Space News

NASA ROUNDUP!

VOL. 3, NO. 5 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS DECEMBER 25, 1963

Season's Greetings

To the entire staff of the Manned Spacecraft Center and their families:
As 1963 rapidly comes to an end, I extend my warmest wishes for the Holiday season.

This has been a most eventful year. We have been able to write into history the successful completion of Project Mercury. In addition, we have made notable strides in Projects Gemini and Apollo, and in the construction of new facilities at Clear Lake. We will continue work on these programs during the coming year with added emphasis.

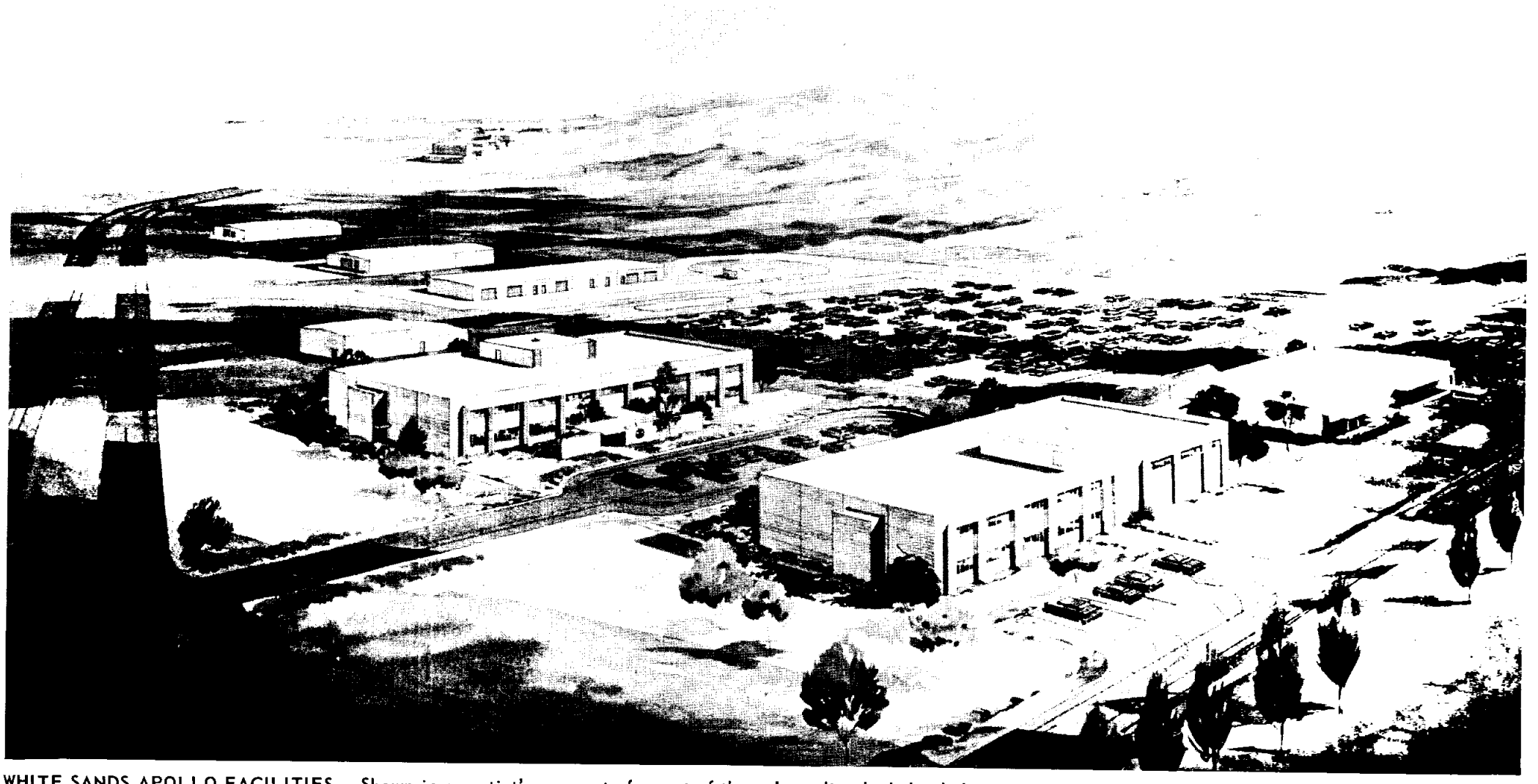
My personal thanks go to each member of the team for the contributions made in supporting these historic programs and your continuing dedication to the achievement of our objectives during the coming year.

Robert R. Gilruth

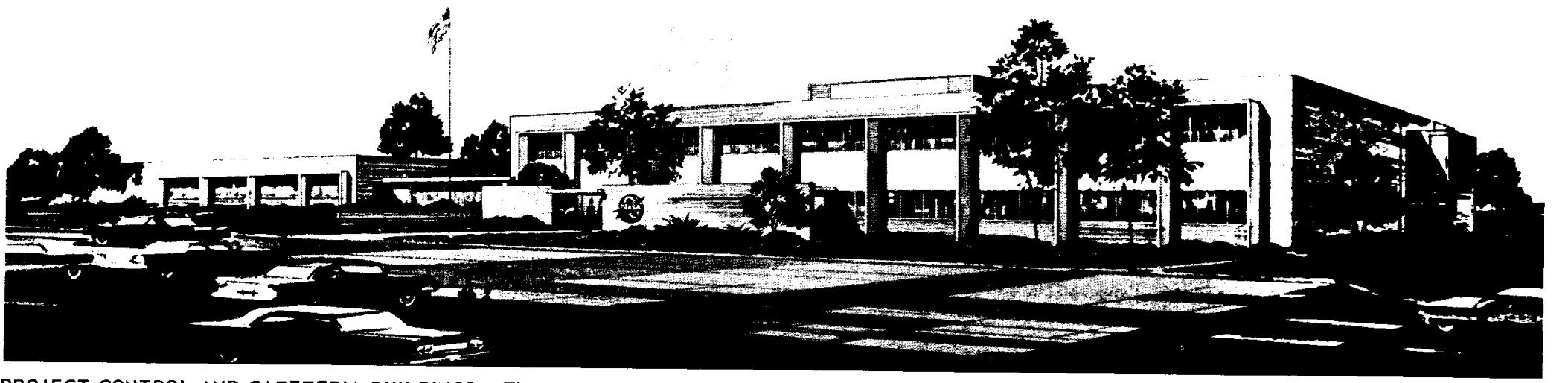
ROBERT R. GILRUTH
Director

COMPLETION DATES SET FOR MARCH 1964

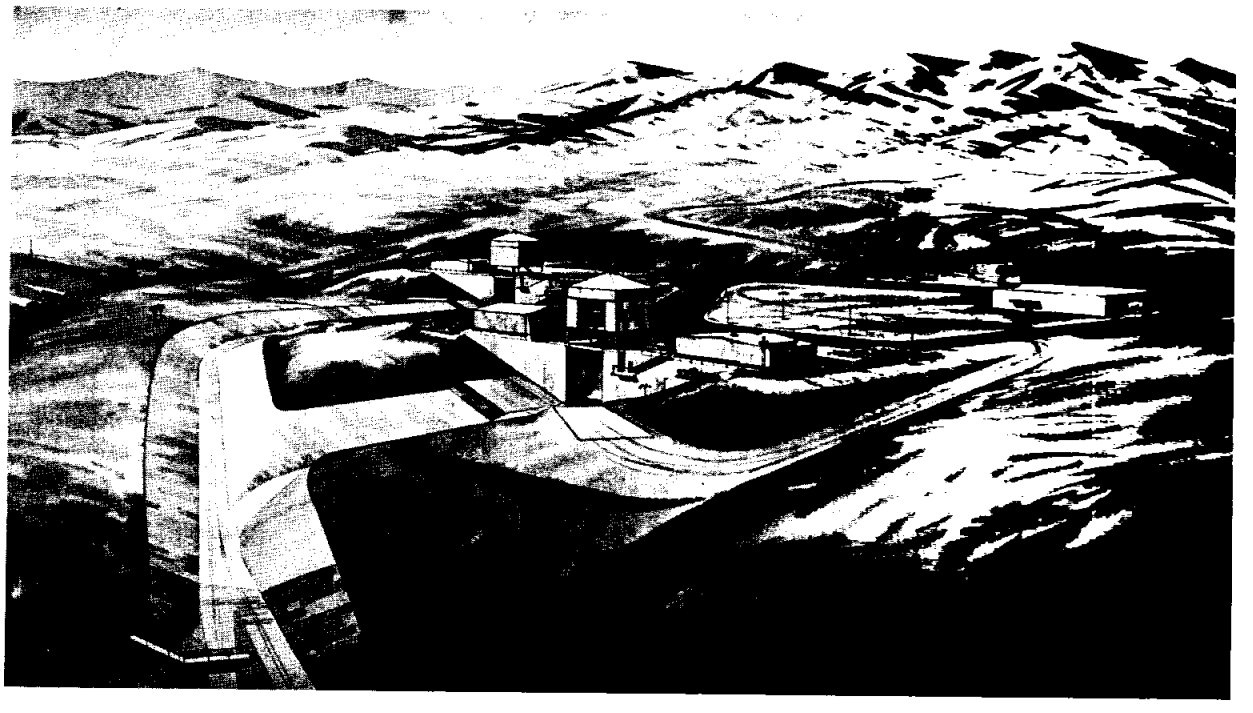
WSMR Apollo Support Facilities Under Construction



WHITE SANDS APOLLO FACILITIES – Shown is an artist's concept of a part of the Apollo Propulsion Systems Development Facility located approximately 20 miles northeast of Las Cruces, N.M. on White Sands Missile Range. These structures will accommodate personnel, equipment housing, and storage space which are necessary in support of the development of the Apollo Spacecraft propulsion systems and interactions of all spacecraft systems under hot firing conditions. The three buildings in the foreground depict two 2-story project control buildings and on the right, a cafeteria. Immediately behind the project control building on the left is an emergency center building which will provide a fire station and emergency medical facilities for the project control and test area (not shown). A maintenance building and two warehouse buildings are located just beyond the emergency center building. In the distance is an outline of the preparation buildings to be used for maintenance and checkout of the spacecraft during pre-test and post-test static firings.



