

Round-the-clock Control Requires Three Shifts

Flight controllers in Mission Control Center-Houston are on

NASA Deputy Dr. Hugh Dryden Dies Of Cancer

Dr. Hugh L. Dryden, Deputy Administrator of NASA since its creation in 1958, died in Washington December 2 of cancer. Ill for several years, Dr. Dryden did not enter the National Institute of Health until November 16.



At the time he was appointed NASA Deputy Administrator, Dr. Dryden was director of NASA's predecessor, the National Advisory Committee for Aeronautics.

Dr. Dryden was born in Pocomoke City, Md., in 1898, and attended public schools in Baltimore, and graduated from Johns Hopkins University in 1916.

In 1918, he joined the National Bureau of Standards, specializing in fluid dynamics, and earned his PhD from Johns Hopkins the following year. By 1946, he was Bureau associate director. In August, 1947 he was appointed Director of Aeronautical Research of NACA, and was named NACA director in May, 1949 serving until NASA was created in 1958.

Among the honors Dr. Dryden received during his career are the Sylvanus Albert Reed Award, U.S. Army Air Force Medal of Freedom, Daniel Guggenheim Medal, Wright Brothers Memorial Trophy, and President's Award for Distinguished Federal Civilian Service.

Dr. Dryden is survived by his wife and three children — Hugh L. Dryden, Jr., Mrs. Andrew H. Van Tuyl and Nancy Travers Dryden.

a three-shift basis during the Gemini VII/VI mission.

On prior missions, flight controllers have worked on a shift basis. During the 22-orbit mission of Astronaut Gordon Cooper two shifts were used for the 34-hour flight, and three shifts were used during Gemini IV, and the eight day Gemini V mission. The Gemini VI mission in October was cancelled during the second shift when Agena failed to orbit.

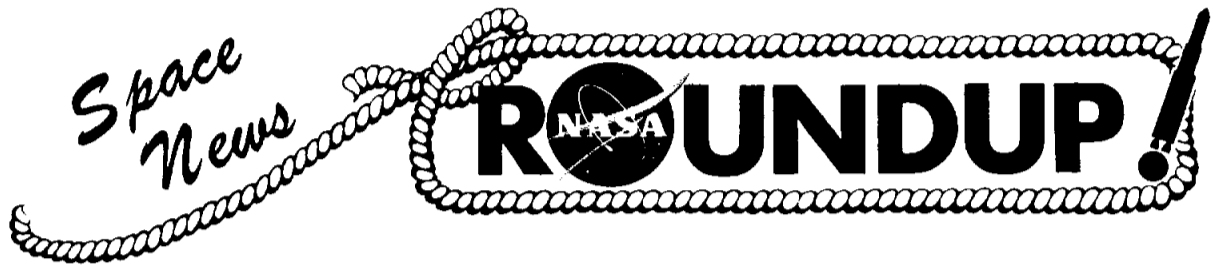
Sleeping facilities for key people involved in the flight control and support are available in the lobby wing of the Mission Control Center. Two private rooms have been provided, one for the flight directors, and the other for key Department of Defense people. In addition, there is a large dormitory style room which will accommodate 30 persons at a time. These facilities will make it possible to reach these people within a matter of minutes, if they are needed at any time during the mission.

The flight controllers are responsible for analyzing a vast quantity of data on a continuing basis in order to advise the pilots regarding the mission status.

As Mission Director, William C. Schneider is responsible for overall conduct of the flight. He is supported during the mission period by Department of Defense, contractor, NASA, and other personnel. In this role, Schneider conducts a mission readiness review several days before the launch. After receiving status reports on the crew, the spacecraft, the launch vehicle, the Manned Space Flight Network, the recovery forces and the weather, he must make a Go/No Go decision. If he decides the mission is Go, he sets the proposed date and time of launch.

Christopher C. Kraft Jr., assistant director for Flight Operations at MSC, was one of the flight directors for the Project Mercury flights and was flight

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VOL. 5, NO. 4 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS DECEMBER 10, 1965

LIGHT PAD DAMAGE—

No-Holds Gemini VII Launch Dual Mission's Perfect Start

The Gemini VII/VI long-duration and rendezvous mission was well on its way to success December 4 when Gemini VII lifted off at 1:30 p.m. CST following a perfect no-holds countdown.

Smoke from the Gemini launch vehicle's engines had not fully cleared away before damage assessment teams were inspecting Launch Complex 19 for pad damage to determine how soon Gemini VI and its launch vehicle could be re-erected on the pad for lift-off next Monday. Pad damage was exceptionally light and both stages of the Gemini VI launch vehicle were trundled out of the hangar and out to the pad.

By 2:30 a.m. the following morning, both stages had been erected; by noon, the Gemini VI spacecraft had been mated to the launch vehicle and pre-launch checkouts and tests were begun.

Gemini VII's crew, Frank Borman and Jim Lovell quickly settled down for the long 14-day haul after a half-hour period of station keeping with the second-stage booster. Both men slept approximately eight hours the first night and 10 hours the second night (by Houston time reference). Radio silence was maintained during these periods by stations in the Manned Space Network and by Mission Control Center-Houston.

Telemetry readouts, activated by ground radio commands, kept tabs on the condition of the spacecraft systems and the astronauts' physical condition.

An early drop in fuel cell cryogenic oxygen pressure, reminiscent of the early hours of Gemini V, was corrected when the crew of Gemini VII elected to open the cross-over valve which allows the supply of breathing

oxygen to boost pressure in the fuel cell reactant oxygen tank.

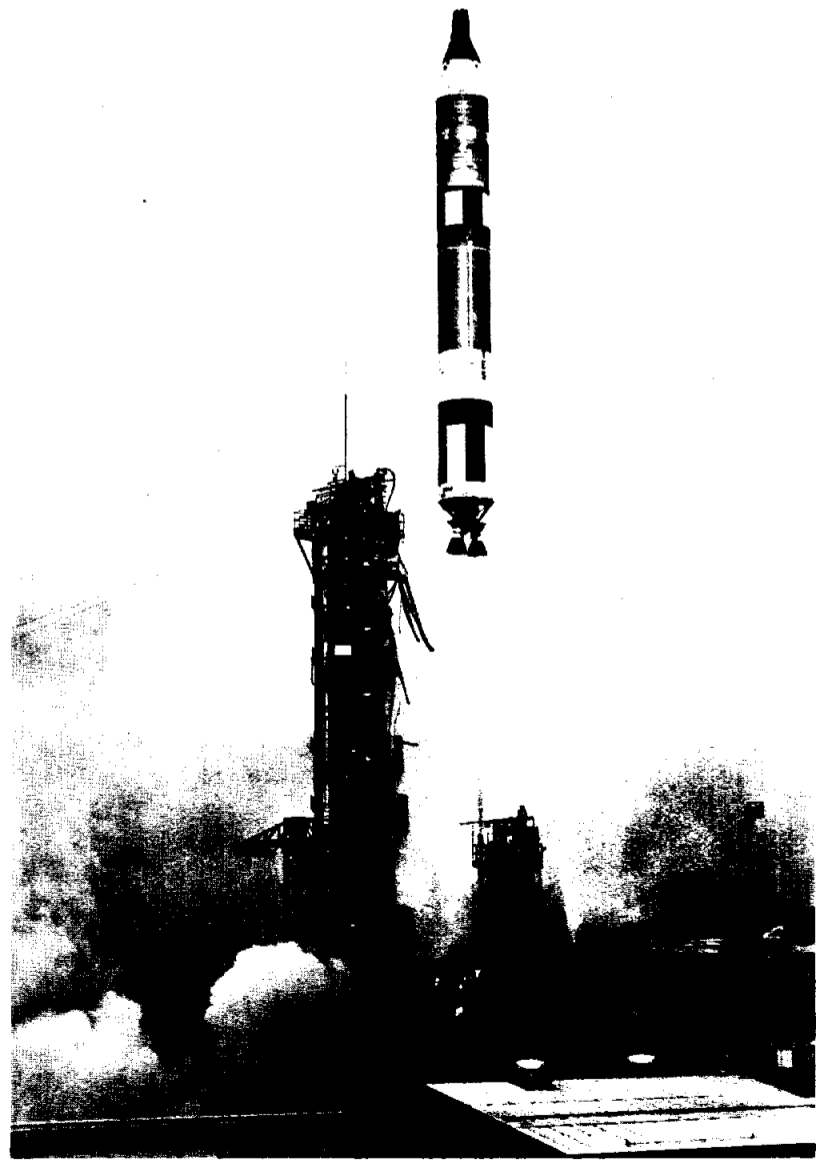
Gemini VII was inserted into an orbit with a perigee of 87.2 nm and an apogee of 177.1 nm and inclined 28.89 degrees to the equator. (Planned 87/183, 28.87 degrees).

A 59 ft/sec posigrade OAMS burn at 3 hours 47 minutes elapsed time raised perigee to 120 nm. The next maneuver was made yesterday for circularizing

(Continued on page 3)



COUNTDOWN CONFERENCE—Mission Director William C. Schneider, left, Blue Team Flight Director John Hodge and Red Team Flight Director Christopher C. Kraft discuss the smooth countdown of Gemini VII while grouped around the Flight Director's console in Mission Control Center-Houston.



