Space News
NASA ROUNDUP!

VOL. 4, NO. 2 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS NOVEMBER 11, 1964

Approximately 1,000 Attend—

MSFM Delegates Hear Talks By Edward Welsh, Dr. Mueller

The NASA/AIAA sponsored Third Manned Space Flight Meeting held at the Rice Hotel in Houston last week, was attended by approximately 1,000 AIAA members, representing private industry, the military, and the nation's space agency.

St. Louis was the site of the first Manned Space Flight Meeting in 1962, and the second was held last year in Dallas.

The meeting here was climaxed on Thursday night by the banquet and presentation of awards in the Grand Ballroom.

Edward C. Welsh, executive secretary, and acting chairman, National Aeronautics and Space Council, Washington, D. C., was the speaker for the evening. President Johnson was chairman of this council while he was vice president.

Referring to the successful flight of the Russian's three-man spacecraft, Welsh emphasized that the United States is behind in manned spaceflight. He said the Soviet flight of a month ago "should dissolve any doubts that the USSR is pursuing energetically a manned space program."

He said he believed that the Russian booster used to orbit the three-man spacecraft was not as powerful as the Saturn I, but that they only had an improved upper stage of previous rockets they have used.

However he indicated there is every reason to believe that Russian scientists are working on a much more powerful booster.

Welsh would make no prediction regarding next year's space budget but did suggest that space expenditures over the coming years, even with occasional plateaus, will be characterized by an upward trend.

Our national security will be greatly enhanced as satellites contribute to alertness about what other countries are doing, and the nation will see the day that space flight will be routine, he stated.

"In fact," he said, "eventually space flight may develop as a normal means of transportation. There are those who still do not permit their minds to transfer aviation principles to space flight. Some dismiss the idea of recoverable and reusable boosters and spacecraft, and stick to the old ammunition philosophy of one shot and no return."

Thursday evening, the 1964 Astronautics Award of AIAA was presented to Walter C. Williams, former deputy director of the Manned Spacecraft Center. The award, given annually for exceptional achievement in advancing the spaceflight field, was presented to Williams "for outstanding and continuing achievement in successful aerospace systems operations." Williams is now with Aerospace Corporation, El Segundo, Calif.

Past recipients of this award include Astronauts Walter M. Schirra Jr., L. Gordon Cooper Jr., John H. Glenn Jr., and Alan Shepard.

Other awards presented included: the John Jeffries Award for achievements in aerospace medical research which went to Eugene B. Konecci, member of the professional staff of the National Aeronautics and Space Council.

A two-man team of test pilots from the NASA Ames Research Center, Fred J. Drinkwater and Robert C. Innis, were presented the 1964 Octave Chanute Award of AIAA, for notable contributions made by pilots to the aerospace sciences.

Lt. Col. Robert C. Miller, chief forecaster, Air Force Centralized Forecast Facility, was presented the AIAA Robert M. Losey Award for his outstanding contributions in the

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Awards Day Rescheduled For Nov. 19

The Annual Awards Day Ceremony of the Manned Spacecraft Center has been rescheduled for 10 a.m., Thursday, November 19, in the MSC Auditorium.

Originally scheduled for November 2, the awards ceremony was postponed because of the death of Astronaut Ted Freeman.

Awards will be presented by Dr. Robert R. Gilruth, director, MSC; George M. Low, deputy director; and Paul E. Purser, special assistant to the director. Also taking part in the awards program will be Wesley L. Hjornevik, assistant director for Administration, and Stuart H. Clarke, chief, Personnel Division.

The awards program is under the direction of the Incentive Awards Committee, composed of 32 persons who review, evaluate and make recommendations to determine the award winners.

Walker Describes LLRV Flight At Manned Space Flight Meeting

The first flight of the Lunar Landing Research Vehicle was described last Thursday by Joseph A. Walker, project pilot for the National Aeronautics and Space Administration's Flight Research Center at Edwards, Calif., at the third annual Manned Space Flight meeting here in Houston.

The LLRV is being flown at NASA's Flight Research Center, Edwards, Calif., to study the piloting and operational procedures involved during the final phases of a manned lunar landing and during the initial portion of the lunar take-off. The program is in support of project Apollo. The LLRV was built for NASA by Bell Aerosystems, Buffalo, N.Y.

Walker announced that the first flight of the LLRV on Friday, October 30, was the first of several pilot familiarization and check-out flights. Simulated lunar missions are scheduled for early next year.

Walker said that the first flight consisted of three separate take-offs and landings. Total free flight time was just under a minute with a maximum altitude attained of approximately 10 feet. He stated that he utilized only the jet engine for lift power and did not activate the lift rockets. He did, however, operate all eight of the standard control rockets for short periods.

The LLRV is equipped with a jet engine that can be automatically regulated to counterbalance five-sixth's of the vehicle's weight to compensate for the one-sixth gravitional difference between the moon and earth. This engine is also used to provide take-off power.

During forthcoming check-out flights, two hydrogen peroxide rocket-motors, capable of delivering from 100 to 500 lbs. of thrust each, will be used to regulate lift.

Astronaut Theodore C. Freeman

Training Flight Crash Takes Astronaut's Life

The hopes and plans of Astronaut Theodore C. Freeman to one day take part in a round trip to the moon, ended suddenly at 10:50 a.m., Saturday, October 31, when his T-38 jet trainer plunged to the ground near Ellington AFB while he was on a routine training flight.

Air Force Captain Freeman, the first U. S. astronaut to die while in training, was buried last Wednesday with full military honors in Arlington National Cemetery in Virginia, with the entire astronaut team attending the services.

Memorial services for the astronaut were conducted the previous day at the Seabrook, (Tex.) Methodist Church by the Rev. Conrad W. Winborn, with fellow astronauts and neighbors serving as pallbearers. They were Dr. Clifford Duncan of the Manned Spacecraft Center, and Astronauts William A. Anders, Charles A. Bassett II, Michael Collins, David R. Scott, and Frank Borman.

Freeman, who began piloting airplanes when he was 15, was born Feb. 18, 1930 in Haverford, Pa. He was quoted as saying that he considered flying safer than riding his bicycle the three blocks from his home to the Center, which he regularly did.

He joined the astronaut team Oct. 18, 1963 and began his training here at the Center this past February.

An experienced pilot, he had logged more than 3,300 hours flying time, including more than 2,400 hours in jet aircraft. He was also a graduate of both the Air Force's Experimental Test Pilot and Aerospace Research Pilot courses.

He attended the University of Deleware for one year, then entered the U. S. Naval Academy and was graduated in 1953 with a bachelor of science degree. He elected to serve with the U. S. Air Force. In 1960, he received a master of science degree in aeronautical engineering from the University of Michigan.

Freeman's astronaut working specialty assignment was to follow the development of launch vehicles used in the manned space flight program. He had been

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Cape Kennedy Gemini Mission Simulator Now Operational

The National Aeronautics and Space Administration announced November 1, that the Gemini Mission Simulator facility, used for training astronauts at Cape Kennedy during Gemini mission prelaunch preparations, is now operational.

The prime and back-up astronauts selected for the upcoming Gemini-Titan GT-3 mission will train in this simulator for their planned three-orbital flight scheduled for the first quarter of 1965.

The simulator is capable of effecting all aspects of a Gemini mission with exception of lift-off and re-entry forces and weightlessness in space. With a capability of 600 discrete malfunctions and the flexibility of computer programming, there are few emergencies beyond the capabilities of the simulator.

Gemini mission simulation furnishes trajectory and telemetry data by means of computer programming to the Mission Control Center Operations Room and world-wide tracking stations for training personnel of the flight control team.

The Gemini simulator crew station is identical to the cabin section of the Gemini spacecraft. Three closed-circuit TV cameras are provided in the crew station to monitor instrument panels and record astronaut's physiological responses.

Plans call for installation of a celestial display depicting stars, sun, and Earth movement outside the simulated spacecraft's windows to provide realism during the simulated mission.

The Gemini mission simulation room, an addition to the Mission Control Center (MCC), measures 55 by 85 feet. It consists of a Gemini crew station, instructor console, a telemetry console, three computers, and support equipment. One million feet of wiring is concealed beneath the floor of the room.

The entire trainer complex is controlled from a three-man instructor console and a two-man telemetry monitor console.

The Cape Kennedy simulator is one of two Gemini mission simulators manufactured by the McDonnell Aircraft Company at St. Louis. The other simulated spacecraft is located here at the Manned Spacecraft Center.

GEMINI SIMULATION ROOM—Instrumentation complex of the Gemini simulation room in NASA's Mission Control Center. At the right rear are the racks of peripheral equipment. In the foreground are the telemetry console, tape preparation reader, performance measurements recorders, instructor consoles and performance data recorders. In the background are the Gemini crew station and suit and cabin comfort systems for training astronauts for upcoming manned Gemini flights.

GEMINI CREW STATION—Close-up of the Gemini Mission Simulator being checked out at the NASA Mission Control Center at Cape Kennedy. The simulator is a training station for the astronauts and can simulate all aspects of a Gemini mission except lift-off and re-entry forces and weightlessness in space.

Scientists Demonstrate Design Technology For Compact Nuclear-Electric Powerplant

Pratt & Whitney Aircraft scientists have now demonstrated much of the technology on which the design of a compact nuclear-electric powerplant for deep space missions will be based.

This major step toward interplanetary travel and exploration of the solar system was achieved by the successful 10,000-hour operation (14 months) of an engineering-sized lithium-columbium alloy system run at 2000 degrees Fahrenheit and at a power level of 5000 kilowatts. The endurance test was comparable to running a motor car 500,000 miles without any maintenance whatsoever.

The test was completed at the Connecticut Advanced Nuclear Engineering Laboratory (CANEL) at Middletown, Conn., a government-owned facility operated for the Atomic Energy Commission by Pratt & Whitney Aircraft, a division of United Aircraft Corporation.

Such prolonged operational data on fluids and alloys hitherto was non-existent for full-scale systems and hence is a major technological contribution to work on the SNAP-50/SPUR program to develop a nuclear-electric powerplant with a 300 to 1000 kilowatt range.

SNAP stands for the AEC's "systems for nuclear auxiliary power," and SPUR means the Air Force's "space power unit reactor." The program is the only one of its size and range currently under active development in the United States.

The need for a lightweight, nuclear-electric powerplant arises because chemically-propelled vehicles are inadequate for long missions because of heavy fuel requirements.

In the test just concluded, electricity simulated the nuclear reactor's heat. Lithium, circulated by centrifugal pumps, removed the heat, transferring it through powerplant-type heat exchangers to a pumped sodium-potassium circulation system and thence to the atmosphere.

The technology in the test is directly applicable to the SNAP-50/SPUR powerplant which is under development at CANEL. In the actual powerplant a similar system will transfer heat from the reactor to a potassium boiler. Potassium "steam" from the boiler will power a turbogenerator to provide large amounts of electricity for space vehicles.

Lithium, nature's lightest metal, melts at 354 degrees Fahrenheit, and is the most efficient heat transfer fluid known for high temperature systems. But it is highly corrosive. The scientists solved that problem by developing columbium alloy pipes to contain the fluid. Stainless steel tubing was used in the sodium-potassium part of the test system.

Other successful 10,000-hour tests on reactor pressure vessels and components have been done at CANEL. Design of lightweight circulating pumps is under way and model testing will begin soon. These tests and the one just concluded will establish the feasibility of fabricating large, high-temperature reactor heat transport systems with rotating components capable of sustained, trouble-free operation.

A SNAP-50/SPUR powerplant has many potential uses, both propulsive and non-propulsive, in manned and unmanned vehicles. It could be used for large orbiting stations, as a stationary power base on the moon, for a lunar shuttle service, for solar and planetary probes, and for advanced military reconnaissance and weapon systems still undefined.

Current planning calls for construction of a space prototype reactor test in the 1969 period, with a ground test of a complete flight-type powerplant system in the early 1970s.