PROJECT CONTROL AND CAFETERIA BUILDINGS – This picture portrays one of the project control buildings and cafeteria which comprise a part of the administrative facilities in support of the Apollo Propulsion Systems Development Test Program. These structures will be located 20 miles northeast of Las Cruces, N.M. on White Sands Missile Range. The two-story project control building of approximately 32,900 square feet is designed to accommodate an estimated 340 personnel representing NASA, North American Aviation and associated contractors and subcontractors. Other facilities will accommodate additional personnel. The cafeteria is a structure with approximately 9,000 square feet gross area for use in providing food services to 240 people at any one time including NASA personnel, contractor and subcontractor forces, vendors, and official visitors. Expected completion date of the project control building is March 1, 1964 and is estimated to cost $472,000. The cafeteria is also scheduled for completion on March 1, 1964 at a cost of approximately $196,000.



WSMR APOLLO STATIC TEST AREA – This artist's rendering (right) represents a control center, on the right, and two test stands for use during the propulsion development static firing tests to be conducted at NASA's Apollo Propulsion Systems Development Facility located 20 miles northeast of Las Cruces, N.M. at White Sands Missile Range. The control center will be a reinforced concrete structure of approximately 4,800 square feet gross area designed for maximum protection against explosion and toxic fumes which may result from test operations. This building will house instrumentation, a data acquisition system, control consoles, and checkout equipment. Reinforced concrete cableways connecting the control center with the Ground Support Equipment Terminal room will house cables for long-run control and instrumentation. The two test stands will be constructed with structural steel towers, one to support Test Fixture F-2 during early propulsion development static firing tests and one to support the service and command modules during combined systems testing. It is estimated that $274,000 will be required to construct the control center, planned for completion on March 24, 1964. Construction of the test stands will be accomplished simultaneously and with the same target completion date as the control center. Cost of the test stands will be approximately $881,000.

Worlds Largest Rockets To Be Given Squeeze

A gigantic new tool being built at the NASA-Marshall Space Flight Center will soon enable test engineers to put the squeeze on the world's largest rockets.

The tool---which will be housed in a 155-foot high hangar type building now being built around it---is a 30-million pound test tower capable of testing rocket structures more than 65-feet in diameter.

Called a load test facility, it is a project to support the Saturn V booster development program. Saturn V first stage--S-IC--a fabrication is underway at MSFC and at the Michoud Operations.

The rocket will be pushed, pulled and twisted in the tower to tell engineers what forces will "break-up" their vehicle.

The working part of the 140-foot high tower is a 1,500 ton steel crosshead or movable platform. Twenty feet deep, the crosshead will move up or down 103 feet--from the top of the tower down to about 25 feet above the ground.

A structure being tested will have several hydraulic cylinders between it and the bottom of the crosshead. Test engineers will simulate various conditions by crushing, stretching or twisting the structure with up to 30 million pounds force downward and 750 thousand pounds from the sides.

The big vice will be capable of handling the S-IC stage with a shortened upper tank. The full size S-IC will be 138 feet long. Other structures which can be tested here will include single-tank vehicles and components up to 54 feet in diameter and 65-foot diameter cluster vehicles.

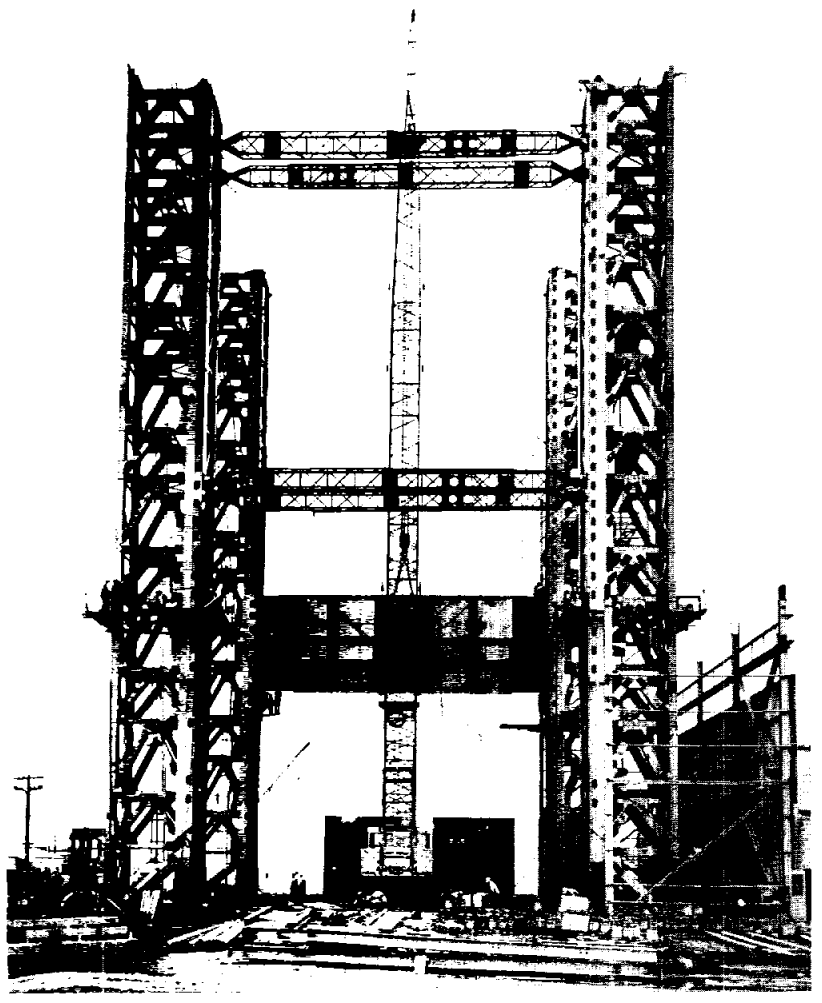
The test tower is now up to its full height and the contractor is presently working on the building. The facility is scheduled for completion in mid-1964.

The four main tower legs presented a problem to the builders. They had to be tilted outward slightly so that when the full weight of the crosshead is applied the legs will lean inward to a straight position.

A special positioning system for the crosshead was necessary. The positioning system is essentially four 13-inch diameter screws and "roll ramps."

The roll ramp at each screw makes it possible to raise or lower the heavy crosshead on the screws much the same way a monkey climbs. Drive gears move two nuts in each roll ramp in such a way that one holds the great weight while the other is being moved.

Total lifting capacity of the system is six million pounds.



MOVABLE PLATFORM STARTED—A movable platform or crosshead, estimated to weigh 1,500 tons, is beginning to take shape on the NASA Marshall Space Flight Center's load testing tower being built in the Propulsion and Vehicle Engineering Laboratory area. The 140-foot tower is now up to its full height and the building around the gigantic tool is being constructed. The facility is scheduled for completion in mid-1964.

WALKING ON THE 'MOON' – A NASA scientist, suspended almost parallel to the floor, is "walking on the Moon" at NASA's Langley Research Center, Hampton, Va. It's only a plywood Moon – big enough for a man to stand or jump on – but it helps study gravitational problems on a lunar surface. The scientist, held by a system of slings, is tilted 80.5 degrees away from vertical. On the Moon, where he would not be anchored as securely as on Earth, the astronaut might not be able to stand erect. These experiments provide the "slant" on lunar movement.

Langley Scientists "Walk" On Moon

Scientists at NASA's Langley Research Center are walking on the Moon -- thanks to an inexpensive but effective apparatus they devised to study the problems an astronaut might have in doing his job on the lunar surface.

In this case, it's only a plywood Moon, an inclined walkway 4 feet wide and 24 feet long. On it, a NASA scientist can stand, walk, jump, and climb under simulated lunar gravity achieved by a system of slings which support only five-sixths of his weight.

With extremely low gravitational pull, a man on the Moon would not be anchored as securely as he is on Earth. It might be difficult to stand upright on the lunar surface. In the Langley tests, the scientists are suspended almost parallel to the floor.

Langley designed the tilted research device to determine man's physical capabilities on the Moon and to investigate his ability to adapt to environment at the lunar surface, where the gravity is only one-sixth that of the Earth.

The simulator is providing basic information on some of the adjustments explorers must make in their accustomed methods of walking, climbing, and jumping while on the Moon.

