

Space News **ROUNDUP!**

McDivitt, White Named Prime Crew For Second Manned Gemini Flight

Astronauts James A. McDivitt and Edward H. White II were named last week as the prime crew for the Gemini-Titan-4 (GT-4) flight which is scheduled for the first quarter of 1965 and will be the second manned Gemini in space. McDivitt will man the com-

mand seat and White will be his co-pilot.

The backup crew for this second manned flight will be Astronauts Frank Borman, command pilot, and James A. Lovell Jr., co-pilot.

The announcement of the crew was made on July 27 with

a press conference being held on the 29th in the auditorium here at the Manned Spacecraft Center.

GT-4 is scheduled to be up to a four-day flight with some 10 or 11 experiments to be performed during the mission.

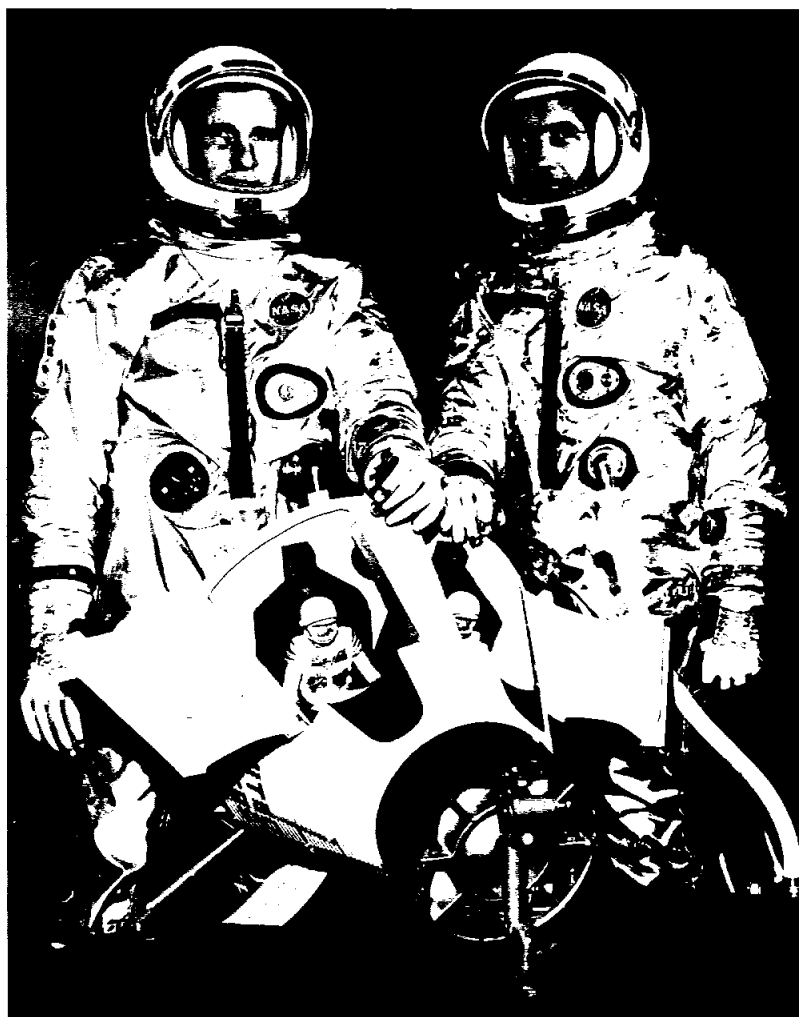
Consideration is now being given to opening the hatch on this flight with one of the crew standing up for the first exposure of man in space outside a spacecraft, said Kenneth S. Kleinknecht, deputy manager of Project Gemini.

Both McDivitt and White seemed quite pleased that they had been selected for the flight, as reporters questioned them at the press conference.

The two have been friends of long standing and both were students at the University of Michigan at the same time.

White is the youngest of the two crews, he is 34, while McDivitt is 35, and both Borman and Lovell are 36 years old.

McDivitt told reporters how
(Continued on Page 2)



GT-4 PRIME CREW—Astronauts Edward H. White II (left) and James A. McDivitt were named on July 27 as the prime crew for the GT-4 flight which is scheduled for the first quarter of 1965.

Paraglider Tow, Deployment Flights Completed Successfully

Two successful test flights of paraglider vehicles were made July 29 at Edwards AFB in California.

The first flight was a captive-tow test of a manned vehicle simulating the Gemini spacecraft beneath a pre-inflated paraglider landing system. The tow test vehicle (TTV) experiment in the morning was an evaluation of control and stability characteristics of a paraglider with an unmanned spacecraft.

A similar configuration was dropped in the afternoon from an airplane to evaluate paraglider deployment characteristics. The drop was made at an altitude of 32,000 feet from a C-130 aircraft.

In the drop test sequence the unmanned Gemini test vehicle was separated from its launch sled; the paraglider was automatically deployed from its container and controlled remotely in flight from 22,000 feet down to 12,500 feet altitude. At this altitude the paraglider was separated, and the Gemini test vehicle was brought down by parachute and recovered. There

was no damage to either the paraglider or the Gemini test vehicle.

With NAA test pilot E. P. Hetzel aboard, the TTV was towed off the ground to 6,000 feet altitude by a CH-46C helicopter. While airborne, Hetzel used his hand controller to put the TTV through its preplanned maneuvers—inflight flares, turns and banks, and back to earth for landing.

The TTV total weight is about 3,650 pounds, including the 350-pound paraglider.

NASA is continuously evaluating the paraglider program as a means of landing systems for recovering returning manned spacecraft. However, no decision has yet been made to remove the paraglider from its research and development status to put it into production status.

The paraglider recovery system is being developed by North
(Continued on Page 2)



PARAGLIDER SUCCESS—Last Wednesday the paraglider was towed aloft by a helicopter and then it glided back to earth while still attached to the copter by a cable. Pilot E. P. Hetzel rides to earth in the spacecraft suspended from the paraglider at Edwards AFB. A successful deployment test was also completed with an unmanned vehicle.

Successful Ranger 7 Sends Back First U.S. Close-Up Moon Pictures

Ranger 7 spacecraft impacted on the moon in the Sea of Clouds (Mare Nubium) area last Friday morning at 7:25 (CST), but not before it had taken 4316 pictures and transmitted them back to earth and the Deep Space Network tracking station at Goldstone, Calif.

Jet Propulsion Laboratory scientists said the Ranger impacted within 10 miles of the

planned target area and continued taking pictures up until three-tenths of a second before impact.

The last picture was taken at less than a half-mile from the moon's surface and covered an area some 65 feet across. Pictures were recorded on 35mm

film and magnetic tape.

In a message to Dr. William Pickering, director, Jet Propulsion Laboratory in California, Dr. Robert R. Gilruth, director, Manned Spacecraft Center said, "Congratulations on the tremendous success of Ranger 7."

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Christopher Kraft Picked To Direct Next Gemini Flight

Christopher C. Kraft Jr. was appointed Flight Operations Director last week for the second Gemini Titan flight GT-2, an unmanned suborbital mission scheduled this fall by NASA.

Dr. George E. Mueller, associate administrator for Manned Space Flight, at NASA, said Kraft would have overall responsibility for direction of the flight. Kraft, assistant director for Flight Operations here at NASA's Manned Spacecraft Center, is an original member of the manned space flight team formed when the agency was created in 1958.

For the GT-2 mission Kraft replaces Dr. Walter C. Williams, who resigned from NASA last

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THREE MILES above the moon some 2.3 seconds before impact, this picture, taken with a 25mm lens, shows an area about one-and-two-thirds miles wide. The smallest craters are about 30-feet in diameter and 10-feet deep. One rounded crater, top left, is about 300-feet in diameter and has an angular rock mass in its center which might be responsible for its origin.

MSC Crew At Cape Tests GT-2 Operational Procedures

Pre-mission flight control training intensified at the Cape Kennedy Mission Control Center as 12 members of the Manned Spacecraft Center flight control team began developing and testing new operational procedures for the scheduled GT-2 Gemini mission.

This is the first opportunity the flight controllers have had to operate MCC equipment in a GT-2 configuration. Later this year, the controllers will conduct world-wide tracking network drills to simulate launches, orbital flights, and recovery operations in preparation for the GT-2 and GT-3 missions.

Modifications in the Operations Control Room at the MCC are nearing completion for GT-2.

Members of the MSC Flight

Control team developing tests and procedures include: Operations and Procedures, M.H. von Ehrenfried and Jones Roach; Telemetry and Computer, Arnold Aldrich and James Tomberlin; Digital Command System, Stu Davis (Philco); Telemetry and Computer, Lary Wofford (Philco); Booster Systems, William Platt; Retrofire and Digital Command System Procedures, John Llewellyn, Tom Carter and Jerry Bostick.



MANNED SPACECRAFT Center flight controllers conduct Digital Command Systems Tests in the Modified Operations Control Room at the Mission Control Center, Cape Kennedy, Fla. in preparation for the upcoming Gemini GT-2 flight later this year.