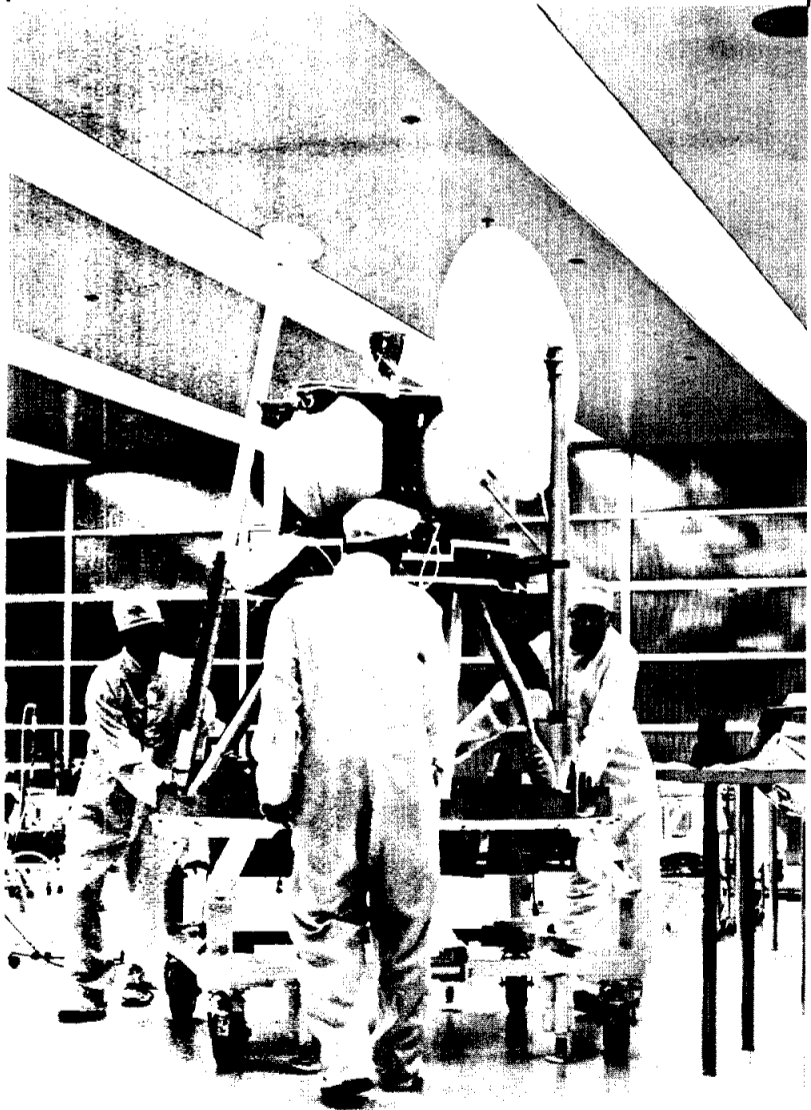
SEE YOU IN TWO WEEKS—Spacecraft Gemini VII lifts off from Launch Complex 19 at 1:30 p.m. CST December 4 with crewmen Frank Borman and Jim Lovell aboard following a perfect no-holds countdown for a two-weeks stay in orbit and a planned rendezvous with the Gemini VI spacecraft.

Laser Briefing



LASER AT WHITE SANDS—Briefing newsmen on the communications laser experiment scheduled for Gemini VII is project monitor Douglas Lilly of IESD, left. Lilly explained and demonstrated the ground equipment portion of Experiment MSC-4 to a dozen television, newspaper and wire service representatives at White Sands Test Facility, N.M. During the Gemini VII mission, Astronauts Borman and Lovell will attempt to speak to the White Sands station and to sites at Ascension and Hawaii. Voice transmissions from the spacecraft will be carried to the ground receivers over a laser beam.

Scout for Apollo



LUNAR RECONAISSANCE—The first completed Lunar Orbiter spacecraft is shown being wheeled from a Boeing-Seattle white room on its way to vacuum chamber tests. The spacecraft is one of three being built for ground testing. Eight spacecraft are being built in all. The Lunar Orbiter Project, aimed at gathering sharp close-up photos of the lunar surface to aid in selecting landing sites for Apollo, is under the direction of the NASA Langley Research Center.

Remote-Site Flight Control Teams Have Heavy Mission Responsibility

The MSC remote-site flight controller teams for the Gemini VII/VI mission are deployed to the seven locations around the world where they are exercising detailed real-time mission control during the flights of Gemini VII/VI.

In addition to the six remote sites: Canary Islands (CYI); Canarvon, W. Australia (CRO); Kauai, Hawaii (HAW); Guaymas, Mexico (GYM); tracking ship Rose Knot (RK); and tracking ship Coastal Sentry (CS); a crew from Houston will also man the Corpus Christi, Tex., (TEX) site.

The teams, each composed of from four to seven men, were on station by noon Thanksgiving Day to begin preparing the sites and crews for the network simulations prior to the Gemini VII/VI missions.

A pre-mission preparation phase was the first order of business at each remote site. The first day, briefings were given the local maintenance and operations (M&O) people by the flight controllers.

The briefings were on the general mission flight plan, and a discussion of procedural changes that have been instituted since the previous mission. The senior flight controller who is the Command Communicator at each site gave the briefing.

The Gemini systems engineer briefed the M&O group on the Gemini spacecraft and their unique aspects for the current mission and any specialized "backroom" monitoring procedures deemed appropriate for a given spacecraft pass or the entire mission.

A briefing by the aeromedical monitor will be held to provide the M&O staff with the medical aspects of the mission and biomedical or other research experiments to be performed.

Another member of the team at the remote sites is the astronaut simulator. His duties prior to the actual mission are to man the astronaut simulator console at the remote site and play the part of the astronauts in the spacecraft. He also controls the pre-mission remote site simulations. During the mission he performs duties as backup command communicator or spacecraft systems engineer at the site.

On the second day a network test simulation was held at the remote site to confidence test the equipment. This was followed by network tests to integrate the remote site into the network operation. Local confidence tests are run to integrate the remote site flight controllers and the M&O people and at the same time develop confidence in the remote site systems. A state of readiness is maintained at each site until liftoff on mission day.

Prior to deployment, the remote site crews study the standard operating procedures for the remote sites such as the use of the command system and telemetry, the air-to-ground

communications, network tests and other necessary procedures. Each man gets at least three hours in the Gemini procedures trainer for cockpit familiarization. They also attend systems and procedural briefings.

In the days before deploying to the remote sites the crews take part in simulated network simulations in the Mission Control Center. From a back room in the MCC, the remote site flight controllers conduct simulated missions as though they were on station at the various sites.

The command communicator at the remote site, in addition to supervising the preparation of the site for the mission, is the delegated representative of the Mission Control Center Flight Director and serves as the operations manager of the site and its supporting crew throughout the mission phase. He is responsible for the air-to-ground communications with the spacecraft and for operation of the ground to spacecraft command system. Any decision from a site that affects the mission is made by the command communicator.

Two Gemini systems engineers are at each site and their area of responsibility is to monitor, analyze and report any spacecraft systems anomalies noted on the telemetry displays. They in turn make recommendations for corrective action to the command communicator and/or the MCC-H.

Each site has two surgeons (aeromedical monitors) whose primary responsibility is to monitor the physical and physiological well being of the astronauts via telemetry. The information is reported by the doctors to the command communicator who relays the information to the MCC-H.

During the course of the mission the command communicator normally relays all information to the MCC-H and the spacecraft crew. The exception being when a discussion with the flight controller's counterpart at the MCC-H is necessary to resolve a point.

The normal work day for the remote site flight controllers is 14 to 15 hours. The hours worked during each 24-hour period are determined by liftoff time of the spacecraft from Cape Kennedy, which in turn sets the ground track passes over each station. An average of seven passes are over each remote site daily.

During periods when the spacecraft is not over the site the operation goes on standby. Then about two and one-half hours before acquisition time on the first pass of a series of passes by the spacecraft, all equipment at the site is confidence tested and all mission teletype messages are reviewed in preparation for support of the mission.

Flight controllers at the remote sites stay in commercial facilities as near the sites as possible. Limited food facilities

are available at all remote stations and the crews usually get in a little cooking experience also.

Team member assignments vary from mission to mission and a flight controller may be assigned to any one of the seven sites for a Gemini flight.

After the mission is completed and the crews return to Houston, they conduct a complete evaluation of the operation of equipment and procedures used at the remote site and make necessary recommendations for hardware changes that are deemed necessary to improve operations. They also evaluate all documentation used and try to make improvements for the next mission.

Flight controllers for the Gemini VII/VI mission and their stations are as follows:

Canary Islands (CYI) site crew is James R. Fucci, command communicator (CC); Floyd E. Claunch and Robert D. Legler, Gemini systems (GS); Luis J. Espinoza, astronaut simulator (AS); and Lt. Col. John W. Ord, USAF and Capt. Charles Wilson, USAF, aeromedical monitors (AM).

Canarvon, W. Australia (CRO) site members are Keith K. Kundel (CC); James F. Moser and George M. Bliss (GS); Edward L. Dunbar (AS); and Capt. Edward L. Beckman, USN, Sqdn. Ldr. Mike Mury-Alston and Wing Cdr. L. N. Walch (AM).

Kauai, Hawaii (HAW) is staffed by Edward I. Fendell and Capt. William F. Buchholz, USAF (CC); Hershel R. Perkins and Joseph Fuller, Jr. (GS); John W. Collins (AS); and Cdr. Eustache Prestcott Jr., USN, and Maj. James R. Wamsley, USAF (AM).

Guaymas, Mexico (GYM) site staff for the Gemini VII/VI mission is Gary B. Scott (CC); George W. Conway and Albert W. Barker (GS); Harold V. Berlin (AS); and Maj. Richard M. Chubb, USAF and Maj. William P. Nelson, USAF (AM).

