members for the high-g force of re-entry, could be used for many experimental purposes, and be of assistance in accomplishing some tasks best performed in a gravity environment, such as eating or drinking.

DUCK DOMAIN – With the Flight Crew Operations Offices Building in the background, seven ducks cruise in the waters of the lakes in the center of the building complex at the Clear Lake Manned Spacecraft Center.

SWIM-IN RESTAURANT – The highly pampered water fowl at MSC have the very latest innovation in dining facilities – they are provided with a well stocked swim-in box lunch.

Early MSC Settlers Occupy Lakes

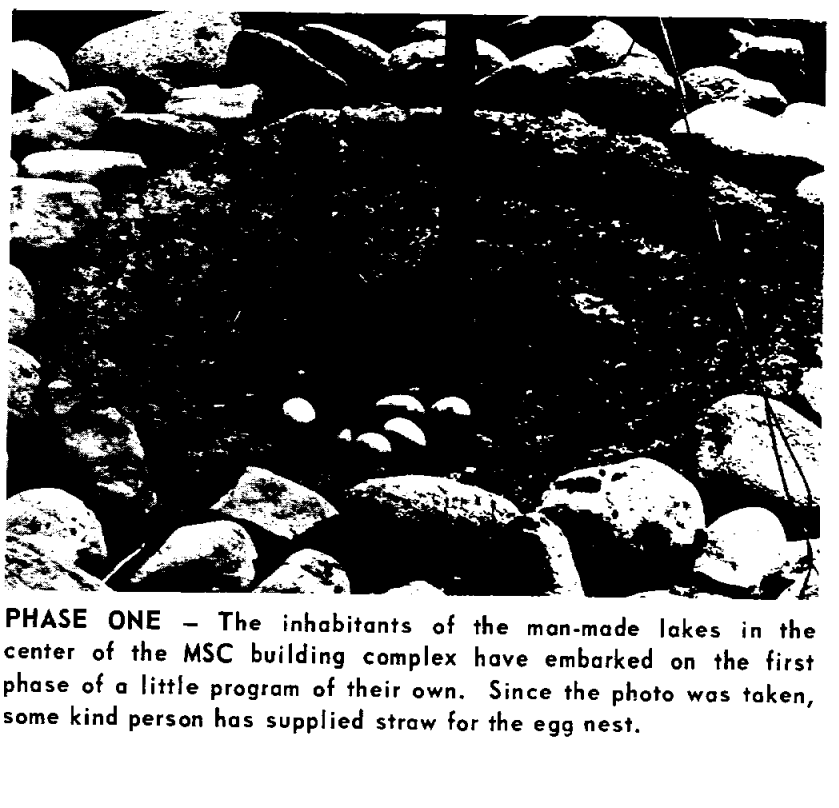
Along with the astronaut training program here at the Manned Spacecraft Center, there is another training program which could be called the "astro-duck" inner-space program.

The man-made lakes in the center of the building complex here at MSC have become home to a group of man's fine feathered friends and they have all the comforts of the very latest in "game preserves."

The clipped-wing ducks may be seen taking a leisurely stroll along the winding walkways that surround the lakes or feeding near the edges of the water, but most often they can be seen in their favorite habitat, cruising to and fro, oblivious of the towering buildings on all sides of their domain.

Now whether they actually have a hard and fast training program is not easily discernible but they are methodical in their own way. They have started a little project of their own in the small area around one of the rock encircled trees--the laying of eggs. A kind assist has been provided by one of the humans that ventured into their domain with some straw to line the nest.

Who knows, these sometime soon offspring may grow up and fly off to distant parts of the earth to tell others of their kind, that "their parents were residents-in-training at the Clear Lake Manned Space-Craft Center, even before the astronauts."



PHASE ONE – The inhabitants of the man-made lakes in the center of the MSC building complex have embarked on the first phase of a little program of their own. Since the photo was taken, some kind person has supplied straw for the egg nest.