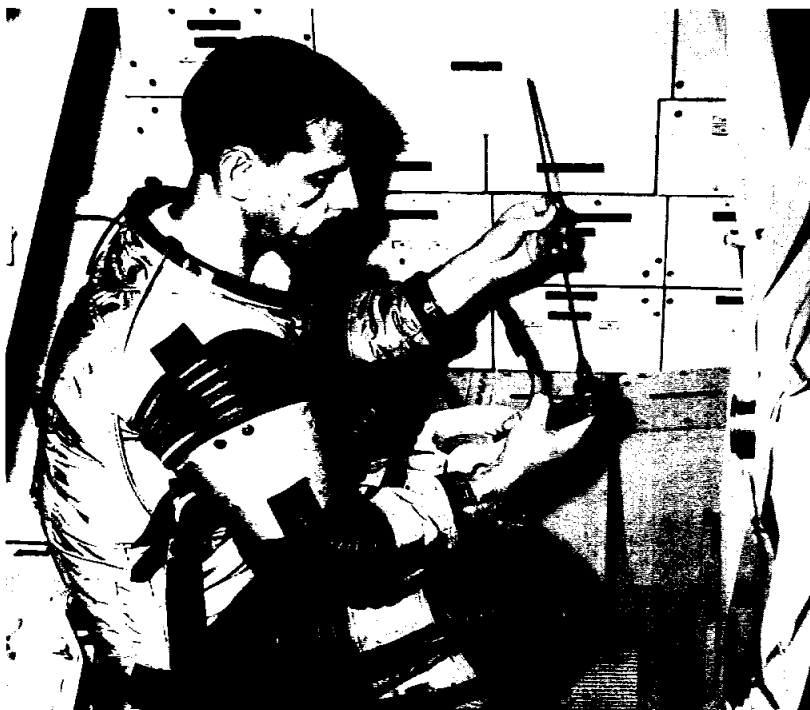
Tool Set Developed For Use On Moon Flight

An inflight toolset for space flight operations and maintenance is being developed for use by Apollo astronauts on their first round trip to the moon.

The toolset is being designed at North American's Space and Information Systems Division, Downey, Calif., for NASA's Manned Spacecraft Center. Weighing only 12 ounces, it has been earmarked for more than a

dozen in-flight uses and more than 30 maintenance tasks, with many more expected.

For instance, it will be used by astronauts at the work station in the Apollo command module. It will open and close valves, operate the astro-sextant door, open and close various compartments, tighten environmental control system equipment, adjust the couches, remove and



APOLLO TOOLSET—Technician in space suit tests all-purpose inflight Apollo toolset under development for astronauts enroute to the moon.

Gemini

(Continued from Page 1)

he and White had always been considered big eaters. He said that they had a little private joke that if they ever flew a mission together that, "all the food would be eaten the first day." The flight is scheduled for up to four days. McDivitt than jokingly said, "the flight would really be a medical experiment in how long we can go without food."

The prime crew for the first Gemini flight, Astronauts Virgil I. (Gus) Grissom and Thomas P. Stafford, was selected last April. They have since been training for the first manned Gemini flight which is scheduled to be a three orbit duration flight.

Backup crew for the first Gemini mission is Astronauts Walter M. Schirra and John W. Young.

Ranger

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I realize how important this mission was to you and your team at JPL. All of us at the Manned Spacecraft Center are most interested in the pictures you took this morning."

Dr. Gilruth also commented that this was really the first time a spacecraft has been used as a magnifying glass on another celestial body right up to impact.

He also stated that MSC has Warren Gillespie, technical assistant to Maxime Faget at JPL and that plans are to send several people from the lunar surface technology area at MSC to JPL in California.

Dr. Gilruth, Dr. Joseph F. Shea, manager, Apollo Space-

craft Program Office, and Paul Haney, Public Affairs Office, were at JPL Monday to look at the Ranger photos of the moon.

"The news of Ranger 7's successful flight indicates JPL did an outstanding job. The pictures should be very very interesting from our point of view and should be very helpful to our work," was the reaction of Donald K. Slayton, assistant director for Flight Crew Operations, to the successful Ranger flight.

The Ranger 7 spacecraft was launched from Cape Kennedy, Fla. at 10:50 a.m. (CST), Tuesday, July 28 by an Atlas-Agena rocket. After a near-perfect launch it was on its planned 69-hour, 228,522 mile space voyage.

At 3 a.m. (CST) last Wednesday a mid course maneuver was performed by the Ranger 7 spacecraft on command from a radio signal sent from the earth. The moon-bound-craft was nearly half way to its destination when the correction was radioed for the course change.

The single experiment carried by the 806-pound Ranger 7 consisted of six television cameras. In the 16 plus minutes before impact the cameras began taking and sending pictures back to earth from an altitude of about 1400 miles above the surface of the moon.

The 382-pound television package, designed and built by RCA's Astro-Electronics Divi-

replace electronic cards and instruments. The toolset will eliminate the need for handles and knobs and other hardware on various module parts and will eliminate the need for several individual tools.

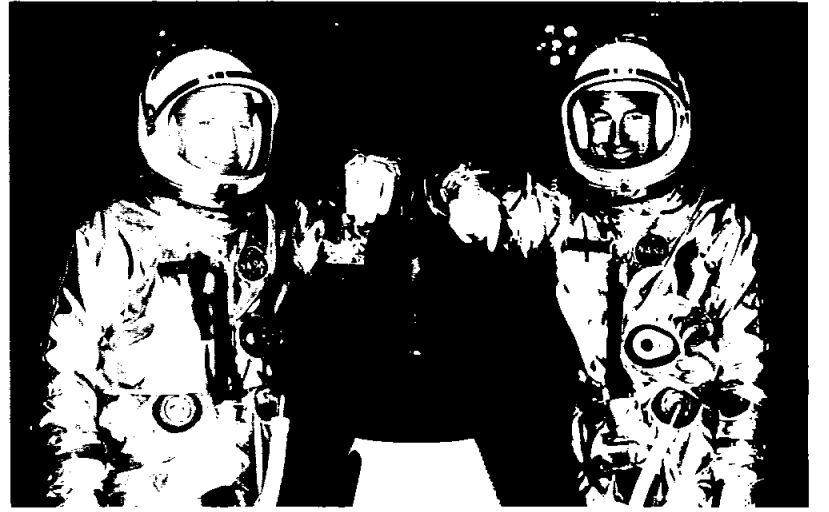
The basic toolset handle consists of a 1½ by ¾ by 6-inch handle containing a three-position ratchet, a pry bar, an adjustable torque control unit and a built-in dual size driving lug containing 7/16-inch and 5/32-inch hexagonal male wrenches.

The 7/16-inch wrench has a ball lock onto which various attachments will snap. The handle also contains a flip-out device which converts the handle into a crank.

Seven attachments come with the toolset. They include other hexagonal keys of varying sizes and lengths, one with a flexible cable, one internal hexagonal socket wrench, and two screw drivers.

Handle parts and attachments are made of high-grade steel. The toolset handle shell is made of forged aluminum.

A companion wrench set consisting of two handles and eight interchangeable open-end wrenches varying in size from 7/16 of an inch to 1 inch also is being developed for some maintenance tasks.



BACKUP CREW—Astronauts Frank Borman (left), and James A. Lovell Jr. were named as the backup crew for the second manned Gemini flight, GT-4.

mission and shaped like a truncated cone 59 inches high continued to take and transmit pictures up until the moment of impact. Ranger 6 was launched January 30 carrying a very similar payload to the one on Ranger 7. The basic spacecraft performance was excellent and impact was in the Sea of Tranquility on the Moon within 20 miles of the target point. However the television cameras failed to function.

The Ranger program is directed by NASA's Office of Space Science and Applications. It has assigned project management to the Jet Propulsion Laboratory, Pasadena, Calif., which is operated by the California Institute of Technology. Tracking and communication with Ranger 7 was conducted by the NASA/JPL Deep Space Network.

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The 382-pound television package, designed and built by RCA's Astro-Electronics Divi-



HEADED FOR MARE NUBIUM—This sketch depicts the attitude of Ranger 7 as it drops to the Mare Nubium (Sea of Clouds) on the lunar surface. Spacecraft is tilted to allow cameras to look down the flight path.

Paraglider

(Continued from Page 1)

American Aviation's Space and Information Systems Division, Downey, Calif. under contract to the NASA Manned Spacecraft Center.

Eleven full-scale deployment tests have been conducted with the paraglider system since January of this year. These tests are to insure that developmental problems encountered earlier in wing structures and in sequencing have been solved successfully.

Dress For Apollo Crews A Far Cry From Mercury Days

Project Apollo space travelers will bear little resemblance to the men who took the first orbital steps into space during Project Mercury.

Space Suits, for instance, may be white instead of silver.

And no matter what color the space suits are, they'll be hidden by coveralls when the first

American astronauts set foot on the moon.

Even enroute to the moon—a three-day journey—the space suit may be shed in favor of a "Constant Wear Garment," a form-fitting cross between ski suits and long underwear.

These are just a few of the concepts under consideration

here at the Manned Spacecraft Center where members of the Crew Systems Division are working to improve the safety, comfort and mobility of men who must venture into environments hostile to earth residents.

And many of their ideas will find application here on earth.

Take water-cooled underwear,

for example. That's what astronauts may wear beneath their pressure suits on the moon. Water—or a glycerine liquid—will be pumped through tubing sewn into long underwear to cool the wearers and to prevent perspiration.