The tracking ship Coastal Sentry (CS) to be on station northeast of Luzon, Philippines, is manned by Charles R. Lewis and Harold M. Draughon (CC); Gene F. Muse and Harry Smith (GS); Willard D. Robinson (AS); and Maj. Joseph A. Ionno and Cdr. Robert W. Maher, USN (AM).

Flight controllers onboard the tracking ship Rose Knot (RK) located in the Atlantic Ocean northeast of Victoria, Brazil, are William D. Garvin (CC); Charles A. Link and John E. Walsh (GS); James R. Bates (AS); and Maj. O'Neill Barrett, USAF and Cdr. Michael C. Carver, USN (AM).

Corpus Christi, Tex. (TEX) site is manned by Arda J. Roy Jr. and Maj. William G. Bastedo USAF (CC); Dale L. Klingbeil (GS); and Capt. Lawrence J. Enders, USAF (AM).

Gemini VII

(Continued from page 1)

the orbit and proper phasing with the Gemini VI launch.

The first several days of the Gemini VII mission have been spent in conducting experiments. Toward the end of the fifth day in orbit, after 77 revolutions, the crew of Gemini VII will use the spacecraft's OAMS thrusters to adjust the orbit to about 161 nm. circular to optimize launch conditions for Gemini VI and for subsequent rendezvous of the two spacecraft.

Gemini VI spacecraft is scheduled for launch Sunday, at 8:50 a.m. CST contingent upon testing and re-checkout of the spacecraft and launch vehicle. Launch of Gemini VI should nominally occur at 7 days 19 hours and 20 minutes Gemini VII elapsed time and at the beginning of Gemini VII's 119th revolution.

Rendezvous and "formation flying" of the two spacecraft should begin in the fourth orbit at about 5 hours 40 minutes Gemini VI elapsed time.

Formation flight, or station keeping, will continue for two and one half revolutions. Gemini VI reentry and landing in the West Atlantic recovery zone will be at 46 hours 45 minutes elapsed time at about 7:20 a.m. CST.

Gemini VII will continue its flight for a total elapsed time of about 329 hours 30 minutes, landing in the West Atlantic zone at 7 a.m. CST two days after Gemini VI recovery.

The prime mission of Gemini VII is 14 days duration, regardless of whether or not the Gemini VI mission is launched within the same time frame.

All Medical Experiments

All the medical experiments that have been developed for the Gemini program are being flown on the Gemini VII mission.

These medical experiments are: *M-1, Cardiovascular Reflex Conditioning; M-3, In-Flight Exerciser; M-4, In-Flight Phonocardiogram; M-5, Bioassays of Body Fluids; M-6, X-Ray Densitometry; M-7, Calcium Balance Study; M-8, In-Flight Sleep Analysis, and M-9, Vestibular Effects.*

The Cardiovascular Effects of Spaceflight, once classified as Experiment M-2, is now a routine pre- and post-flight medical procedure involving tilt-table tests of the crew. (For Dr. Charles A. Berry's description of Gemini VII medical experiments, see November 12, 1965 *Roundup*.)

By contrast, the two-day Gemini VI mission will carry no medical experiments. As in all manned missions, telemetry readouts of the Gemini VI crew physical condition will be watched as a matter of operational routine by medical monitors at stations in the Manned Space Flight Network and by flight surgeons in Mission Control Center-Houston.

Gemini VII Experiments

In addition to the eight medical experiments carried aboard

Gemini VII, nine scientific experiments are being conducted in the mission. These experiments are:

- *D-4/D-7, Celestial, Space and Terrestrial Object Radiometry* — Spectral analysis of ground and space objects using cameras and infra-red spectrometers, including measurements of the second-stage booster, clouds, the moon, the sun, volcanoes and other "hot earth" sources, and storms.

- *D-5, Star Occultation Measurement* — Evaluation of a photoelectric occultation telescope and of pilot procedures for developing a simple, accurate, self-contained orbital navigation system.

- *D-9, Simple Navigation* — For developing and testing sextant star sighting procedures aimed toward evolving an onboard navigation system.

- *S-8/D-13, Visual Acuity/Astronaut Visibility* — Investigates the limits of human visual acuity during prolonged periods of weightlessness by means of ground patterns at Laredo, Texas.

- *S-2, Synoptic Terrain Photography* — Aimed toward improving techniques of large-area geological and topographic aerial photography. Some 43 ground features are listed as possible objects to be photographed, subject to weather constraints.

- *S-6, Synoptic Weather Photography* — Color photographs of selected weather systems on a global basis. i.e., squall lines, thunderstorms, frontal clouds, jet stream cirrus, Gulf States morning stratus, tropical and extra-tropical cyclones, and wave clouds induced by islands and mountain ranges.

- *MSC-2/MS-3, Proton Electron Spectrometer and Tri-Axis Flux-Gate Magnetometer* — Measures the radiation outside the spacecraft, and monitors the direction and amplitude of the earth's magnetic field with respect to the spacecraft.

- *MSC-4, Optical Communications* — For determining feasibility of using coherent light for space communications. A Laser transmitter aboard Gemini VII will be used to attempt voice communications with ground Laser stations at White Sands Test Facility, Hawaii and Ascension Island.

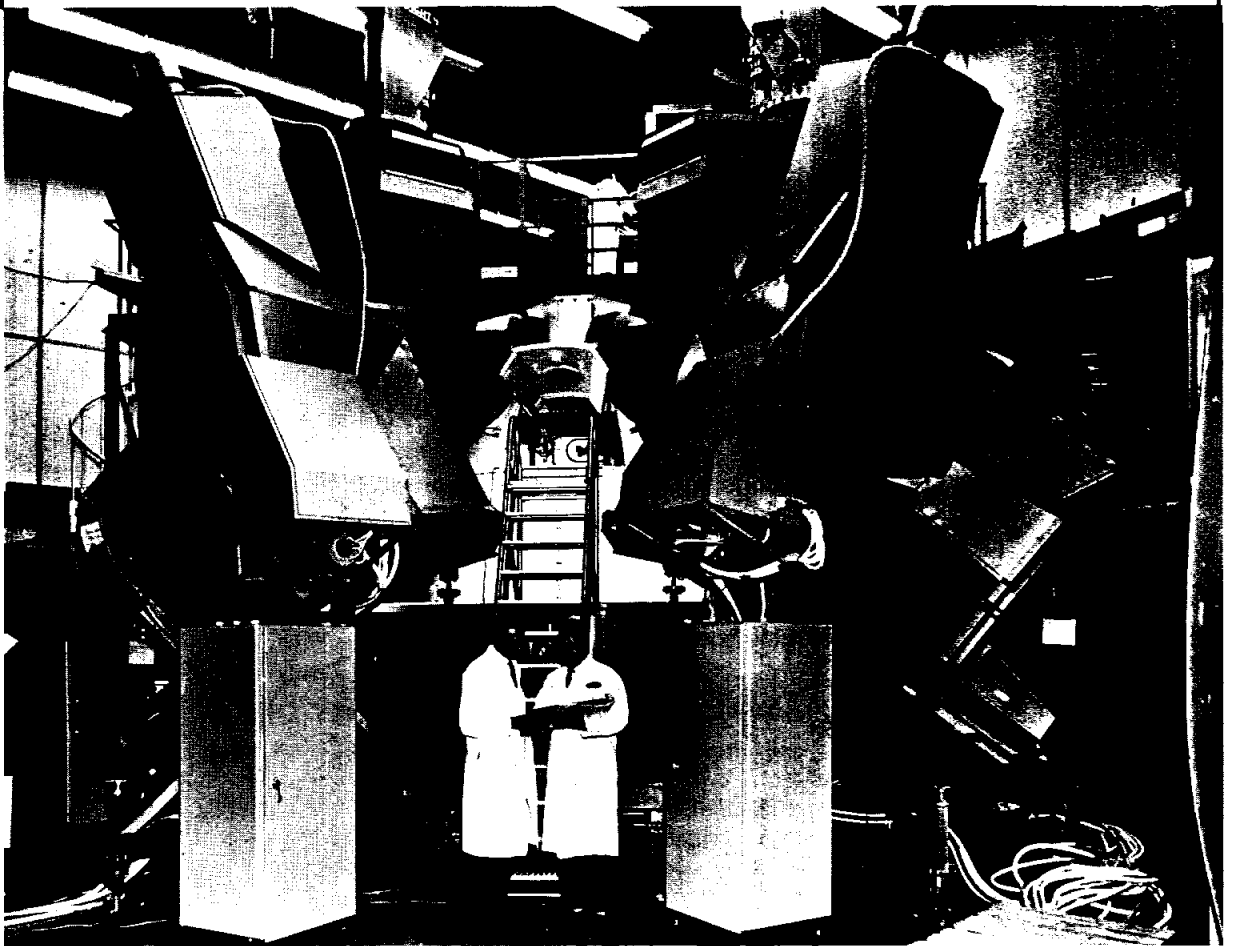
- *MSC-12, Landmark Contrast* — Measures contrast of land-sea boundaries by means of photometers and cameras to gain reference data for Apollo guidance and navigation system.

Gemini VI Experiments

Two of the scientific experiments carried aboard Gemini VII will also be carried on Gemini VI: *S-5, Synoptic Terrain Photography* and *S-6, Synoptic Weather Photography*.

