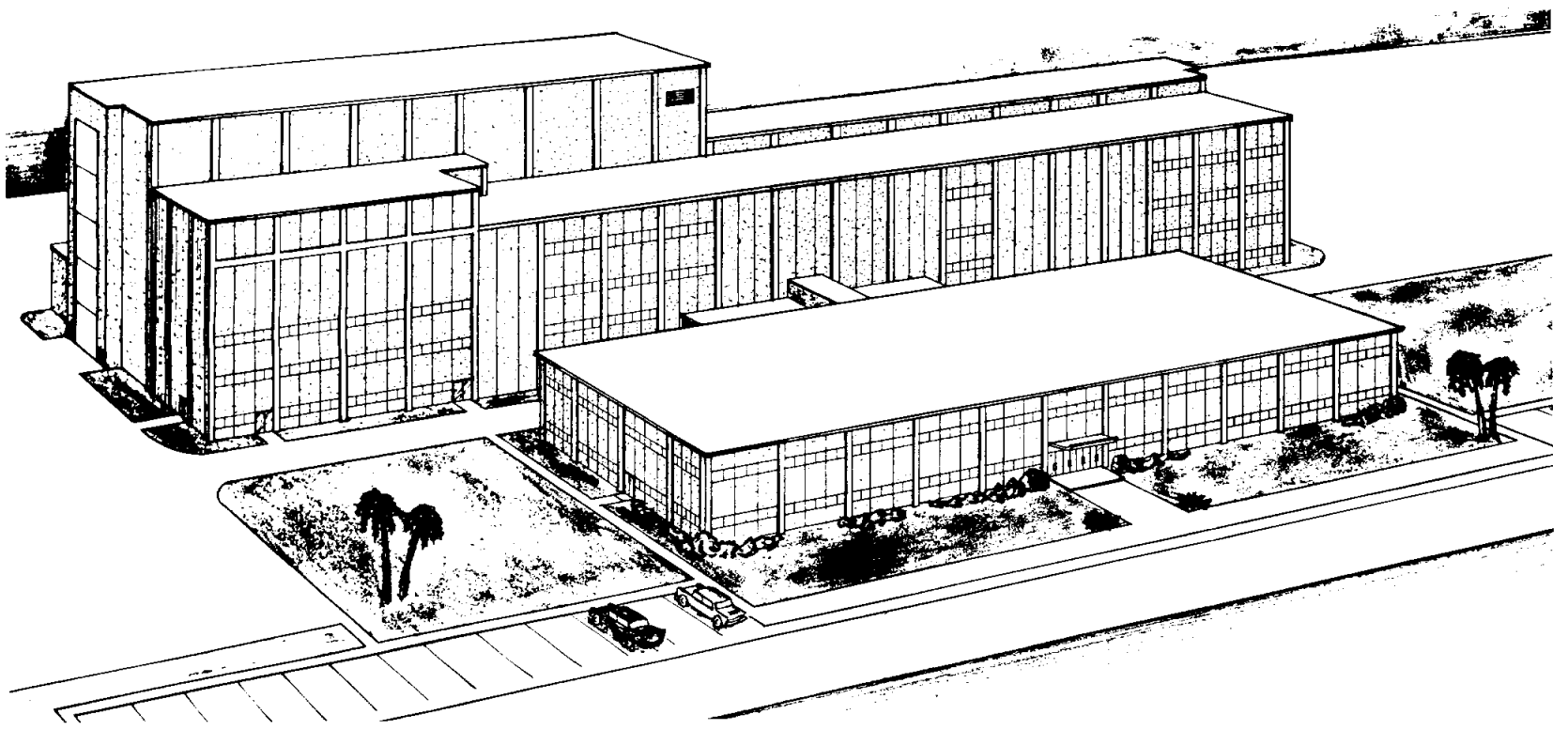
Space News
NASA ROUNDUP!

VOL. 2, NO. 7 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS JANUARY 23, 1963

Cape Lets Contract For O & C Building



ARCHITECTS' DRAWING of the planned Operations and Checkout Building for Project Apollo at Cape Canaveral shows three separate sections of building. Two-story portion in foreground will contain administrative offices, with connecting extension divided between briefing room and cafeteria-conference room. Middle-sized section rising to the rear will house technical laboratory space, astronaut quarters, training and medical facilities in four stories at right side of building, five on left side. Tallest portion of building is one-story, 104-foot high bay area for spacecraft assembly and testing. Single-story portion just visible at rear of building is the service area.

Contract Goes To Paul Hardeman, Morrison-Knudsen

Two California firms already involved in construction of the main portion of the buildings at the new MSC site at Clear Lake last week received the contract for the $7.4 million Operations and Checkout Building at Cape Canaveral.

They were Paul Hardeman, Inc. of Stanton, Calif. and Morrison-Knudsen, Inc. of Southgate. The two firms submitted a joint low bid of $7,691,624.

Hardeman and Morrison-Knudsen along with C. H. Leavell and Co. of El Paso were successful joint bidders for the $19 million contract for 11 office and laboratory buildings at Clear Lake.

The Cape structure will be primary headquarters for Project Apollo at Cape Canaveral, and the second largest building at the missile test center, outranked only by the technical laboratory constructed several years ago at Patrick AFB.

It will be built on Merritt Island, the first structure to go up in the planned expansion of Cape facilities on newly acquired land.

Scheduled for completion in only one year, the building is expected to be ready for occupancy by February of 1964. Construction will be begun immediately.

The concrete frame building will be composed of three separate facilities under one roof—a two-story administrative section, a five-story laboratory control facility, and a tall, one-story checkout and assembly area for spacecraft.

Its' 300,000 square feet of floor space will also contain quarters for the astronauts, an auditorium and cafeteria and conference room, and various service areas.

The assembly and test area will be 104 feet high, about as tall as an average eight-story building.

Two bridge cranes running the width of the area will provide heavy lifting capabilities for handling spacecraft during assembly and checkout.

The administrative and engineering office area of the build-

(Continued on page 7)

Williams Named I.A.S. Fellow; To Receive Award

Walter C. Williams, MSC deputy director for mission requirements and flight operations, was named a Fellow of the Institute of Aerospace Sciences during the organization's final meeting as a separate group in New York City Monday and Tuesday.

The IAS is merging with the American Rocket Scoiety to form the Institute for Aeronautics and Astronautics in Febru-

(Continued on page 2)

T. J. Bailey To Get PGRQC Award Tonight

Frederick J. Bailey, Jr., chief of the Reliability and Flight Safety Office, will receive the 1962 award of the Professional Group on Reliability and Quality Control, Institute of Radio Engineers tonight at the Sheraton Palace Hotel in San Francisco.

The event will highlight the banquet of the group's Ninth National Symposium. The award will be presented by L. J. Paddison, chairman of PGRQC.

The award is given annually

(Continued on page 2)

Gemini 'Chute Tests Proceeding Successfully, Says Project Office

A successful series of Gemini parachute design qualification tests is drawing to a close at El Centro, Calif. this week, with two more series to go before the 'chute system is qualified.

The Gemini parachute system is considered strictly a backup mechanism in case of water landings.

The latest series of tests includes 19 drops, the 18th of which was held January 14 and the last of which was scheduled last week.

An 18-foot ring-sail drogue 'chute and an 84-foot ring-sail main parachute packed in an "R and R" (rendezvous and recovery) can which also contains the radar recovery aid make up the system. It is essentially a "scaled up" version of the Mercury parachute system.

The first four drops in the current series were held using only the drogue with the R and R can, to determine rate of descent. Two simple weight drops to determine the structural characteristics of the 84 foot 'chute followed. Beginning with drop number seven, tests began going through the entire sequencing of the system.

Drops were made from an Air Force C-130 at 10,000 feet.

"We had some problems, up to test number 13," commented

(Continued on page 2)

Crew Systems Tests New Type Of Astronaut Couch

The astronaut couch on which MA-9 pilot L. Gordon Cooper goes into orbit this spring may bear little resemblance to those used in previous Mercury flights.

If qualification testing of the new couch is successfully completed in time, the present 42-pound moulded couch, relatively bulky with its layers of energy absorbing material, will be replaced with a simple tubular steel framework covered with close-meshed material known as Somyk net. It weighs about 20 pounds.

Somyk net, made by John Somyk, Inc. of Pawtucket, R. I., posesses a rather special property.

In engineering terms, it "absorbs energy while elongating and concurrently undergoes and assumes a permanent elongation without rebound."

What this means in plain English is that if you stretch the stuff it stays that way, and does not snap back. As a result, it absorbs impact, and there is no need for shock absorbing material other than the net itself. All that is required is a space into which the net can expand.

There are other advantages. The net is economical and strong enough to withstand high impact loads.

Astronauts Cooper and Alan Shepard report that they prefer the new couch as being more comfortable under one g (earth gravity). They also say it improves mobility.

Another advantage is that the new couch can be easily used by all astronauts, without having to be moulded to individual fit.