In designing the device, a suspension system on an overhead trolley, NASA scientists realized that if the body members of an experimenter are constrained so they are free to move only in parallel planes, he can still perform his tasks in a more or less normal manner in these planes.

They also observed that it is possible to study the movement of a person under any desired gravity level by supporting the properly constrained test subject at an angle depending on the gravity level desired. In the Langley lunar simulator, the subject is tilted 80.5 degrees away from the vertical.

Structures And Mechanics Division Reorganizes, Kotanchik Named Chief

The reorganization of the Structures and Mechanics Division was announced recently naming Joseph N. Kotanchik as division chief.

Making the announcement was Maxime A. Faget, assistant director for Engineering and Development, under whom the division falls, and the effective date for the organization was November 18.

Robert E. Vale and H. Kurt Strass were named as assistant chiefs of the division.

The division branches and their chiefs are as follows: Structural Mechanics, Leslie G. St. Leger; Thermo-Structures, R. Bryan Erb; Structures Facilities, George E. Griffith; Mechanical and Landing Systems, Richard F. Smith; Environmental Facilities, Richard J. Piotrowski; and Spacecraft Test, Dale L. Hannaford.

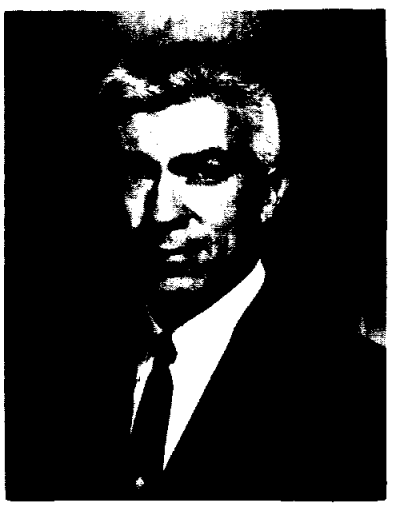
No Thirst-Parched Pioneers In The Trek Across Space

The early, thirst-parched American pioneers who trekked the hostile western deserts would envy tomorrow's astronaut who will pioneer the hostile environment of space in Gemini and Apollo Spacecraft.

The astronaut, unlike the pioneer of yesterday, will have a ready source of water, and it won't be a canteen slung from his spacesuit.

The water will be the residue of fuel cells which will be used rather than batteries for most of the power needs of the spacecraft. The ingenious cells, in their chemical reaction to give off power, make highly potable water which is collected for the astronaut's use.

As one space scientist put it, "What a system! It's like carrying your own well with you on a desert journey."



MARTIN A. BYRNES JR.

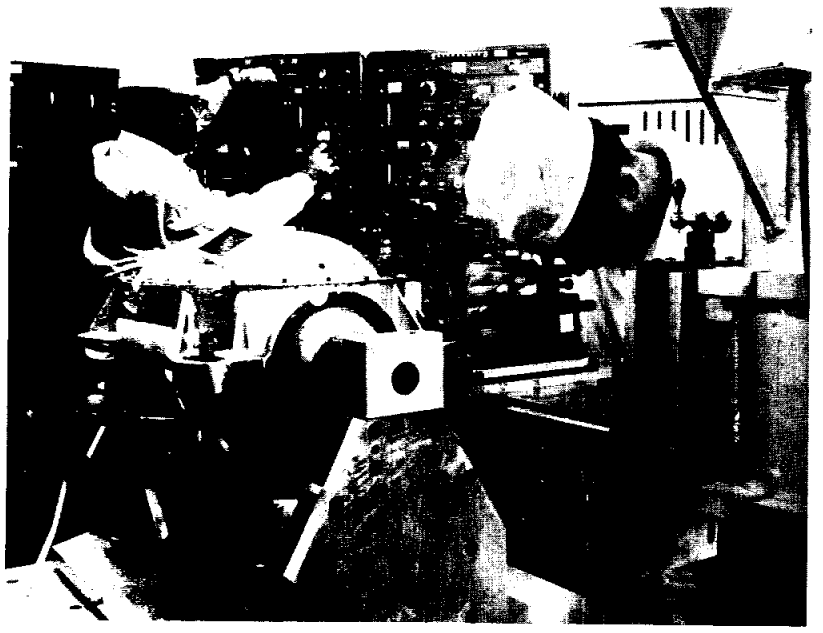
Byrnes Named Executive Officer To "Deke" Slayton

Martin A. Byrnes Jr., was recently named the executive officer to Donald K. "Deke" Slayton, assistant director for Flight Crew Operations, it was announced by that office.

In this capacity, Byrnes will be working directly under Slayton, assisting him in the management of the Astronaut Office, Aircraft Operations Office and the Flight Crew Support Division.

Prior to being transferred to his present job, Byrnes was manager for Missions and Operations Support under the assistant director for Administration.

Guidance And Control Equipme



CENTAUR INERTIAL GUIDANCE platform undergoes final visual alignment on a precision test stand at Honeywell's Florida Aeronautical Division in St. Petersburg. The all-attitude platform monitors the space vehicle's performance, maintaining its own orientation in space regardless of Centaur's varying attitudes during flight. Technician Bill Hansen (right) uses an autocollimator to optically align the platform gimbals through special windows provided in the case. Assisting is test technician Warren O'Brien.

The people who work at NASA's Manned Spacecraft Center have one thing in common with Mercury, Gemini and Apollo astronauts. The same company that controls heating and air conditioning at MSC's new Houston complex also provides control systems for all of the manned spacecraft programs.

PAUL B. WISHART
Chairman of the Board, Honeywell

Honeywell has been in nearly every major civilian and military space effort, manned or unmanned, from the beginning. At the outset it built the inertial reference system that helped hurl the first grapefruit-sized Vanguard satellite into orbit in 1958.

Honeywell stabilization and control systems aided the first American astronauts during Project Mercury and its adaptive autopilot assisted X-15 rocket plane pilots beyond the 50-mile-high gateway into space.

To date, more than 90 per cent of the U. S. space vehicles successfully orbited have been guided by Honeywell inertial guidance equipment or have used its gyroscopes in their guidance systems.

Gemini spacecraft, which will be the first manned spacecraft capable of being guided as well as controlled, will have a dual Honeywell contribution. One is an Attitude Control and Maneuver Electronics sub-system through which signals are generated to activate the various control or maneuver jets. The other is the Inertial Measuring Unit for the navigation system. It reports how far and in what direction Gemini has traveled from its starting point in space.

For Apollo, Honeywell is developing and building the vital Stabilization and Control System which controls the spacecraft's attitude during its near half-million-mile journey to the moon and back. The system also monitors and displays information about its own performance and that of several other important Apollo systems and provides manual controls for the astronauts to use in situations where automatic sequences must be overridden.

All of the company's space and military activities are centered in its Military Products Group, an organization of some 18,000 persons headed by corporate vice president Charles L. Davis. The group is divided into two multi-location divisions, Aeronautical and Ordnance.

The Ordnance Division, headquartered in Minneapolis, is a leading producer of missiles, missile

OPTICAL LENSES AND REFLECTORS shown (above left) are the heart of the new solar simulator built by Honeywell's California Ordnance Center for Goddard Space Flight Center. Radiation from a 2.5 kilowatt mercury-xenon lamp (at the top of the picture) is collected in an elliptical reflector and projected through a fused silica condenser and relay lens system. The blinding glare of sunlight will be reproduced along with scorching heat by 127 of the powerful arc lamps at the top of a new six-story-tall space chamber (above right) at NASA's Goddard Space Flight Center at Greenbelt, Maryland. The lamps will be capable of simulating the sun's rays as they appear in certain areas of space, shining down on spacecraft being tested in the chamber.

JAMES H. BINGER
President, Honeywell

ATTITUDE CONTROL AND MANEUVER ELECTRONICS (ACME) for NASA's Gemini spacecraft undergoes pre-shipment test at Honeywell's Aeronautical Division where it was developed for Gemini prime contractor McDonnell Aircraft. Evaluation engineer Richard Noyes adjusts the test equipment, also specially designed by Honeywell. At left-foreground is one of two rate gyro packages containing three gyroscopes to sense pitch, roll and yaw rates of Gemini. Next to it, a solid state power inverter changes DC current to AC. Behind the inverter is the OAME computer (Orbit Attitude and Maneuver Electronics) and above it is the ACE computer (Attitude Control Electronics).

COMPLETE GUIDANCE SYSTEM for Centaur is displayed prior to final system test at Honeywell's Aeronautical Division, St. Petersburg, Fla. Two cylinders in foreground are the signal conditioner (left) and platform electronics. The waffle-patterned container (center) is the pulse rebalance electronics or coupler. System computer (left rear) and inertial platform (top right) combine with electronics packages to make the first all-inertial guidance system for U.S. space vehicles. First Centaur mission after successfully completing its test program is to carry Surveyor instrument packages to the moon for exploration before manned lunar landings are attempted.

The Spotlight On MSC Secretaries....

For this issue of the Roundup, we go to the sunny state of Florida to feature four of the secretaries with the Manned Spacecraft Center – Florida Operations at Cape Kennedy.