Furnace workers, sports car drivers, even fire fighters may someday wear versions of this garment. Polar explorers and mountain climbers may wear it for warmth. British pilots are experimenting with the idea, too.

But NASA's engineers are mostly concerned about a wardrobe for moon travelers. Here are just a few of the concepts they're working on:

The Constant Wear Garment: long, cotton underwear to absorb sweat and act as a wick, allowing evaporation which cools astronauts in the Apollo command module while enroute to the moon.

Liquid-Cooled Undergarment: long underwear entwined with tubes of liquid to prevent perspiration and offer constant, comfortable temperatures, even during heavy workloads.

Pressure Suit: a reasonably conventional (for pilots) garment

to provide oxygen for breathing and pressurization while outside the spacecraft or in the event of a failure of cabin pressure.

Thermal Garment: a monk-like coverall which covers the entire body with shirt, trousers, boot covers, mittens and hood to protect astronauts from the direct rays of the sun while on the lunar surface.

Meteoroid Garment: a covering cape-like garment which may be a separate metallic material over the thermal garment, or may be designed as part of the thermal coverall.

Add to this a helmet, complete with microphones and ear-phones, a "King Arthur" visor to filter radiation and feeding port to allow space explorers to eat and drink while in a pressurized suit.

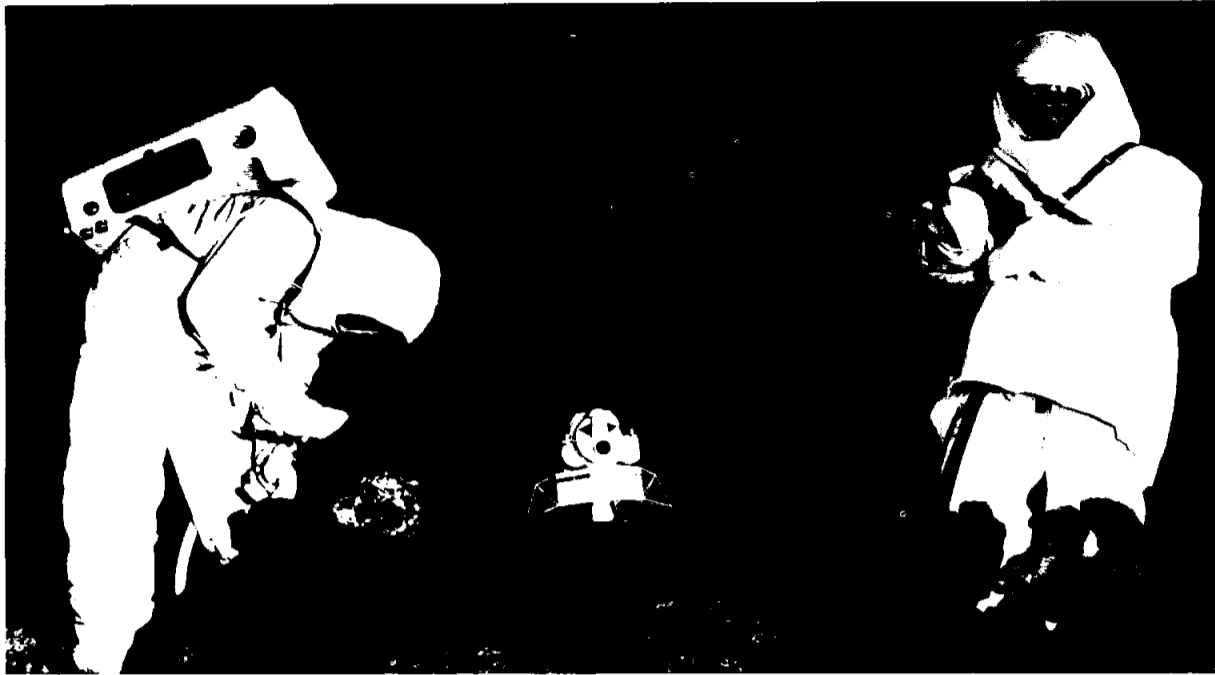
Then strap on a portable unit to supply pumps (for the liquid undergarment), oxygen (for pressure and breathing), radios (for telemetry and communications) and an evaporator (to dissipate heat).

Exotic?

Yes.

Chic?

No.



PROTECTIVE OVERGARMENTS—Astronauts Frank Borman (left), and Elliot M. See Jr., demonstrate prototype thermal overgarments designed to protect men on the moon from the direct rays of the sun and the resultant heat radiated without a thick protection of atmosphere as on earth. On their backs are mock-ups of units which will provide life support and communication equipment for the astronauts while they are on the surface of the moon.

Students In MSC's Co-op Program Maintain High Academic Standings

Tom Buckler, an MSC Co-op student since Feb. 5, 1962, received the Pi Tau Sigma Sophomore Scholastic Award at the 1964 Honors Exercises at Georgia Tech recently.

Buckler, a mechanical engineering student, is assigned to the Mechanical Landing Systems Branch, Structures and Mechanics Division. He is one of twenty co-ops from Georgia Tech and has been with the Center as long as many permanent employees.

Most of the other co-ops at MSC share two things with Buckler—an interest in aerospace engineering and high academic standing (most have a "B" average or better).

The Co-op Program, like the rest of MSC, has grown rapidly. From its beginning in March, 1961, it has grown to 200 students from 31 colleges and universities throughout the United States.

These schools range from Drexel Institute, University of Louisville, and Virginia Polytechnic Institute in the East to the University of Arizona and New Mexico State University in the West. Fenn College, University of Detroit, Northwestern University, are representative of the North and Midwest. The

University of Florida, South Florida and Auburn join Georgia Tech in the South and Southeast. Among the local Texas schools are Arlington State, Texas A&M, University of Houston and SMU.

Seven Engineering and Development Divisions participate in training Co-op students. Flight Operations and Flight Crew Operations also join in these efforts along with the Engineering Division, Facilities Division and Resources Management Division. MSC co-ops are also assigned to MSC Florida Operations and MSC White Sands Missile Range.

All trainees are given the opportunity to observe and gain experience in the several areas of aerospace engineering practiced at MSC. Co-ops are afforded practical experience in applying basic engineering principles and theories which allows them an opportunity to determine the kind of work for which they are best suited.

Each co-op represents a well-trained potential future MSC Engineer or Scientist. Upon graduation, these students are able to step into full-time positions without the usual orientation and time-consuming training.

Like full-time MSC employees, co-op students are selected from a Civil Service Register. They must be enrolled at a school with which the Center has cooperative agreement in addition to having a high academic average.

Each co-op represents a well-trained potential future MSC Engineer or Scientist. Upon graduation, these students are able to step into full-time positions without the usual orientation and time-consuming training.



WATER COOLED GARMENT—An experimental garment designed to cool space-suit-clad astronauts by water-filled tubes sewn to its fabric has been delivered to the Crew Systems Division here at the Manned Spacecraft Center for evaluation. The garment which promises to allow astronauts to work harder and perform more tasks than originally expected, is being developed by the Hamilton Standard division of United Aircraft Corporation.



CO-OP STUDENTS AT WORK—Three of the 99 co-op students presently on the MSC employee rolls are shown as they discuss the design of a variable orifice shock absorber used in conjunction with the test and development of Apollo docking hardware. They are (l. to r.) Mike Robinson and Tom Buckler from Georgia Tech, and Dave Bettler from Southern Methodist University.

Kraft

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March to become vice president and general manager, Manned Systems Division, at Aerospace Corp., El Segundo, Calif.

Kraft was responsible for flight direction from lift-off to recovery in Project Mercury, the Nation's first manned flight program, and also the first Gemini flight.

When not directing a flight, Kraft's regular responsibilities include coordinating details associated with preparing for the tracking, recovery and control of a mission.



CHRISTOPHER C. KRAFT

Advanced Manned Missions Study Contracts To Cover Period After Landings On Moon

Looking beyond the time when American astronauts will have landed on the Moon, the National Aeronautics and Space Administration announced recently that the Marshall Space Flight Center, Huntsville, Ala., has negotiated 29 contracts for studies of advanced manned missions.

The 29 studies, as well as two more still being negotiated and a third to be negotiated soon, will cover the subjects of vehicle development, earth orbital operations and lunar and planetary explorations.

Out of the information gathered by the studies, NASA will determine what manned space programs after Apollo (as the Moon mission is called) most effectively meet urgent national needs. In addition, the work will enable NASA to plan the best use of scientific and engineering talent.

Of the 29 study contracts, 17 are on launch vehicles, including two studying improvements of Saturn IB.

Five studies involve improvement of Saturn V.

Under the heading "Launch Vehicle Systems Criteria," Boeing will consider "Projections from Historical Trends" and North American will study "projections from potential trends."

In the continued investigation of a reusable orbital transport, Lockheed will consider aspects of the first stage, and General Dynamics/Astronautics, the second stage.

As now envisioned, a reusable orbital transport would be a two-

stage rocket plane able to take off horizontally with the second stage riding the first piggyback.

The booster would take the second stage almost to orbit before burnout. The second stage would then separate and continue the payload to orbit under its power. The booster could be piloted through a nose-high re-entry into atmosphere and then be flown back to base on air-breathing engines.