The main advantage of the new couch, however, is its ability to absorb the stress of high g loads.

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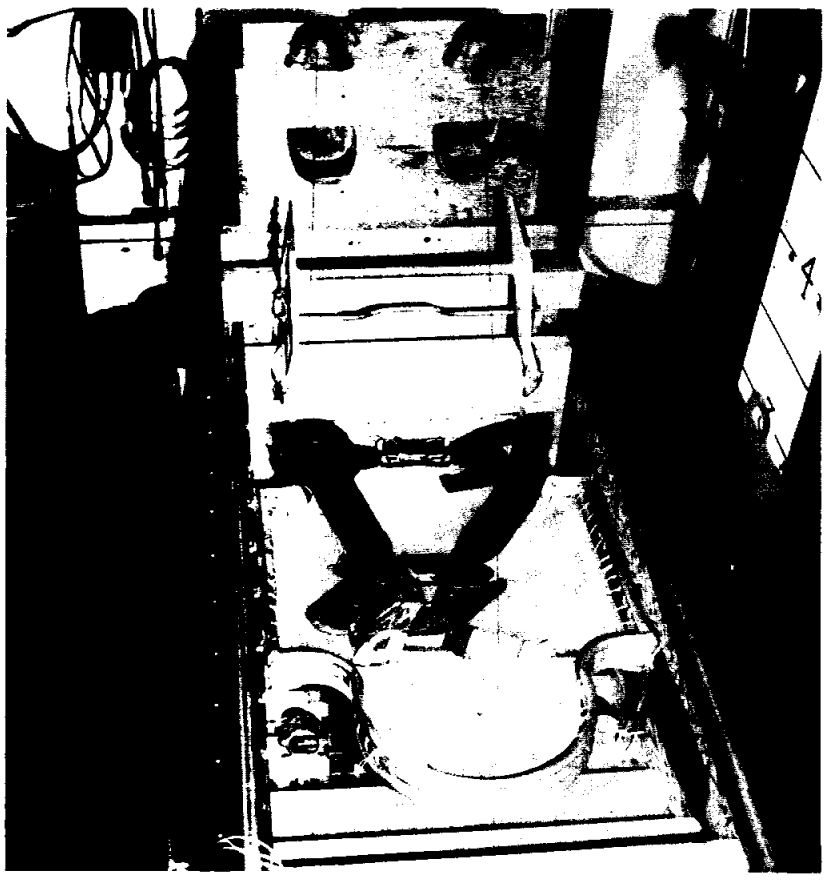


LOOK FAMILIAR? It doesn't, even to those of the Manned Spacecraft Center staff who have seen the inside of a Mercury spacecraft. This is a prototype of the new astronaut couch presently undergoing tests in Crew Systems Division, shown here installed in the CSD test facility. It consists of a material called Somyk net and a tubular steel framework. The attached straps are part of the restraint harness developed for the B-70 bomber by North American Aviation.

Crew Systems Tests Couch

(Continued from page 1)

Matthew Radnofsky and Douglas J. Geier, of Crew Systems Division, report that tests in CSD facilities indicate the net can attenuate high g loads to human tolerance level by stretching alone.

The couch is well able to withstand the 42 g impact loads that could be encountered during an emergency land landing, as well as the normal maximum Mercury launch load of 8 g's and normal water landing loads of 12 to 16 g's

Plans call for using the new couch in conjunction with a new restraint harness developed by North American Aviation for the B-70 bomber.

If it lives up to the designer's hopes, there could be many future applications for Somyk net, such as couches for the Apollo spacecraft.

"Something like this, covering a collapsible frame, would make acceleration couches that could be taken down and stored to give additional room in the Apollo craft during the trip to the moon," Geier said.

Data Reduction Design Requested

Requests for a design study of an electronic equipment complex to reduce space flight and test information in Manned Spacecraft Center's completely automatic data reduction facility at Clear Lake have been made by NASA officials.

The facility will handle large data reduction problems resulting from Gemini and Apollo flights, from space environmental tests, astronaut training devices (centrifuge), and other equipment tests.

Grumman Plane

(Continued from page 8)

transferred to MSC from Langley.

Contractor-maintained while at Houston, the aircraft make numerous trips to and from Cape Canaveral and there are seldom more than three in Houston at any one time.

MSC is presently negotiating for the use of a helicopter for training and test-monitoring purposes.

Gemini Tests

(Continued from page 1)

Ken F. Hecht of Gemini Project Office. "Most of them had to do with "tucking," where the edge of the 'chute tucks under and hinders full inflation. But beginning with test 14, we have had complete success." Loads in pounds per square foot of parachute were increased steadily from test number 14, from the design load of 120 psf to a maximum of 180 psf on the final two tests.

"The next series will go to boiler-plate spacecraft," Hecht said, "with the first drops test-the bridle."

The Gemini spacecraft is attached to its parachute by a harness or bridle, which carries the spacecraft at a 55 degree angle from the horizontal.

Bailey Award

(Continued from page 1)

to the person or group of persons considered foremost in the field of reliability and quality control during the year. It recognizes Bailey particularly with respect to the reliability record of Project Mercury.

SEDD Vibration Testing Lab Begins Work At Rich Bldg.

Systems Evaluation and Development Division has begun operating a new vibration testing facility in the Rich Building to perform qualification and design evaluation tests on spacecraft structures, and support MSC programs requiring vibration testing.

Included in the facility is a Ling 275 electrodynamic shaker system and plans call for the addition of two Ling 310 thruster-type shaker systems in late February. Four additional thrusters will be purchased later.

Engineer in charge of the facility is A. N. Levine.

MSC personnel requiring the services of the facility should contact George E. Griffith, chief of the Structures and Materials Section, Test Facilities Branch, SEDD.

Williams Award

(Continued from page 1)

ary.

Williams was also awarded the Sylvanus Albert Reed Award at the Honors Night banquet of the IAS Tuesday.

Three other NASA personnel were among the 17 awarded Fellow memberships at the meeting. They were John V. Becker of Langley Research Center, Payl F. Bikle, director of Flight Research Center at Edwards, Calif., and Dr. Hermann H. Kurzweg of NASA Headquarters.

MSC 'Navy'

(Continued from page 8)

this type of craft with the Army and holds the necessary marine license from the Coast Guard. An engineer will be hired to bring the full-time permanent crew to two persons. The rest of the deck crew will be made up of contract personnel.

The craft is expected to be operative here by the end of March. It will be docked somewhere in the Seabrook area.

"At Langley, this kind of support was provided by a contract fishing vessel," explained Peter J. Armitage, chief of the Operational Evaluation and Test Branch of Flight Operations Division, which will be in charge of the "navy."

"If we had a long-term operation in progress—three days or more—it was handled by the U.S. Navy out of Norfolk. Since we've been in Houston, we have used a contract shrimping boat to handle Mercury drop tests. But when we get into Gemini and Apollo testing, the shrimping boats can't handle that much weight out of the water. We are going to need something heavier, and that's why we have purchased this craft."

If necessary, special lifting equipment can be installed aboard the LCU to increase its own considerable lifting power.

Armitage said no name for the craft had been selected as yet. The Roundup would be glad to pass any suggestions along to Flight Operations Division.

School Contest

(Continued from page 8)

class. The school's head of science will chose the winning paper for the school.

The same procedure will be followed on editorial entries, except that the winning editorial papers from each class will be judged by the head of the school's English department who will select a top winner from the school.

The editorial winner and technical paper winner from each school will then be forwarded to the Central Judging Committee, a 12-man board made up of three members of MSC's technical staff, three members from the supervisory level of the Houston school system, three members of the Chamber of Commerce and three members of the Houston Engineering Council.

The top eight winners will be given achievement certificates, plaques, and pins and will be guests at a special program at MSC which will include meeting with one or more of the astronauts.

About 20 of the best papers, including the top eight entries, will be presented at the Seminar of High School Science.

Both types of papers will be judged on originality, scientific thought, thoroughness, and clarity, and the editorials will be judged on dramatic value as well.

Credit Union Mails Notices Of Insurance

A form recently mailed to members of the MSC Federal Credit Union is merely notification, as required by law, of the terms under which a members' savings and outstanding loans are insured against the member's death, Credit Union manager Joseph Murray reports.

The form is not an application for insurance. Both savings and loans are already insured for all members.

Survivors would get $1 insurance for every $1 on deposit before the member reached the age of 55; 75 cents for every dollar deposited from 55 to 59; 50 cents for each dollar deposited from age 60 to 64; and 25 cents per dollar deposited after 65.