Apollo Dynamic Stability Testing

TRANSONIC WIND TUNNEL—Preparations for dynamic stability tests of the Apollo command module and its launch escape system are observed by a NASA engineer at the Lewis Research Center, Cleveland, Ohio. A scale model of the spacecraft and its escape system are undergoing tests in Lewis' eight by six foot transonic wind tunnel. The tunnel simulates conditions the spacecraft will encounter during a portion of its flight through the earth's atmosphere.

Astronaut Theodore C. Freeman

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assigned as booster monitor in the Mission Control Center at Cape Kennedy for the forthcoming GT-2 and GT-3 flights.

Dr. Robert R. Gilruth, director of MSC, was at the plant of one of the Center's contractors at the time of the accident and when notified said, "I am terribly sorry to hear of this. All of us are naturally shocked at this loss. Our deepest sympathies go out to Mrs. Freeman, their daughter, and Astronaut Freeman's parents. We will do all we can to help them through this tragic period."

Freeman is survived by his parents Mr. and Mrs. John Freeman from Lewes, Del., by his wife the former Faith Dudley Clark, and a 10-year old daughter Faith Huntington Freeman, both from Nassau Bay, across from MSC.

Inquiry Board To Investigate Astronaut's Aircraft Crash

A board of inquiry composed of members of the Manned Spacecraft Center and Ellington AFB, will investigate the crash of the T-38 jet trainer that killed Astronaut Theodore C. Freeman on October 31, it was announced by Astronaut Donald K. Slayton, assistant director for Flight Crew Operations.

An autopsy performed the following day at the Ben Taub General Hospital in Houston, showed Freeman to have suffered a skull fracture and severe chest injuries. These were named as the cause of death by Dr. Donald I. Thursh of the aviation division of the Armed Forces Institute of Pathology.

The crash of the jet trainer took place approximately two miles west of Ellington AFB as the astronaut was approaching the field for a landing at 10:50 a.m.

According to witnesses, he was approximately 300 to 500 feet high when the canopy appeared to leave the aircraft. It was not clear whether Freeman had ejected or been thrown from the aircraft on impact. The body of the astronaut was found some 100 yards from the aircraft. The plane did not catch fire.

Freeman was pronounced dead at the scene by Dr. Samuel C. Puma, Center Medical Office of MSC.

The wreckage of the aircraft was moved from the crash scene to a hanger at Ellington AFB where the investigation of the wreckage will be conducted.

The T-38 was one of the 15 jet aircraft used by the NASA astronauts to maintain their jet flying proficiency. The 15 aircraft include five T-38's and 10 T-33's.

Freeman had been in the air approximately one hour on the first of two proficiency flights he had planned for the day, when the crash occured. He took off from Ellington AFB at 9:55 a.m. the day of the accident.

Findings by the board of inquiry will be announced when the group has completed its investigation.

Eight MSC Employees Become U.S. Citizens

NEW NATURALIZED CITIZENS—Naturalization ceremonies were conducted last Friday at the United States District Court in the Houston Federal Building for eight members of the Manned Spacecraft Center, and some members of their families, as they became U. S. citizens. Above standing from MSC (l. to r.) are: John D. Hodge, Rodney G. Rose, George A. Watts, Peter J. Armitage, David Brown, Morris V. Jenkins, Thomas V. Chambers, and John K. Meson. Seated are (l. to r.) U. S. Circuit Judge John Brown, and U. S. District Judge James Noel, who was the presiding judge at the ceremonies. A reception followed the naturalization ceremonies.

MSF Meet

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science of meterology as applied to aeronautics.

Members from the Manned Spacecraft Center, and other parts of NASA took part in all of the sessions.

After the introduction and welcome on Wednesday, by Dr. Robert R. Gilruth, director of MSC, and his special assistant Paul E. Purser, along with the mayor of Houston, Louie Welch the first part of the program got underway with the session on the Gemini Program.

Charles W. Mathews, manager, Gemini Program presented "The Gemini Program — Progress and Plans" in which he presented a summary of the progress of the major elements which comprise the program.

Scott H. Simpkinson, manager, MSC Office of Test Operations, presented a paper on the "Gemini Test Program." The Gemini session was chaired by Kenneth S. Kleinknecht, deputy manager, Gemini Program Office.

Wednesday, Dr. George E. Mueller, associate administrator for Manned Space Flight, addressed a noon luncheon for those attending the meeting. He cited four important decisions made in the United States in the past 10 years.

"The first was in 1954, when as the result of the Von Neumann Committee's recommendation we began the ballistic missile program on a top-priority basis.

"The second decision a year later was to undertake the Vanguard program as the second priority effort, completely separate from the ballistic missile program."

The passage of the National Aeronautics and Space Act, was the third, and the fourth came in 1961 when President Kennedy decided to expand American space activity, he said.

Mueller went on to say that there is no such thing as unmanned exploration of space. The only question regarding man is his location . . . should he be on the ground, operating his instruments by remote control? Or should he be present in the spacecraft?

He said these questions were foregone in the early years of the space age by the lack of rocket power; however, at the present, we are moving into a period in which the launch vehicle power is available. In fact the pendulum is swinging the other direction, he said.

On Wednesday afternoon the "Apollo Program Status" was presented by Dr. Joseph F. Shea, manager, Apollo Spacecraft Program Office.

This portion of the Manned Space Flight Meeting was chaired by Robert O. Piland and coordinated by James Neal, both of Apollo.

Maxime A. Faget, assistant director for Engineering and Development and Christopher C. Kraft, assistant director for Flight Operations, presented a paper on "Spacecraft Reentry Landing and Recovery Techniques."

Thursday morning sessions on Launch Vehicles, coordinated by Jerome B. Hammack of MSC, and Guidance and Control, coordinated by Cline Frasier of MSC, were presented. This was followed by a session on Bio-Technologies.

The latter session was chaired by Rufus R. Hessburg, M. D., from MSC, and included a paper by Gilbert M. Freedman of MSC, on "Control of Man's Thermal Environment During an Extravehicular Mission."

Thursday afternoon a session on Spacecraft Design, with Carl B. Peterson from MSC serving as coordinator, was presented.

Another session on Thursday was presented on Simulation and Training, and Donald K. Slayton, assistant director for Flight Crew Operations, was chairman, with John Jones, also of MSC, as the coordinator.

Papers were presented by Astronaut Neil A. Armstrong on "Manned Spacecraft Center Training Programs," and by Clarke T. Hackler of MSC, on "Handling Qualities for Pilot Control of Apollo Lunar Landing Spacecraft."

On Friday the Advanced Manned Missions session was chaired by E. Z. Gray, NASA Hq, and coordinated by Thomas Briggs of MSC.

The final session on Future Challenges included a paper by Dave W. Lang, MSC Procurement and Contracts Division chief, on "The Government's Attitude Toward Profit."

AIAA AWARD WINNERS—Awards were presented last Thursday evening at the Third Manned Space Flight Meeting banquet to (l. to r.): Fred J. Drinkwater and Robert C. Innis, NASA Ames Research Center, the "1964 Octave Chanute Award;" Lt. Col. Robert C. Miller, Air Force Centralized Forecast Facility, the "AIAA Robert M. Losey Award;" Eugene B. Konecci, National Aeronautics and Space Council, the "1964 John Jeffries Award;" and Walter C. Williams, Aerospace Corporation, the "1964 Astronautics Award of AIAA;" and making the presentations was Courtland D. Perkins, president of AIAA.

COST REDUCTION CORNER

Mission scanning of either daily launch windows or monthly periods was previously accomplished manually by submitting individual restricted programs.

Automation of mission scans provides optimum scan solutions eliminating the necessity of continuous manual input and cross plotting of numerous results.

This saved labor in the amount of $2,000 and machine time of 60% or $7,000.

James J. Taylor credited for this savings of $9,000.00.

Lear Siegler Furnishing Many Of Indicators For

When the first manned Gemini spacecraft lifts off the pad at Cape Kennedy, on its orbital flight of the earth, the crew will depend on the panel of instruments before them for vital information concerning the flight.

Many of the indicators on the instrument panel that will provide this information, were engineered and produced by a company with the experience of many years, and literally hundreds of thousands of instruments behind them—the Instrument Division of Lear Siegler, Inc., in Grand Rapids, Mich.

Located on an ultra-modern 65-acre industrial aerospace complex, this is just one of 14 domestic and foreign LSI divisions. The Instrument Division, however, is devoted entirely to the design and production of gyroscopic and electronic devices for missiles, aircraft and spacecraft.

The division has produced over 25,000 remote vertical gyro indicating systems, which include special units for such projects as the X-15 research plane.

In 1962, it was announced that the Instrument Division had been selected to supply the flight director-attitude indicators for Gemini.

This display is the primary visual reference used by the astronauts throughout the entire flight and indicates the spacecraft attitude in pitch, roll, and yaw. It also shows corrections in attitude required to perform specific maneuvers in space. The integral flight director needles are used to display attitude and rate change commands, while special markings on the sphere provide accurate retrofire attitude information. Two of these vital indicators are mounted in each Gemini spacecraft, one directly in front of each astronaut.

FINISHING TOUCH—This "white room" technician is putting the finishing touches on one of the Gemini three-axis attitude indicators. The Instrument Division has approximately 42,000 square feet of "clean" and "superclean" rooms for the assembly of precision instruments.

In addition to the indicators, a controller that allows the astronauts to select the modes of operation of the indicators, as well as the type of reference to which the attitude system should be slaved, is provided for each indicator.

A few months after the award of the attitude indicator contract, the LSI Instrument Division also was made responsible for the incremental velocity indicator for Gemini. This device displays changes in the velocity of the spacecraft along all three major axes of movement. Mounted on the panel in front of the left or command pilot, and directly below the attitude indicator, the incremental velocity indicator becomes of prime importance to the astronaut when he is adjusting the ship's orbit to coincide with that of a rendezvous target vehicle preparatory to the docking maneuver.

In the spring of 1963, LSI Instrument Division participation in the Gemini Project was again increased when they were selected to supply the launch vehicle propellant tank indicators. These units display the pressures within the fuel and oxidizer tanks of both the first and second stages of the launch vehicle. The indicators are mounted high on the center instrument panel, where they can be observed by both astronauts.

During lift-off, the Gemini crew will use the first pair of instruments to monitor the pressures of the first stage rocket engine. Incorrect pressure could indicate potential malfunction of the launch rocket and lead to an abort of the mission.

The second pair of indicators will monitor lockup pressure of the second stage during first stage operation to assure adequate pressures for staging and also operational pressures during second stage flight. These instruments feature vertical scale readouts and fully floated meter mechanisms for maximum environmental protection.