The second stage, meanwhile, could continue to rendezvous with an orbiting space station and take on passengers or deliver cargo to a point in orbit before returning to earth. Both stages would be piloted by men on each flight and could be used repeatedly.

Of the three Earth orbital studies, one is a seven-month continuation of work on "Advanced Orbital Launch Operations," authorized by modification of an earlier contract with Ling-Temco-Vought, Inc. Boeing has contracted for another study in the series "Orbital Launch Facility." A study called "Utilization of Spent Stages" is being negotiated with North American.

Boeing's study is intended to

(1) produce a conceptual design of an initial orbital launch facility (OLF) that can be used in support of manned planetary and lunar missions; (2) specify activities that call for designed-in gravity and determine whether a zero-G or artificial gravity-type OLF is required; (3) identify the supporting research and development tasks needed to solve problems for an OLF; and (4) develop, if required, a design evolution for a possible series of OLFs beginning with an early orbital research laboratory.

The other two studies will determine the operations involved in launching spacecraft from Earth orbit and consider possible uses for spent rocket engines and modules orbited while performing other missions.

In the Apollo Logistics Support System (ALSS) program, three studies are to be made. Boeing and the Bendix Corp. (\$800,000 each) will make parallel studies of a mobile laboratory (MOLAB) to operate on the Moon surface. MOLAB would have a complete life-support system for two exploring astronauts in "shirt-sleeve environment" (pressurized cabin) with an air-locked exit for the gathering of soil and rock samples in space suits.



MAKING FINAL CHECKS of the live pitch control motors of the Apollo Spacecraft (BP-15) Launch Escape System, (LES), are MSC-Florida Operation's Elmer Karberg, quality control inspector, left, and Al Cave, mechanical systems engineer. Karberg and Cave are part of the NASA-Contractor team at Cape Kennedy conducting preflight tests of the BP-15 Apollo spacecraft in preparation for the Saturn-Apollo SA-7 launch. The LES, designed to pull the Apollo Command Module, housing the astronauts, clear of the launch vehicle in an abort operation, is being checked in the newly completed Manned Spacecraft Ordnance Storage Building on NASA's Merritt Island.

Apollo Launch Escape System Checkout Made At Merritt Island

The Launch Escape System for the Apollo Spacecraft BP-15 became the first system to undergo tests and checkout on NASA's new Merritt Island Complex, according to an announcement by NASA officials at Cape Kennedy.

Although Manned Spacecraft Center—Florida Operations, the first major NASA organization scheduled to occupy facilities on Merritt Island, will not start their move until September, a few Merritt Island buildings are now in limited use by NASA and contractor elements.

The Launch Escape System, (LES), whose solid propellant motor develops approximately 155,000 pounds of thrust, has been undergoing tests in the new Ordnance Storage Building. The 33-foot-long LES provides for astronaut safety by lifting the Apollo command module away from the launch vehicle in the event of an emergency abort operation.

"Buildup of the LES marks several firsts," said Ed Timmons, MSC-Florida Operation's Ordnance Engineer, "It will be the first firing of the Launch

Escape Motor in the Apollo series of flights at Cape Kennedy, the first system checkout at Merritt Island, and the first unit to be checked out in the new Merritt Island Industrial Area."

North American Engineer Jim Payne indicated that on the upcoming Apollo-Saturn SA-7 flight, the LES will be jettisoned in a test of the escape motor. "Ninety miles down range at an altitude of 50 miles, ignition of the escape motor will occur," he said, "causing LES separation from the Apollo boiler plate Command Module."

The LES is scheduled to be moved from the Ordnance Storage Building, Merritt Island, and held in readiness at Cape Kennedy for eventual installation on top of the BP-15 Command Module of the SA-7 flight vehicle. Launch is scheduled for September.

New Temperature Resistant Compound For Space Use Developed At Goddard

Researchers at the NASA Goddard Space Flight Center have developed the first known high temperature-resistant ceramic potting compound in which delicate space electronics can be baked for protection against extreme heat.

The reliability of electronics is effected by high temperatures.

Much like baking a cake with a file in it, the new ceramic potting compound is mixed to the consistency of cake batter, poured around the electronic components contained in a metallic tray and baked in an oven.

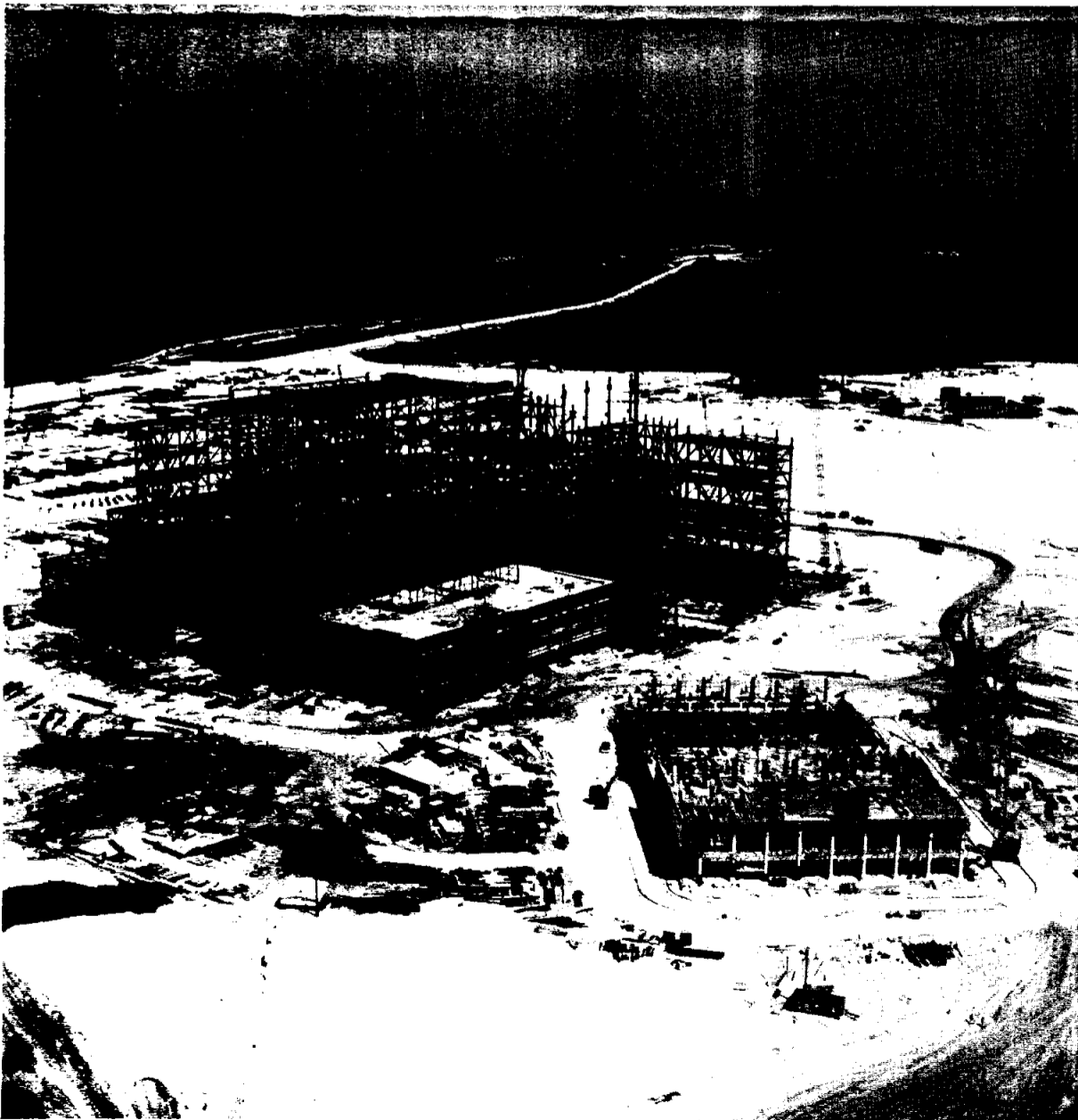
Differing from the edible cake, however, the ceramic is allowed to rise (or foam) and is then baked (or cured) at temperatures half those required for the edible cake.

The ceramic potting compound can be cured at temperatures as low as 150 degrees Fahrenheit, a feature which per-

mits it to be cured in place around the electronics without effecting them. It combines protection against heat up to 2500 degrees Fahrenheit with protection against vibration.

Goddard developed the heat-resistant ceramic potting compound as a weight-saving method of protecting satellite electronics against possible damage by heat from onboard nuclear power sources.

The compound also will have application in shielding the electronics of sounding rockets against the transient high temperatures encountered during launch and re-entry.



FLORIDA GIANT—The giant Vertical Assembly Building (VAB), which will house the Saturn V moon rockets during pre-launch checkouts, begins to take shape in this recent aerial photo of construction progress at NASA's Merritt Island Launch Area. At the lower right is the Launch Control Center for Complex 39. In the background is the towering mobile launch pad (445 feet high when completed), and to its right, the beginnings of a second mobile launch pad. Hidden behind the VAB is the crawler transporter assembly area.