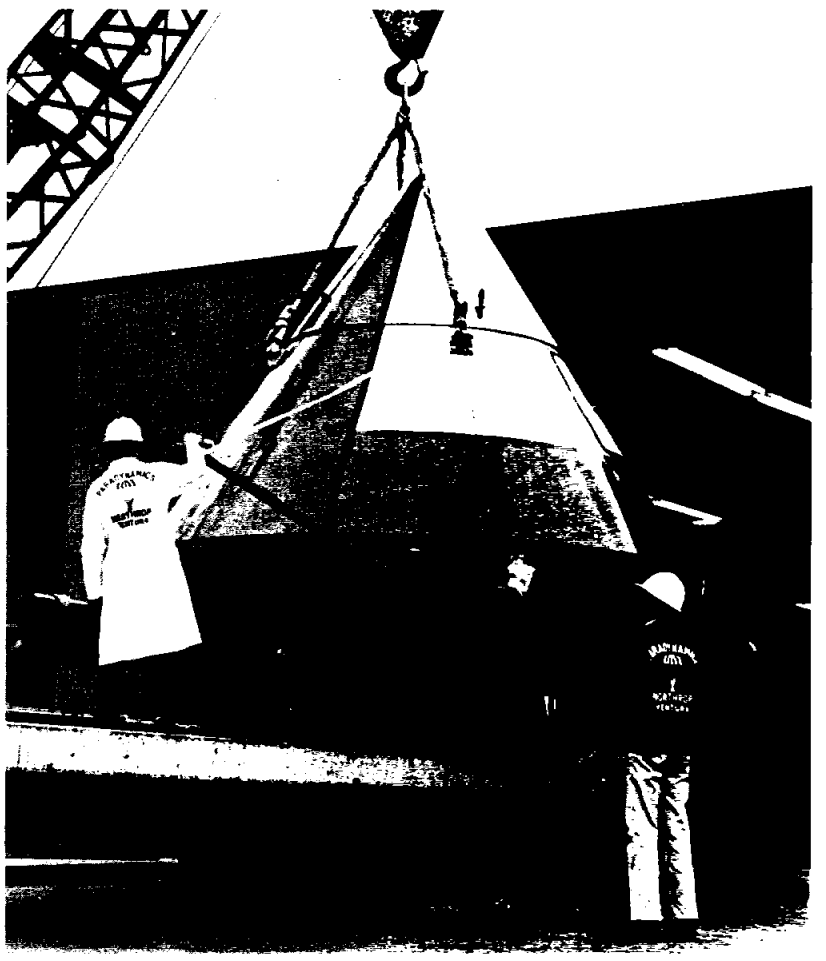
Public Speaking Group Begins 12-Week Course

A special course for members of the MSC Speakers' Bureau began January 16 in the East End State Bank Building Classroom, to run for 12 two-hour sessions, one each week.

Jim Guest, a professional speaking instructor who has conducted speech training at a number of Government installations is conducting the course.

Classes are limited to 10 persons and will be repeated as is necessary.

High school children of MSC employees will be eligible for participation in the contest.



A FULL-SCALE TEST MOCKUP of the Apollo command module is unloaded at Northrop Corporation's Ventura Division plant in Newbury Park, Calif. Equipped with a complete earth landing system designed and produced by Northrop, the boiler plate module will undergo a series of drop tests at El Centro, Calif. during he next several months. It was built by North American's Space and Information Systems Division, prime contractor for Apollo.

NEW CONCEPTION of the RIFT vehicle in flight was released recently by Lockheed Missiles & Space Co. Eighty-eight feet long, it will be assembled in a huge, converted dirigible hangar at the Moffett Field Naval Air Station adjacent to Lockheed Missiles & Space Company's main plant at Sunnyvale. The above artist's conception shows the nuclear engine firing after the Advanced Saturn booster has fallen away. Together with the Saturn, the RIFT vehicle will stand more than 300 feet high and have a diameter of 33 feet.

RIFT Program Will Usher In Nuclear Power For Space Use

NASA's pioneering nuclear rocket effort, the RIFT (Reactor-In-Flight Test) program, will be flown from Cape Canaveral in about five years.

Marshall Space Flight Center in Huntsville, Ala. is the management agency for the RIFT program. Prime contractor is Lockheed Missile and Space Co. of Sunnyvale, Calif.

Ten RIFT vehicles will be produced and tested, according to RIFT project manager Scott Fellows of Marshall, six for ground tests and four for flight as the third stage of the Saturn C-5.

While RIFT is an experimental "test bed" for nuclear propulsion, the stage is being designed as a potential stage operational nuclear rocket. A C-5 vehicle with a nuclear third stage would be able to carry two or three times as much weight into earth orbit an an all-chemical Saturn C-5 rocket. For deep space missions, the advantage is even greater, Fellows said.

The RIFT stage mounted on the S-IC and S-II stages of the C-5 will provide a vehicle of about 350 feet in height. All three stages will be 33 feet in diameter. The RIFT stage itself will be slightly longer than 80 feet.

Five of the six ground test vehicles will undergo various types of testing at the Nuclear Rocket Development Station in Nevada. The other test vehicle will be brought to the Marshall Center for dynamic testing.

The four flight units will be fired from Launch Complex 39, Cape Canaveral. In the first flight test, the NERVA engine powering the stage will be inert, that is one that cannot go "critical." The other three flight units will be powered by "live" nuclear engines which will be operated only outside the atmosphere.

A typical flight trajectory would call for two engine "burns" during a ballistic trajectory which will terminate in deep water about 500 miles from the Canaveral launch site.

While the engine is operating, the stage will be in a vertical position to extend flight time and limit the range of the flight.

Beckman Delivers New Gas Chromatograph

Beckman Instruments, Inc., has announced that it has delivered to Jet Propulsion Laboratory of the California Institute of Technology, under terms of a $680,000 contract, a lunar gas chromatograph designed to analyze components of the moon's surface and subsurface.

Developed in conjunction with NASA's Project Surveyor moon probe program, he instrument will identify—among twenty-eight specific constituents thought to be present on the moon—water, nitrogen, carbon monoxide, carbon dioxide, and a number of additional organic compounds. It is the first gas chromatograph instrument capable of analyzing solid samples.

Classified information including combinations to classified containers should not be revealed in telephone conversations.

MSC Works On Better 'Paste' For Bio-Patch

MSC is investigating the development of a better "paste" for attaching electrodes to the skin of orbiting astronauts.

Not the kindergarten variety, the special conducting paste is used as a medium through which electrical impulses relay the astronaut's physical condition to a medical observer on the ground.

On Mercury flights, electrodes were used to measure heart and respiration rates of the astronaut in space. Flights of longer duration, such as Gemini and Apolli, will require an electrode conducting paste which will not irritate the skin, and which will not lose any of its stability or conducting ability during missions lasting several weeks.

Baylor University's College of Medicine, under contract to the Manned Spacecraft Center, is presently conducting research in long term electrodes. Some ideas pursued are dry electrodes, as well as improved pastes.

Although medical observers are monitoring heart and respiration rates only with electrodes on Mercury flights, development of a better electrode technique may yield other biomedical responses such as: galvanic skin responses, brain alertness, and eye motions to detect zero-G effects.

Gilruth Speaks

(Continued from page 8)

summarizing the industrial complex required to produce spacecraft for Mercury, then Apollo, and the role of Marshall Space Flight Center in producing the Saturn and Launch Operations Center in launching it, he turned to the part MSC plays in the program.

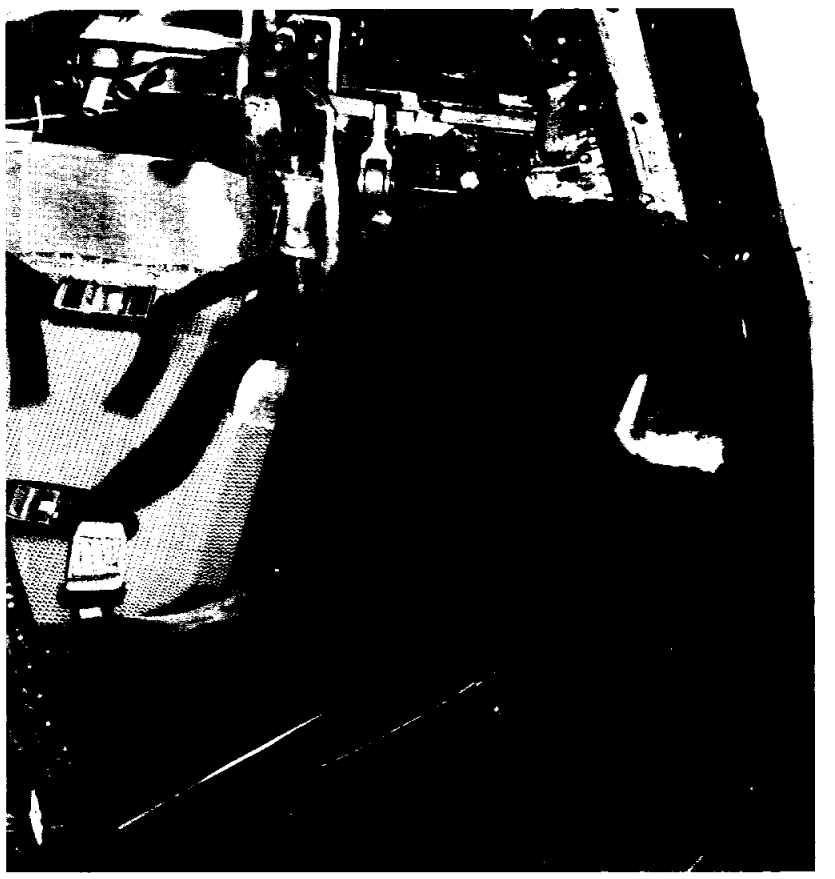
"We have two primary missions—spacecraft development and space flight operations.