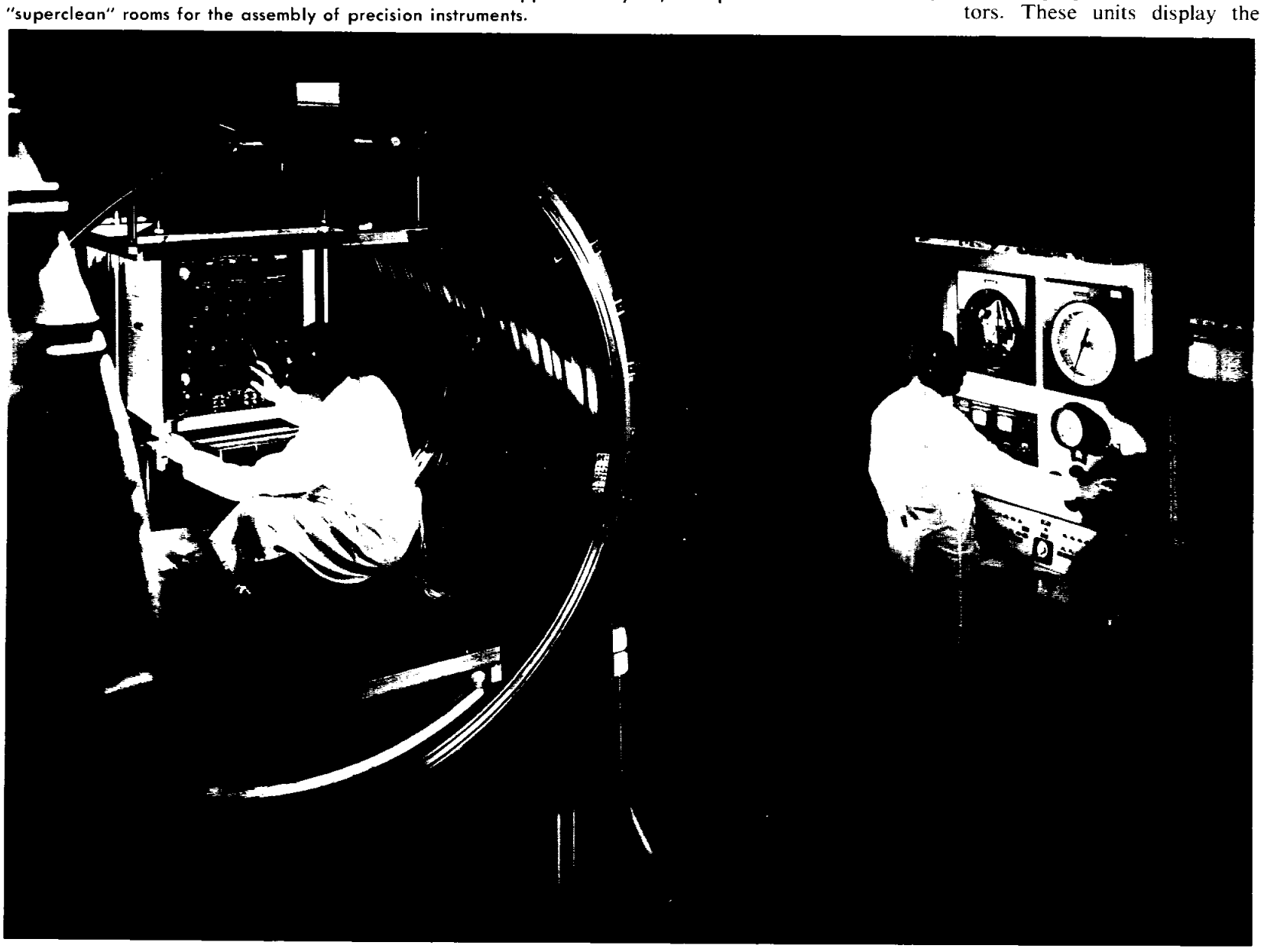
Also in 1963, the three environmental indicators for Gemini were assigned to the LSI organization. The linear scale units indicate the temperatures of the cabin and of the astronauts' space suits, the cabin pressures, and also the quantity of the secondary oxygen supply, to be used by the flight crew during the re-entry phase of the flight after the primary system has been jettisoned.

The linear "thermometer" configuration is utilized on these indicators, as on many Gemini indicators, because this style of instrument has been found to be quicker and easier to read than the more conventional "clock-type" indicator. The environmental indicators also are located on the center instrument panel, convenient to both astronauts.

The most recent Gemini display by the LSI Instrument Division, is the Power System Monitor. This indicator also is a vertical scale instrument and is mounted in the panel facing the right-hand Gemini pilot. It supplies eight electric readings: six ammeters, an AC-DC voltmeter, and a pressure indicator, all mounted in a one-piece magnesium frame. The eight precision D-Arsonval meter movements used in this instrument are fully floated for environmental protection.

Because of the extremely stringent requirements of the Gemini program, a special LSI project team was assembled to produce these high reliability, limited production units. Highly trained technicians joined an engineering staff to form the nucleus of the group. Instrument Division Environmental Test Laboratories, one of the most extensive and capable organizations of its type in the nation, virtually became a part of the Gemini instrument project because of the broad array of tests that were a requirement for these devices.

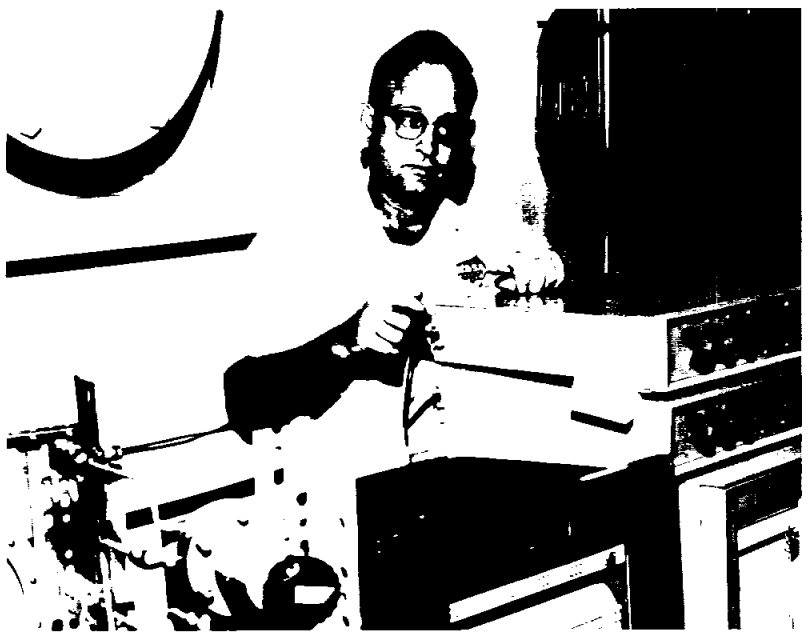
Instrument Division "clean rooms," environmentally controlled work areas, were used for the assembly of the units. Quality Control maintained a



TESTING FOR SPACE—The Instrument Division-built Gemini instruments have proven their ability to operate efficiently in the environments of space. They've all been tested at the temperatures and air pressures encountered at orbital altitudes in the Division's space chamber.

MSC at work...

MADELINE WITHOFF, secretary to Astronaut M. Scott Carpenter, executive assistant to the director, is shown as she helps with the formulation of the agenda for a forthcoming MSC conference.



JAMES E. ADKINS, electronic instrument maker, of the System Test Branch, Crew Systems Division, wires the Gemini waste test equipment which will be used in the 20 foot chamber in Building 7.

MSC Christmas Dance Final Plans Announced

Final plans for the Annual MSC Christmas Dance sponsored by the MSC Employees Activity Association have been announced by Charles H. Pace, chairman of the dance committee.

This semi-formal dress affair will feature dance music by Nick Navarro and his 11-piece orchestra. The gala event will be held from 8:00 p.m. until midnight, Friday, December 11, at the Sylvan Beach Pavilian in La Porte.

Tickets will be $2.50 *per person*, which includes admission and set-ups. There is no charge for parking. Tables in the 800-seat pavilion on Galveston Bay will be set for parties from four to twenty people on a "first come—first served" basis.

Employees Activities Association representatives, as well as building receptionists, will begin ticket sales on November 25. Roving sales representatives will also sell tickets in the cafeteria.

Reserve Friday night, December 11th, for the Annual MSC Christmas Dance. Further dance news, along with a directional map to Sylvan Beach Pavilion, will appear in the Roundup.

Don't forget to make your reservations for the trip down the Houston Ship Channel on the Inspection Boat "Sam Houston" at 2 p.m. Sunday November 14. Call Flossie Leggett, ext. 2438 to make your reservation.

Hey There! You With The Voice

People interested in forming a small vocal group, just for the fun of singing, are urged to contact Ed Bernard, Ext. 4115.

Election Results Announced—

New EAA General Assembly Members Will Hold First Meeting January 6

The results of the November 3 election of representatives and alternates to the MSC Employees Activities Association General Assembly were announced this week.

The first meeting of the new General Assembly will be held at 1 p.m., Wednesday, Jan. 6, 1965 in Room 661 of Building 2. At that time vacancies on the Executive Council of EAA will be filled from the General Assembly members.

The present executive board is made up of: Al Ligrani, president: Abner Askew, vice president: Claude Ingels, treaurer: Phoncille De Vore, secretary and chairman of the Promotion Committee: David Bell, chairman of Building, Grounds and Safety Committee: Ragan Edmiston, chairman of Activities Committee: Joe McMann, chairman of Children's Committee: Mary Sylvia, chairman of Social Committee: and Mervin Hughes, chairman of Arts and Crafts.

A new chairmanship will be created for a Corresponding Secretary and Phoncille De Vore will remain as chairman of the Promotion Committee.

The above chairman seat along with the following will be filled by an election in the General Assembly when it meets in January: president: chairman of Building, Grounds and Safety Committee: chairman of Activities Committee: and chairman of Children's Committee. These will be elected for a two year term. The other members of other offices on the Executive Council of EAA will continue to serve for another year.

The following are members elected to the 36 districts of the EAA at the Center. The district number is given and followed by the name of the elected representative and the alternate.

1. Philip T. Hamburger, Elwyn H. Yeater.
2. John E. McLeaish, S. Sherman Kendall.
3. Leroy Fair, Beatrice K. Anderson.
4. Colin Kennedy, Allen Williams.
5. Juanita G. Bower, Frank D. McCrimmon.
6. Tom F. Brahm, Eugene G. Edmonds.
7. Imogene McDonald, Marvin Cohn.
8. William Laycock, Paul A. Folwell.
9. David B. Mullins, Jesse Lee Crusey.
10. Charles E. Beckman, Evon Collins.
11. Paul Liebhardt, William C. Hannor.
12. Rita Sommer, Charles W. Jones.
13. Stanley P. Weiss, Robert S. Harris Jr.
14. Ralph E. Prior, Jesse R. Dull.
15. Charles W. Dessens, Joy Morris.
16. Myrtle A. Richard, Lee R. Nichols.
17. Rex R. Bauerlein, George Stephenson.
18. Gloria B. Martinez, Edward E. Quinn.
19. John Miles, Robert A. Balusek.
20. Connie Rae Turner, Ernest M. Fridge III.
21. Luther E. Walters, Jack Foster.
22. Ron Bartosh, William L. Baldwin.
23. Hugh M. Scott, Inez B. Reynolds.
24. Ernest E. Kennedy, Loretta Orlando.
25. Edward B. Sheffel, Linda Drysdale.
26. Flora Byers, Dannie C. Barclay.
27. David M. Harrell, Herbert G. Patterson.
28. J. T. Taylor, Peggy Chambers.
29. William K. Creasy, Willie S. Beckham.
30. Ann Bragg, Virginia Smith.
31. Hank A. Rotter, Charles R. Thomas.
32. Joyce L. Lowe, Robert Jones.
33. Barbara D. Arabian, Sidney L. Whitney.
34. Ray J. Roten, Janice Moody.
35. Marjorie Hamm, R. W. McCausland.
36. Mary Etta Barnes, Robert W. Horstman.

New Employee Orientation Set November 20

The orientation for new employees here at the Manned Spacecraft Center has been postponed one day, from November 19 to the 20th.

It is scheduled to be held from 9 a.m. to 12 noon, November 20, in the MSC Auditorium.

MSC employees who have not attended one of these orientations sessions and would like to attend, are welcome.

Areas covered in the orientation by speakers from the Center, with the aid of films and slides, are the MSC organization, mission, personnel policies, procedures, and historical data on NASA and MSC.

Test Your Security I. Q.

1. Material classified Secret must be stored: A. In a modified cabinet with a padlock: B. In a Security approved safe with a three position combination lock: C. In a key lock file cabinet.

2. After hours emergency Security Assistance may be obtained: A. By calling the NASA Guard Dispatcher (EXT. 2691): B. By calling the Security Division: C. By dialing the MSC Operator.

3. Unsolicited questionnaires concerning your job should be: A. Answered but not signed: B. Referred to Security Division: C. Destroyed.

4. If your NASA Badge is lost: A. Advise Security Division by memo outlining the circumstances: B. Obtain a temporary badge and wait for the return of your badge: C. Notify your Division Chief.

5. Yellow painted curbing indicates: A. No parking: B. Visitor reserved areas: C. No parking except for emergency vehicles.

(Answers on page 5-A)

RECEIVES AWARD—Grace K. Winn, of the Educational Programs and Services Branch, Public Affairs Office, is shown receiving the Sustained Superior Performance Award recently, from Paul E. Purser, special assistant to the director of MSC.