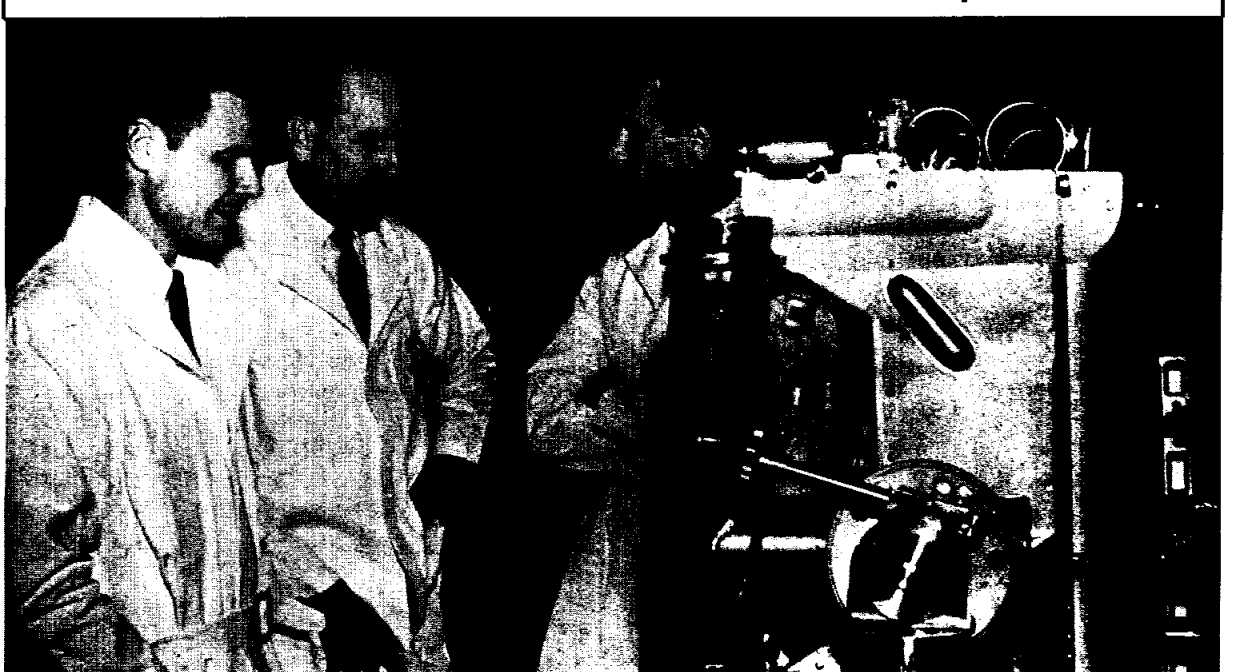
The third and last Gemini VI experiment is *D-8, Radiation Experiment*, which measures the radiation level and radiation flux inside the spacecraft, and measures radiation level intensity especially in the crew vicinity.

Simulates Apollo Missions



ALMOST READY — The forty-ton Apollo Mission Simulator is shown prior to its shipment from Link Group, General Precision Inc., Binghamton, N.Y., to MSC, where it will be installed in the Flight Crew Support Division's training area in Building 5. The simulator will be operational in early 1966. Link built the simulator under contract to North American Aviation. A second Apollo Mission Simulator is under construction for Kennedy Space Center.

Pilot Meets His Mechanical Buddy



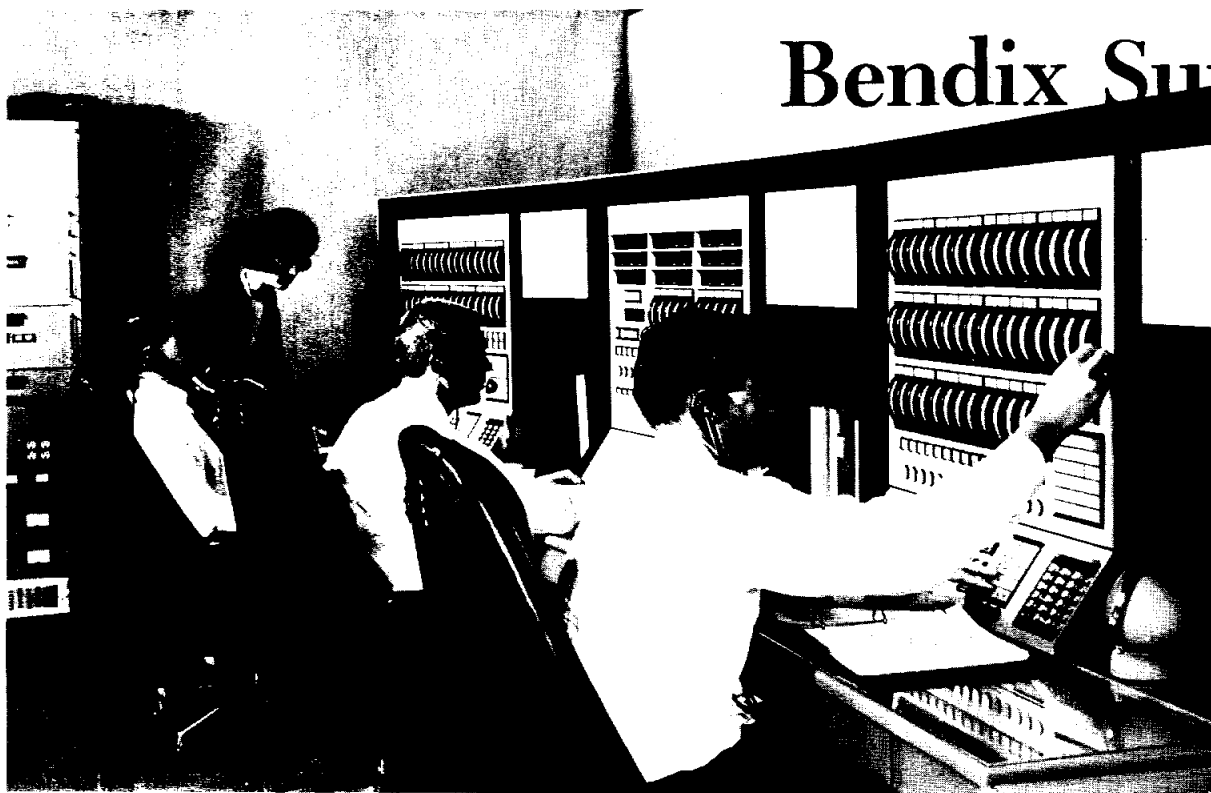
POWER FOR EVA — Charles A. Bassett, Gemini IX prime crew pilot, left, examines the Astronaut Maneuvering Unit (AMU) he will use to propel himself through space during his one orbit of EVA in the Gemini IX mission. Maj. Edward Givens, Air Force AMU Project Office, center, and Eugene Cernan, Gemini IX back-up crew pilot, saw the AMU at the Ling-Temco-Vought plant in Dallas prior to its acceptance by Air Force Space Systems Division.

110 Years' Service



CENTURY OF QUALITY CONTROL — Arms outstretched, White Sands Test Facility chief of Quality Control, R. J. Sturtz, spans the 100-year-plus of QC personnel to whom he has presented length-of-service awards. The cited members of his office are, from left, Robert Colston, George Koepke, Jack Kohanke, Sturtz, Sterling Davis, Christal Grisham, and Lawrence Puga. The six 15-year awards plus Sturtz' own 20 years in the field total 110 years.

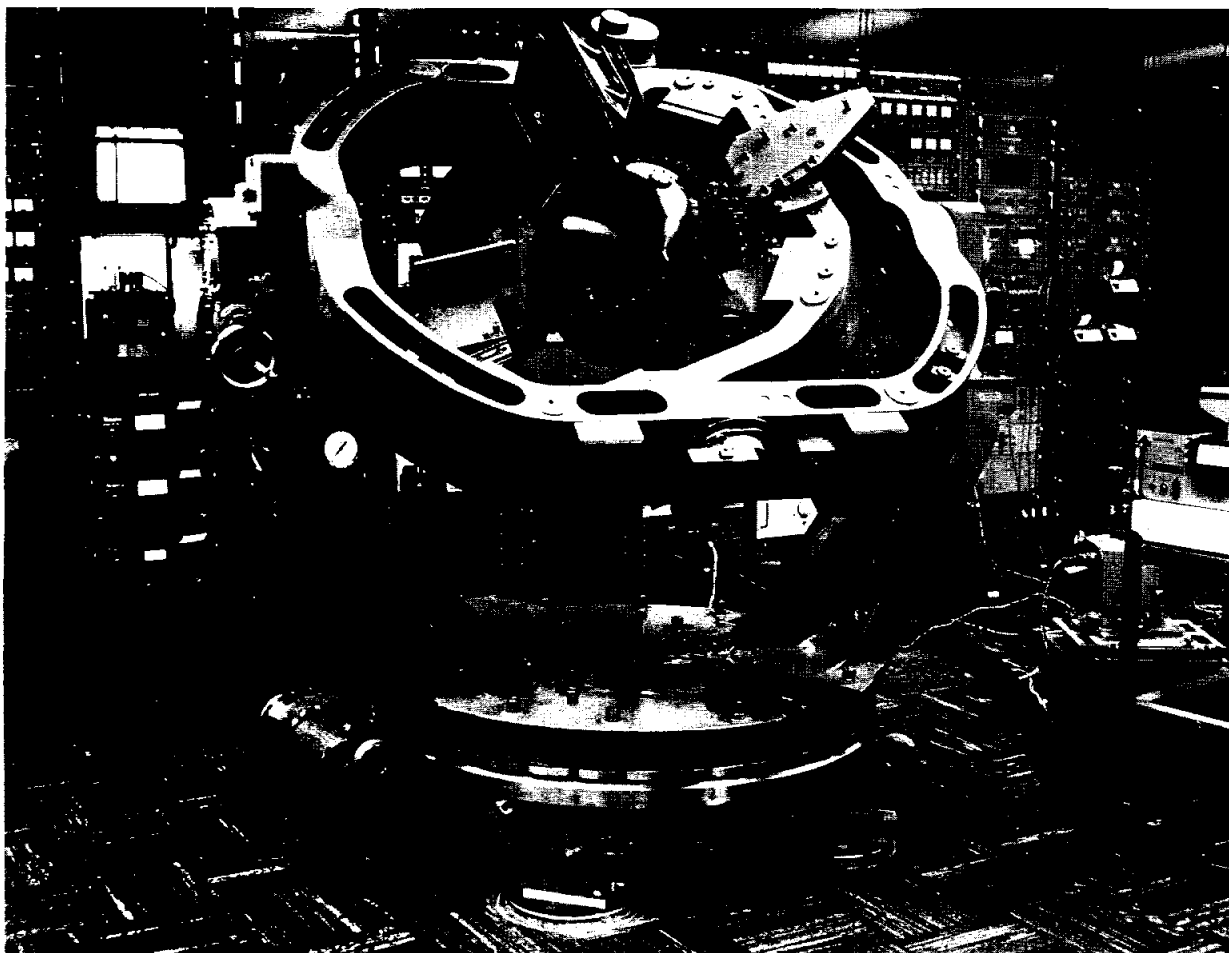
Bendix Support of Manned Space Ranges From To Po