"In exploratory programs such as ours, the early research and development and preliminary design efforts only begin to obtain solutions to the problems facing us. Therefore, rather than handing a contractor a completed design which he must fabricate, we work together as a team to develop solutions as we go along."

Under space flight operations, Dr. Gilruth summarized the development of trained flight crews, mission planning and control, and recovery operations.

CORRECTION

The annual meeting for all MSC Federal Credit Union members will be held in the cafeteria of Farnsworth and Chambers Building at 7:30 p.m. next Tuesday night, January 29. The Roundup regrets an erroneous headline in the January 9 issue which reported the date as January 22.



AS SIMPLE AS THE SAFETY PIN, this device promises to be just as useful, at least to Mercury astronauts and test subjects. Fitted across the hatch opening, it facilitates entrance and egress from the Mercury spacecraft. This is one of the first models. Later models are curved to fit the side of the spacecraft.

Simple Concept Turns Out To Be Highly Useful Item

A bright-red fibreglass device, which looks simple but is expected to solve a serious problem, has made its debut around the various Mercury spacecraft at MSC.

Its developer, Lawrence M. Christman of the Personal Support Equipment Section, Crew Systems Division, calls it a contoured fibreglass slide. But it has already been nicknamed "the shoehorn" around Crew Systems.

The gadget is designed to help astronauts and test personnel in and out of the small side hatch in the Mercury spacecraft, an awkward and difficult egress at best and one which would become dangerous if the person inside was injured.

Presently, should an engineer inside the spacecraft pass our during an altitude chamber test, for instance, he would have to be half-dragged, half-lifted across the console on the right side of the spacecraft and over the hatch frame.

This kind of treatment rips the pressure suit on console switches and hatch flange, not to mention being pretty rough on the subject. The problem is complicated by the fact that there is room for only one man at a time to reach outside the small hatch opening.

With the slide suspended from the edge of the hatch, and curving across the console to the edge of the couch, however, the subject can be pulled across the slick fibreglass with a minimum of effort, using a modified parachute harness to furnish grips at either shoulder.

The slide has already proved itself a handy aid for astronaut insertion into the spacecraft, as well, and will be used for that purpose before future Mercury flights according to its designer.

NASA Asks Corps To Define Lunar Research Study

NASA has asked the Army Corps of Engineers to define a research program which would be required in order to give the United States a lunar construction capability.

The study, authorized in a letter from D. Brainerd Holmes, Director of NASA's Office of Manned Space Flight, to Brig. Gen. T. J. Hayes, Assistant to the Chief of Engineers for NASA Support, is to be completed in six months at a cost of $100,000.

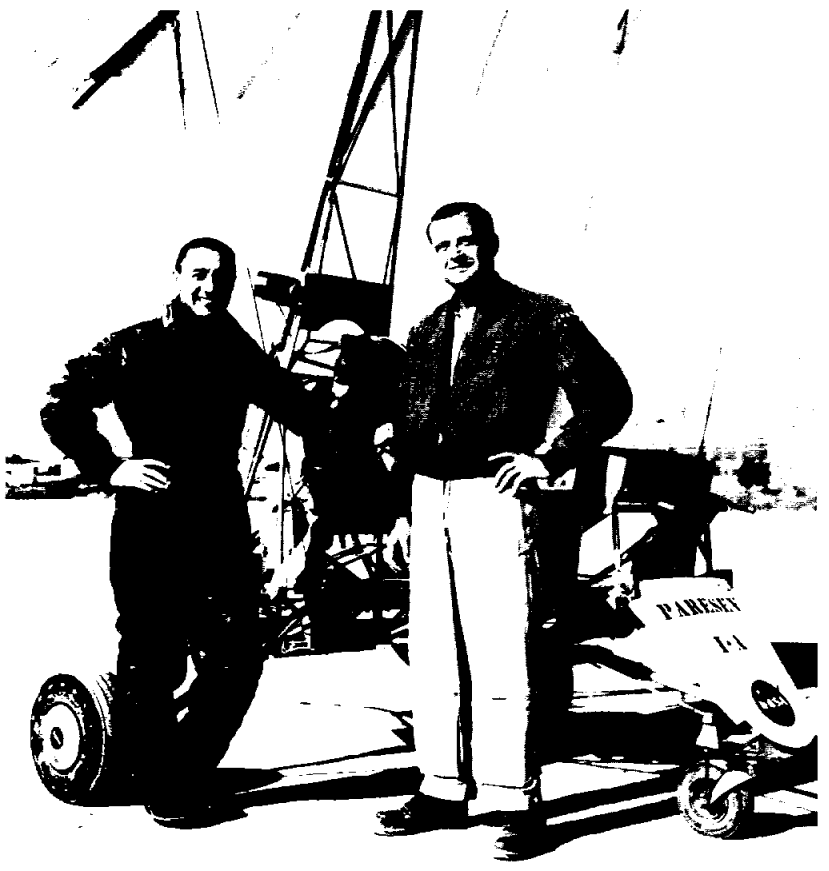
Holmes emphasized in his letter that although a requirement for construction of a manned lunar laboratory has not been established, "we feel that initial studies are required now which can lead to the existence of a lunar construction capability . . ."

Objectives of the study are to:

1. Define the research and development effort required to provide a U. S. lunar research capability.
2. Define experimental facilities on earth needed to carry out such a research effort.
3. Prepare schedules and budgetary estimates required to carry out a lunar construction research program.

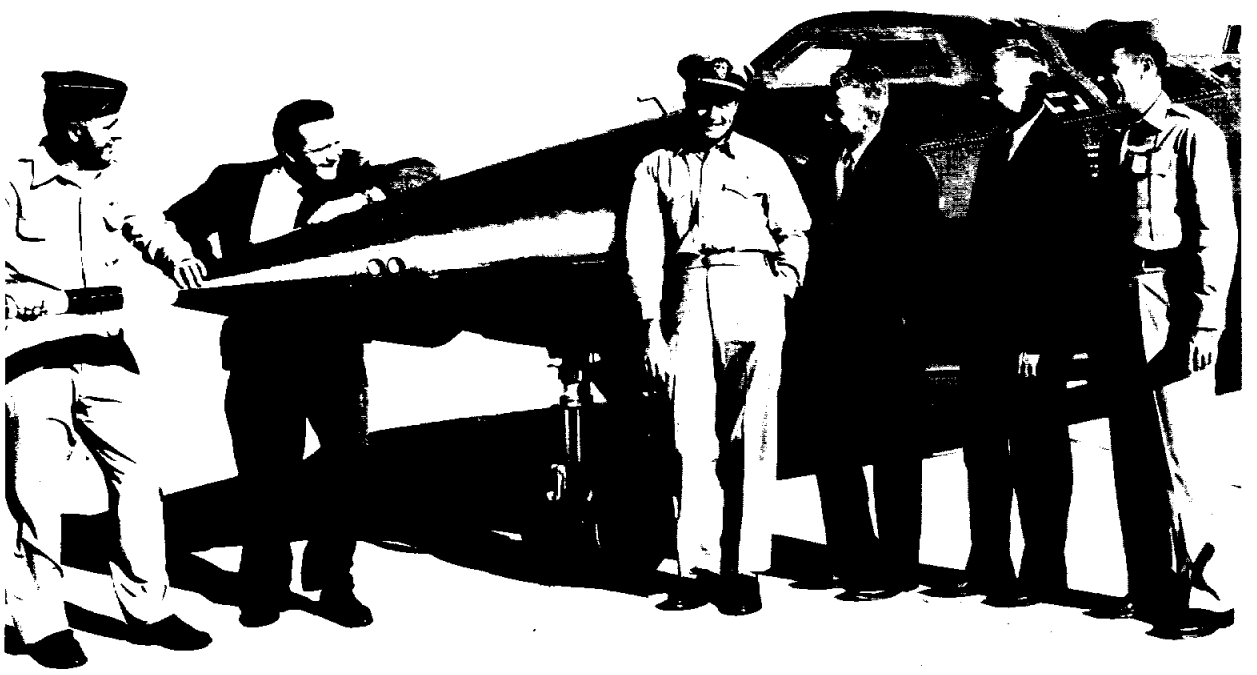
The new study will take into account results of related earlier studies by the Air Force and The Army (Project Horizon).

Flight Research Center At Edwards Is Nesting Place Fo



ASTRONAUT "GUS" GRISSOM (left) takes a five-minute break after his initial checkout in the paraglider at Roger's Dry Lake, under the tutorage of the Flight Research Center's project pilot Milton O. Thompson (right). Over 100 flights have been made in a combined study of controllability, stability and pilot training during the program.