MSC Makes Flu Vaccine Available To Employees

Flu vaccine is being made available for all MSC employees again this year on a voluntary basis by the Center Medical Office.

The first innoculations were given last Friday here at the Center and at White Sands Operations in New Mexico.

Immunization innoculations will be given again from 9 a.m. to 3 p.m., this Friday, in the reception room of the dispensary located in Building 8 here at the Center.

No charge is made to MSC employees for this service. It has been established as a part of the preventive medicine program for MSC.

Employees allergic to eggs or who have other severe allergies should not receive the innoculation against influenza. Also, the vaccine should not be taken by any individual with a cold, it was stated by Willard R. Hawkins, M.D., assistant chief for Occupational Medicine.

Employees should bring their personal immunization record if they have one, so that proper entry can be made in their records.

AF COMMENDATION MEDAL — Dr. Charles A. Berry (right), chief of Center Medical Programs, presents a citation accompanying the Air Force Commendation Medal to TSgt. Nelson D. Parsons, as Dr. D. Owen Coons, chief of Medical Operations, looks on. Sergeant Parsons was awarded the Commendation Medal for his outstanding achievement as an Aero Medical Technician in support of the Gemini and Apollo programs while assigned at MSC-Florida Operations at Cape Kennedy. The award was presented in a ceremony in the MSC-Florida Operations new Manned Spacecraft Operations Building at Merritt Island, Fla.

Lots Of Planning Turns A Picnic Into Lots Of Fun

What's involved in putting on a picnic like the one for MSC employees on September 27 of this year?

These figures came to light recently and may give an indication of the cost and work that it takes to provide us humans with a few hours of fun.

The total cost was $6,055.46. The Exchange Council paid $3,527.04 and the Employees Activities Association, $2,528.42.

If you were one of those attending the picnic, you were served one of the 4,125 dinners and helped to consume 3200 chicken halves, 1786 pounds of potato salad that contained 900 pounds of potatoes, 1080 eggs, 236 pounds of trimmed celery, 25 gallons of pickles, 40 gallons of mayonnaise, and 72 pounds of pimentos. On top of this add 160 gallons of barbecue sauce, 160 gallons of baked beans, 40 gallons of green olives, 54 gallons of dill pickles, and 348 loves of bread.

This was all prepared by MSC Cafeteria workers the Friday and Saturday before the picnic, then transported to the picnic grounds and served between 12 noon and 4 p.m., on Sunday.

The EAA members also put in a lot of hard work and time on the project. They provided 54 kegs of beer, barrels of soft drinks, 13,000 snow cones, plus bushels of popcorn and cotton candy and they wrapped knives, forks and spoons into 4,000 napkins. There were 3,000 hats as favors and 54 prizes for races. Entertainment was furnished in the form of a band, square dancers, movies, ponies, pony cart, merry-go-round, fire engine, ferris wheel, and sports equipment. Gas was furnished for the ski and drag boats. Tickets had to be sold. These were some of the more necessary items that were required to make the whole affair a most enjoyable and successful picnic.

Then there's next year!

MSC BOWLING ROUNDUP

MSC MIXED LEAGUE
Standings as of Nov. 2

TEAM	WON	LOST
Eightballs	23	9
Alley Cats	21	11
Celestials	20	12
Dusters	20	12
Virginians	18	14
Gutter Nuts	18	14
Shakers	16	16
Falcons	14	18
Chugg-a-Lugs	13	19
Hawks	12	20
Play Mates	11	21
Goof Balls	9	23

High Game Women: Barnes 180, Taylor 174, Gassett 165.

High Game Men: Morris 230, Schmidt 221, Sargent 220.

High Series Women: Barnes 511, Gassett 450, Smith 394.

High Series Men: Spivey 574, Morris 570, Sargent 564.

High Team Game: Eight Balls 823, Dusters 803, Celestials 802.

High Team Series: Eight Balls 2321, Alley Cats 2227, Celestials 2271.

MSC COUPLES LEAGUE
Standings as of Nov. 3

TEAM	WON	LOST
Wha Hoppen!	29	7
Hi-Ho's	23	13
Sandbaggers	21½	14½
Crickets	21	15
Schplitz	21	15
Alley Cats	16	20
Pinsplitters	16	20
Thinkers	15	21
EZ-Go	14½	21½
BLTZF	13	23
Goofballs	12½	23½
Bowlernauts	12½	23½

High Game Women: S. Swain 234, Don Donatto 223.

High Game Men: L. Townsend 236, D. Kennedy 225.

High Series Women: S. Swain 548, 526, 524, J. Foster 514.

High Series Men: G. Sandars 568, D. Behne, J. Warren 561.

MIMOSA MEN'S LEAGUE
Standings as of Oct. 29

TEAM	WON	LOST
Fabricators	22	14
Alley Oops	21	15
Pseudonauts	20	16
Whirlwinds	20	16
Sizzlers	19	17
Green Giants	19	17
Roadrunners	16	20
Technics	15	21
Turkeys	15	21
Spastics	13	23

High Game: Hecht 244, Amason 233, Blalock 225.

High Series: Keggins 607, Folwell 604, Sanders 586.

High Team Game: Fabricators 990, Green Giants 928, Alley Oops 919.

High Team Series: Fabricators 2641, Green Giants 2591, Sizzlers 2542.

NASA 5 O'CLOCK MON.
Standings as of Nov. 2

TEAM	WON	LOST
Suppliers	18	10
Sombreros	17	11
Foul Five	16	12
Computers	15	13
Hot Shots	11	17
Alley Gators	7	21

High Game: H. Erickson 224, C. Eckert 219, E. Gorecki 212.

High Series: H. Walker 557, R. Linberger 537, G. Carter 531.

High Team Game: Suppliers 845, Foul Five 832, Hot Shots 805.

High Team Series: Hot Shots 2326, Foul Five 2304, Sombreros 2208.

2,163 Members—

Credit Union Deposits Are Up

Assets of the MSC Federal Credit Union reached a new high with over $727,000 on deposit by 2,163 members, as of October 1, just 31 months after the credit union was formed, Joe Murray, manager announced.

This compares with the $314,000 on deposit by 1,022 members on Oct. 1, 1963. At that time the credit union had outstanding, 505 loans, totaling $305,000.

The present number of loans on the credit union books is 891 for $588,000. Murray said that approximately $140,000 is now available for loan to members at cheaper rates than the banks or loan companies. Each loan is also insured free, he said.

Loans are now being made on new 1965 automobiles for a 36 month period, at three-fourths of one per cent per month on the unpaid balance, Murray stated. Loans are also available on used autos for up to 30 months.

In addition to the credit union being the best place to borrow money for less, it is also the best place to earn more on money you have to invest, Murray said. Last year the MSC Federal Credit Union declared a 5.04 per cent dividend on all deposits.

Bridge Winners, Tournament Announced

Winners at the October 20 MSC Duplicate Bridge session were: Max Cone and John Stanfield, first, North-South; and Betsy Mason and Leona Kempainen, first, East-West. Second place, North-South, went to Bob and Terry Hodgson; with Ray Lynch and Paul Swanzy coming in second, East-West.

Attendance at the October 27 game was unusually light, so a Howell movement was used. First place was won by Wayne and Elizabeth Brewer, and second by Bob and Terry Hodgson.

One of the big national bridge tournaments, the Fall Nationals of the American Contract Bridge League will be held in Dallas commencing November 28.

Conference Hosted By MSC

The annual NASA Property and Supply Management Conference held recently at the Kings Inn Motel in Clear Lake City, was hosted by the Manned Spacecraft Center.

Conferees were welcomed to MSC by Paul E. Purser, special assistant to the Director. Hazen L. Walker, chief, Logistics Division, presented a special review and briefing on overall supply operations in MSC since the relocation of the Center to Houston.

A tour was then made of the Site by the group.

The three day conference was devoted primarily to workshop groups and discussions concerning supply management problems presented by the various NASA Centers throughout the Agency.

ANSWERS TO SECURITY QUIZ
1. B, 2. A, 3. B, 4. A, 5. C.

NASA PROPERTY AND SUPPLY MANAGEMENT CONFEREES — NASA organizations represented are pictured during their recent conference as they assembled prior to touring the Center. They are: (Front row, left to right) Hazen L. Walker, chief, Logistics Division, MSC; C. D. Gang, WOO; D. Morehead, WOO; Frank Lofurno, Langley Research; George Mallios, MSC; L. T. Birch, Wallops; B. M. Davis, KSC; D. E. Mahoney, KSC; W. Mills, PLO; (Second row) J. Robinson, Goddard; C. Shaffer, NASA Hqs.; R. K. Manning, LRC; John Munick, Langley Research; L. J. Walsh, FRC; E. P. Beach, Wallops; E. J. Skochin, NASA Hdqs; R. Weisskopf, Ames Research; (Third row) R. Blades, Goddard; D. King, NASA Hqs.; L. R. Duckwall, Marshall; O. G. Parsons, FRC; W. M. Harris, MSC; J. E. Bonnell, Ames Research; Dave Buchanan, Langley Research; (Fourth row) R. C. Cowan, Goddard; W. Adamson, NASA Hdqs; L. C. Crouch, Marshall; D. R. Hendrickson, MSC; L. S. Hanson, Director of Property and Supply, NASA Hdqs; C. J. Eckert, MSC; B. E. Calhoun, MSC.

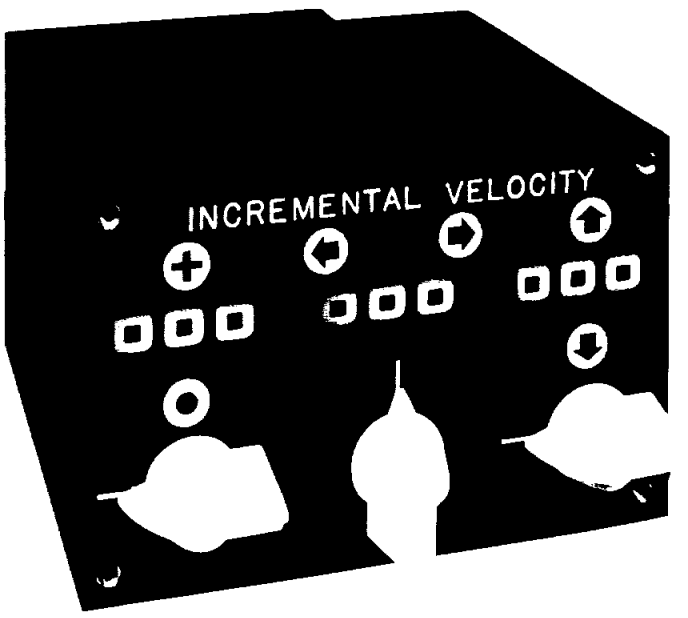
Gemini's Instrument Panel

close watch at every step of the manufacturing operation. Every person involved in the production of the Gemini instruments at LSI was aware of the vital role these instruments would play in the space flights.

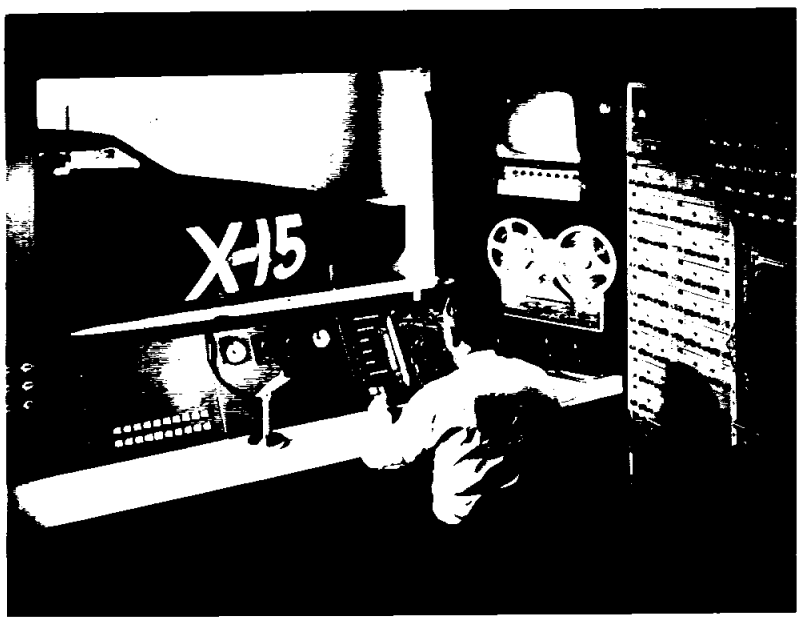
To give some idea of the rugged precision that all Gemini instruments are required to exhibit, they all are tested and must prove their abilities to perform efficiently under temperatures ranging from zero degree F., to 200 degrees F. and in "thin" air pressures down to 1.47×10 to the minus fifth power psia. They are subjected to shocks ranging to 40 times the force of gravity and must be able to withstand such hostile conditions as 100 per cent humidity, fungus growth, salt spray and sand and dust "baths."