BUDDY ON THE GROUND—Flight controllers in the Manned Space Flight Network tracking stations monitor spacecraft systems and crew medical status on these consoles built by Bendix-Pacific. Two complete installations of these consoles, used for training remote site flight controllers, are located in the Simulated Remote Sites on the second floor of Mission Control Center Houston.



LAST LOOK—Final inspection is given a Saturn inertial guidance platform by a Bendix technician.



EDITOR'S NOTE: This is the forty-sixth in a series of articles designed to acquaint MSC employees 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 Bendix Corporation.

Tracking and communicating with the Gemini astronauts; developing and supplying navigation and control systems for space vehicles; studying and researching projects connected with Project Apollo and the post-Apollo time period . . .

These are several of the key areas in which The Bendix Corporation and many of its divisions are working with NASA.

Bendix' Pacific division supplied two complete sets of Gemini remote-site display consoles and associated data distribution equipment for use at the Mission Control Center-Houston to train flight controllers. The equipment is identical to that developed by the Bendix division for use at tracking stations of the Manned Space Flight Network during Gemini flights to monitor conditions of the astronauts and their spacecraft.

During the Gemini 4 mission the Bendix division supplied a new cardiograph unit that provided physicians at the tracking stations with a beat-by-beat report on the astronaut's heart-beat and respiration rates—including those of Ed White during his walk in space—which supplemented the physiological information displayed on the aeromedical consoles. NASA has ordered for Mission Control-Houston four additional cardiograph systems to be used for test and evaluation purposes in future operations.

The Bendix division also has supplied "quieted" teletypes and cardioscopes for the consoles used at the Manned Spacecraft Center during the manned missions. In addition it has supplied for the Systems Test Facility Group a simulated command control console and is providing system integration assistance for a compatibility test operation of the spacecraft and ground stations during simulated flights.

Data reduction equipment developed by the Bendix division, and installed and used extensively during the Mercury program, is still playing an important role in other programs at MSC. The Bendix division, a pioneer in the field of telemetry, also has supplied the airborne telemetry package used in MSC's Apollo spacecraft boilerplate tests.

Lunar Studies

Since 1960 the Bendix Systems division has been studying applications in the area of extra-terrestrial surface exploration. At the present time the Bendix division is conducting a mineral stability study for MSC.

The study embraces research on the structural and chemical changes that occur in certain earth minerals when they are subjected to temperature and vacuum conditions simulating those of the lunar environment. The researchers also are simulating a returning-spacecraft environment, and testing the stability of the lunar minerals when exposed to the temperature, humidity and atmospheric conditions of the spacecraft and of the earth.

In addition the Bendix Systems division is one of three firms selected by NASA to design the Apollo Lunar Surface Experiment Package (ALSEP) under separate and concurrent \$500,000 six-month fixed-price contracts. The package will contain scientific instruments to measure the moon's structure and surface characteristics, atmosphere, heat flow, solar wind, radiation, and micrometeorite impact. The contract calls for delivery of mock-ups of the experiment package to MSC, and to Grumman Aircraft Engineering Corporation, about March 1, 1966.

The Bendix Systems division also has conducted studies in the area of lunar exploration, including the Surveyor Lunar Roving Vehicle for JPL; and the Apollo Logistic Support System study for the Marshall Space Flight Center, encompassing the design of a mobile laboratory (MO-LAB). In addition, the Bendix division is conducting lunar mobility studies in support of the Apollo Extension Systems (AES), and of a local scientific survey module (LSSM).

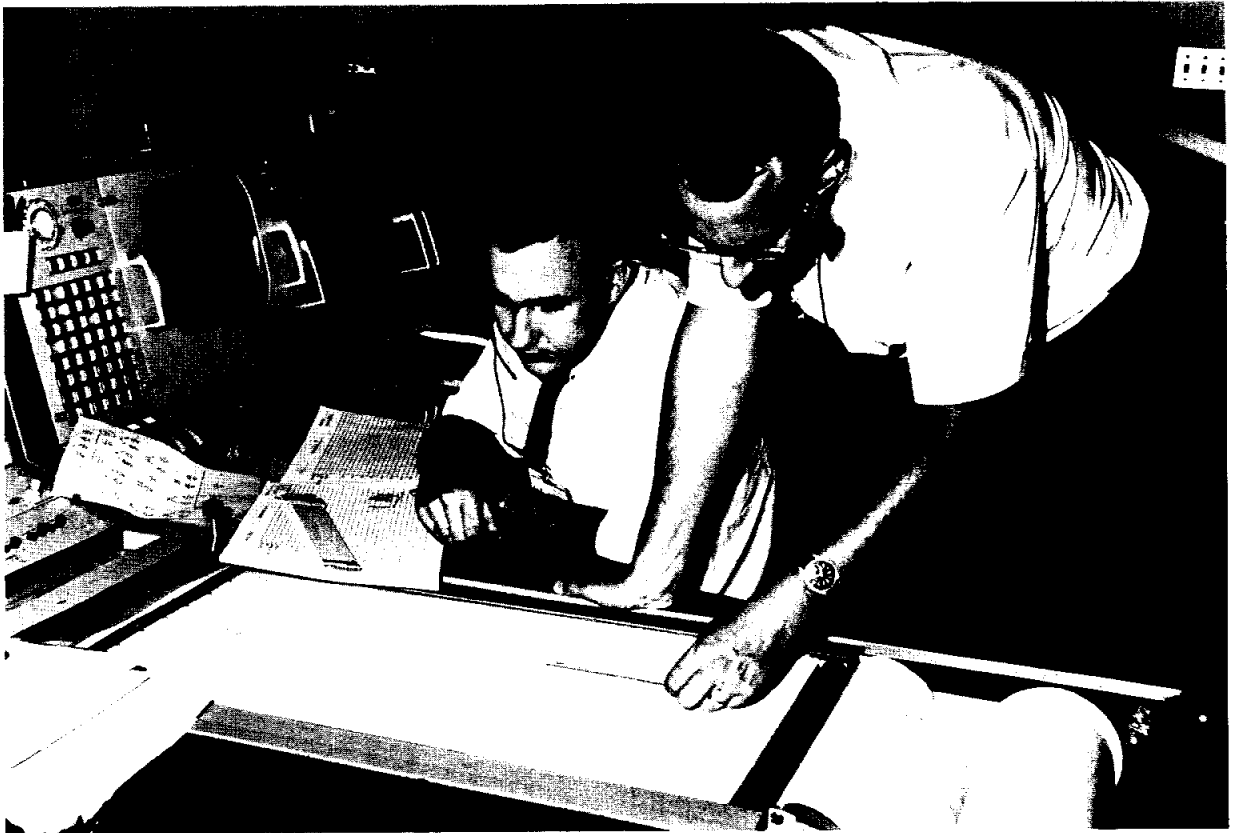
In another area of the space program covering activities of the Manned Spacecraft Center the Bendix Products Aerospace division is conducting research on lunar landing gears. The Bendix study is devoted to an examination of the behavior of a spacecraft from the time it first touches the moon's surface until it comes to rest.

The research includes the use of high-speed computers and the drop-testing of scale models. The knowledge gained from the

SATURN HELMSMAN—The Saturn inertial guidance system stabilized platform for Saturn I, IB and V launch vehicles is built by Bendix Eclipse-Pioneer Division. Here, a platform receives a calibration check on a tilt-turn stand.

Pre-flight Operations in Ground Control Test-Apollo Concepts

KEEPING TAB—Medical monitors in the Flight Surgeon Staff Support Room of Mission Control Center-Houston check crewmen's responses during the Gemini V mission. Bendix supplied the cardiscopes and sound-insulated teletypes used in Control Center medical consoles.



research will be used in the development of systems for the Apollo program, and other spacecraft programs.

Another Bendix division, Pioneer-Central, is developing cryogenic oxygen and hydrogen storage and supply systems for MSC. The systems are applicable to life support and auxiliary equipment aboard manned spacecraft. The systems include storage tanks, valves, heaters, heat exchangers, and instrumentation.

Previous experience on both super-critical and sub-critical storage systems and highly efficient methods of reducing heat loss for airborne and spaceborne storage tanks provided the division with a sound technological approach to the NASA program and contributed to significant advances in the state of the art.