JUNE MARIE CARSON (upper right) is secretary to G. Merritt Preston, manager of the MSC – Florida Operations. A native of West Union, W. Va. and a graduate of Doddridge County High School of that city, she also attended government-sponsored classes at Dickenson Secretarial School and the Dayton Art Institute, both in Dayton, Ohio. She was with the Army Ballistic Missile Firing Laboratory when NASA took over in July, 1960 and which later became Launch Operations Center. Prior to this she held other jobs on the Cape with Launch Vehicles Division, LOC; Pacific Automation Products, and North American Aviation. In addition she was with the Atomic Energy Commission in Oak Ridge, Tenn., and at Wright Field in Dayton. Her husband, Wilbur "Kit" Carson, is office manager, Coast Electric Co., Merritt Island. They have three children, Robert 22 (married and a senior at Florida State), Lynn Marie 13, and Lois Lane 12. June's hobbies include ancient history (she has a large library collection on Egyptian, Roman and Greek History), cake decorating and building miniature villages of cardboard.

ETHEL R. SAROKON (upper left) joined NASA in September of 1962 and is now the secretary to Floyd D. Brandon, business manager of MSC - Florida Operations. Her home town is Central City, Penn. Before joining NASA, Ethel was employed by the Personnel Offices at Holloman AFB, N.M. and Edwards AFB, Calif. and also by the Air Force plant representative's office, of the Palmdale, Calif. Convair plant. Her husband, Daniel, is an engineer with General Dynamics/Astronautics. The couple reside in Cocoa Beach and when asked if they had children, she said they do not "expect any children until June 1964." She enjoys as hobbies: swimming, needlecraft art work and reading.

JEANETTE M. LOUIS (lower left), secretary to D.O. Black, deputy manager, MSC - Florida Operations, joined NASA in July of this year. She was born in Columbus, Nebr. where she completed high school. She attended Norfolk Junior College in Nebraska. Previous jobs held by Jeanette include the Army Corps of Engineers, Omaha; Army Corps Lincoln Area Office (Lincoln AFB, Nebr. – Atlas F complex construction); and the Office Chief of Engineers in Washington, D.C. In June of this year while returning from a vacation in the Bahamas, she stopped at the Cape and ended up going to work for NASA shortly thereafter. She is single and lives in Cocoa Beach. Jeanette said she enjoys traveling, bowling, dancing, reading and hunting.

SARAH F. GREENFIELD (lower right) of the Support Office, MSC - Florida Operations, is secretary to B. Porter Brown. Sarah hails from Edgewood, Md., where she completed high school. She attended the Baltimore Business College in Baltimore. Sarah has been with NASA since June 1959, and prior to that time she held jobs as a chemical indexing clerk with the U. S. Army Chemical Corps in Maryland, and as a secretary with Sundstrand Machine Tool Co. and Space Technology Laboratories, both located at the Cape. She is married and her husband, Stanley, is maintenance foreman at the USAF Technical Laboratory, Patrick AFB. The couple reside in Cocoa, Fla. In her free time she enjoys reading, sewing and "star gazing."

Great Books Group To Be Formed Early Next Year

A Great Books Discussion Group will be formed by the MSC Employees Activities Association, with meetings beginning early in 1964, it was announced by Ragan Edmiston, president, EAA.

The group will meet twice monthly and hold a discussion of an assigned "Great Book" from the literature of the Western world.

Those interested in participating should call James A. Stephens, Ext. 7751.

Cautious Holiday Observance Urged By MSC Safety Chief

With the added incident of accidents that usually accompany a holiday season, John Kanak, assistant chief for Safety, Center Medical Operations Office, cautions MSC employees to exert extreme care in their activities so that they may be around to enjoy the new year.

He urged all to make themselves aware of the fire hazard created by a dry Christmas tree and to dispose of the tree and gift wrappings as soon as possible.

Kanak also urged MSC employees to observe all the rules of the road while driving their automobile over the holidays and to wear seat belts. If your car is not equipped with seat belts, he suggested you consider the safety factor and install them at the next opportunity.

410 MSC Employees To Receive Awards

Honorary service awards will be presented to 410 Manned Spacecraft Center employees it was announced by the Personnel Division last week.

The awards are for those becoming eligible during the months of July through September 1963, and will be presented by division and office chiefs.

Fifteen-year government service awards will go to 47 persons, 10-year awards to 51 and 312 will receive one-year awards.

MSC BOWLING ROUNDUP

MSC COUPLES LEAGUE

Standings as of Dec. 10.

Team	Won	Lost
Ridgerunners	37	19
Goofballs	37	19
Lame Ducks	34½	21½
Schplitz	34	22
Bowlernauts	29	27
Spare-O's	27	29
Four Aces	24½	31½
Shucks	23	33
Hackers	20	36
Piddlers	16	40

High Game Women: C. Clyatt 198, M. Jordan 191.
High Game Men: G. Sandars 223, H. Bishop, L. Lindley 213.
High Series Women: C. Clyatt 515, V. Lantz 500.
High Series Men: H. Brasseaux 564, P. Thomas 559.

MSC MIXED LEAGUE

Standings as of Dec. 17.

Team	Won	Lost
Eight Balls	42½	17½
Alley Oops	42	18
Celestials	37	23
Little Splits	33½	26½
Snap Shots	32½	27½
Five Flushers	30½	29½
Pricers	30½	29½
Hardley Ables	28½	31½
Space Mates	27	33
Virginians	27	33
Aborts	26	34
Core Dumps	22	37
Decigones	20	39
Gabs	18	42

High Game Women: M. Lewis 211, C. Barnes 207, 203.
High Games Men: Pavlosky 236, J. Lewis 234, A. Chop 227.
High Series Women: C. Barnes 545, 543, 543.
High Series Men: A. Chop 632, Shumilak 600, Petersen 599.
High Team Game: Alley Oops 984, 930, 898.
High Team Series: Alley Oops 2658, 2593, 2537.

MSC MEN'S LEAGUE

Standings as of Dec. 12.

Team	Won	Lost
Tecnics	35	17
Whirlwinds	33	19
Turkeys	32	20
Lunar Lights	31	21
Cosmonuts	27	25
Pseudonauts	24	28
Asteroids	24	28
Fizzlers	22	30
Overshoots	17	35
Spastics	15	37

High Game: J. Garino 266, L. Lee, P. Horsman, W. Chase--233.
High Series: J. Strickland 621, B. Harris 556.
High Team Game: Fizzlers 936, Turkeys 901.
High Team Series: Whirlwinds 2562, Tecnics 2404.

A VERY POPULAR FELLOW – A somewhat padded Santa Claus (William Johnson) made a big hit with the children at the EAA children's Christmas party.

SPELLBOUND – Children attending the EAA children's Christmas party were held spellbound by the magic tricks supplied by I. Edward Campagna of MSC and a group of local magicians.

EAA Christmas Party Big Success Over 300 Children In Attendance

Over 300 children of MSC employees were treated to a Christmas party December 13 at the Harbach-Ripley Neighborhood Center in Houston, with the MSC Employees Activities Association as host.

The main entertainment feature on the program was a magic show with I. Edward Campagna of MSC serving as MC. The acts included juggling, sword into a basket, ventriloquist, clown and many fascinating magicians tricks.

Santa Claus along with Tinker Bell, who handed the presents to the children, provided the most popular portion of the program. William Johnson, Photographic Division was the Santa and Sandra McChargue, Flight Operations, was Tinker Bell.

Caroles were sung by the children during the early part of the party and movies were shown to occupy the children while waiting for their parents to pick them up. The children were served punch and cookies.

As one mother, and EAA party committee member at the affair put it, "obviously, from the looks of the children, a good time was had by all and the party was a howling success!"

30-YEAR AWARD – Dr. Robert R. Gilruth (right), director of the Manned Spacecraft Center presents an award to John C. French of the Reliability and Quality Assurance Office. The award was for 30 years of government service.

20-YEAR AWARD – Milton Kingsley (right) of the Instrumentation and Electronics Systems Division is presented a 20-year government service award by George Barry Graves, acting division chief.

WEST COAST 20-YEAR AWARDS–Earl K. Smith (right), head, Quality Assurance Section, Reliability and Quality Assurance Branch and Harvey W. Fritz (left), chief, Reliability and Quality Assurance Branch are presented 20-year government service award certificates and emblems by Robert H. Ridnour, acting manager, Resident Apollo Program Office at North American Aviation, Space and Information Systems Division, Downey, Calif.

t In MSC's Space Vehicles Supplied By Honeywell

warheads and skins, safing, arming and fuzing systems and munitions. It is prime contractor for the Navy's ASROC missile.

Through its West Coast facilities in Los Angeles and Seattle, Ordnance Division personnel engage in advanced undersea technology as well as design and production of such things as space environment simulator equipment, communication systems and training devices.

The division recently contracted with NASA to investigate hot air balloons as possible recovery devices for space vehicles and is already providing power conversion equipment for both Gemini and Apollo.

Aeronautical Division facilities are located in Minneapolis, St. Petersburg, Fla., and Boston. The latter is recognized as one of the nation's leading developers of electro-optical devices and is involved in NASA projects which include a non-orbiting star telescope and controls for the AOSO satellite.

In general, Minneapolis Aero handles stabilization and control problems while St. Petersburg concentrates on guidance and navigation. Minneapolis heads Honeywell's Apollo effort while the two combine their talents on Gemini.