When the flames and smoke begin to spew forth from the launch vehicle that will propel the Gemini and its crew outward from earth, things will probably slow down for a short time in the three huge tan brick buildings that house the Instrument Division in Grand Rapids. It will be understandable, because the people in these buildings have put their best efforts into their instruments and each employee will have contributed a little to the space bound Gemini spacecraft.

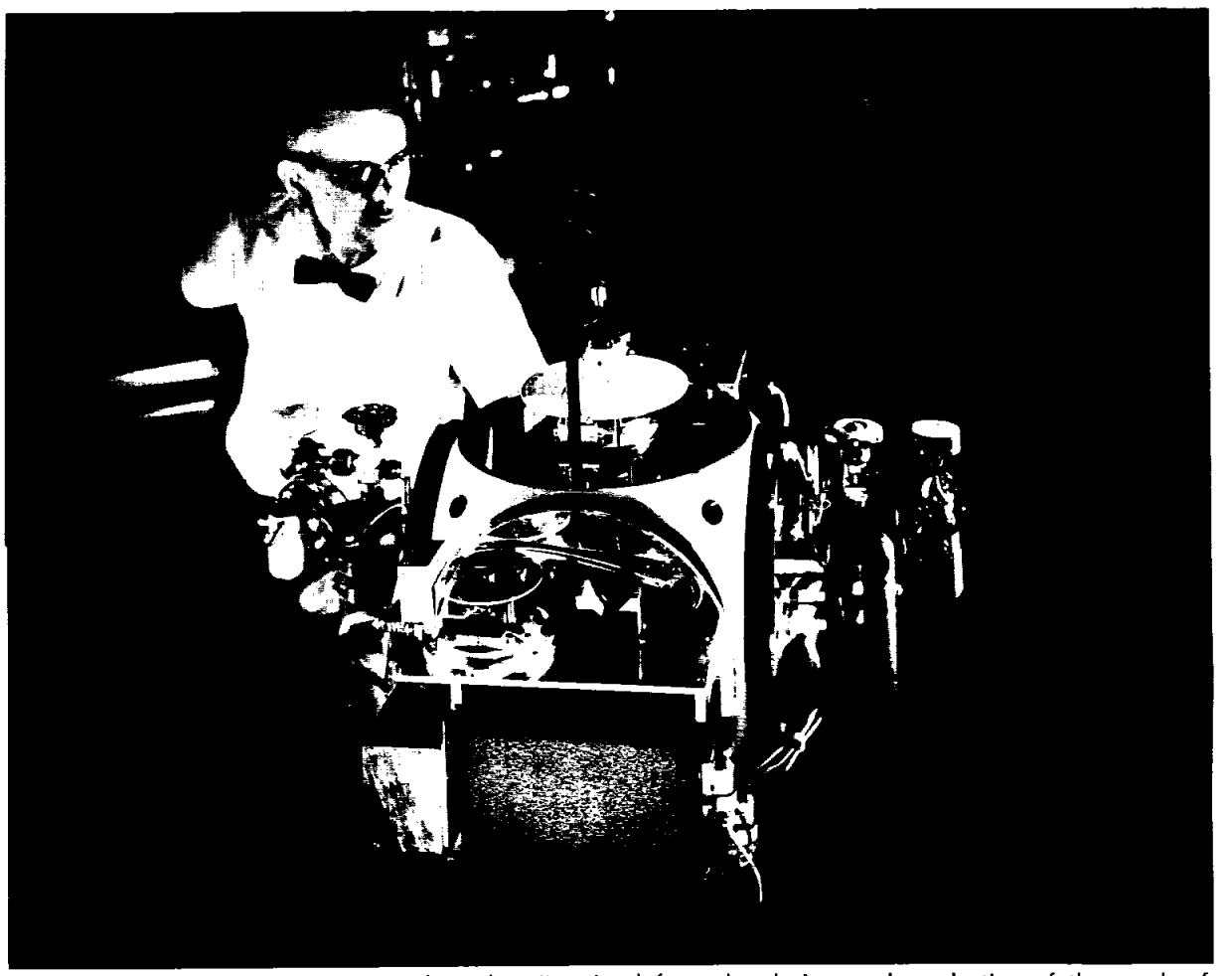
EDITOR'S NOTE: This is the thirty-fifth in a series of articles designed to acquaint MSC personnel with the Center's industrial family, the contractors who make MSC spacecraft, their launch vehicles and associated equipment. The material on these two pages was furnished by the Product Information, Lear Siegler, Inc., Instrument Division.



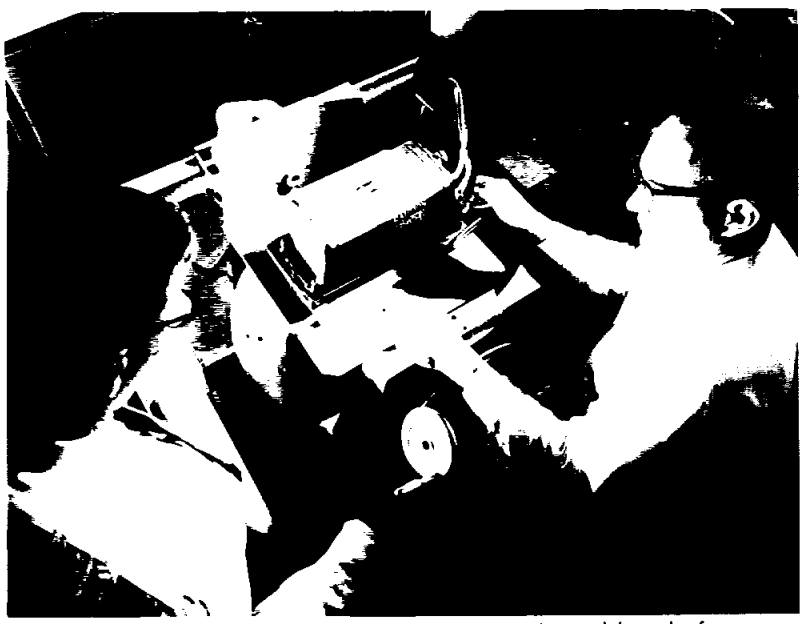
VELOCITY INDICATOR—This incremental velocity indicator, with digital readouts of speeds along all three axes of flight, is one of the instruments produced by the Instrument Division for the Gemini program.



CONTROL-DISPLAY SYSTEMS—Design and development of complete control-display systems is a special forte of the Instrument Division. This operating mock-up of a new panel for the X-15 research aircraft is undergoing tests in the Division's flight simulation laboratory.

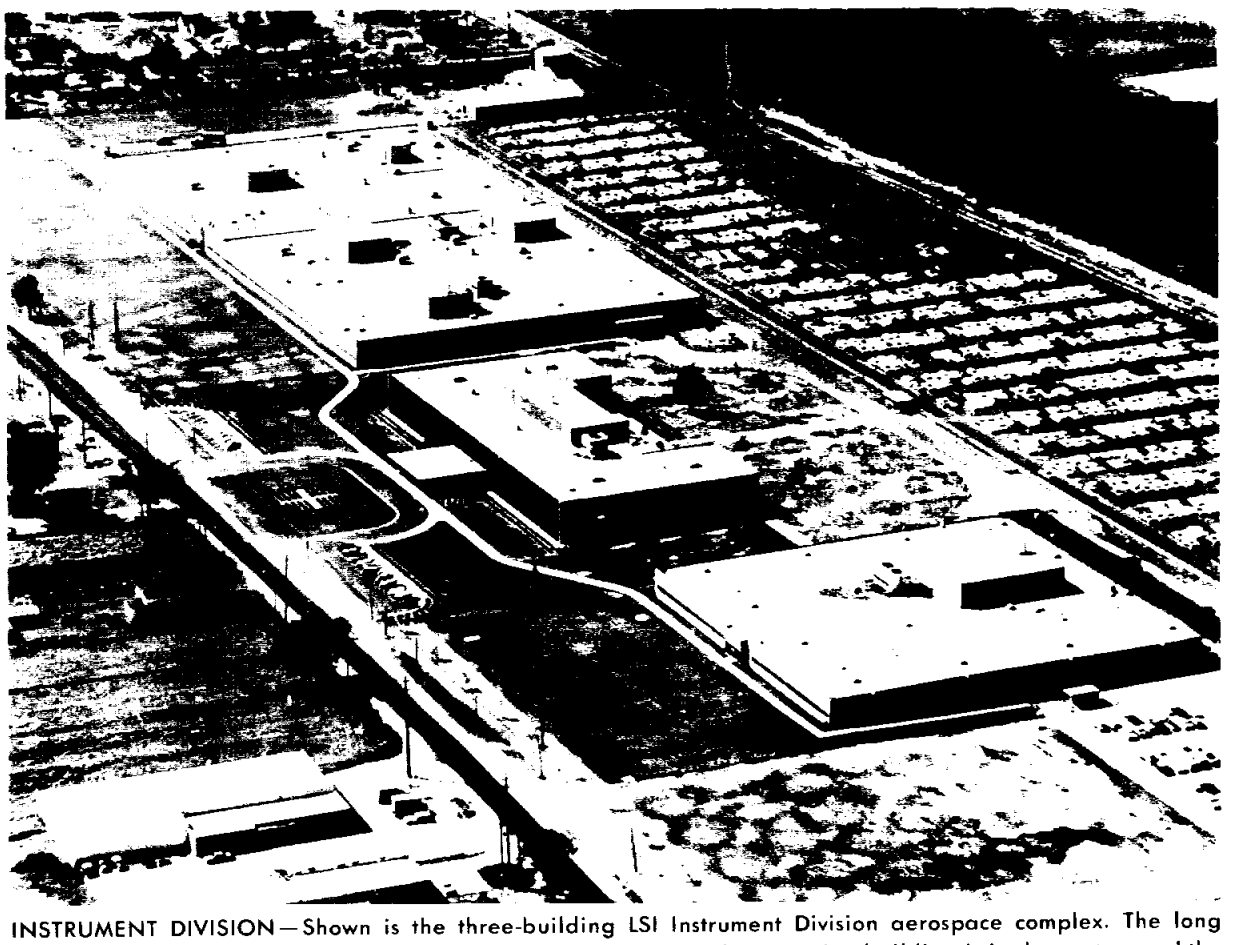


"SUN-SEEKER"—Instrument Division "know-how," gained from the design and production of thousands of flight control and guidance systems for aircraft, now is being applied to space travel problems. This breadboard model of a guidance and control system for a space ship is based on a "sun-seeker." That is, it uses the sun as a reference point to maintain the stability and flight direction of the ship.



GYRO PLATFORMS—Gyroscopes and gyroscopic stable platforms are another major product line of the Instrument Division. Two-gyro platforms of the type being tested here are standard equipment on many of the nation's jet fighters.

CLEAN ROOM TESTING—Instrument Division instruments are carefully tested and checked out before they are declared ready to ship. Every two-gyro platform, of the type undergoing testing in this clean room, has at least 30 continuous hours of acceptance testing to its credit before it is considered ready to go.