EDWARDS' FLOCK of high, fast birds includes the Douglas X-3 (center), a 9,700-pound thrust jet capable of a speed of 800 mph which was used in solving the problem of inertia coupling in 1954; the Convair X-92A (top left), the first U. S. delta-wing aircraft; the Douglas D-558-1 "Skystreak" jet (center left); the Bell X-1A rocket plane (lower left), capable of speeds to 1600 mph at altitudes up to 93,000 feet; the Northrop S-4 (lower right); the Douglas D-558-II "Skyrocket" (center right), capable of speeds to 1,350 mph at altitudes up to 83,000 feet; and the Bell X-5 (top right) which is capable of varying its wing sweep in flight.



MASTERS OF THE X-15, these are the six Government pilots who fly the research craft out of and back into the earth's atmosphere. Left to right they are Maj. Robert Rushworth, USAF; John B. McKay of NASA; Cdr. Forrest Petersen, USN, who made an emergency landing on Mud Lake after his engine failed to light Jan. 10, 1962; Joseph A. Walker, of NASA, who attained the highest speed achieved in the X-15 when he reached 4,104 mph June 27, 1962; Neil Armstrong, now an astronaut trainee with MSC, who made the first "hot-nose" flight in the X-15 Dec. 9, 1960; and Maj. Robert White, USAF, who attained FAI world altitude record of 314,750 feet July 17, 1962 and the highest Mach number recorded for the X-15, 6.04.

The history of the NASA Flight Research Center is intimately connected with the history of the research airplane program, first conceived by John Stack of the Langley Aeronautical Laboratory, and begun in 1944.

From its conception as a device for obtaining essential information about the problems of transonic and supersonic flight, the specially designed and instrumented airplane has become one of the most valuable tools of aeronautical research. So rapid and so spectacular have been the performance gains that it may be difficult to recall that, only 18 years ago, even the most advanced airplanes were limited by "compressibility" to Mach numbers below .85. Now, the latest of the series, the X-15, has already attained speeds over 4,100 miles an hour and altitudes over 300,000 feet, the fringe of outer space. Yet, in the last months of World War II, even the newest of the United States jet fighters were limited to speeds in the region of Mach 0.8 and 0.85, obtained by dives at considerable risk to the pilot and to the aircraft.

Edwards Air Force Base, then known as Muroc Air Force Base, was an ideal location for the X-1 (the first of the research aircraft to exceed the speed of sound) flights, not only because of the 64-square mile natural dry lakebed which provided an ideal landing site, but because its remoteness and favorable climate offered additional advantages for a program of this type. Accordingly, in October, 1946, the X-1 was shipped to Edwards, accompanied by 13 NACA engineers, instrument technicians and test observers. The extended research program, under the direction of Walter C. Williams, former chief of the original High-Speed Flight Station and now MSC deputy director for mission requirements and flight operations. It was begun with the first successful power flight of the X-1 in December, 1946. At that time, the NACA unit under Williams was considered a unit of the Langley Laboratory detailed on temporary assignment to Muroc.

The X-1 airplane assigned to the Air Force was delivered in August, 1947, but it was not until March, 1948 that the NACA X-1 was available for tests. The earlier Air Force flights resulted in the first supersonic flight by Capt. Charles E. Yeager on October 14, 1947. The first supersonic flight by a civilian in the X-1 occurred on March 4, 1948, made by NACA pilot Herbert Hoover.

Maj. Gen. Albert Boyd summed up the NACA-USAF X-1 program by writing that, "The end results of the high-speed flight research programs conducted jointly made available to aircraft designers, for the first time in the history of flight testing, sorely needed information which served a dual purpose. The rapid but sketchy USAF portion of the program supplied the answers which went toward determining the military applicability of a research aircraft, whereas the lengthy but detailed NACA program confirmed or refuted wind tunnel data and at the same time provided information which would permit aircraft designers to avoid dangerous flight characteristics in future military and civilian aircraft of a more advanced design."

It is interesting to note that even before the X-1 had completed its NACA flight program, its earlier flights had broken the sonic "barrier" and encouraged operational aircraft to be designed and operated at sonic speeds in dives.

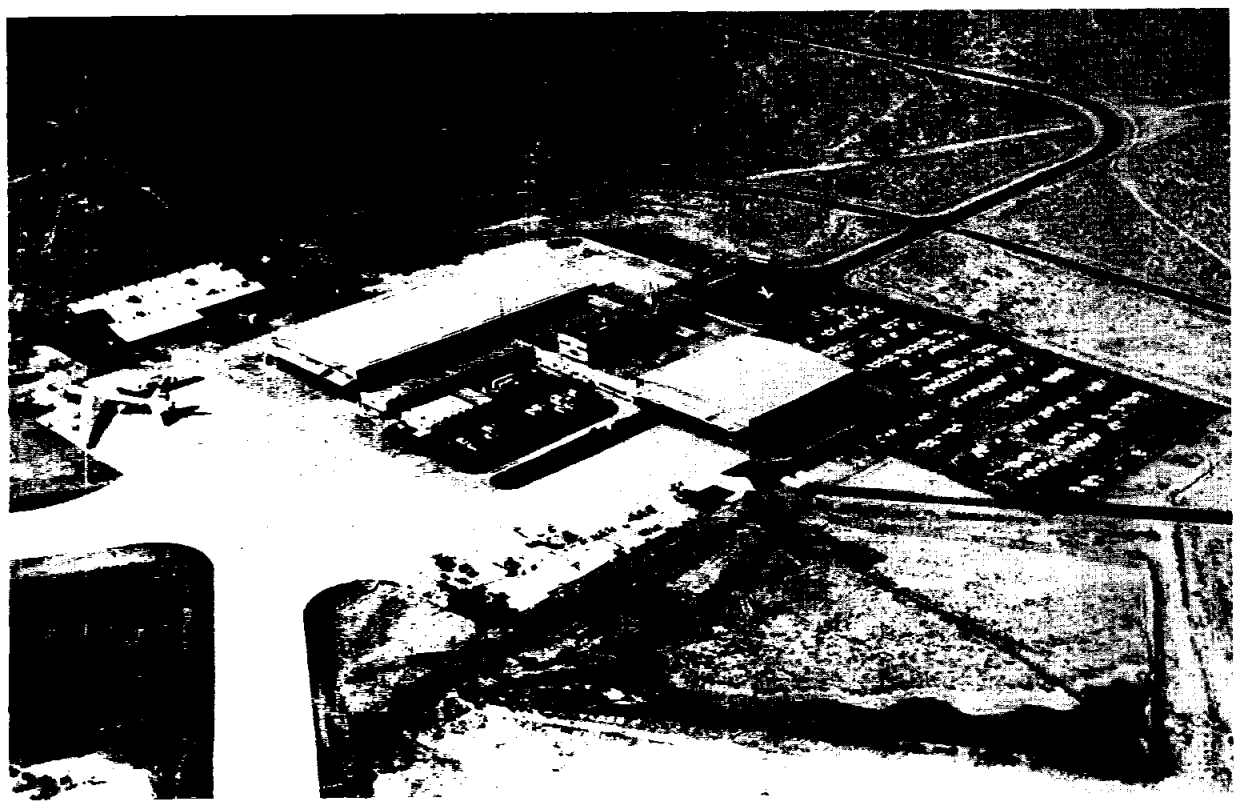
Two D-558-I airplanes were

Paul F. Bikle
Director
Flight Research Center

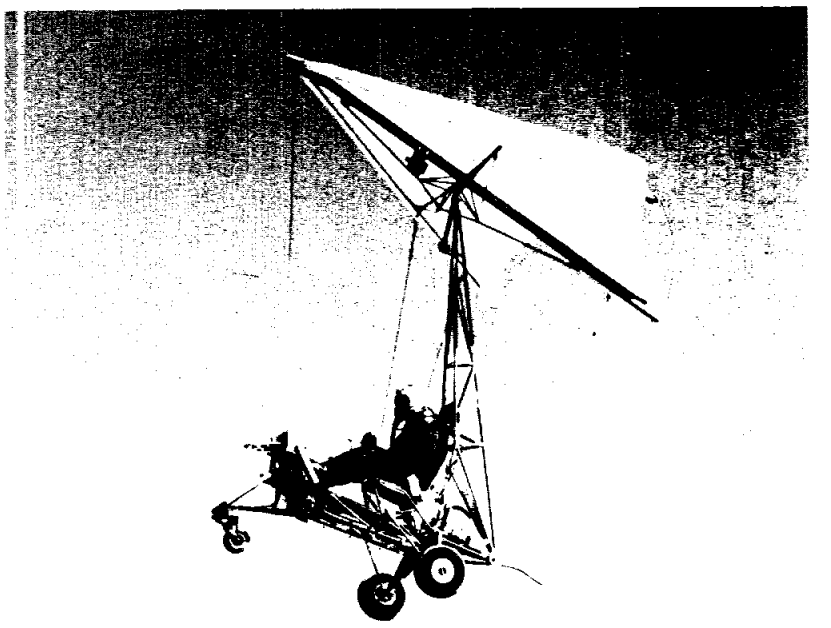
delivered to the NACA at Edwards in the fall of 1947. These airplanes, being jet powered, did not have the speed potential of the rocket powered X-1, so were used extensively for research up to Mach numbers of about 0.9. The two experimental airplanes were used in combination as the programs developed, the D-558-I for heavier work and more sustained flights and the X-1 used for investigations of higher speeds.