The corporation also has a vital role in the Saturn program. The Inertial Guidance Platform of its Eclipse-Pioneer division

has been used on all Saturn launches — from launch 6 through 10; and the system also is scheduled for use on the Saturn IB and Saturn V.

Advanced Design

The platform uses gas-bearing gyros and accelerometers of the most advanced design. It also uses beryllium for all its structural members and most of its components — permitting a design that features weight-saving as well as providing greatly improved stability over a wide range of temperatures.

In the development of space navigation and control systems the Eclipse-Pioneer division has conducted an extensive program. These systems include reaction wheels, star trackers, and sun sensors.

The capability of The Bendix Corporation to engage in major phases of NASA's programs is based on a wide range of scientific and engineering research

that dates back to the early years of the nation's space effort.

The corporation participated in Project Vanguard, the nation's first satellite program. In Project Mercury the corporation supplied, installed and tested sensitive radars that tracked the spacecraft. It also was responsible for ground-to-space communications, telemetry receiving systems and display consoles for the Mercury tracking and ground communications network; and Bendix personnel operated stations of the Mercury Manned Space Flight Network.

Bendix Field Engineering Corporation is now doing essentially the same job for the Gemini network. Engineering services for the Gemini Manned Space Flight Network are also provided by Bendix. This work encompasses advanced studies of future ground support requirements, the engineering of new equipment, and general technical services in support of the entire network.

Other Space Assignments

Other major Bendix space communications assignments include important operational responsibilities at the Pacific Missile Range, and NASA's Goldstone facility for tracking deep-space probes.

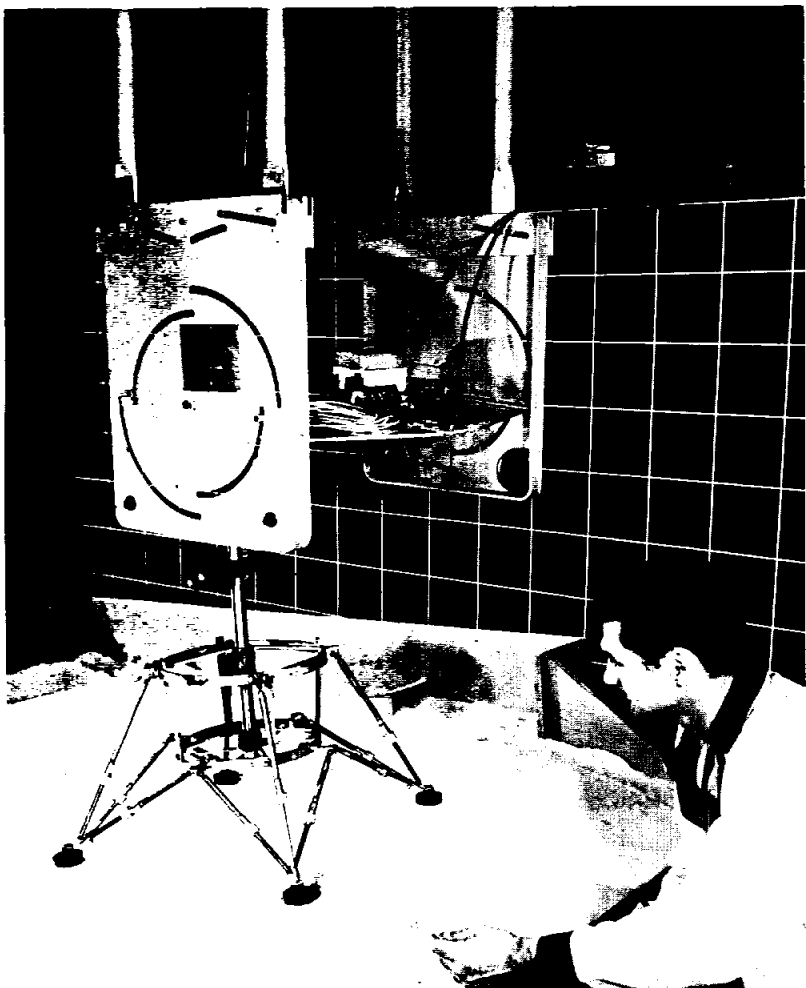
At NASA's Kennedy Space Center launch area the Bendix Field Engineering Corporation is providing launch-support services. The basic scope of work that Bendix is performing includes the operation of Launch Complex 39 — the center of launch activities for the Apollo-Saturn V engineering support services; technical shop operations; propellant services; ordnance storage and check-out; materials testing and cleaning services; and converter-compressor facility operations.

LANDING IMPACT — Spacecraft landing gear structures of various designs are tested through small scale models to determine the best configuration for various types of surfaces. Bendix engineers analyze data from such tests in conjunction with computer programs.



LABORATORY ON WHEELS—A conceptual mobile lunar exploration laboratory mounted on a LEM descent stage was developed under a NASA study contract by Bendix. The laboratory would be for extended exploration of the lunar surface and would include television links back to earth.

MISTER CLEAN—A cryogenic storage tank for supercritical liquid gases is assembled within a plastic hood by a Bendix technician.



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Out Of Texas' Past . . .

(EDITOR'S NOTE: To acquaint MSC employees with the rich historical background of the Galveston Bay area, and of Texas in general, a series of historical articles prepared by the Historical and Library Services Branch will appear in the Roundup.)

Half a mile north of Pelican Island, in busy Galveston Bay, the naked hull of an old concrete tanker—veteran of the First World War—sits firm on a shoal bottom and lifts her motionless prow rakishly against the sky. Seen from the vehicle deck of the Bolivar Ferry or the bridge of a ship entering the harbor, the old ship appears in late afternoon to be sailing off into the twilight. And those who know her history sometimes say: "There goes Captain Frenchy, sailing for the promised land."

His real name was Clesmy LeBlanc. He was an Acadian from the other side of Sabine Lake, and so naturally everybody called him Frenchy. The ship's name was *Selma*. And for three years that old derelict ship was Frenchy's home and castle, his sanctuary, his dream ship, his private island.

Frenchy began living on the *Selma* in 1952, when he was 75 years old. He ferried himself and everything he owned out to the ship in a homemade plywood boat with an outboard motor. He hauled the boat up onto the deck of his 420-foot island of reinforced concrete and moved into the forecabin with his gear. To the occasional curious boatmen who hove to on his lee and asked why he lived there alone, the skipper of the *Selma* replied:

"To get away from women and politics."

In time he had his own water system—two cargo tanks that he

had cleaned and converted into cisterns, rain-fed by an ingenious collection of troughs and gutters. He built his own electric plant, with batteries and a wind-charger. He had a radio, a small library and a well-stocked galley, and the fishing was good on all quarters.

He was truly the captain of the *Selma*, and he loved her as faithfully as any skipper ever loved a vessel. And if he hadn't gone ashore in 1955 to undertake an odd job of carpentry for a widow of his acquaintance, maybe he could have died aboard his ship—as he had hoped to do when his time came. Frenchy overdid the carpentry chore and collapsed with a heart attack.

From a bed in John Sealy Hospital he told his life story—and his secret.

Once a successful rice planter in Vermilion Parish, twice married and a widower, he had achieved old age with one last dream. He dreamed of an island paradise, not too far from the city's strand, where he could live like a king—and get rich besides.

"Get rich? How do you mean?" an interviewer asked.

By that time he was a gaunt, gray little man with a prominent nose and deepset brown eyes that were almost blind. He didn't know he had had a coronary, and insisted that somebody had slipped him a mickey.

"I had me a big idea," he said.

"But my ship—she is all right?"

"She's safely anchored in the bay," he was told.

He smiled. "Well, I cleaned out a big cargo tank and fixed me a windmill to pump fresh sea water through that tank. And you know what I put in that tank?"

Nobody knew.

"Oysters! More than ten barrels of live oysters that I dug, just me. And a lot more besides that a fisherman named Louis gave me. And my oysters—they lived for a while. A man from the government came out to inspect them. He said they was laying lots of eggs.

"But then they died. All my oysters died." The old man's eyes filled with tears. "And you know what? It wasn't one pearl in all them oysters."

Captain Frenchy of the *Selma* outlived his bivalves by about a year. He died Dec. 23, 1956. And there are fishermen who say his ghost still keeps watch on the dead tanker's forecabin-head. But fishermen are not considered reliable as historical sources.

Order Spells Out Employee Privileges In Joining Groups

The program of employee—management cooperation, established by Executive Order 10988 of January 17, 1962, is designed to increase the efficiency of Government operations and contribute to the well being of employees by:

- Recognizing the right of Federal employees and employee organizations to participate in the formulation and implementation of personnel policies offering them;

- Providing status, recognition, and representation rights to employee organizations;

- Establishing a system for orderly and constructive relationships between employee organizations and agency management; and

- Defining the respective rights and obligations of employee organizations and management officials in dealing with one another.

It is an accepted principle that any Federal employee has the right to join or not to join any employee organization which does not assert the right to strike against, or advocate the overthrow of, the Government of the United States.

Currently, three employee organizations—the American Federation of Government Employees (AFGE), The National Federation of Federal Employees (NFFE), and the Pattern Makers Association—are represented at MSC.

The American Federation of Government Employees has petitioned for exclusive recognition for a unit composed of wage board employees other than Wood and Plastic Modelmakers represented by the Pattern Makers Association. In addition, the AFGE has requested informal recognition for a unit of Class Act employees.