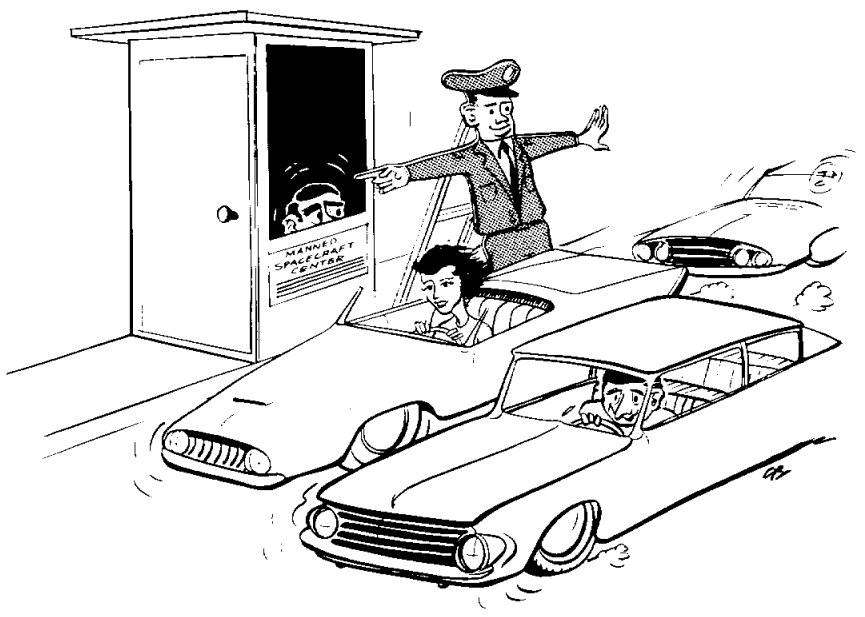


INSTRUMENT DIVISION—Shown is the three-building LSI Instrument Division aerospace complex. The long building on the left is the manufacturing facility, the two-story administration building is in the center, and the engineering building is on the right.

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

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

On The Lighter Side



Welcome Aboard

Eighty-six new employees joined the Manned Spacecraft Center during the last reporting period. Of these, one was assigned to White Sands Operations, seven to MSC-Florida Operations, and the remaining 78 here in Houston.

CENTER MEDICAL OFFICE: Madie C. Evans, and Doris C. Grauerholz.

RELIABILITY AND QUALITY ASSURANCE OFFICE: James W. Donnell.

OFFICE OF ADMINISTRATIVE SERVICES: Beverly C. Hildebrand, Chester J. Meyers, Freddie Pete, and Augustine A. Verrengia.

OFFICE SERVICES DIVISION: Helen G. Arthur, and Leon Renfro.

TECHNICAL INFORMATION DIVISION: Shirley A. Elrod, Freddie R. McDonald, and Martin P. McDonough.

LOGISTICS DIVISION: Edith J. Brasher, Gerald R. Kimbrough, and Marquis G. Powell.

PROCUREMENT AND CONTRACTS DIVISION: E. Virginia Alexander, Judith A. Bohanan, Orissa G. Cox, Harold V. Dutton Jr., Carolyn E. Hartman, Maurice L. Higgins, Karren K. Hollenbeck, Beatrix Martin, and Ralph Villafranca.

PERSONNEL DIVISION: Joanne R. Bradshaw, Karen Gerson, Barbara P. Hardy, Ruby J. Hibbard, Eleanor J. Jurecek, Nan C. Moore, Ella A. Smith, Sharon L. Stiles, and Gloria J. Webb.

RESOURCES MANAGEMENT DIVISION: Dorothy M. Coker, Charles L. Gardiner, Robert C. Gillespie, John E. Hede, William F. Moran, and Donald R. Wolf.

SECURITY DIVISION: Bonnie E. Henry, and Linda L. Losier.

OFFICE OF TECHNICAL & ENGINEERING SERVICES: Claudette E. Fucci, Thomas V. McGrath, Maudine E. Bailey, Janet R. Veloso, Jay L. Carleton, Jerry L. King, John L. Palmer, James E. Stringer, and Herbert E. Taylor.

FLIGHT CREW SUPPORT DIVISION: Walton P. Henry Jr., and Charles K. Seaman.

INFORMATION SYSTEMS DIVISION: Theodore W. Eggleston.

COMPUTATION & ANALYSIS DIVISION: Sterling L. Fugman, Norman W. Naugle and Atlas R. Westbrook.

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION: Robert W. Wilmarth.

GUIDANCE AND CONTROL DIVISION: Richard D. Burghduff.

STRUCTURES AND MECHANICS DIVISION: Estella Hernandez.

ADVANCED SPACECRAFT TECHNOLOGY DIVISION: Garland T. Bauch, and Virginia L. Voelkel.

FLIGHT CONTROL DIVISION: Joseph Fuller, Willard S. Presley, and Donald R. Puddy.

LANDING AND RECOVERY DIVISION: Stanley F. Howell, and Leroy A. Penn Jr.

MISSION PLANNING AND ANALYSIS DIVISION: James M. Allen, and Rebecca J. Boozer.

GEMINI PROGRAM OFFICE: Robert J. Thoben, and Gene D. Walker.

MSC-FLORIDA OPERATIONS (Merritt Island, Fla.): Fred D. Evans Jr., John A. Hallmark Jr., Dorothy Huntoon, Donna M. Jay, Karl A. Keinanen, William F. Petty, and F. R. Schilling.

APOLLO SPACECRAFT PROGRAM OFFICE: Harry L. Culver, Elton R. Foor Jr., Y. Nancy Hughes, Charles H. M. Laubach, Russell S. Morton Jr., J. Arnold Smith, Anna M. Wells, and Jean J. Wyatt.

WHITE SANDS OPERATIONS (Las Cruces, N.M.): Dorothy C. Archuleta.

SPACE QUOTES

U.S. SHOULD NOT UNDERRATE OWN ACCOMPLISHMENTS. Editorial, *The Washington Daily News*, Oct. 14, 1964.

"It is important, therefore, that we not underrate our own significant accomplishments—and expensive efforts—in space just because the Soviets have scored another dramatic first. (Voskhod)

"It is equally important that we not overlook the potentialities of space—either for good or for evil.

"Of major concern should be the possibility that the Soviets may seek to exploit space for military purposes, a possibility underscored by their strong emphasis on manned space flight . . .

" . . . just as a plane can be used for military as well as civilian purposes, so can the rockets, the space ships, the technical facilities, the scientific know-how and the industrial capability which is being developed in connection with the much-publicized and much-criticized moon-landing program.

"Thus, we have an over-all national space program—geared both to explore the civilian aspects of space and to exploit, if such need should arise, its military prospects."

General Jones Named Deputy To Dr. Mueller

Brig. Gen. David M. Jones has been appointed a deputy associate administrator for Manned Space Flight, effective Dec. 15, it was announced November 3 by Dr. George E. Mueller, associate administrator for Manned Space Flight at the National Aeronautics and Space Administration.

General Jones will be primarily concerned with major development problems in the Gemini and Apollo Programs, the planning for Advanced Missions and all Mission Operations. He will work with other NASA program offices to insure optimum use of other elements of NASA to accomplish program objectives.

Born in Marshfield, Ore., General Jones attended Tucson (Ariz.) High School and the University of Arizona. He entered pilot training in 1937 and has had continuous military service since his graduation from flight training in 1938.

Early in 1942, General Jones volunteered for the Doolittle Project and flew the initial evaluation flights on the two-engine bomber aircraft which were specially equipped for takeoff from a Navy aircraft carrier on a mission to bomb Tokyo.

In Sept. 1942, General Jones was assigned as group commander of the 319th Bomb Group in North Africa to develop low level bombing tactics and techniques. On his fifth mission he was shot down over Bizerte and spent 2½ years as a prisoner of war.

His experience as deputy chief of staff, Operations, of the Air Proving Ground resulted in his being appointed as director of the B-58 Test Force when it was organized in 1958.

In 1960 he was named vice-commander of the Wright Air Development Division and in 1961 vice-commander of the Aeronautical Systems Division at Wright-Patterson AFB, Ohio.

General Jones' most recent assignment has been as deputy chief of staff, Systems, Air Force Systems Command, Andrews, AFB.

MSC PERSONALITY

Information Systems Division Headed by Paul H. Vavra

Paul H. Vavra began his career in 1947 as a project engineer at the NACA Pilotless Aircraft Research Test Station, Wallops Island, Va., which was used to test fly pilotless aircraft and gather research data with the use of telemetry and radar.

At that time the Pilotless Aircraft Research Division of Langley Aeronautical Laboratory had as its chief, Robert R. Gilruth.

In November of 1962, Vavra joined the Manned Spacecraft Center as Ground Systems Project Officer, and assumed his present duties as chief, Information Systems Division in February of this year.

During the intervening years he was with the Langley Research Center and the Goddard Space Flight Center, where he had a part in early programs supporting Project Mercury, and participated in the planning, implementation, and operation of the tracking and ground instrumentation network for the first orbital mission of Project Mercury (MA-4).

Vavra said that one of his most satisfying experiences since his association with the space program, was to witness the performance of the Mercury network on its first mission (MA-4), after just a little over two years of effort in its development.

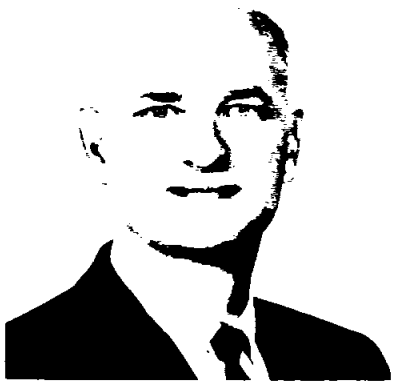
His present duties include the responsibility for planning, analysis and engineering of overall spacecraft/ground telecommunications and trajectory systems. He is also responsible for planning and engineering design of digital data systems and specialized processing and display equipment to meet MSC needs.

Vavra was given other duties recently when he was designated manager of the Apollo Unified "S" Band system with the responsibility for assuring compatibility in the design and implementation of the USB transponder and the Manned Space Flight Network.

He is also responsible for support of Apollo and Gemini programs by providing planning, engineering designs, and in some cases project management of information and control systems for the Manned Spaceflight Control Center, the MSC Data Reduction Complex, and for certain Engineering and Development Directorate test facilities.

Vavra was born in Cedar Rapids, Iowa and was graduated from Iowa State College in 1943 with a BS degree in electrical engineering.

He was a radar instructor with the Army before joining NACA in 1947 as a radar instrumentation engineer at Langley. From 1951 to 1953 he was head of the radar group at Langley, and in June of 1953 he became head of the Langley Readout Equipment Section.



PAUL H. VAVRA

In July of 1959 he became assistant head of the Langley Tracking and Ground Instrumentation for Project Mercury, where he was instrumental in implementing the original worldwide Mercury tracking and data instrumentation network.

He left Langley in June 1961 and became associate chief of the Manned Space Flight Support Division of the Goddard Space Flight Center. There he led a team of experienced Mercury network engineers, transferred from Langley Tracking and Ground Instrumentation Organization, to form the nucleus of the GSFC Mercury network engineering and operations team. He was at Goddard until he joined MSC in November of 1962.

Vavra co-authored the "Mercury Network Performance" section of "First U. S. Manned Orbital Space Flight," and was author of "NASA Instrumentation Ship Program" at Goddard in 1962.

He was a recipient of the 1962 Group Achievement Award for Manned Spacecraft Tracking Network Operations.

Vavra is a member of the Institute of Electrical and Electronic Engineers, and a member of Tau Beta Pi, Eta Kappa Nu, and Phi Kappa Phi, all honorary engineering fraternities.

He is married to the former Eunice Van Evera and the couple has five children, John 17, Susan 15, Karen 13, Janet 12, and Nancy 7. The family resides in Kemah, Tex.

Vavra says his most enjoyable pastimes are sail boating and square dancing, but lately he hasn't been able to find time to do much of either.

Here At MSC—

World's Largest Manned Centrifuge Scheduled For Use Next Summer

NASA's astronauts will begin training next summer on the world's largest manned centrifuge, now nearing completion here at the Manned Spacecraft Center.