Rates Down, Policy Revised On MSC Credit Union Loans

The board of directors of the MSC Federal Credit Union recently revised the loan policy on current model cars, reducing the interest rate on these loans to three-fourths of one per cent per month on the unpaid balance.

Joe Murray, manager of the Credit Union explained the new policy. "The Credit Union will finance 80 per cent of the actual purchase price of a current

MSC Tennis Club Now Reorganizing, Membership Open

The reorganization of the NASA/MSF Tennis Club was announced last week, with membership open to all interested persons experienced or inexperienced.

Location of play is tentatively set to be at MacGregor Tennis Courts in south Houston, just off the Gulf Freeway. The time and day of play shall be determined by agreement of the members.

MSC Employees Activities Association will be requested to supplement part of the playing cost.

For further information interested persons should contact Robert Swint at HU 3-4765.

MSC Duplicate Bridge Club Votes To Hold Meetings Every Tuesday

The interest in duplicate bridge has been so enthusiastic that the members of the MSC Duplicate Bridge Club recently voted to increase the playing nights to every Tuesday.

Games are held at the NCO Club at Ellington, with play scheduled to commence at 7:15 p.m.

Willingness of J. R. Arnett, Wayne Brewer and J. N. Lamarque to assist Jim Raney in directing the games makes it possible to schedule the meetings on a weekly basis.

The MSC Duplicate Bridge Club is now affiliated with the American Contract Bridge League and is sanctioned to award master points. Thus far, the Club has only held Fractional Master Point games, but a schedule of full Master Point games is being established.

Winners at recent games were:

model car for three-fourths of one per cent, provided the car is purchased from an authorized dealer."

He also stated that member borrowers will be required to show a bill of sale to authenticate the purchase price and that \$100 deductible and comprehensive insurance coverage will be required on these car secured loans.

The new interest rate is also in effect for loans which are fully secured by savings. "This type of loan has definite advantages when the insurance benefits are considered," Murray said.

Life savings insurance if offered by the Credit Union on deposits up to \$2,000 and loan protection insurance on loans up to \$10,000 at no extra cost to the member.

Commenting on the phenomenal growth of the Credit Union, Murray stated that the half-million mark in assets has been passed. There are ample funds available for immediate loans to anyone who can qualify for a Credit Union loan.



SERVICE AWARDS—Maxime A. Faget, assistant director for Engineering and Development, (top left), presented fifteen year service emblems and certificates for government service and at least one year with the NASA. Receiving awards are (front row l. to r.) Ulys E. Ward, Structures and Mechanics Division; Myra Sherman, Instrumentation & Electronics Systems Division; and R. E. Kosinski, Instrumentation & Electronics Systems Division; (back row, l. to r.) Faget; Cecil Raines, Crew Systems Division; Arthur Hinners, Crew Systems Division; and M. R. Franklin Jr., Information Systems Division.

New Entrance To Center Opened This Week

A new entrance to the Manned Spacecraft Center located at the west end of Avenue B was opened Monday for use by vehicles on which the MSC decal or vehicle pass is displayed.

The access road to this entrance leads to State Road 3 (the old Galveston highway), north of Webster.

All visitors will continue to be routed to, and processed through, the Second Street entrance.

Avenue B west entrance will initially be open from 7 a.m. to 5:30 p.m. on regular working days. Traffic count surveys will be conducted to determine if the open hours should be expanded or curtailed.

Any changes in these hours will be announced prior to their becoming effective.

MSC Dance Club Lesson Session To Begin Soon

A new session of inexpensive summer dance lessons is starting soon it was announced by the MSC Dance Club.

The lessons are open to couples or stags and will cost less than \$1 per hour for beginner, intermediate or advanced lessons.

Interested parties may call Jerome Kucicz, Ext. 33239, or at his home WA 1-5554.

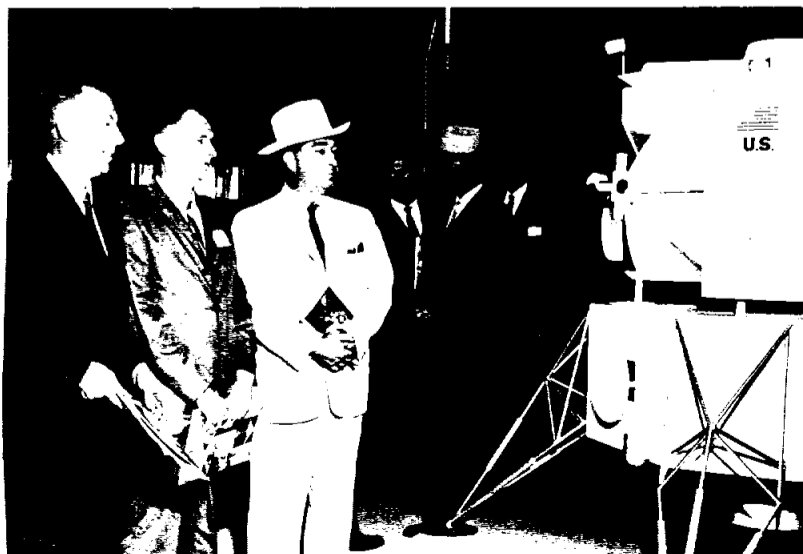
MSC BOWLING ROUNDUP

MSC COUPLES LEAGUE			Standings as of July 28	
Team	Won	Lost	Bowlernauts	12 20
Cotton Pickers	22½	9½	Lucky Seven	10 22
Our Gang	22	10	Shucks	7 25
The Uncalled Four	21	11	Women's High Games: S.	
Four Aces	20	12	Swain 215, 210	
Schpidrunners	18	14	Men's High Games: L. Galler	
Fireballs	14½	17½	228, 215	
The Thinkers	13	19	Women's High Series: S.	
			Swain 590, 559	
			Men's High Series: L. Galler	
			657, H. Maples 560	

Visitors At MSC . . .



CHAMBER OF COMMERCE managers representing an eight state area were recent visitors to the Manned Spacecraft Center. The C of C managers were given a tour of the Center and are shown viewing one of the exhibits in the Auditorium.



TEXAS SENATORS—Recent visitors to the Manned Spacecraft Center were (l. to r.) John P. Wold, Shell Chemical Co., Houston; and Texas State Senators Criss Cole of Houston and Culp Krueger of El Campo.



INCENTIVE AWARDS—Maxime A. Faget, assistant director for Engineering and Development, presents superior performance award checks of \$500 each to Richard S. Johnston, chief, Crew Systems Division (left) and Ralph S. Sawyer, chief, Instrumentation & Electronic Systems Division (right). The awards are given in recognition of outstanding performance over a period of at least six months.

WAKE UP TO
THRIFT WITH
U.S. SAVINGS BONDS





Spotlight On Secretaries . . .

THELMA HORN (left) is secretary to H. Kurt Strass, assistant chief, Structures and Mechanics Division. She joined the Manned Spacecraft Center on May 16, 1962. Born in Houston, Thelma is a graduate of Ball High School in Galveston, and attended Metropolitan Business College in that city. Prior to joining MSC, she was a secretary with the M. W. Kellogg Company in Texas City. She also has held various other secretarial jobs in this area. Thelma has three children, Judith 15, Jack 10, and Janet 5, and they reside in Kemah, Tex. Her spare time interests include bowling and sewing.



BARBARA SCHWARTZ (right) is secretary to Andre J. Meyer, senior assistant; Paul M. Sturtevant, special assistant; John E. Roberts, technical assistant; and Stephen M. Andrlich, special projects, in the Office of the Manager, Gemini Program Office. She joined NASA in April 1962 here at Houston. Barbara was born in Natchez, Miss. and completed high school in Memphis, Tenn. She attended Memphis State University and also Southwestern Business University in Houston. Before joining NASA she taught school in Ismailia, Egypt, and for a short period worked in the Harris County Court House. Her husband, Robert Schwartz, works in the Structures and Mechanics Division here at MSC, and the couple resides in Dickinson, Tex.

President Issues New Policy Aimed At Aiding Handicapped

A new call to "Show the Nation what can be done" by the Government as an employer "to make fuller use of the abilities of handicapped Americans" was recently issued to Federal agencies by President Lyndon B. Johnson.

The President announced issuance of a new policy statement to agencies in his remarks at the annual Washington meeting of the President's Committee on Employment of the Handicapped.

The new policy defines the handicapped as including:

1. The qualified mentally retarded, who can perform well some of the simpler tasks that must be done in any large organization.

2. The mentally restored, whose only handicap is that they once were ill.

3. The physically impaired, who are not thereby occupationally disabled.

"We can make this extra effort without creating extra jobs especially for the handicapped—without impairing the merit system—and without compromising the quality or efficiency of our work force. In fact, I believe we will add to the efficiency of the Government," the President said.

"I am convinced that it is morally right—socially just—economically sensible—and administratively feasible to open the door of employment to handicapped but job-qualified Americans," he continued. "An enlightened Government can—and will and must lead the way.

According to Carl Maxey, MSC Personnel Division, coordinator for the Employment of the Handicapped, there are over 100 employees at MSC with major physical handicaps. These persons perform well a variety of assignments throughout the Center, both in technical and administrative fields.

Civil Service Commission is considering a pair of proposals

designed to streamline Federal recruiting and examining procedures and to simplify the process by which a citizen applies for a civil service job.