In 1949, the NACA Muroc Test Unit had moved from its makeshift facilities in an Air Force hangar to a small hangar and lean-to buildings leased

NASA's Flock Of Supersonic Birds – Including X-15



AERIAL VIEW OF FLIGHT RESEARCH CENTER at Edwards, Calif. shows hangars and office building. Now at a strength of 560 employees, the Center is being utilized for all high-performance aircraft and other vehicle testing within NASA and as a focal point for the nation's most advanced aircraft research programs.



PARASEV (Paraglider Research Vehicle) is being used by NASA engineers for study of its flight characteristics and possible use for future space vehicles. The device is towed aloft and released to glide back to a landing on Rogers Dry Lake bed. The program began early last year.

THE BLACK BIRD which can carry man to speeds of over 4,000 mph, six times the speed of sound, and to altitudes over 50 miles, the "fringe of space," then land in the manner of a conventional high-performance jet, an X-15 rests on the ground at Edwards. Designed and built by North American Aviation, this is one of three such research aircraft built. It is 50 feet long and has a 22-foot wingspread. It lands on steel skids rather than conventional wheels, and burns liquid ammonia and liquid oxygen in a rocket engine.

from the Air Force. In the fall of 1949, the unit, numbering about 60 persons, was permanently established at Edwards as the High-Speed Flight Station.

From 1950 to 1953, a variety of projects was undertaken. These included, in 1951, flight research with the Bell X-5, a unique aircraft capable of varying its wing-sweep in flight. In 1952, the Convair XF-92A, the United States' first delta wing aircraft, was the subject of detailed investigations of pressure distribution on its surfaces. The research done on the SF-92A by the Station, with wind tunnel tests, were instrumental in the development of the fence configuration now seen on the F-102 airplanes. Also, in a concurrent program requested by the Air Force and Northrop Aviation, Inc., structural failures in the F-89 were the subject of intensive tests using strain gauges to measure aerodynamic loads in flight.

By 1953, it was apparent that the work done at Edwards for the NACA flight research program would continue indefinitely. Accordingly, a Congressional appropriation was obtained for construction of hangar and office facilities and lease of 175 acres at Edwards Air Force Base. The Station complement at this time had increased to 222 employees.

The years 1953 and 1954 saw an increase in the scope and amount of work done in flight research. During this period, a Boeing B-47 was heavily instrumented for testing of loading effects and stability and control. Later, the same airplane was used in connection with the noise problems of jet aircraft. NACA engineers cooperated with the Air Force and the Boeing Company in a similar program with a Boeing B-52, augmenting the work already done with the B-47 and extending research knowledge well into the transonic speed ranges. Initial flight tests of the Bell X-1A series airplanes were made during 1953. These rocket powered aircraft differed from the original Z-1 in cockpit configuration and in rocket fuel capacity. Soon after the X-1A reached a record speed of Mach 2-5 in December, 1953, the X-1A and the X-1B airplanes were delivered to the NACA at Edwards as part of a cooperative program between the manufacturer, the Air Force and NACA.

The X-1B continued to yield research data until its retirement to the Air Force Museum at Wright-Patterson Air Force Base in January, 1959. One of its later contributions was the flight testing of reaction controls at high speeds and altitudes. These controls are now incorporated in the design of the North American X-15 and served at prototypes to those on the Mercury spacecraft.

The problem of inertia coupling was first discovered in flight tests of the Douglas X-3, a stilleto shaped research aircraft delivered to the NACA at Edwards in 1954. Even before the NACA analysis of this problem was completed, similar problems were uncovered in the F-100, then in the process of becoming operational with the Air Force. An intensive program between the NACA, Air Force and North American Aviation, Inc. resulted in an understanding and subsequent remedy of the problem.

Installed in the new facilities and renamed the High-Speed Flight Station in the summer of 1954, the NACA team continued its research programs throughout 1955, 1956 and 1957 on such diversified aircraft as the Douglas Skyrockets, the B-47, B-29, F-100, F-101, F-102, F-51, X-3, X-1B, and the X-1E, a modified version of the original X-1. In 1956 and 1957, the Station received for testing the F-104 and the F-107. Later, other models of these aircraft were delivered, some of which are still being used.

The transition of the NACA to the National Aeronautics and Space Administration was accomplished in October of 1958. In September, 1959, the Station was officially designated the NASA Flight Research Center. That same month Paul F. Bikle succeeded Walter C. Williams as Director of the Center. He had been technical director of the Air Force Flight Test Center, Edwards AFB, Calif.

The first X-15 flight was made by Scott Crossfield, test pilot for North American Aviation, the prime contractor of the aircraft, in September of 1959. A total of three aircraft were produced and the flight results from these three aircraft, capable of leaving and reentering the earth's atmosphere, are still providing valuable aeronautical data. During these flights new highs of 4,104 mph and 314,750 feet were accomplished by the aircraft.

Joseph A. Walker is the NASA chief project pilot and Maj. Robert M. White, is his USAF counterpart. Two other pilots are currently flying the rocket powered aircraft; John B. McKay, NASA and Maj. Robert Rushworth, USAF. Besides Crossfield, two other men piloted the aircraft, Cdr. Forrest Petersen, USN and Neil Armstrong, NASA—now an astronaut trainee.

In the early spring of 1962 a unique vehicle called the PARESEV (paraglider) was flown. The project, designed to evaluate the characteristics of a Rogallo wing vehicle, untilized Milton O. Thompson, NASA, as project pilot.

Now at a strength of 560 employees, the Center's facilities will be utilized for all the high-performance aircraft and other vehicle testing within the National Aeronautics and Space Administration. The Flight Research Center will, in the future as in the past, continue as a focal point for the nation's most advanced aircraft research programs and the scene of historic advances in evolution of aeronautical and space science.

This is the eighth in a series of feature articles about the activities of other NASA installations. The information concerning Flight Research Center and its program was supplied by the Flight Research Center Public Information Office.

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

Director . . . . . Robert R. Gilruth
Public Affairs Officer . . . . . John A. Powers
Chief, Internal Communications . Ivan D. Ertel
Editor . . . . . Anne T. Corey

On The Lighter Side

Hello, Procurement? Never mind who is to blame— just tell me how to adjust it!

The equipment MSC needs to put a man on the moon includes some strange and wondrous things. And the items that turn up on purchase requests must cause some high-level head-scratching in the Procurement Division. Take one from Photographic Services. They wanted, if we are to believe a straight-faced purchase request, six "polecats, adjustable." Not ordinary polecats, mind you. Adjustable polecats.

A tongue-in-cheek query to Jack Ottinger of the Still Photo Branch produced the following:

A polecat (adjustable) is a metal pole used for hanging lights, backdrops, or other camera equipment on. One end rests on the floor and a spring holds the other end against the ceiling. As to where the name "polecat" came from, Ottinger didn't know. The next question is, who explains these things to Procurement?

WELCOME ABOARD

Manned Spacecraft Center welcomed 34 new employees aboard during the period from December 31, 1962 to January 2, 1963.

Apollo Project Office: Velva L. Hoskins and Richard Kayfetz.

Spacecraft Technology Division: Willie Heineman, Jr., Spencer H. Gardner, James P. Kenny, Jon C. Axford, Clarence E. Humphries, Ronald W. Newman, and Cecil W. Messer.

Crew Systems Division: Donald L. Boydston.

Systems Eval. and Devel. Division: Jimmie D. Weber.

Flight Operations Division: Fred S. Jaap, Gene A. Reed, Connie R. Turner, and Mark T. Lee.

AMR Operations, Cape Canaveral: Camilla M. Smith, and George F. Killmer, Jr.

Ground Systems Project Office: Leroy L. A. Ruetz, Robert E. Driver and James W. McDowell.

Computation and Data Reduction Division: William H. Haynsworth and Sydney N. Heaton.

Financial Management Division: Wauretta P. Hendrix, and Bernard Horm.

Procurement and Contracts Division: Mavis E. Study, Williene G. Violette, Milton H. Sands, Jr., nd Franklin D. Nolin.

Facilities Division: Robert J. Fisher.

Photographic Division: Samuel J. DiMaggio and Noel T. Lamar.

Logistics Division: Peggy A. Lusk.

Public Affairs Office: Joyce L. Zelenevitz.

Program Analysis and Evaluation Office: Hugh O. Fleming.