The one million-pound device, capable of imposing a load equal to 30 times the force of gravity (30g), will help prepare moon-bound space pilots for the rigors of launch acceleration and earth re-entry.

At 42 revolutions per minute, the 50-foot arm of the centrifuge exerts a 30g load while swinging around its hub at 150 miles an hour. The arm can be lengthened to 60 feet, allowing high g loads at fewer rpm.

Until completion of this facility, NASA astronauts will continue training at the Navy's Aviation Medical Acceleration Laboratory at Johnsville, Pa.

A three-man gondola at the tip of the 50-foot arm will represent the interior of an actual Apollo spacecraft, complete with controls, dials, switches and an environmental control system to simulate actual space conditions. A vacuum equal to altitudes up to 125,000 feet can be produced by environmental equipment inside the 12-foot gondola.

Computers will gimbal the gondola spacecraft in pitch and roll, adding two axes to the forward motion of the device. A third movement, yaw, could be added if necessary, but simulations on the centrifuge are already programmed to be somewhat more demanding than any anticipated space flight. The astronauts will be able to control their motions through the computers.

The most acceleration American astronauts experienced during Project Mercury was slightly above 11g during the suborbital flights of Astronauts Alan Shepard and Virgil Grissom. Re-entry from orbital flight produces lower g levels.

Re-entry from an Apollo lunar return flight is expected to impose fewer than 10g normally, or as many as 15g under emergency conditions.

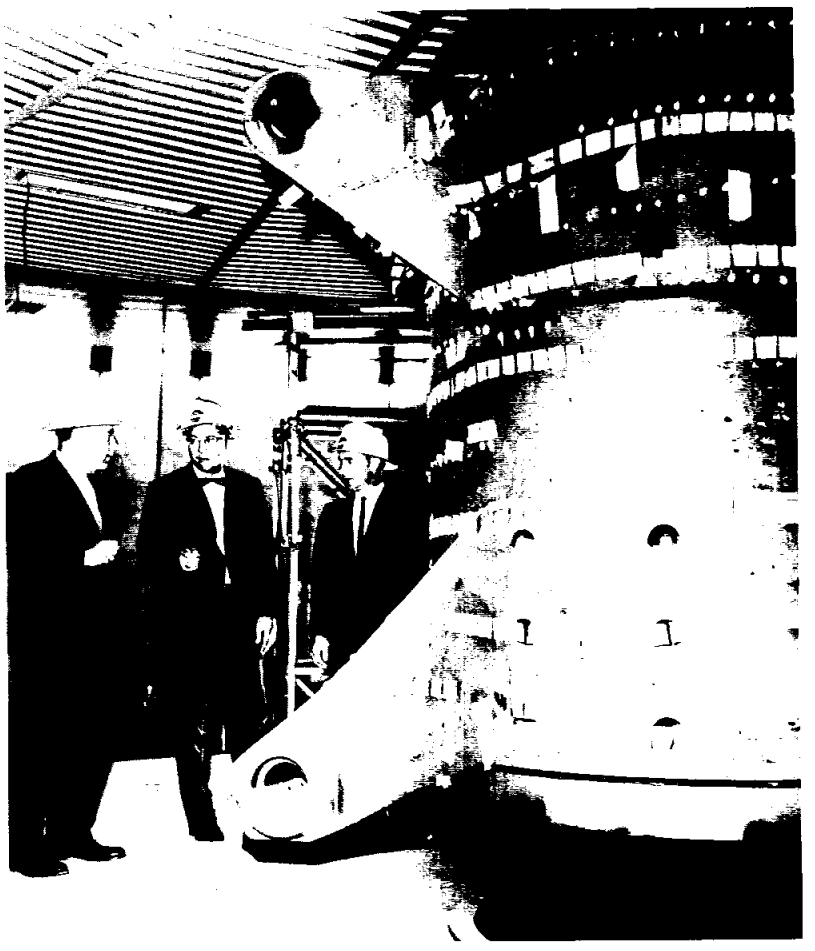
The centrifuge can produce 30g for three minutes or 20g for half an hour, far beyond that predicted for space flight or training. But the device will also be used to test equipment and to conduct physiological stress studies.

Astronaut Walter M. Schirra has experienced 18g on a centrifuge, more than any other astronaut. Test subjects have endured up to 25g for peak period of five seconds. Astronauts are trained to perform under loads up to 15g.

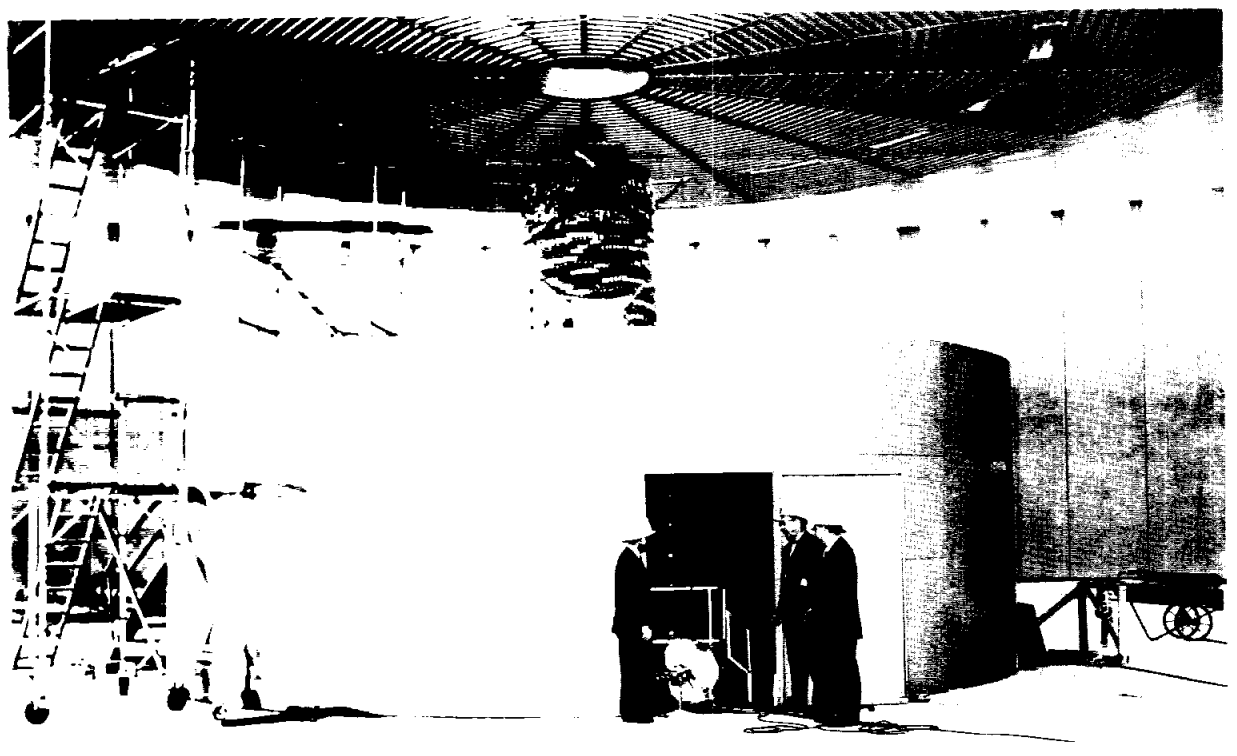
The effects of positive gravity forces are cumulative, varying with time, position of the body and rate of acceleration. Tolerances vary also with arbitrary limits, such as ability to perform effectively, remain conscious or simply survive.

Designed primarily for Apollo training, the facility will have medical laboratories for pre-flight and post flight simulations. During centrifuge runs more than 400 measurements can be obtained, including biomedical information similar to that monitored during actual space flight.

The 6,700 nominal horsepower Westinghouse electric motor which drives the MSC centrifuge is the largest vertical electric motor in the free world.



CENTRIFUGE HUB—The arm of the three-man centrifuge will be attached to the hub, being inspected here by (l. to r.) Richard S. Johnston, chief, Crew Systems Division; Arthur Hinners, chief, Flight Acceleration Branch; and Astronaut Richard F. Gordon Jr.



MSC CENTRIFUGE MOTOR HOUSING—The largest vertical electric motor in the world which will drive the three-man centrifuge at the Manned Spacecraft Center, is located inside the housing shown here in the Flight Acceleration Facility, Building 29. The training device is scheduled to be operational in the spring of 1965.

Mariner 3 Spacecraft Flight Apparently Fails, 4 On Tap

Mariner 3, the spacecraft that was scheduled to reach Mars in 255 days, was launched from Cape Kennedy at 1:22 p.m., CST, November 5, but a combination of problems have apparently ruined the U. S.'s first effort to probe the red planet.

Tracking data indicated that the second stage of the Agena D booster shut down four seconds early when it reignited its engine a second time to shove Mariner 3 on its way to Mars.

Even if the rocket had performed perfectly, tracking information indicated that Mariner 3 itself had failed to perform these two critical functions:

Four solar panels designed to draw power from the sun did not fold down as planned. Without the panels in position, the spacecraft batteries would die within a few days.

The spacecraft did not align itself properly with the sun after it separated from the rocket, indicating a failure in the control system. Without proper orientation, the solar panels cannot draw sun power and communication antennas are not pointed properly.

Mariner 3 was one of two launchings planned this month. An identical payload, Mariner 4, is scheduled for launch. Its launching date will depend on evaluation of data received from the Mariner 3 flight.

After November 29, Mars will not be in a favorable target position again for two years.

Lunar TV Camera Contract Awarded To Westinghouse

The Westinghouse Electric Corporation, Aerospace Division, Baltimore, Md., has been awarded a $2.29 million contract for the development of a lunar TV camera.

This camera will utilize a recently developed secondary electron emission conductivity (SEEC) vidicon tube. It is considered to be the ideal image sensor for fulfilling the TV requirements during the trans-lunar, lunar stay, and trans-earth phases of the Apollo mission. It is planned that these pictures would be made available to commercial television for nation-wide broadcast during the lunar mission, as well as provide scientific information.

For purposes of lunar operation, the camera must be designed to withstand temperature ranges from minus 300 to plus 250 degrees Fahrenheit. It must operate in high vacuum, and televise pictures in the glare of lunar day and the earthshine conditions of lunar night.

The Westhinghouse camera will be used in Apollo flights in which the Lunar Excursion Module is included. In Apollo Earth-orbital flights, a camera provided by Radio Corporation of America, will be utilized.

Space News Of Five Years Ago

Nov. 12, 1959—A NASA-Department of Defense agreement was signed by NASA Administrator T. Keith Glennan and Deputy Secretary of Defense Thomas Gates, relevant to the principles governing reimbursement of cost incurred by NASA or DOD in support of Project Mercury.

Nov. 14, 1959—New Aerospace Medical Center dedicated at Brooks AFB, Tex.

Nov. 16-20, 1959—Wearing the Mercury pressure suits, the astronauts were familiarized with the expected reentry heat pulse at the Navy Aircrew Equipment Laboratory, Philadelphia, Pa.

Nov. 18, 1959—NASA-DOD memorandum of understanding was signed providing for interim management of Project Saturn, pending its formal transfer to NASA.

Nov. 20, 1959—At the fifth Mercury Coordination Meeting, the Army Ballistic Missile Agency proposed the installation of an open-circuit television system in the Mercury-Redstone second and third flights (MR-2 and MR-3). The purpose of the system was to observe and relay launch vehicle and spacecraft separation data.

Nov. 20, 1959—Discoverer VIII satellite successfully placed into a polar orbit.

NASA - MSC Technical Papers

The following are Technical Papers by Manned Spacecraft Center staff members. Those that are available for reference at the MSC Library in Building 12 are noted.

"Spacecraft Landing Systems and Recovery Techniques — Engineering and Operations Analysis of Present and Future Systems:" Maxime A. Faget, and Christopher C. Kraft Jr. Delivered at the Third Manned Space Flight Meeting, Houston, Tex., Nov. 4, 1964.