One proposal calls for creation of Interagency Boards of Examiners and Interagency Job Information Centers at principal locations throughout the Nation, to eliminate duplication, cut costs, and provide better service.

The other proposal would establish career rosters to facilitate interagency use, transfer, and promotion of well-qualified employees in the upper levels.

Both proposals, now under discussion with Federal agencies, stem from a broad CSC staff study of the Commission's total examining and recruiting program.

Legislative Proposal Would Authorize More For Employee Moves

A Legislative Proposal that would authorize Federal agencies to pay for more of the moving costs when employees are relocated for the convenience of the Government has been sent to Congress by the Civil Service Commission.

The proposal seeks to amend the Administrative Expenses Act of 1946. It provides authority to increase the maximum weight limit of transported household goods, liberalize travel expenses of the employee's immediate family, pay their subsistence expenses as well as the employee's, for up to a month, and reimburse employees who move to isolated posts in this country for up to three years' storage of household goods.

New maximum weight limit of household goods under the proposal would be 11,000 pounds, up nearly 60 percent from the present 7,000-pound limit.

MSC Rod And Gun Club To Provide Deer Hunt Areas

The MSC Rod and Gun Club is attempting to provide MSC personnel with good hunting areas at a reasonable cost.

The 1964 Texas deer season will open Saturday, November 14, in most regulatory counties. Each year it becomes a more difficult problem for deer

hunters to find an open range to hunt. Hunting leases are available in Texas ranging from \$10 a day to \$100 per gun per season. However, it is difficult for a hunter not familiar with Texas areas to select one to suit his needs and pocketbook.

The time to start selecting an area is now. Contact Richard McComb at Ext. 3-4571 for additional information.

Her hobbies and interests include traveling, cooking, reading and sewing.

MSC

at work...



ARTHUR C. CHAPMAN, electronic development technician, of the Structures and Mechanics Division, Experimental Dynamics Section, operates a Sine Console for a vibration system.



PATRICK LAFFERTY, AST, Advanced Spacecraft Technology Division, Radiation and Fields Branch, checks installation drawings for electrostatic charge measurement equipment for the GT-4 mission.



PETER HIGGINS, Advanced Spacecraft Technology Division, is a project engineer for the ground observation system of optical and radio telescopes at Apollo tracking stations, used for monitoring solar flares.



BILL NELSON, Structures and Mechanics Division, Experimental Structures Branch, operates an oscilloscope — reproducing data from an analog tape recorder.

Under Weightless Conditions Hook-Loop Device May Keep Astronaut's Feet On Floor

A device originally designed to replace zippers may keep an astronaut's feet on the floor in the weightlessness of an Apollo spacecraft.

The device is a nylon tape-fastening material, used widely in place of zippers in clothing. It consists of two pieces of nylon fabric—one covered with scores

Apollo Spacecraft Clock And Timer Contract Awarded

The contract for designing and building mechanical clocks, mechanical timers and electronic timers for use in the Apollo spacecraft, has been awarded to Gibbs Manufacturing and Research Corporation, a subsidiary of the Hammond Organ Company.

The mechanical clocks will be small, highly accurate, rugged timepieces that will be panel-mounted in the pilot compartments of the spacecraft. Hour, minute, and sweep-second hands will indicate time on 24 hour, 60 minute-second dials. A single knob will permit winding and setting. The clocks will operate for more than eight days without rewinding.

The mechanical timers will be similar in form to the mechanical clocks and will utilize some of the same design features. The timer hands will indicate time on 10 hour, 60 minute-second dials. A knob will permit winding and setting, and a second knob will permit starting, stopping, and resetting hands for timing events.

The electronic timer will operate from external electrical pulses to indicate time on a digital readout. Push-buttons will permit starting, stopping, and resetting for timing events.

All the clocks and timers will be hermetically sealed and will be able to withstand the severe variations in temperature and pressure, as well as the high amplitudes of vibration, acoustical noise, acceleration, and shock encountered in space.

of tiny hooks, and the other with scores of tiny loops.

When pressed together, the hooks engage the loops. A slight pull bends the hooks, releasing them from the loops and separating the two pieces of fabric.

Engineers at North American Aviation's Space and Information Systems Division, under contract to NASA's Manned Spacecraft Center, are considering use of the tape in the Apollo spacecraft.

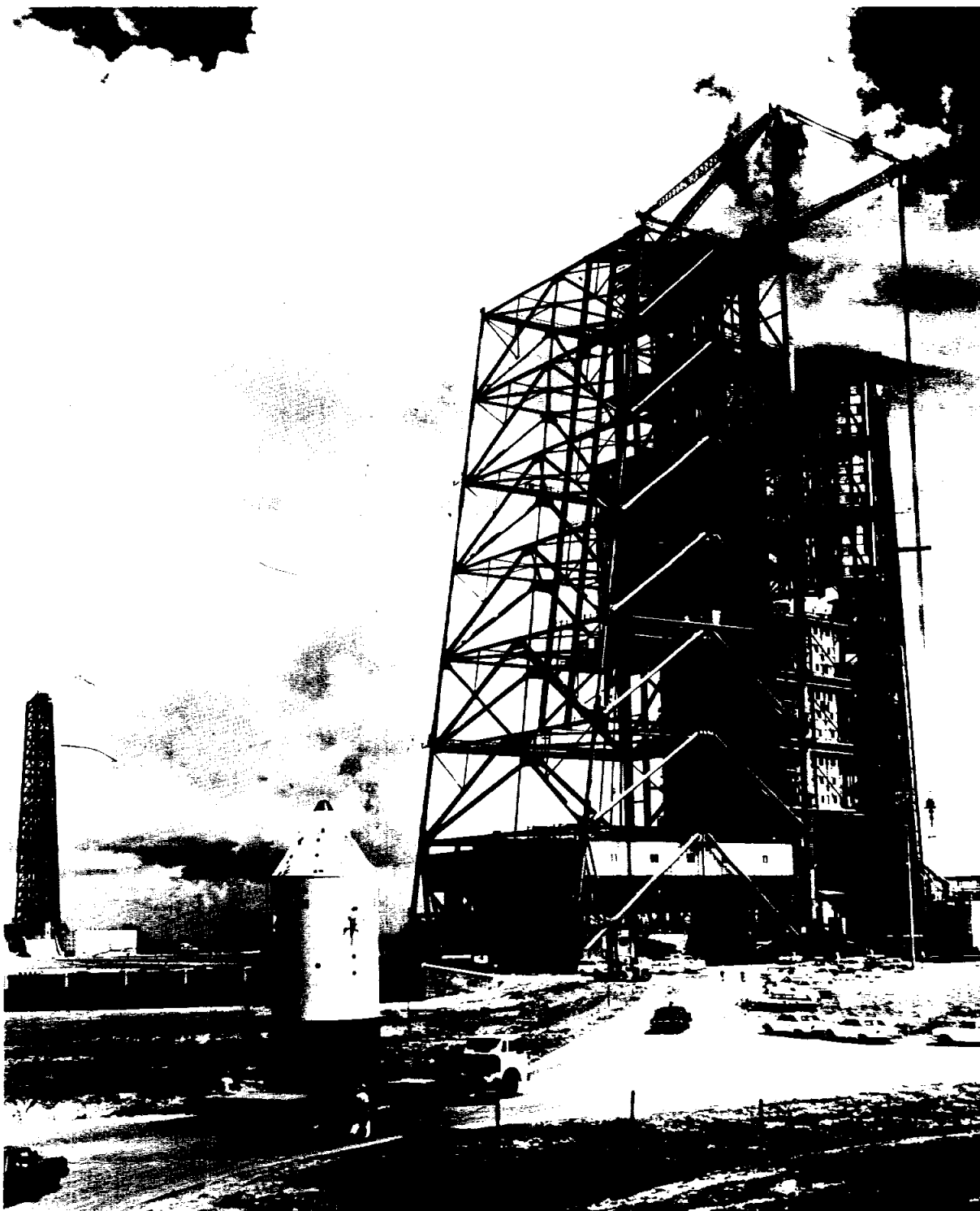
Weightlessness in space presents many problems for astronauts. If one bends over to tie his shoe, his feet will leave the floor like a diver doing a jack-knife and he may tumble head over heels. If he is not held down, any small movement may send an astronaut floating across the cabin.

The tape may solve this problem and others. In recent tests, a small pad made of the hooks was attached to sandals, and a rug made of the loops was attached to the floor. The test subject was thus held in place and his hands remained free.