EDITORIAL EXCERPTS

San Francisco Chronicle
Thursday, Jan. 3, 1962

A SAD HINT OF NO VENUSIANS

The apparent success of Mariner II makes it fairly certain we will begin a close-up examination of at least three more planets in the next decade.

These would be Mars, Jupiter and Saturn. The two big ones, however, are so distant (Jupiter 480 million miles and Saturn 880) that it would require several years for a vehicle to reach them. The little inner planet, Mercury, is so hot, and faraway Uranus and Neptune comparatively so featureless, that they have not engaged the astronomical imagination.

But every 15 to 17 years Mars is no farther from us than Venus, and the Space agency this week set a target date for a shot in 1966. Unlike the Mariner II shot, which passed 22,000 miles from Venus, attempts will be made to land instrumented vehicles on Mars.

Several methods of examination are evolving, most of them plans to absorb soil samples to learn if bacteria or spores exist on the planet. Doubtless the ultimate will be an effort to televise the Martian crust.

If interpretations so far released on Venus are valid, Mariner II was an immense triumph.

The Venusian atmosphere is largely carbon dioxide and hides the surface of the planet. But there is indication Venus has a very slow spin, possibly equaling her period of revolution, 225 days, keeping one face to the sun.

It is also possible the Venusian spin is clockwise, which would make it a freak. Another freak is Uranus, with an axis almost parallel to its plane of orbit, so it spins on its side.

But by far the most significant discovery so far announced is that Venus has little, if any, magnetic field. Mariner II caught weak fields in interplanetary space, reported almost nothing near the planet.

The earth has a powerful magnetic field, but Jupiter, which rotates in 10 hours, has a field far more powerful. Astrophysicists theorize that magnetic fields are created by the spin of the metallic core of a planet, in effect a dynamo.

In any case, the importance of the earth's field, formed in the now-familiar radiation belts, is that it is a shield against the deadly flow of radioactive particles from the sun. The field traps and converts these, letting comparatively few through to the earth's surface.

Most scientists believe that, without a magnetic field to trap solar and cosmic particles, any form of life is excluded on Venus, regardless of other physical environment.

MSC PERSONALITY

Tech Services' Jack Kinzler Began NACA Career In 1941

"From model airplanes to model spacecraft" is a thumbnail description of the career of Jack A. Kinzler, chief of MSC's Technical Services Division.

Model-making is actually only one of the functions of the division, which is a central shop of skilled craftsmen providing support services to the Center as a whole. "We originate no programs of our own," Kinzler said, but the division is constantly challenged to make "first of a kind" items, guided only by drawings, blueprints, or an idea.

The division recently received a commendation for constructing a full-scale mockup of the lunar excursion

Jack A. Kinzler

module on which "many of the details were defined by word of mouth" and "engineering drawings were supplied piecemeal." Tech Services did the job in a six-day round-the-clock crash program and delivered the mockup on time.

Including basic machine, sheet metal, model and plastics, welding, and electronic and equipment shops, the division also has technicians in such widely varying fields as parachute packing, pyrotechnics, and installation mechanics.

Kinzler was born Jan. 9, 1920 in Pittsburgh, Penna. and spent his first 21 years there, graduating from high school in the spring of 1938. He went to work as a bookkeeper in a Pittsburgh bank, but never abandoned what had been his first love and hobby for 11 years — building and flying model airplanes.

He also worked in his father's photo-engraving shop where for two years he was engaged in precision assembly of photo engraving equipment, using a drill press and electric welding equipment.

In March of 1941, he had a chance to make his hobby a profession when he was hired by Langley Research Center as "Under Aircraft Model Maker," making close tolerence, minutely accurate scale models of aircraft for use in wind tunnel tests.

Since then he has had 21 years of continuous NACA and NASA service.

NACA started an apprentice school in Kinzler's second year with the organization, from which he graduated a journeyman toolmaker early in 1944.

Shortly afterward he began eight years as assistant shop supervisor, managing all field installations around LRC.

As more and more wind tunnels were constructed at the center Kinzler became involved in the assembly and shakedown phase of each.

In November of 1958, he was one of the original 35 personnel detached from LRC for the formation of the Space Task Group, of which he became technical advisor for the technical services branch, and assistant supervisor of the machine shop. He became superintendent of the machine shop in January of 1960 and supervisory production controller for Technical Services in December of the same year, a title which evolved into that of division chief.

Looking back over his early days with MSC, Kinzler remembers particularly the preflight days of Project Mercury.

"MA-1 came to Langley for fitting with our own instrumentation gear, though it was a production spacecraft. We followed through again, monitoring the launch preparation and training the crew," he remembers.

Kinzler has also helped with astronaut egress training and done much planning and recruiting for wage board employees hired by MSC. He chose the tools and set up the technical services shop at the Cape, and did much of the same work for the tech services shop at Goddard Research Center.

With Harold Johnson he designed and built the air breather for the astronauts' alpha trainer. He designed fittings for the rentention of the heat shield on the Mercury spacecraft after the shield's loss on Ham's flight, and supervised a crash program on the impact bag problem.

Married to Sylvia Richardson of Eau Claire, Wisconsin, whom he met while she was a secretary at Langley, Kinzler has three children: John, 11, Nancy, 8 and James 5. The family has moved into a new house in Timber Cove.

Among Kinzler's hobbies are his MG sports car and the family sailboat, as well as building high fidelity sound equipment. He has one other hobby in which he spends "busman's holidays" — his home workshop.

Credit unions hold more than ten per cent of the nation's installment credit.

O & C Building Contract Let

(Continued from page 1)

ing will contain three-forths of a total 60,543 square feet of office space for roughly 800 personnel.

Laboratories will occupy another 81,000 square feet of floor space for more than 500 scientists, engineers and technicians. Some 7,500 feet will be occupied by shops and 4,700 square feet by the astronaut area. About 7,700 square feet will be included in the training area. The cafeteria and conference room will take up almost 5,000 square feet and the mission briefing room another 4,000. The high bay assembly and test area will occupy almost 40,000 square feet.

Here's a brief rundown on what each section of the building will contain:

The front portion of the building, facing due north, is to be two stories high. A lobby, reproduction room, mail and TWX room, some 30 offices and storage space will take up the first floor. The second will be given over to extensive office space and a technical library.

A low, one-story connecting area between the administrative section and the assembly and lab area will be split down the middle by a corridor. On one side will be the mission briefing room and on the other, the cafeteria and conference room. The briefing room will be equipped with a projection booth.

The laboratory section of the building will contain labs for environmental testing, environmental control, electrical testing, navigation and guidance, reaction control system and propulsion, calibration, material testing, and analytical work as well as several offices on the first floor. The second floor will be given over to a photo lab; instrumentation service pool; examination, suiting and altitude chamber room; engineering development lab; an electronic construction room with storage for stock; data processing and recording labs; a flight instrumentation checkout room; a flight module modification room; and inspection areas.

The third and fourth floors, and the portion of the building that includes a fifth floor, will be designated for astronaut quarters and training, as follows:

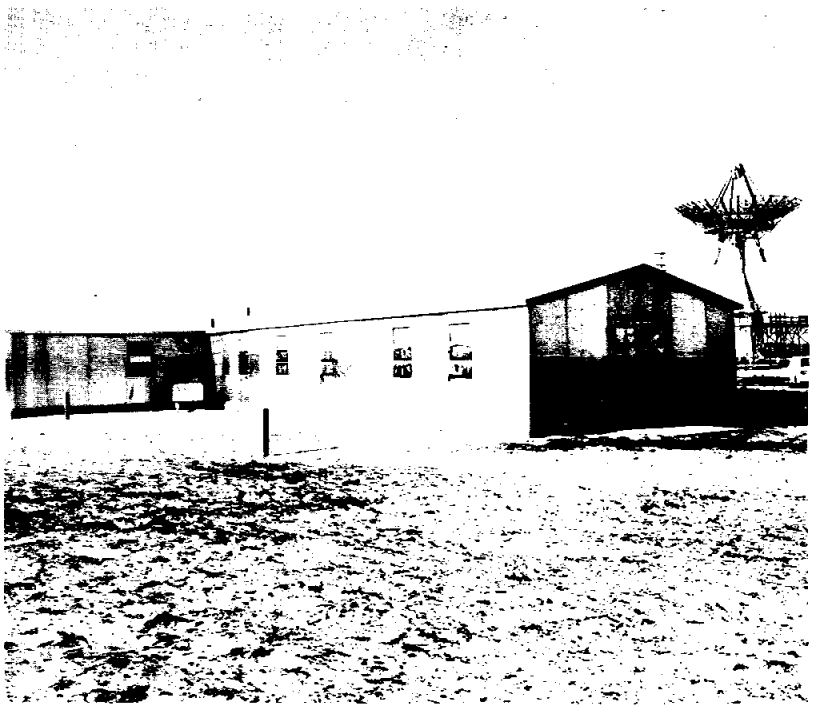
Doctors and nurses offices and a medical dispensary will be located on the third floor's east end, along with a dormitory, pressure suit equipment lab and data reviewing lab and offices for the astronauts. The west end of the building will contain a crew exercise and conference room, various checkout and control rooms, and the astronaut alert area including nine bedrooms.