St. Petersburg, which is known informally as Aero Florida, is one of the few facilities in the United States conceived and designed explicitly for the development and production of guidance and navigation systems and devices. It has built the nation's first all-inertial guidance system for space missions, now receiving flight tests in the Centaur space vehicle.

The division already envisions and is working toward the day when spaceships will be guided by a system having but one moving part; also toward "off-the-shelf" systems which can be easily altered to serve an almost endless variety of aerospace navigation needs.

To support advanced navigation system requirements, an ultra-reliable digital computer is currently being designed at Aero Florida to join an already established computer product line. It will incorporate a revolutionary new memory developed by the Honeywell Research Center and an integrated circuit technique developed with the company's semiconductor facility at Riviera Beach, Fla.

For expeditions into deep space where earth assistance is unavailable, scientists in Minneapolis have already developed another type of computer known as an Airborne Integrated Maintenance System which not only allows astronauts to see where equipment failures are developing but helps them troubleshoot and repair faulty components as well.

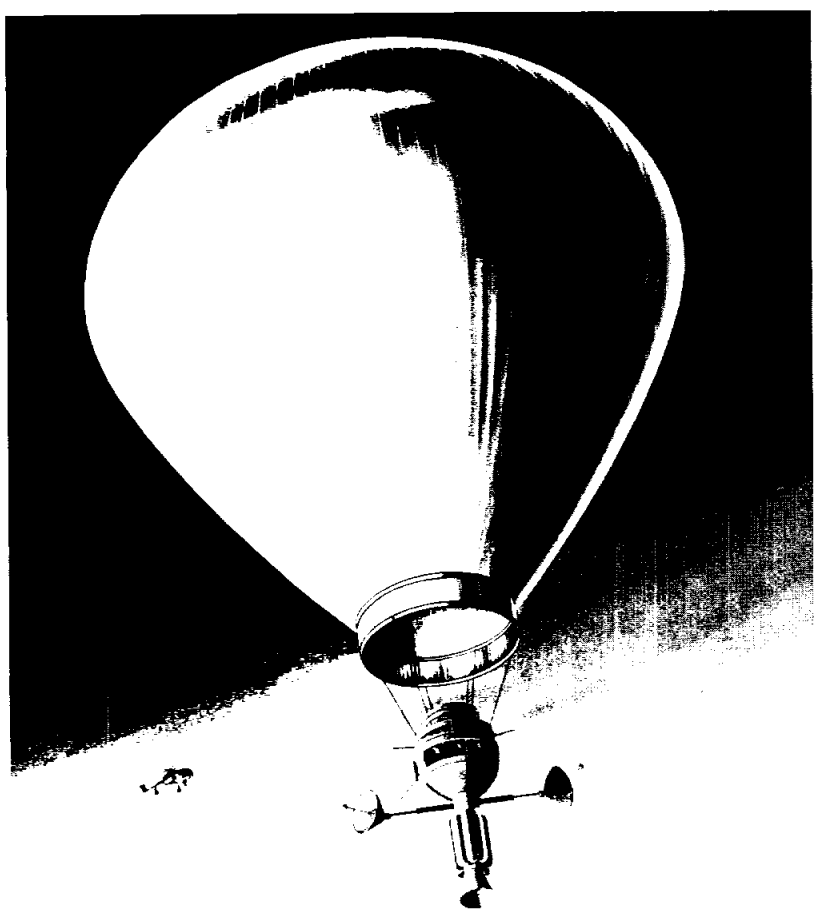
Also under active study are ways to achieve proper stabilization and control of manned orbiting space laboratories as well as environmental control of such man-made satellites.

Honeywell was founded in 1885 to produce the world's first automatic home heating control system. In nearly eight decades, it has grown to become an international enterprise employing some 48,000 persons with 46 plants in the United States and overseas.

In one way or another, the company's products can measure, regulate and monitor nearly everything in the world that needs such attention giving rise to the corporate slogan "First in Control."

EDITOR'S NOTE: This is the eighteenth 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 Office, Minneapolis-Honeywell Regulator Company.

HOW DOES IT FEEL IN SPACE? – Down-to-earth engineers working on Project Apollo at Honeywell can now reach into "space" by simply thrusting an arm into a pressure suit glove affixed to a small plexiglass vacuum chamber. The simulation unit was built at the company's Aeronautical Division in Minneapolis for engineers who have never experienced the handicap of a pressurized spacesuit yet must design equipment for spacesuited astronauts.



PARAVULCOON RECOVERY SYSTEM (artist's concept) shows how a huge hot air balloon can be used for the safe recovery of valuable space vehicles. Honeywell's Ordnance Division is investigating the concept for NASA's Langley Research Center. The gigantic balloon hovers on hot air generated from a self-contained gas burner. A burner control system floats the payload at pre-selected altitudes until the Paravulcoon drifts or is towed to a safe landing site where the vehicle can be recovered undamaged. The space vehicle pictured is imaginary.

WHAT'S MY ATTITUDE? – A tricky question for the earth-taught senses of an astronaut checking the position of his spacecraft in flight. To show astronauts how to answer that question during NASA's Project Apollo flight to the moon Honeywell built the teaching device shown here. A model of the Apollo command module in the device mimicks instruments that show the spacecraft's attitude, thus allowing earthbound onlookers to visualize in three dimensions what Apollo's actual attitude will be under various flight conditions. Bernard Olson (left) and John Haaland are shown during human factors studies at the company's Aeronautical Division where Apollo command module control and display equipment is being developed for prime contractor North American Aviation.

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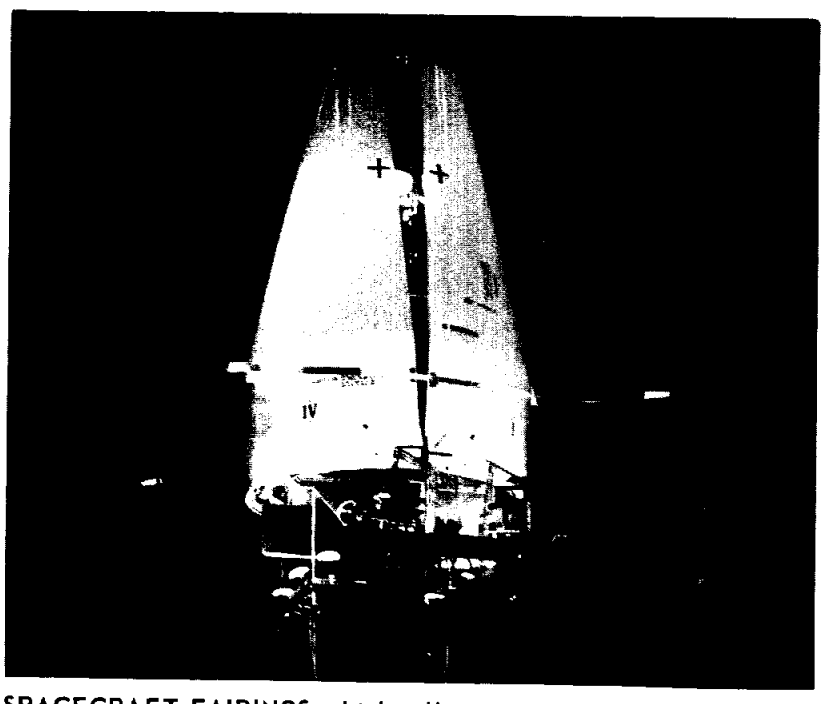

SPACECRAFT FAIRINGS, which will protect NASA's Gemini docking adapter during launch into space, are shown during separation test at the Douglas Aircraft Company's Tulsa Division in Oklahoma. The fairings, 10 feet long and 5 feet in diameter, are attached to the Agena D target vehicle and jettisoned in space, exposing the docking adapter for Gemini orbital rendezvous attempts.

Douglas To Build Fairings For Agena D Target Vehicle

A $500,000 contract for fabrication of fairings to protect NASA's Gemini docking adapter during booster flight has been awarded the Douglas Aircraft Company's Tulsa Division.

The award was made by Lockheed Missiles and Space Company, program manager for the Gemini docking system, it was announced December 9 by the Tulsa Division.

The contract calls for manufacture of eight sets of the clam-shell fiber glass fairings, 10 feet long and 5 feet in diameter at the base.

Attached to Agena D target vehicles during launch through the atmosphere, the fairings are jettisoned in space, exposing the docking adapter for Gemini orbital rendezvous attempts.

Delivery of the first fairing system is scheduled for January, 1964.

The fairing project is a part of the Douglas-Tulsa program of designing, fabricating and testing hardware for spacecraft protection, attachment and separation.

Saturn

(Continued from page 8)

paration for later flights to the moon via the Saturn V. Douglas is also producing the S-IVB Saturn V upper stage which will thrust Apollo spacecraft to the vicinity of the moon.

In addition, the company is also prime contractor for the Saturn S-IV stage. The S-IV, in production at the Douglas Missile & Space Systems Division, will propel unmanned versions of the Apollo spacecraft into low-earth orbit.

Saturn S-IV, utilizing the high energy propellant combination of liquid hydrogen-liquid oxygen, will generate a total thrust of 90,000 pounds with its six RL-10A3 Pratt & Whitney engines.