"Integrated Operating Mode of the Apollo Mission Simulator:" Samuel H. Nassiff, and Fred O. Martikan. Presented Oct. 23, 1964, at the 11th Annual East Coast Conference on Aerospace and Navigational Electronics in Baltimore, Md. (available for reference)

"Handling Qualities for Pilot Control of Apollo Lunar-Landing Spacecraft:" Donald C. Cheatham, and Clarke T. Hackler. Presented at the Third Manned Space Flight Meeting, Houston, Tex., Nov. 4-6, 1964.

Space News ROUNDUP!

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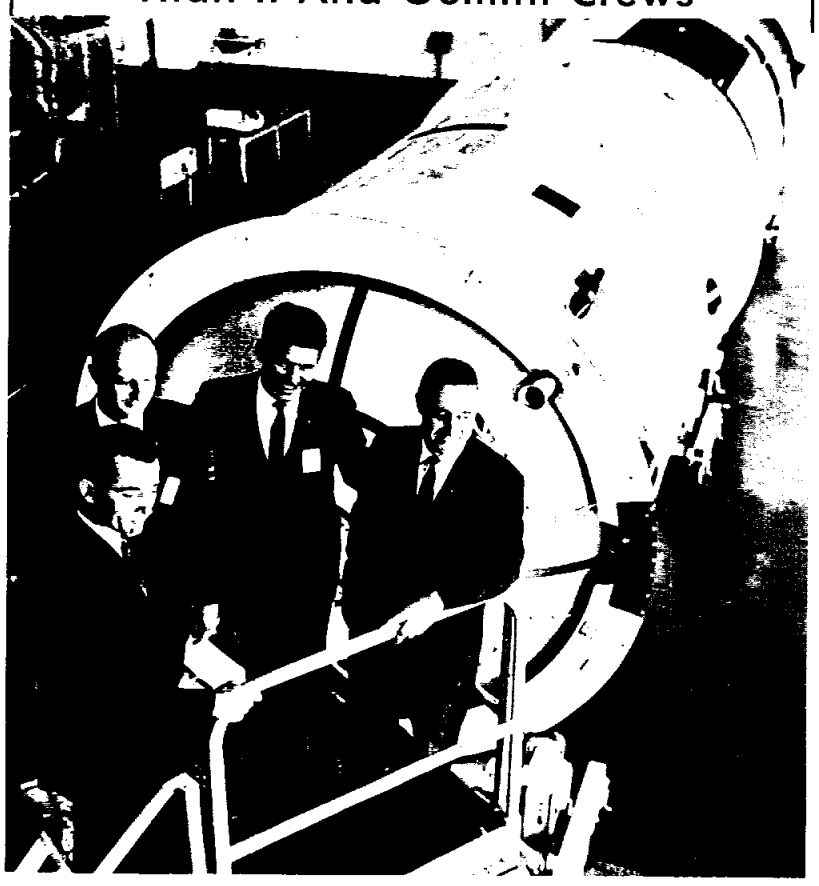
Titan II And Gemini Crews



TITAN II ACCEPTED—The crew and the back-up crew for the first manned Gemini flight (GT-3), stand by the Titan II booster rocket that will be used for the flight. The Titan II passed acceptance tests at the Glenn L. Martin plant located outside Baltimore, Md. The astronauts are (l. to r.) John W. Young, pilot; Thomas P. Stafford, pilot (back-up crew); Walter M. Schirra Jr., command pilot (back-up crew); and Virgil I. "Gus" Grissom, command pilot.

Gemini Suits Now Being Qualified For Operational Flight Conditions

Seventeen Gemini suits are currently being tested in California, Massachusetts, and at Manned Spacecraft Center to qualify the suit for operation under any possible environmental or flight condition to be encountered in the first manned flights.

Four suits are being tested at the U. S. Army Testing Laboratory, Natick, Mass., for life cycling and reliability tests on the suit and individual components. Two suits are being used at the Manned Spacecraft Center for testing of physical parameters. Five suits will be used for parachute jump tests at El Centro, Calif. Four suits will undergo sled ejection tests at China Lake and two suits will be used in F-106 seat ejection tests using the Gemini seat at El Centro.

Following the philosophy of component testing, no suit will go through the complete testing cycle, but each suit will be used in part of the qualification program.

There are more than 47 individual tests performed to qualify the suit for the first and second manned orbital flights in Gemini spacecraft. The testing is done at three levels; on the complete suit assembly, on the particular systems, and on the components of the assembly.

In life cycling, various parts of the suit assembly, such as the neck and wrist disconnects and bearings, the entrance closure, and the helmet drinking port are subjected to repeated tests on their operation. The tests determine whether the material will last or the mechanisms will function after repeated use.

A series of environmental tests are also conducted. The suit is tested under temperature ranges from a plus 250 degrees Fahrenheit to zero. It is tested under vacuum at simulated orbital altitudes and at cabin pressure, and under re-entry and abort conditions.

There are many other environmental tests which include vacuum, rapid decompression, toxicology, acceleration, vibration, shock, and noise. Frequently, the environmental tests are conducted in conjunction with systems or component tests.

In demonstration tests, the suit is checked out for mobility. The astronauts must be able to reach controls and equipment in either a pressurized or unpressurized suit. The flight crew must also be able to use the drinking port while the suit is pressurized.

The four day comfort test is conducted in an altitude chamber pressurized at a simulated spacecraft environment of 5.5 psia. The subject remains in the suit for a period of four days, using the environmental control system, the waste management system, and the bio-instrumentation.

In suit systems tests, the suit will be tested for pressure drop in the spacecraft environment. Such systems as the helmet carbon dioxide removal and the visor defogging system, the communication system, and the glove fingertip lights will be fully qualified.

Component testing will be performed on the suit pressure indicator, the suit pressure relief valves, the blood pressure cuff assembly, and the glove fingertip lighting system. Environmental qualification as well as leakage, cycling, and performance tests will be conducted on components.

Gemini suit qualification is a program which will insure that the suit provides protection for the spacecraft crew from the environments to be encountered during Gemini manned space flights with the maximum probability for mission success.

GEMINI SUIT—Henry Friloux, Crew Systems Division, is shown in a Gemini G-2C astronaut training suit.

'Moon Blink' To Help Detect Colors On Moon's Surface

The National Aeronautics and Space Administration is developing an instrument to detect different colors on the surface of the Moon.

Called a "Moon Blink," the instrument already has proved itself by helping three men detect a red spot, October 27, in the crater Alphonsus near the center of the Moon. This is the same area in which red spots were observed six years ago by Russian astronomer N. Koryzev.

The instrument is helpful in locating spots of color on the Moon by making the spots appear to blink. The blinking effect is caused by rotating colored filters across the light reflected by the mirror of a telescope.

To detect a red spot on the Moon, red and blue filters are rotated across the light causing the spot to blink in and out of the image.

The instrument is being developed by Trident Engineering Associates, Inc., Annapolis, Md., from an idea of Dr. James B. Edson, technical assistant to the associate administrator for Advanced Research and Technology at NASA.

The successful demonstration of the "Moon Blink" apparatus occured at an observatory near Port Tobacco, Md.

The sighting was not recorded. Photographic equipment is expected to be ready for the next opportunity of observation.

Scientists disagree on the cause of the colored spots but some claim that they indicate the Moon may be a source of gasses and possibly of energy rather than a "dead" object.

United Fund Goal Exceeded In MSC Drive

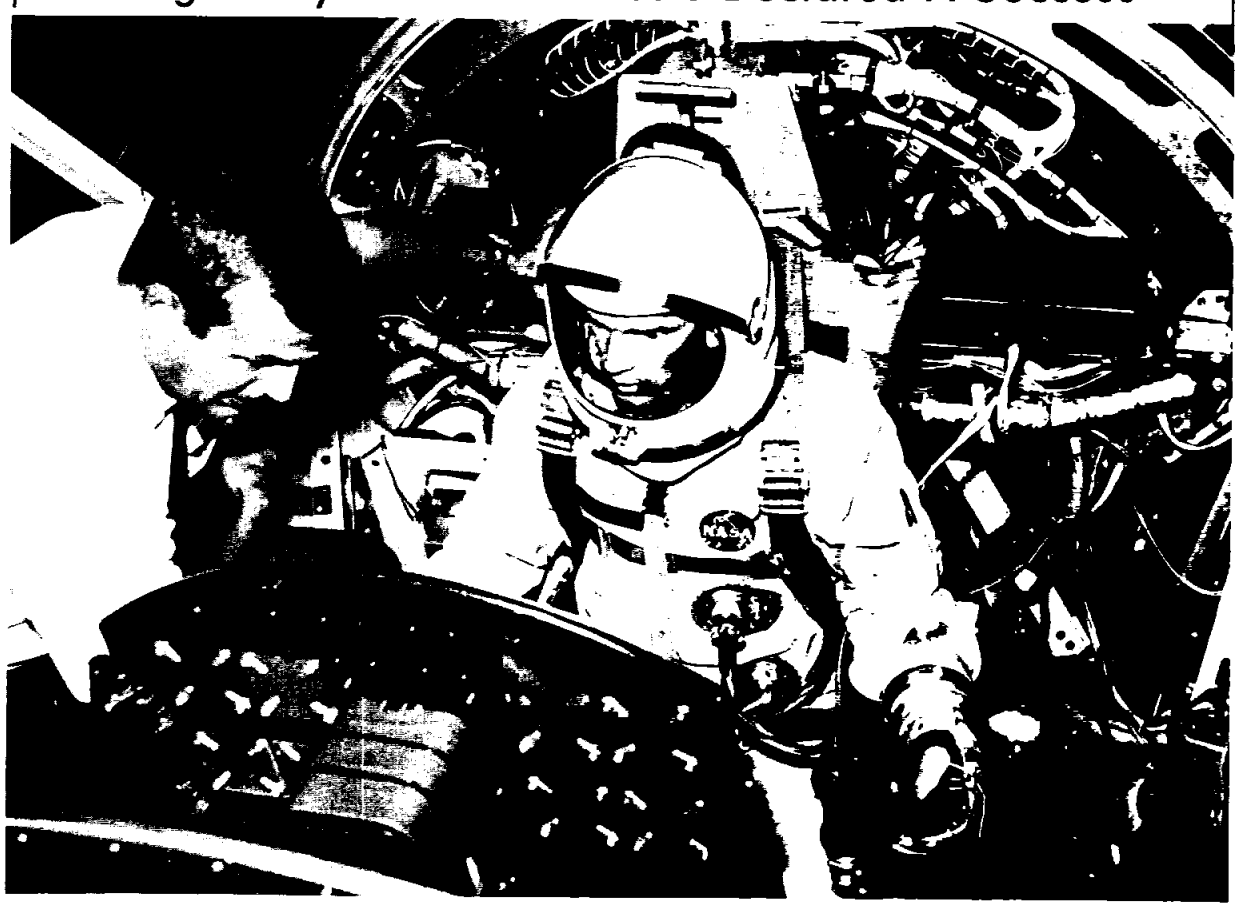
The final tally of the Manned Spacecraft Center employees' contributions to the United Fund drive indicates that the goal was exceeded and a total of $52,221.91 was raised.

Here at the Center, 3,248 of the 3,509 employees contributed to the MSC United Fund for an average gift of $16.07. The overall average for the Center was $14.88.

Of the 51 offices and divisions at MSC, 23 had 100 per cent participation and raised 100 per cent of their goal. Two had 100 per cent participation but did not reach their goal. Sixteen reached their goal but did not have 100 per cent participation, and 10 did not have 100 per cent participation, nor reach their goal.

The total of the goal reached as of the November 4 reporting date was 109.1 per cent.

Eight-Day Biomedical Tests Declared A Success



SIMULATED RE-ENTRY IN A CENTRIFUGE—Astronaut Russell L. Schweickart is shown in the centrifuge on October 26 at NASA Ames Research Center, Moffett Field, Calif., as he receives final preoperation check by Dr. Milton Matters, NASA Ames medical test monitor, prior to a simulated Gemini re-entry run. This was Schweickart's eighth day in the Gemini space suit for a series of tests, evaluations and simulations to determine the compatibility of man and biomedical recording equipment. At a press conference October 30, Schweickart said the tests and evaluation were successful.