SPACE QUOTES

"As Guests Among Foreign Friends," by Alexei Leonov, Hero of the Soviet Union; Aviator-Cosmonaut of the USSR. *Pravda*, November 7, 1965:

"In the process of working at the Congress (Sixteenth International Astronautical Congress, Athens) something interesting happened to us—a friendly conversation with the American cosmonauts Gordon Cooper and Charles Conrad, who accomplished a flight in a cosmic apparatus of the Gemini type. These absolutely courageous fellows said to us, that like the Soviet cosmonauts, they wanted world-wide utilization of cosmic achievements. We took leave of them in a comradely fashion, expressing mutual confidence that we shall meet in orbit."

A Fire Or A Poisoned Child Can Make Christmas Un-Merry

This is the time of the year when strings of lights, glass balls and other decorations are brought down from attics and dusted off, and when the characters in Pogo tune up to sing their carol, "Deck Us All With Boston Charlie."

Christmas again—decorations to put up, gifts to buy, cards to address and mail, and children seem suddenly to become more obedient.

The holiday season is usually met with anticipation and left behind with a sigh of relief by most families. But lurking in the festivities are potential hazards to home and family.

Take the Christmas tree for example. Unless kept moist by a water container at its base, its needles quickly dry out and become easily ignited. For this reason, the tree should not be put up too early, so that it will stay moist until taken down after Christmas.

Artificial Christmas trees do not necessarily head off the hazards, for aluminum trees are electrical conductors and untreated plastic trees can be as flammable as dry fir trees. Test a small piece of a synthetic tree by placing it in an ash try and lighting it with a match.

Small and as harmless as a string of Christmas tree lights may seem, it is still powered by 110 volts of AC power—enough to kill if a frayed cord or cracked socket shorts out when a child prowls around the tree looking for a package with his name on it.

The packages—or what is in them—brings up another potential source of hazard. Some toys with loose parts that are easily swallowed, sharp corners and edges that can cut or stab, have inherent danger in their design. Here is where parents should be highly selective in their choice of gifts for their youngsters. Time was when toys were painted with poisonous cyanide-base paints, but these paints have been outlawed by legislation. Some off-brand toy manufacturers still use lead-base paints which can make a child ill if he swallows chips of paint chewed from his toy. Stick to toy brands certified as having non-toxic paint; "bargains" are not always what they seem.

Most living rooms look like a disaster area on the day after Christmas—wrappings, decorations and other items that have now become rubbish make for a fire hazard unless disposed of quickly. Some prefer to burn this debris in the fireplace, if local ordinances permit, or gather it up in cartons for haul-away. Whatever method of disposal is used, it should be done before a dropped match or cigaret ash can set the whole mess ablaze.

Christmas is supposed to be a happy time for families to get together, a fun-time for children, and a time for remembering that Christmas is His birthday. But unless some precautions are taken around the home, it could become a time for sorrow.

Insure a happy Christmas at your house by:

- Keeping the tree from drying out and becoming a fire hazard.
- Discarding frayed and worn electrical cords and decorations.
- Choosing toys that are non-toxic and non-swallowable.
- Disposing of post-Christmas debris quickly.
- Keeping candles away from flammable decorations and curtains.

Dec. 13, 1960—*Palaemon*, a 180-foot barge built to transport the Saturn launch vehicle from Marshall Space Flight Center to Cape Canaveral by water, was formally accepted by MSFC Director Dr. Wernher von Braun from Maj. Gen. Frank S. Besson, Chief of Army Transportation.

Dec. 15, 1960—Atlas-Able launch vehicle with NASA cislunar spacecraft exploded 70 seconds after launch from Cape Canaveral.

Dec. 16, 1960—Scientists from Great Britain and NASA completed a series of meetings leading to planning for British scientific satellite to be flown on a Scout vehicle.

AEC-NASA Nuclear Propulsion Office announced selection of TALANT industrial team proposal to conduct study of the requirements for a National Nuclear Rocket Engine Development Facility.

Dec. 19, 1960—Unmanned Project Mercury spacecraft launched by modified Redstone booster (MR-1) in a suborbital trajectory, impacting 235 miles downrange after reaching an altitude of 135 miles and a speed of near 4,200 mph. Spacecraft was recovered about 50 minutes after launch.

Dec. 20, 1960—Redstone Launch Vehicle No. 2 was delivered to Cape Canaveral for the Mercury-Redstone 2 (MR-2) mission (chimpanzee "Ham" flight).

President-elect John F. Kennedy announced that Vice President-elect Lyndon B. Johnson would chair the National Aeronautics and Space Council.

Dec. 21, 1960—Space Technology Laboratories was selected by NASA for contract negotiations for an orbiting geophysical observatory (OGO) satellite program. To be managed by Goddard Space Flight Center, OGO will be NASA's first standardized satellite, often referred to as the "streetcar" satellite, capable of placing 50 different geophysical experiments on any one flight.

Eight-engine cluster of Saturn successfully fired for 65 seconds at Marshall Space Flight Center, the firing generating 1,300,000 pounds of thrust.



UNHAND ME!—Jan Shrum's high-heel shoe becomes an effective weapon for discouraging a would-be attacker, played by Paul Boesch, ex-wrestler and radio-TV wrestling commentator, who conducted a lecture on how women can protect themselves.

Wrestling Announcer Lectures On Self-Defense for Women

Pointers on how women can thwart would-be attackers were given November 23 to a group of MSC women employees by Paul Boesch, former wrestler and radio and TV wrestling commentator.

Speaking in the MSC Auditorium, Boesch's lecture on the Womanly Art of Self Defense was aimed toward preparing women to avoid situations of potential danger and how to ward off attackers using simple weapons at hand. Boesch, author of a series on the subject which

runs daily in the Houston Post, is carrying on a sort of personal crusade against crimes involving assault upon women.

Because of the short notice of the lecture, only 40 women attended. Boesch has said that he would be willing to do a repeat lecture some evening in January.

MSC women employees, on-site contractor women and wives of MSC employees who are interested in attending a second lecture by Boesch may indicate their interest by filling out the form below and sending it through inter-office mail.

To: Jan Shrum, AP

I would be interested in attending the "Womanly Art of Self Defense" lecture some evening during January.

Name _____ Office Code _____

Christmas Dance Complete Sell-Out

Ticket sales for the MSC Christmas dance at Sylvan Beach Pavillion tonight were a sell-out within two days after EAA representative received their supply of tickets, according to Rex Bauerlein, dance chairman.

Limited to 700 tickets because of the size of the Pavillion,

ticket sales for last year's Christmas Dance moved much slower.

Music for tonight's dance will be furnished by Phil Gray and his orchestra, and a mystery guest from "several thousand miles north of MSC" will highlight the evening. Drawings for nine door prizes will also be held.

MSC BOWLING ROUNDUP

MSC COUPLES LEAGUE
Standings as of November 30

TEAM	WON	LOST
Bowlernauts	36	16
Idgits	32	20
Spastics	30½	21½
Four Friends	28½	23½
Intimidators	28	24
Almosts	28	24
Sociables	28	24
LBD	23	29
Eight-Balls	22	30
Aces	22	30
Fireballs	20	32
Fabulous Four	14	38

High Game Women: Betty Durkee 222, Shirley Yeater 209.

High Game Men: Joe Garino 237, Gene Petersen 237.

High Series Women: Shirley Yeater 571, Betty Durkee 542.

High Series Men: Joe Garino 629, Dan Kennedy 626.

MSC 5 O'CLOCK MONDAY MIXED LEAGUE

Standings as of November 29

TEAM	WON	LOST
The Bombers	21	15
Pacesetters	21	15
McH's	20	16
Pot Shots	17	19
Hi-Hopes	16	20
Thirds	13	23

High Game Women: T. Bordeaux 193, Alice Jutson 179.

High Game Men: E. Ray Walker 229, Clyde Waters 214.

High Series Women: T. Bordeaux 478, Alice Jutson 469.

High Series Men: E. Ray Walker 583, Harley Erickson 572.

Flag Football Champs Lose To Pasadena 21-14

MSC/Ellington AFB Flag Football League champions, Instrumentation and Electronic Systems Division, lost by a score of 21-14 a challenge game played November 30 with the Pasadena City Football Champions.

IESD led in the first quarter 7-0, and Pasadena scored in the second quarter to tie it up 7-7. Both teams scored seven points in the third quarter for a 14-14 tie.

In five minutes of overtime play, Pasadena won 21-14.

1965-66 MSC/Ellington AFB Basketball League

All games played at the Ellington AFB Gymnasium

American Division		National Division	
Team No.	Name	Team No.	Name
1.	747th Rams	10.	Air Nat'l Guard
2.	Guidance and Control	11.	Tech Svcs Div
3.	Coast Guard	12.	AV Corp
4.	MPAD-Gunners	13.	G.E.
5.	Grasshoppers	14.	FCD
6.	FSD	15.	Philco
7.	ASPO	16.	Univac
8.	2103rd Comm Sqdn	17.	Prop & Power Div
9.	ASTD-Lone Stars	18.	IBM

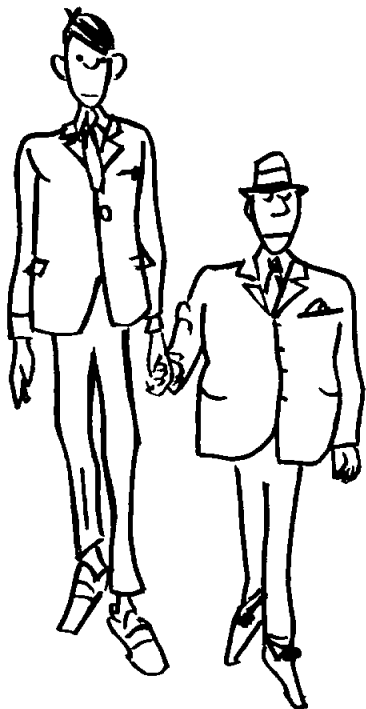
Schedule for December 13-16:

	Dec. 13	Dec. 14	Dec. 15	Dec. 16
6:30 p.m.	17 vs 16	10 vs 14	18 vs 15	13 vs 12
8:00 p.m.	6 vs 7	4 vs 9	5 vs 8	1 vs 3

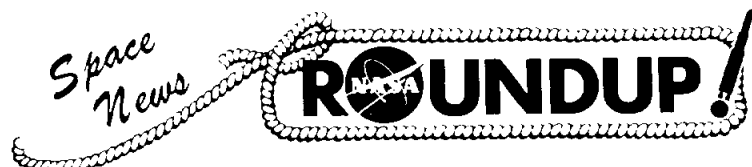
Scores for first week of basketball schedule:

National Division
FCD 69, Technical Services 30.
AV Corporation 52, Philco 43.
Univac 2, Air National Guard 0 (Forfeit).
IBM 100, Propulsion and Power Div. 58.