S-IVB will employ a single Rocketdyne J-2 liquid hydrogen-liquid oxygen engine. Producing 200,000-pounds thrust.

In support of the lunar program, Douglas MSSD maintains a network of field test installations and production facilities at Santa Monica and Sacramento, Calif.; Tulsa, Okla.; Cape Kennedy, Fla., and the company's new Space Systems Center in Huntington Beach, Calif.

Final assembly and systems checkout and test of S-IVB are assigned to the Space Systems Center, while production and final assembly of S-IV are performed at Santa Monica. Both vehicles will undergo static firing tests and acceptance firing at Sacramento prior to delivery to Cape Kennedy.

WELCOME ABOARD

Thirty-two new employees joined the Manned Spacecraft Center during the period November 25 through December 12. Of these six were assigned to Cape Kennedy, three to White Sands Missile Range and one to St. Louis, Mo. and the remaining 22 were assigned here in Houston.

FLIGHT CREW OPERATIONS DIVISION: Robert F. Berry, Martin L. Miller, and Betty B. Curlin.

GEMINI PROGRAM OFFICE (St. Louis, Mo.): Louis Andrasko.

OFFICE SERVICES DIVISION: Virginia G. Combs.

COMPUTATION AND DATA REDUCTION DIVISION: Rowena S. Nau, Gerald Wood, Henry P. Decell Jr., and Fred Fulton.

WHITE SANDS MISSILE RANGE (White Sands, N. M.): Earl F. Bayhan, John F. Day, and Rene J. De La Fuente.

PROCUREMENT AND CONTRACTS DIVISION: Martha R. Bunn.

SPACE ENVIRONMENT DIVISION: Richard L. Nance.

INFORMATION AND CONTROL SYSTEMS: James P. Shaughnessy.

LOGISTICS DIVISION: Bernice H. Taylor.

PERSONNEL DIVISION: Tommie R. Diffey.

TECHNICAL SERVICES DIVISION: Richard J. House, and John D. Orr.

PREFLIGHT OPERATIONS DIVISION (Cape Kennedy, Fla.): Paul D. Davis, and Rodney M. Avery.

BUSINESS MANAGEMENT OFFICE (Cape Kennedy, Fla.): Harry C Neas.

PACE SPACECRAFT PROJECT OFFICE (Cape Kennedy, Fla.): Anthony D. Shostak Jr., and Ralph E. Dorn.

CREW SYSTEMS DIVISION: Alan J. Chapman, and Kristen B. Eik-Nes.

GROUND SYSTEMS PROJECT OFFICE: Donald E. Iloff, and Phyllis A. Hayes.

SYSTEMS EVALUATION AND DEVELOPMENT DIVISION: Robert L. Robinson.

APOLLO SPACECRAFT PROGRAM OFFICE: Joseph F. Shea.

LAUNCH SITE SUPPORT BRANCH (Cape Kennedy, Fla.): Frederick E. Tubbs.

SPACECRAFT TECHNOLOGY DIVISION: Ferderic A. Wierum Jr.

Plant

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conditioning capacity of 6,000 tons. The chilled water then is piped to the air conditioning in the individual buildings.

A water cooling tower is constructed adjacent to the plant. This system has a capacity for reducing some 19,000 gallons of water from 104 degrees to 86 degrees Fahrenheit and returning the liquid to the boiler for recycling.

The cost of the Heating and Cooling Plant was announced as $1,933,957 including modifications to the building that were not in the original plan. Two other small figures remain to be added. These are an amount due the Corps of Engineers for supervision and engineering services, and the pro rata cost of architectural and engineering services. Construction costs include the equipment that went into the building.

Approximately 20 heating and cooling specialists employed by William J. Graham & Son Company, service contractor for MSC, will operate the plant.

MSC PERSONALITY

Insuring Successful Missions Job Of John Hodge's Division

Should a malfunction occur in the flight of a MSC spacecraft, the optimum course of action to be taken to insure a successful mission will be directed by the division headed by John D. Hodge.

Hodge, chief of the MSC Flight Control Division, is responsible for the planning of flight control aspects of all manned spaceflight. This entails development of requirements for worldwide ground support systems, conceptual design of mission control facilities, development of flight operations plans and procedures and training of flight controllers.

JOHN D. HODGE

He was one of the group of 35 engineers from Canada that joined the Space Task Group at Langley in April of 1959. At that time he was technical assistant to the chief of the operations division and was in on planing pre-launch checkout for the early Mercury-Redstone launches, and for flights MA-3 through MA-6 he was flight supervisor at the Bermuda Tracking Station.

Following this he assumed the duties as assistant chief for flight control in Flight Operations and was the number two flight director for MA-9.

November 1 of this year he became chief of the Flight Control Division.

Hodge was born in Leigh-on-Sea Essex, England and completed his early schooling at Minchenden Grammer School in England. He was graduated from Northhampton Engineering College, University of London in 1949 with a BS degree in engineering. For a time he was a part time teacher in engineering subjects at Twickenham Technical College, Middlesex, England.

He was a volunteer reserve pilot in the Royal Air Force from 1947-56.

Working in aerodynamics, he had a part in the final design stages of the Vickers Viscount turboprop transport in 1950 and following this he did wing air flow design studies and began work in supersonic aerodynamics on an English missile equivalent to the Air Force SNARK.

In late 1952 he joined AVRO of Canada in aerodynamics on the supersonic RCAF CF-105 interceptor fighter. He was involved in engine intake design and in 1954-55 he was chief of the aerodynamics loads group. The following year he was coordinator of the total flight test program for the CF-105, and in 1957 he became technical assistant to the division chief and was coordinator for all technical design aspects on the aircraft.

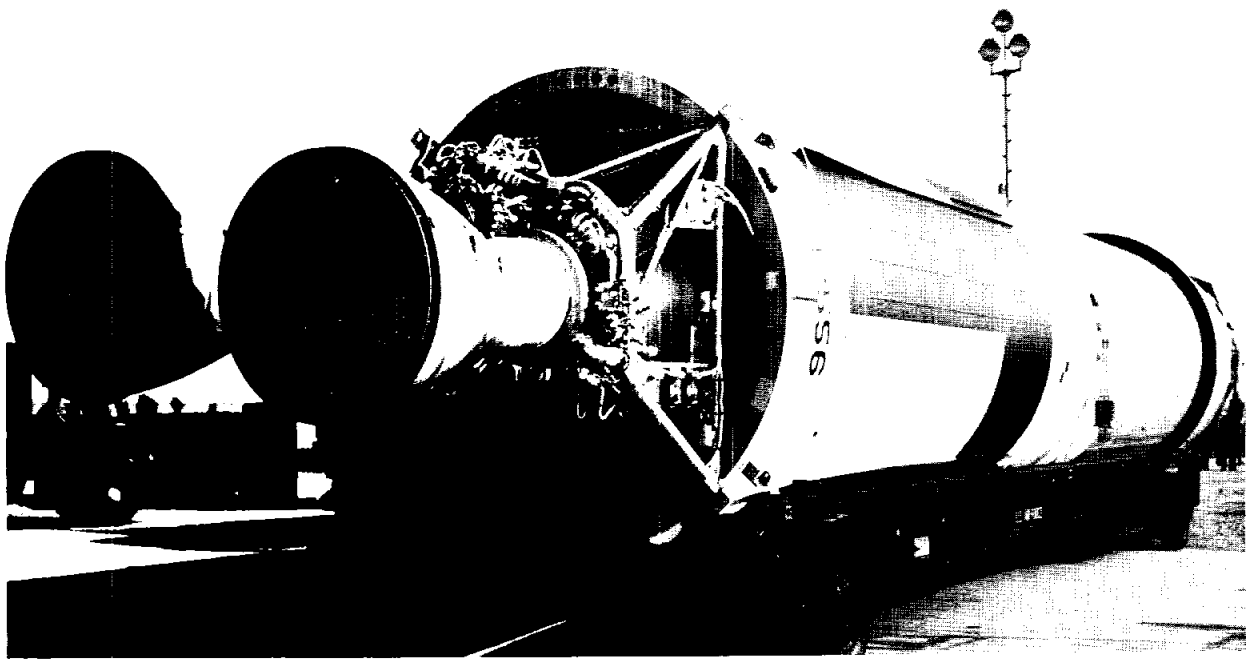
Prior to joining NASA, Hodge was in charge of the flight test program for Arrow-1, MK-1, a Canadian supersonic aircraft.