The fourth floor is the training area. A 25 by 24 foot trainer room extends upward into a fifth story at the east end of the building and is flanked by trainer shop and equipment rooms, a data analysis section for training test results, and a computer room, covering most of the west wing of the building.

Control and receiving rooms for the trainer area occupy the partial fifth floor, along with the upper half of the training area.

Behind the laboratory area is the huge assembly and test bay, more than 400 feet long and 83 feet wide, the tallest portion of the building. Beneath its floor will run a 40-foot-wide cable and utility tunnel.

To the rear of the assembly area is a one-story service area.



MERCURY FLIGHTS are becoming "long hauls" as the number of orbits increases and the group that staffs Mercury Control Center at Cape Canaveral will have to work in shifts on MA-9 and future missions. There are no sleeping facilities closer to MCC than Cocoa Beach. So that key people can remain on call during the entire duration of the flight, an Atlantic Missile Range contractor has constructed at NASA request a dormitory building across the road from the control center (right). It provides beds and restrooms for from 25 to 30 persons. The beds will be assigned by numbers at the foot (above). Officially it is the "Mercury Crew Rest Quarters," but Cape wags have already dubbed the austerely functional building the "NASA-Hilton."

A TRIO OF FORMER "rambling wrecks from Georgia Tech" held an impromptu reunion at the North American Aviation's Space and Information Systems Division plant at Downey, Calif., recently. Astronaut trainee John Young (left), visiting the plant on an orientation tour, ran into Bill Schleich, (center) now manager of the Saturn S-II Flight Technology at NAA and Bill Dean (right) executive advisor for engineering on the staff of a division vice president. Dean and Young were Sigma Chi fraternity brothers and both were cadet commanders of ROTC units. All three graduated from Georgia Tech's School of Aeronautical Engineering, and Young says they spent a lot of time together doing class work—"about 16 hours a day."

Work On Saturn Test Stands Begins At Edwards AFB, Cal.

Work on a $30 million construction project for three new F-1 rocket engine test stands has begun at Edwards Air Force Base, Calif.

The single-position stands will be used for testing all F-1 engines prior to their delivery to NASA for installation in Saturn C-5 rocket boosters. Each C-5 will use five of the 1.5-million-pound thrust engines.

Construction at Edwards is being done under the direction of the Corps of Engineers, Los Angeles District, for the Marshall Space Flight Center.

The three new additions will make a total of five test stands at Edwards. It will be the largest concentration of static testing facilities in the country.

The first stand is to be completed in late 1963. All three will be capable of testing engines with up to 2.5 million pounds thrust.

The test complex will have all necessary support facilities, including a blast resistant control center, instrumentation tunnels, electrical support buildings, pre-test buildings, observation bunkers and off-stand and on-stand propellant systems.

Armed Forces College Personnel Visit Here

Some 16 students and faculty members of the Industrial College of the Armed Forces, Ft. McNair, Washington D. C., visited Manned Spacecraft Center Monday.

The visit was part of a program of field trips to industrial complexes, military installations and research organizations which are particularly concerned with management and decision-making processes.

CAPT. J. P. LOFTUS (left), of Crew Systems Branch, Apollo Project Office, was presented with an Air Force Commendation Medal recently for distinguished service in support of the Air Force in research and development. The presentation was made by MSC Director Robert R. Gilruth (right). An Air Force officer, Loftus is on assignment to MSC.

Houston, Harris County Schools To Participate In Essay Contest

Some 87 junior and senior high schools in Houston and the independent school districts of Harris County have been invited to participate in an editorial essay and technical paper contest on space exploration and space science.

The event will be one of the highlights of the Houston Seminar of High School Sciences to be held this spring, when the winners will be announced.

The contest is being held in cooperation with the Houston school system and the Houston Chamber of Commerce, at their request, as a means of stimulating student interest in America's space program.

Closing date for entries in the contest is February 25.

Eight winners will be selected—two junior and two senior high winners in each catagory, editorial and technical paper.

The two winners will be on an equal basis, rather than first and second place.

English teachers in each school have been asked to judge the editorial entries from their schools, which are limited to about 1,000 words on the subject, "Why Are We Going To The Moon?" Science teachers in each school will judge the science technical research paper entries, which are to be 1,500 word papers on space-related sciences.

Suggested subjects for the latter include aerodynamics as related to space flight, space vehicles (configuration, materials, structures and systems for stabilization, navigation, guidance and control), space life sciences, space flight and propulsion, space physical sciences (application of astronomy, meteorology and physics and related scientific disciplens to problems of space exploration), and space electronics and communications.

English and science teachers will team up to judge technical papers from each science class, selecting a winner from each

(Continued on page 2)

Space Flight Is Step-By-Step Process, Gilruth Tells Society

"We are engaged in the most exciting job of exploration that has yet faced man—the exploration of the vastness of the space which surrounds us," MSC Director Robert R. Gilruth told the Texas Society of Professional Engineers in Galveston Saturday.

Speaking on the theme "Step by Step Along the Road to Space," Dr. Gilruth began with a film of the flight of Astronaut Walter M. Schirra last October and mentioned the upcoming one-day mission of Astronaut L. Gordon Cooper this spring.

"This flight will carry us another step . . . by extending our experience with man and systems in space flight to a full day," he said. "It will also assist us in developing the ground-control techniques required for the longer duration missions which we plan in Project Gemini."

Summarizing the further steps into space planned during Project Gemini, he then showed an animated-drawing movie of Project Apollo in operation.

Using a series of slides, Dr. Gilruth compared the Mercury and Apollo missions, pointing out the greatly increased cost, complexity and effort required by Apollo.

"If we look to the past for guidance and reassurance, however," he said, "we can see that Mercury represented a 400 times increase over our last major step in flight technology—the breaking of the sound barrier with the X-1 rocket airplane. So, although we are planning tremendous steps in our manned space flight program, these steps are not relatively speaking any larger than steps that American knowledge and technology have been able to take before."

Dr. Gilruth then described the requirements for such steps along the road to space. After

(Continued on Page 2)

Graduate Study Spring Semester Kicks Off Feb. 4

The spring semester of the graduate study program begins February 4. Courses in engineering, science, and administrative management are available at Rice University, the University of Houston and Texas A and M. They are open to all MSC employees with a job-related need, with tuition to be paid by the Center.

Courses will be taught both at night and during working hours, but Center policy is to encourage study during daytime hours, according to Jack Lister of the Training Office.

Those who wish further information or who have not yet applied are urged to call the Training Office, ext. 3361, immediately.

Space News ROUNDUP!

SECOND FRONT PAGE

MSC Takes To Waves With One-Boat Fleet

Manned Spacecraft Center is acquiring its own navy—or is it army?

The seagoing force will consist of one modified Army LCU (Landing Craft, Utility), complete with skipper and chief engineer, to assist in recovery and tending of various spacecraft in the waters of both Clear Lake and Galveston Bay.

The vessel is presently en route from Charleston, S. C. to New Orleans where it will be modified, and given a lifting capability up to and including the Apollo command module.

The stern of the 115-foot craft will be altered to resemble a destroyer's fantail, to make heavy retrieving operations possible. The LCU will retain its basic landing craft capabilities, that is it can run right up onto a shallow beach and take aboard any wheeled vehicle from a ramp at one open end.

The craft will be used for conducting field tests such as air drops and floatation tests, and will have a draft shallow enough to go anywhere in Clear Lake or Galveston Bay. It is hardy enough to spend as much as five days in the open seas of the Gulf as well, carrying rations which can be prepared in its own galley.

Sleeping accommodations for 12 will be available in the air-conditioned cabin.

Skipper of the craft (called, in this case, a shipmaster) will be Frank Gamman, who has had extensive experience in

(Continued on page 2)

Center Acquires Grumman Plane For Staff Use

The National Aeronautics and Space Administration has purchased three Grumman "Gulf Stream" aircraft, one of which will be assigned to MSC as an executive transport.

The other two will go to Langley Research Center and Marshall Space Flight Center.

The plane is a twin-engine turbo-prop craft which can be used to transport personnel to and from Cape Canaveral or other points over the country.

It is presently in Los Angeles, Calif. where the interior is being completed prior to delivery during March.

MSC presently has seven other aircraft based at Ellington AFB for staff use. Included are three T-33 jet trainers, two F-102s and two RF-102s, used for maintaining flight readiness of the astronauts. Six of these are on loan from the Air Force; one of the T-33s was

(Continued on Page 2)

THE BOY SCOUTS OF AMERICA presented a "Thank-You" Plaque to Manned Spacecraft Center January 4 at a dinner at the Houston Club. Shown accepting for the Center is Special Assistant Paul E. Purser (left), with John F. Lynch, president of the Sam Houston Area Boy Scout Council. Also present at the dinner were local and national Scout executives, MSC officials, several of the astronaut trainees and Astronaut John Glenn.