American Division
ASTD Lone Stars 73, Guidance & Control 55.
Coast Guard 64, 2103rd Comm Sqdn 57.
MPAD Gunners 79, ASPO 32.
Grasshoppers 2, FSD 0 (Forfeit).



Duhh, Tell me again Mr. Coach. Whadaya call this game?



MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

EMPLOYEE NEWS

25-YEAR SERVICE AWARD



JACK BLACKNER
RASPO-Bethpage



GORDON B. FERRALL
Flight Crew Support Division



SHELL E. MARTIN
Center Medical Office



JOHN J. PETERSON
Astronaut Office



CLIFTON A. ROGILLIO
Aircraft Operations Office



BERNARD WEINFLASH
RASPO-Bethpage



Paul E. Purser, special assistant to the Director, received his 25-Year Service Award and pin from NASA Deputy Associate Administrator Earl D. Hilburn, who was keynote speaker at the November 18 Seventh Annual MSC Awards Ceremony.



Space News **ROUNDUP!**
SECOND FRONT PAGE



QUALITY FOLKS—Dr. Joseph F. Shea, Manager Apollo Spacecraft Program Office (inset), was the keynote speaker at a seminar November 30-December 1 for NASA/Government Agency quality assurance people. The meeting was held in the MSC Auditorium.

Two-Day Meeting Stresses Quality In Apollo Program

A joint NASA/Government agency briefing for quality assurance specialists was attended by 100 people at MSC November 30-December 1. The briefing was aimed primarily toward quality assurance people working in the Apollo program, their role in the quality aspects of the program, and a review of the current status of Apollo.

Apollo Spacecraft Program Manager Dr. Joseph F. Shea was the keynote speaker, and spoke on "Realistic Quality Assurance Requirements as They Pertain to Government Agencies."

The two-day meeting was moderated by M. W. Steintal, of the ASPO Reliability and Quality Assurance Division.

Other speakers were H. D. Farrar of the NASA/DCASR Regional Office; J. A. Jones and C. W. Evans of the MSC Flight Safety-Quality Assurance Office; Astronaut C. C. Wil-

liams; F. Crichton of Kennedy Space Center, and H. M. Lampert of General Electric Apollo Support Department.

NASA Headquarters announced recently that 627 quality salary increases were granted to NASA employees during fiscal year 1965.



KIDDIES' FARE—The Tootsie Pohler Puppets will be joined by TV children's entertainers Kitirik, Nod and Skipper at the MSC Children's Christmas Party December 18.

Boys Home Open House

An invitation to attend open house at the Harris County Boys Home December 18 has been extended MSC employees by Home director Fred Hart. The open house will run from 2 to 5 p.m.

The Harris County Boys Home is just east of MSC on NASA Road 1, just across from the County recreation area and boat launching ramp.

Dec. 18 Is Date For Children's Christmas Party

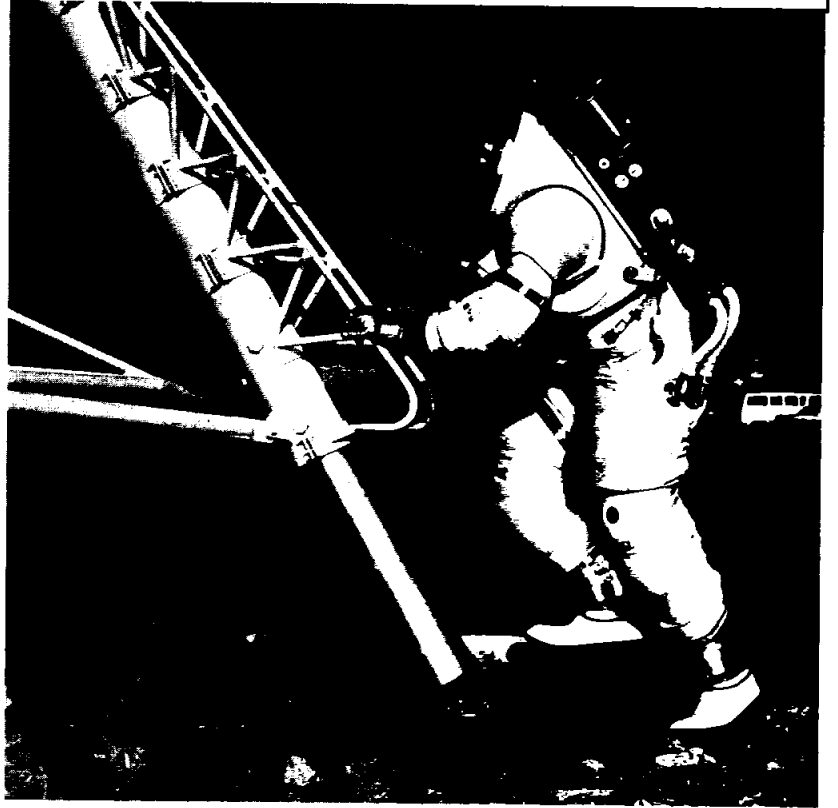
Children age two to 12 of MSC employees are invited to attend the free Third Annual Children's Christmas Party December 18 in the MSC Cafeteria.

Sponsored by the Employee Activities Association, the party gets underway at 2 p.m. with a 30-minute Christmas show by the Tootsie Pohler Puppets, followed at 3 p.m. by local TV entertainers Kitirik, Nod and Skipper.

Santa Claus himself will swing by MSC that day to listen to the youngsters' Christmas wishes. Assisting him will be the Astromettes and MSC clowns. Laverne Hanson will provide Christmas music on the organ, and Philip Hamburger will act as master of ceremonies.

Each child attending is requested to bring a gift not ex-ceeding \$1 in value for a child of the same age and sex, and marked "Boy" or "Girl" and age.

Moon Stroll



HARD-SHELLED—A proposed post-Apollo hard suit undergoes mobility tests at the MSC Lunar Surface Topographic Area. The 80-pound suit, designated RX-2A by its builder, Litton Industries, has constant-volume joints and is made of aluminum and fiberglass. Climbing the LEM leg in the suit is Gordon Swann of the U.S. Geological Service, Flagstaff, Ariz.

Mission Control (Continued from page 1)

director for the two unmanned Gemini Program tests. During the Gemini III flight on March 23, 1965, and the Gemini IV flight June 3-7, 1965, he served as both mission director and flight director. He served as one of three flight directors on the Gemini V mission and the Gemini VI mission this past October.

Heading the Department of Defense support for the mission is Air Force Lt. Gen. Leighton I. Davis, manager of the National Range Division and DOD Manager for Manned Flight Support Operations. DOD support includes launch services at

the Cape, remote tracking facilities and necessary forces for recovery operations. General Davis will be assisted by a staff many of whom have participated in past manned launches.

The three flight directors for the Gemini VII/VI mission are Kraft, Eugene F. Kranz, and John D. Hodge. They will be responsible for detailed control of the flight. They are also responsible for the implementation of mission objectives and for making decisions which might change the flight plan and mission rules on an as-necessary basis.

Judo Club Brings Home Trophies

The MSC/Ellington AFB Judo Club placed third and won two individual trophies in the Goodfellow AFB Invitational Judo Tournament in San Angelo November 27-28.

Manfred H. "Dutch" von Ehrenfried, Flight Control Division, placed first in the 180-lb class; James George, Ellington AFB, second in the Unlimited Class, and Richard Strickland placed third in the Unlimited Class. Attending but not

entered in the tournament were Jim Giles and Don Bray.

The Club plans to enter a tournament each month during 1966, the next meet being at Lackland AFB, San Antonio, January 8-9.

A judo class for persons 35 years and older has been proposed for MSC employees interested in judo, but not in competing in regulation matches. Don Bray, Ext. 2801 has further details. Both men and women are invited.



Ask Trip-Ticket Turn-In

MSC organizations operating GSA vehicles are requested to turn in the "Monthly Motor Vehicle Use Record" forms during the last five days of each month to the GSA dispatcher in Building 417. A new form for each vehicle will be issued which will be valid for the coming month, and which serves both as a trip ticket and as a billing document.

JUDO KUDOS — Manfred H. "Dutch" von Ehrenfried, right, brought home a first place trophy from the 180-lb class in the Goodfellow AFB Invitational Judo Tournament. James George, left, placed second in the Unlimited Class. The rest of the MSC Judo Club stands in the background.

Sang In Graham Choir



CRUSADERS' CHOIR—Betty Midgett, Procurement and Contracts Division, left, and Wanda Slack, Computation and Analysis Division, right, sang in the Billy Graham Crusade Choir November 19-28 in the Houston Astrodome. They are shown here with Choir Director Cliff Barrows.