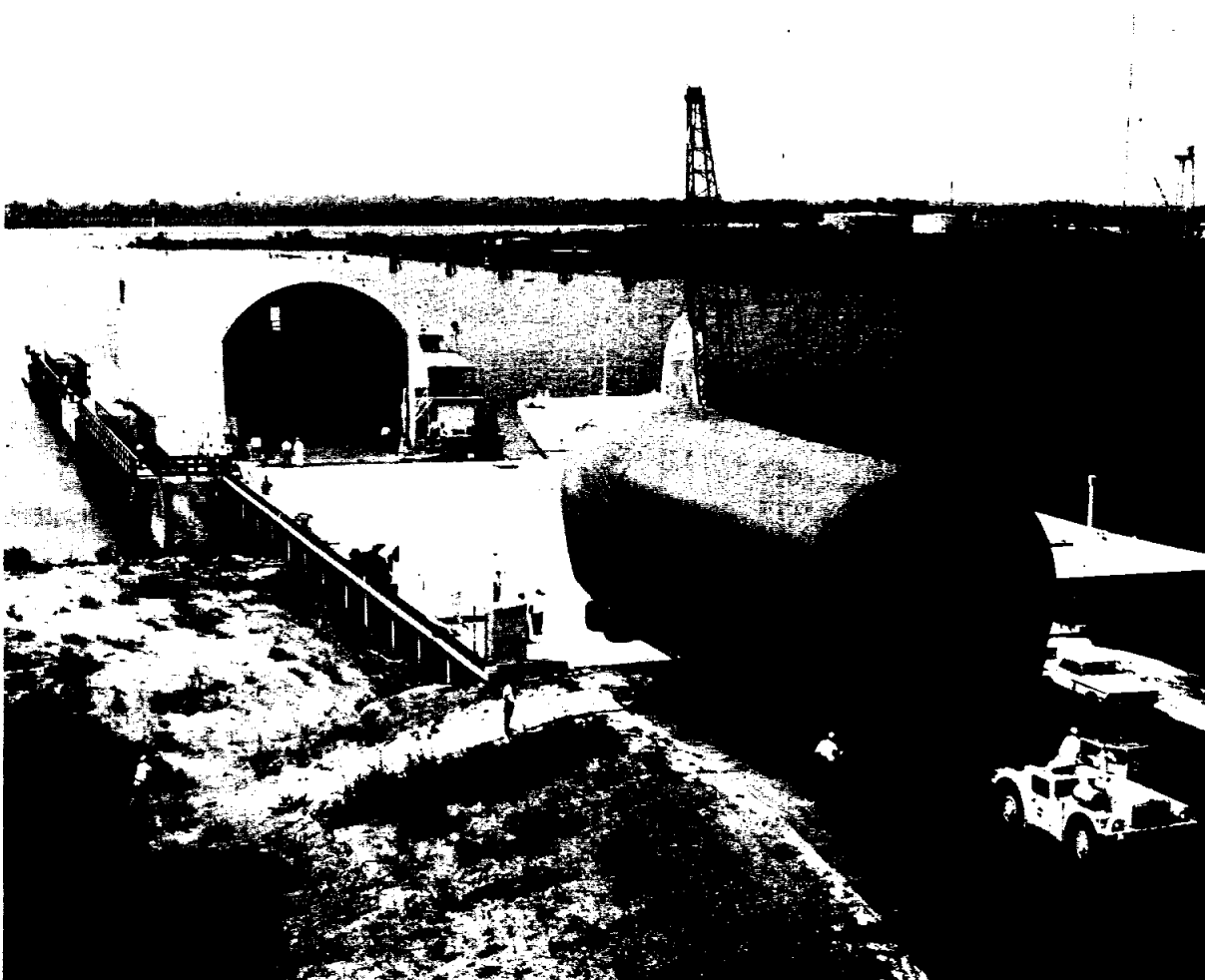
The force holding him was strong enough to permit normal body movements — including such things as using hand tools and lifting equipment. At the same time, he could move about easily. The effort required to separate the hooks and loops is less than that generated in a normal step.

Putting on the sandals in free floating conditions was difficult, but once they made it easier to don other restraining devices. Some operations, such as using a sextant, could not be performed without using the sandals along with other restraints.

The hook and loop fabric also is being considered to immobilize tools, instruments and other loose items to the interior of the Apollo spaceship, and to attach equipment to space suits.



APOLLO BP-15 ON WAY TO PAD—The fully stacked Apollo Boilerplate-15 command module, service module and adapter section are shown being transported to Launch Complex 37A at Cape Kennedy for mating with the Saturn. The SA-7 launch is scheduled late in this quarter.



SATURN FROM MICHOU—The second Saturn I booster (S-I-10) built at NASA's Michoud Operations in New Orleans is shown being loaded onto the NASA barge Promise July 24 for shipment to the Marshall Space Flight Center, Huntsville, Ala. After static firing tests, the 21-foot diameter, 80-foot-tall first stage will be returned to Michoud for final checkouts before being shipped to Cape Kennedy, Fla., for launching. The S-I-10 stage is the first of two Saturn I, and 12 more powerful Saturn IB boosters to be assembled at Michoud by the Chrysler Corporation Space Division. Generating 1.5 million pounds of thrust, the two-stage Saturn I rocket will be used to orbit elements of the Apollo spacecraft in preparation for manned lunar landing flights. The 1100-mile voyage up the Mississippi, Ohio and Tennessee Rivers to Huntsville requires about five days.



APOLLO REVIEW—A review to re-examine crew requirements for the first orbital Apollo spacecraft was held last month at North American Aviation in Downey, Calif. NASA, and Space and Information Systems people are shown examining an Apollo mockup. Several of the astronauts performed simulated exercises of operations that would be required during orbital flight.

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

Space News Of Five Years Ago

August 7, 1959—Explorer VI, popularly called the "Paddle-wheel Satellite," launched by NASA Thor-Able 3, contained 14 experiments, and a photocell scanner which transmitted a crude picture of the earth's surface and cloud cover from a distance of 17,000 miles.

August 13, 1959—Discoverer V placed into polar orbit by AF Thor-Agena A, but reentry capsule not recovered due to postjection malfunctions.

August 14, 1959—NASA Headquarters approved a Space Task Group proposal that nego-

tiations be undertaken with McDonnell for the fabrication of six additional Mercury spacecraft.

August 15, 1959—The astronauts began their initial centrifuge training at the Aviation Medical Acceleration Laboratory. During the first part of the month Space Task Group personnel had installed and checked out Mercury spacecraft simulation equipment at the Aviation Medical Acceleration Laboratories in preparation for the astronaut centrifuge training program.

Welcome Aboard

Forty-two new employees joined the Manned Spacecraft Center during the last reporting period.

AUDIT OFFICE: Ara E. Coker.

RELIABILITY AND QUALITY ASSURANCE DIVISION: Quintin T. Ussery.

PERSONNEL DIVISION: Judith A. Brown, Dianna M. Flowers, Eileen I. Patton, and Mary J. Roth.

WHITE SANDS OPERATIONS (New Mexico): Fidel Provencio Jr.

OFFICE OF ADMINISTRATIVE SERVICES: Thelma D. Katz.

GEMINI PROGRAM OFFICE: Richard D. Gadbois, Richard C. Henry, Marlene V. Forster (Baltimore, Md.)

APOLLO SPACECRAFT PROGRAM OFFICE: Yvette G. Baker, Humberto F. Alcantar, (RASPO, WSO, N.M.), Richard F. Langnau, (Cambridge, Mass.), Robert B. Munson, (WSO, N.M.), Louis R. Gomez, (WSO, N.M.).

ASSISTANT DIRECTOR FOR ENGINEERING AND DEVELOPMENT: Joyce A. Mattocks.

STRUCTURES AND MECHANICS DIVISION: Wade D. Dorland, and Philip R. Chapman.

ADVANCED SPACECRAFT TECHNOLOGY DIVISION: Martin A. Pomerantz.

CREW SYSTEMS DIVISION: Rose M. Hernandez, Carol A. Janecek, and Charles R. Thomas.

GUIDANCE AND CONTROL DIVISION: Jenney P. Burgan.

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION: John C. Sloan, and James B. Tollison Jr.

COMPUTATION AND ANALYSIS DIVISION: Wallace C. Gahan, Richard D. Rogan, and William R. Weimer.

INFORMATION SYSTEMS DIVISION: Bertram Ellis Jr.

MSC-FLORIDA OPERATIONS (Cape Kennedy, Fla): Richard R. Bohlmann, Anne L.

MSC PERSONALITY

Joseph Guy Thibodaux Heads Propulsion And Power Division

With an extensive background in the area of rockets and vehicle propulsion, Joseph Guy Thibodaux joined the Manned Spacecraft Center on January 5 of this year as chief of the Propulsion and Power Division.

He holds five patents on solid rockets and solid rocket manufacturing techniques. In addition to solid rocket research he has specialized in the fields of vehicle propulsion, liquid rockets, thermal protection, and high temperature materials.

Thibodaux has also specialized in research in the fields of meteoroid and impact phenomena, thermal arc technology, flight

test technology and pyrotechnics.

In his present position he guides the division that is responsible for providing direct



JOSEPH G. THIBODAUX

technical support to the MSC program offices in the area of spacecraft main and auxiliary propulsion systems, stored energy systems such as pyrotechnics, gas generators, etc., and electrical power generation sources involving both chemical and nuclear sources.

He is presently supervising and directing several Apollo subsystems in the areas of propulsion, power generation, and pyrotechnics for the Apollo program, and is directing advance and supporting technology in propulsion and power.

Thibodaux joined NASA in August of 1946 at Langley and while there headed up, at different times, the High Temperature Materials Branch, the Materials Section, the Rocket Section, and the Model Propulsion Section. He was at Langley until he came to MSC in his present capacity.