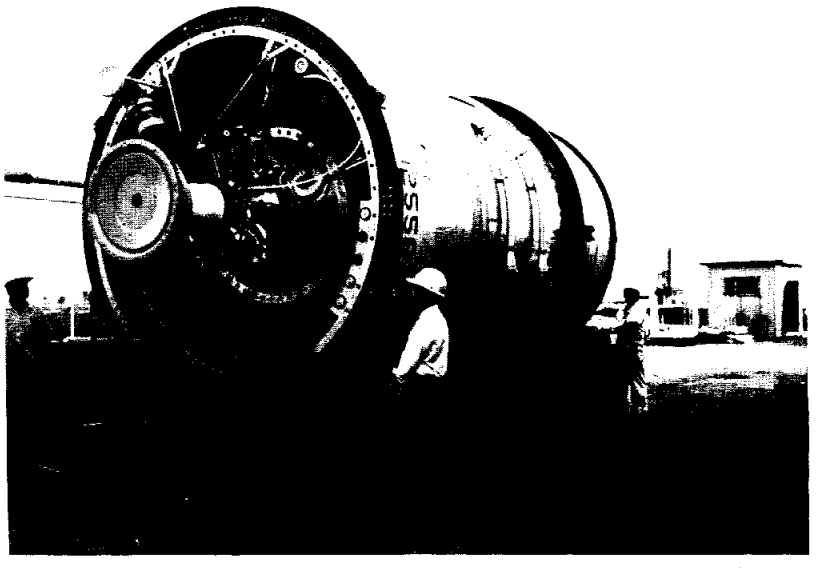
Hodge is an Associate Fellow of the Royal Aeronautical Society.

He is married to the former Audrey Cox of Worthing, Suxxex, England. The couple has three children: Robert John 7; Janice Margaret 4 (both born in Canada); and Nicola Anne (she will be 3 the day after Christmas and was born in the U. S. A. They reside in Houston.

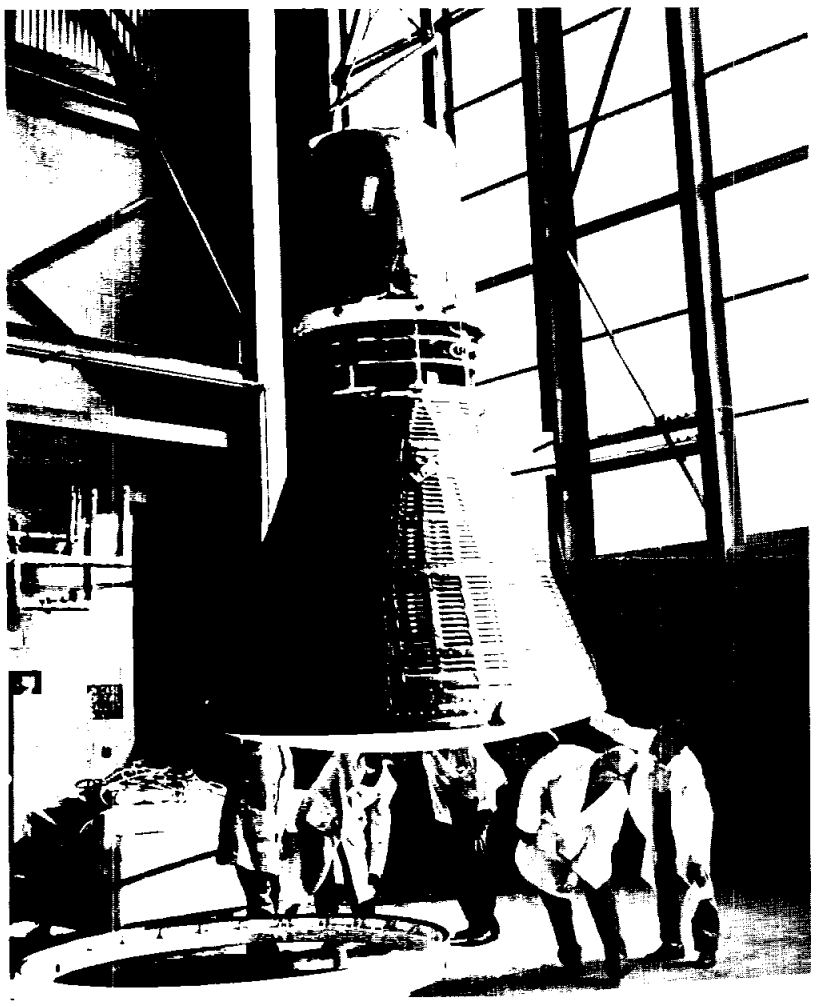
Hodge said he used to play soccer and cricket in England but here he settles for an occasional game of tennis. In his spare time he likes to read science fiction and modern history.

GT-1 Spacecraft Now Undergoing Tests In Hangar-AF At Cape

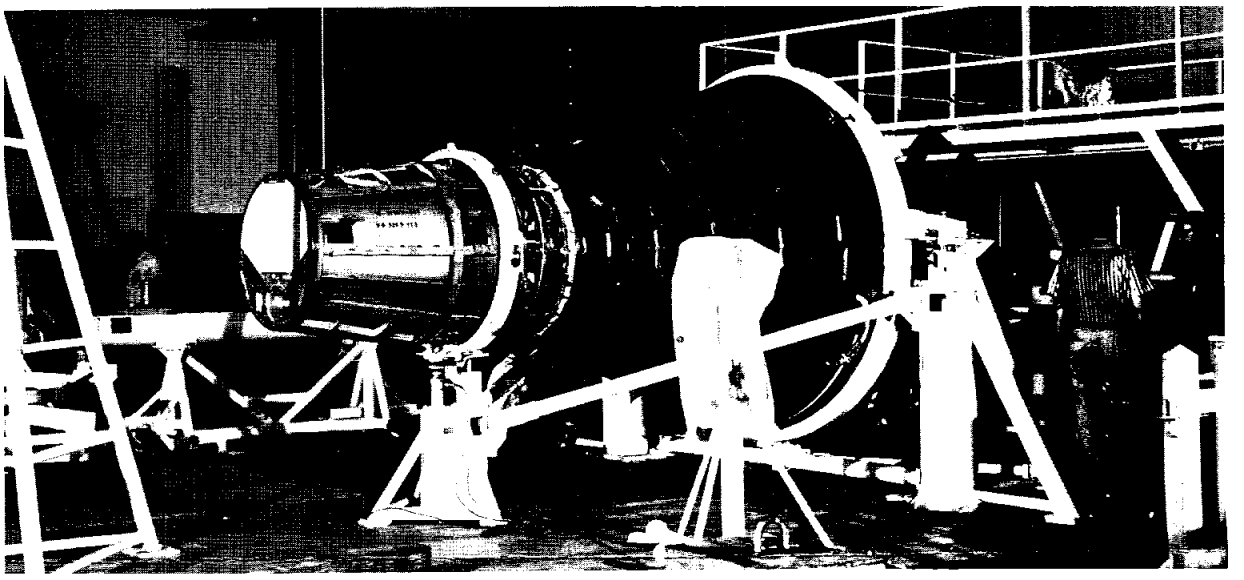




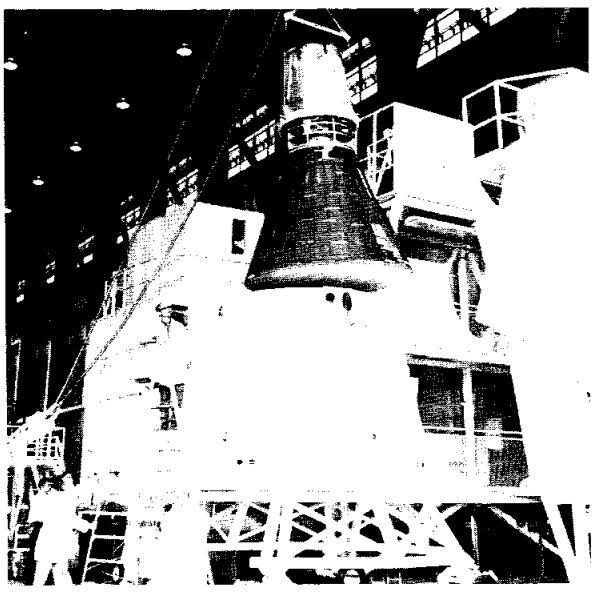
FIRST AND SECOND STAGES OF the Gemini-Titan II launch vehicle to be used in the GT-1 test are shown being readied for the erector at Pad 19 at Cape Kennedy.



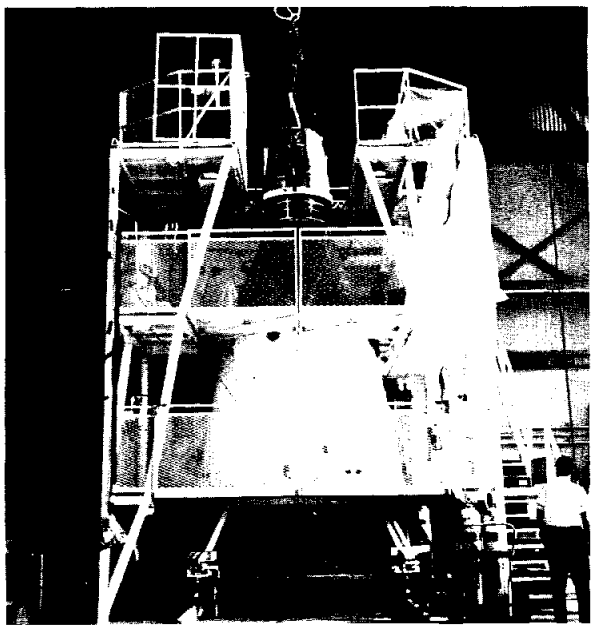
The GT-1 spacecraft is mated to the fixture ring for a weight and balance test.



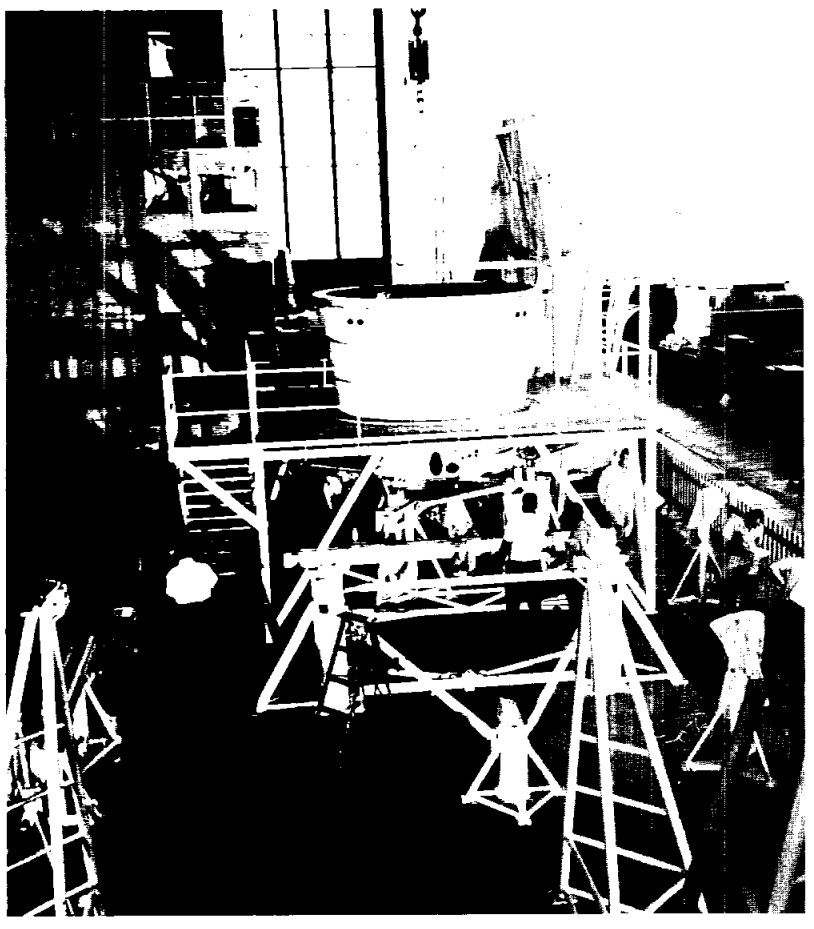
The GT-1 spacecraft shown in the horizontal weight and balance fixture.



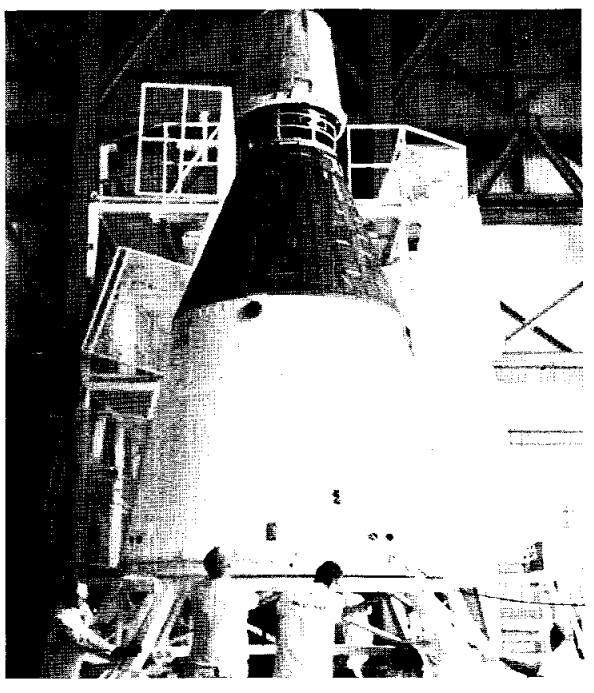
The GT-1 spacecraft and adapter sections are mated in Hangars-AF.



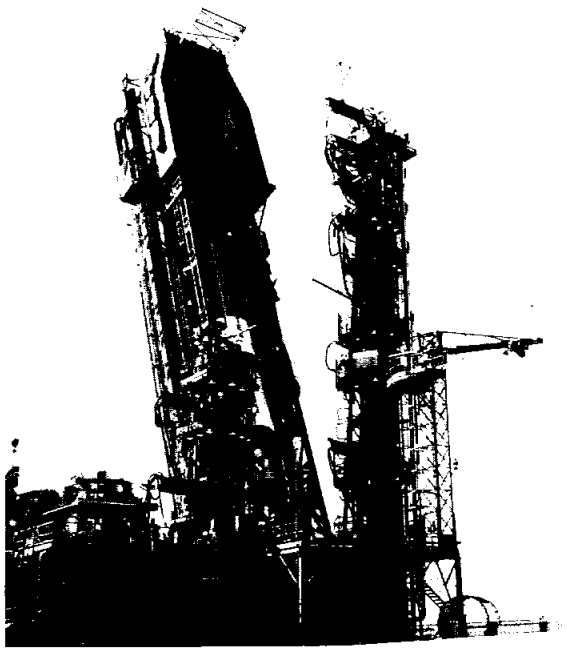
The GT-1 spacecraft is pictured in the three-level work stand.



The GT-1 adapter section in the weight and balance fixture.



The spacecraft is removed from the work stand for a weight and balance test.



The GT-1 launch vehicle is erected at Pad 19.

Space News ROUNDUP
SECOND FRONT PAGE

$48-Million More To Douglas For Part In Saturn Program

An additional $48,064,658 contract for its part in the Saturn program was awarded to the Douglas Aircraft Company Missile & Space Systems Division, Santa Monica, Calif., the National Aeronautics and Space Administration announced December 14.

It brings to $197,325,140 the total awarded to date for Douglas' effort on the S-IVB being developed by NASA under the direction of Dr. Wernher von Braun and his team at the Marshall Space Flight Center.

The new award is for development and production of the S-IVB stage that will be used in the Saturn IB program. In this assignment, S-IVB will place the manned Apollo spacecraft into earth orbit where the critical maneuvers necessary for lunar flight will be simulated. The Saturn IB vehicle, consisting of the first stage Chrysler S-I and the Douglas S-IVB, will be capable of delivering 16 tons into space.

Saturn IB, fitted with a manned and fully operational Apollo spacecraft, will orbit the earth in pre-

(Continued on page 6)

Contracts Awarded For Moving MSC To Clear Lake Site

An estimated cost of $333,375 has been set as the price for moving the Manned Spacecraft Center's equipment, furniture, and supplies from the scattered sites in Houston and Ellington AFB to the new Clear Lake site.

Five Houston trucking firms were awarded the contracts for crating and hauling services. The contracts will remain in force through Dec. 9, 1964

SPACE COMMITTEE VISITS MSC – Staff members of the Committee on Science and Astronautics, U.S. House of Representatives, visited the Manned Spacecraft Center recently and were given thorough briefings by MSC key personnel. Shown (l. to r.) are James C. Elms, deputy director, MSC; Peter Gerardi, staff consultant, space committee; Dr. Robert R. Gilruth, director, MSC; James Wilson, staff consultant, space committee; and Philip T. Hamburger, assistant for Congressional Relations. The group was also conducted on a tour of the facilities including the new site at Clear Lake.

MSC CLEAR LAKE SITE

Central Heating And Cooling Plant Completed

The Central Heating and Cooling Plant, which contains the steam generating and air conditioning equipment to serve the major structures at the Clear Lake site, was placed in operation and turned over to the Manned Spacecraft Center by the U. S. Corps of Engineers on December 12.

This is the twelfth facility to be completed and certified as operational or ready for occupancy out of more than 40 being constructed.

The building is a two-story structure containing 27,742 square feet. It is 143 feet long and 97 feet wide. Predominent features are the solar gray window walls extending the height of the structure.

Two high pressure boilers, each with steaming capacity of 60,000 pounds per hour, will generate the steam to heat the Center. Each boiler will consume approximately 84,000 cubic feet of natural gas per hour at full capacity operation.

Steam generated by the boilers drives turbines which in turn run three separate centrifugal compressors with a total air

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CLEAR LAKE SITE CONSTRUCTION PROGRESS–In this aerial view of the Manned Spacecraft Center, Clear Lake Site, looking northeast, construction progress is clearly visible. Beginning with the nine-story Project Management building on the right and going clockwise, the major buildings are as follows: Auditorium, Systems Evaluation, Instrumentation and Electronics, Spacecraft Research, Central Data, Mission Control Center, Technical Services offices and shops (the taller building in the rear is the shops with the offices in the building immediately to the front), Life Systems, Flight Operations, and just to the right of the Project Management building is the Cafeteria. The two smaller buildings to the left of the MCC are the MCC Emergency Power and Support building and the Southwestern Bell Telephone building. Construction immediately behind these buildings is the Space Environmental Simulation Chamber. To the left of this and not shown in the picture are the Central Heating and Air Conditioning Plant building, the Fire Station, and the recently completed Center Support Office, Warehouse and Shops (the latter were the first permanent buildings to be occupied at the Site). Also to the left and not shown is the Thermochemical test area, now under construction.