Born in Napoleonville, La., Thibodaux attended Fortier High in New Orleans and was graduated from Louisiana State University with a BS degree in chemical engineering in 1942.

He served with the Corps of Engineers, U. S. Army in north and central Burma during World War II.

Thibodaux has written papers for over a dozen technical publications. Technical papers of his include "Analytical and Experimental Studies of Spherical Solid Propellant Rockets", "Summary of Experience in Boosting Aerodynamic Research Models", and "Observed Effects of Rocket Motor Operation on Base Pressures of Bodies in Flight."

He is an associate fellow in the American Institute of Aeronautics and Astronautics (AIAA), a director of the Hampton Roads, Va., chapter of AIAA, and a member of the Solid Rocket Subcommittee of AIAA.

He is married to the former Mary Jo Goliwas of Dixon, Ill., and the couple has four children, Amy 10, Guy 8, Dean 6, and Chris 2. The family resides in League City, Tex.

SPACE QUOTES

"The fact that we do not plan space projects for aggression does not mean that we have a national security space gap or that we will allow one to develop." Dr. Edward C. Welsh, executive secretary, National Aeronautics and Space Council.

"By 2000 A.D. moon-voyaging may be somewhat commonplace (for astronauts). It appears unlikely that a trip to the moon will appeal to the average tourist. Considering the fact that we are still grappling with the problems of the nature of the lunar surface, the results of prolonged periods of weightlessness, and the need for more efficient and less costly moon-launching vehicles, it would be folly to suggest that in another 36 years the moon will have become a tourist haven." Dr. Hugh L. Dryden, deputy administrator, NASA.

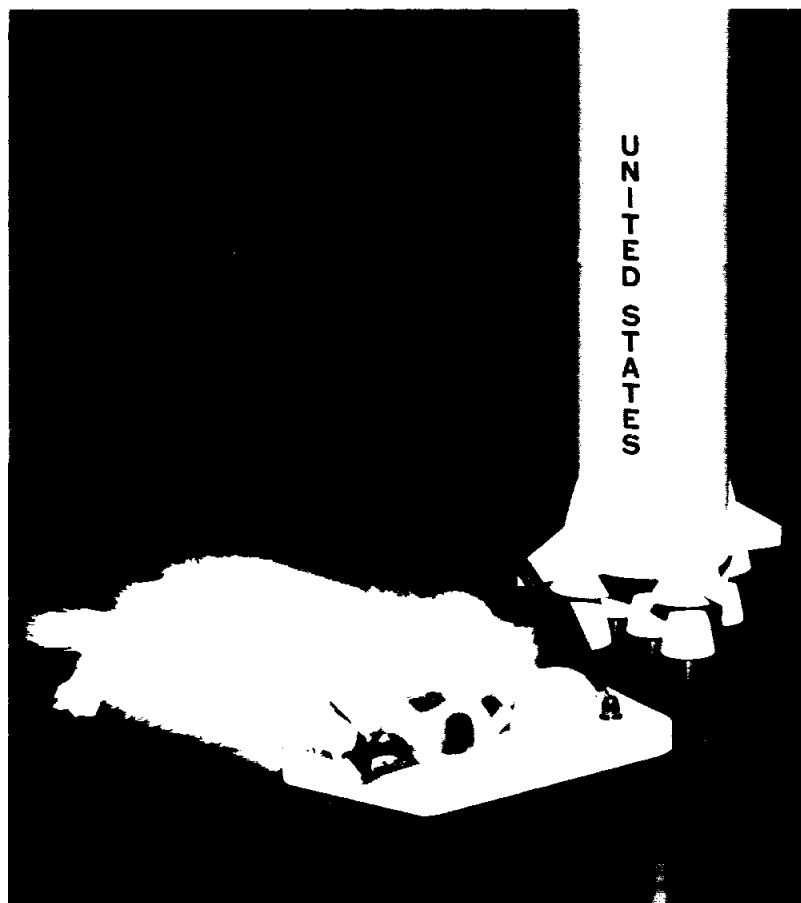
Hull, Thomas P. Keenan, Patricia M. Myers, and John W. Swanson.

OFFICE OF ASSISTANT DIRECTOR FOR FLIGHT OPERATIONS: Janice K. Holder, and Sandra J. Rigamonti.

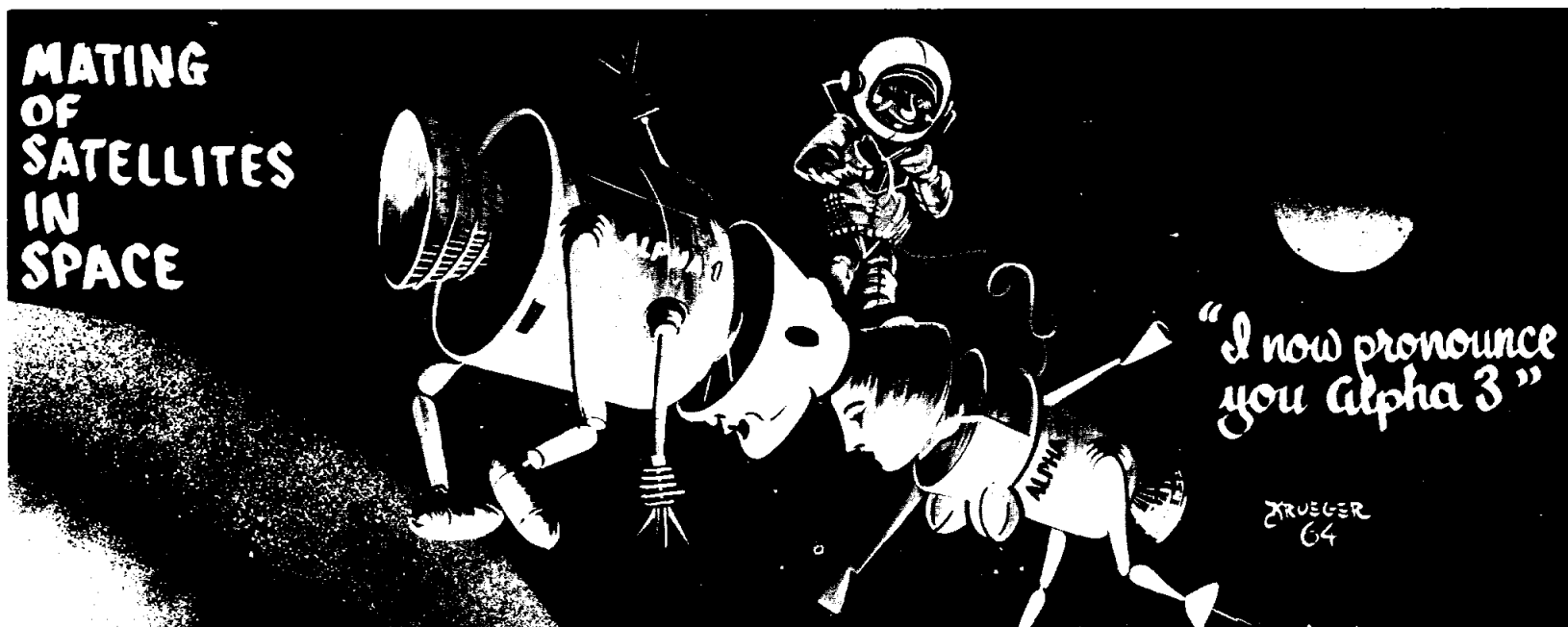
FLIGHT CONTROL DIVISION: Perry L. Ealick, Stewart L. Davis, and John P. Meszaros.

MISSION PLANNING AND ANALYSIS DIVISION: Herbert S. Estes, and Robert E. Prael.

On The Lighter Side



"Space travel? I don't know about you . . . but I'm sticking to my desk job!"



MATING OF SATELLITES IN SPACE

"I now pronounce you Alpha 3"

ZROEGER 64

Laughs, Serious And Touching Moments, All Are Encountered On Faith Seven Tour

For the past 10 months the "Faith 7" spacecraft of Astronaut L. Gordon Cooper Jr., has been on a tour of the state capitals. In each state someone from MSC has accompanied the exhibit to answer the questions most commonly asked as well as to provide general supervision.

This duty can almost be considered an education in itself. There are laughs, there are serious moments and there are situations that are touching.

One exhibit staffer has compiled a number of these situations. Among other things, he has determined that at least 98 per cent of all women who are obviously overweight suffer from claustrophobia. This premise is based on the fact that at least that large a percentage of the ladies in this class who look into the interior of the spacecraft gasp, then proclaim in a loud voice, "That's not nor me. I have claustrophobia." As a contrast, there was one honest woman in Des Moines who looked in and then said, "they'd have to cut 40 pounds of fat off of me before I could get in."

One of the major problems is that of keeping a straight face while answering some of the questions. There are seven basic questions asked which make up perhaps 95 per cent of all queries. They are: (1) "Where did he get in? (2) Where did he get out? (3) Which way was he going? (4) Where is the heat shield and what is it made of? (5) How much does it weigh? (6) How hot did it get? and (7) How did he go to the bathroom?"

These pose no real problem except for the monotony. It is the other five per cent which require quick answers that provide most of the lighter moments. For instance, a woman recently spent at least 10 minutes asking all the normal questions plus a lot of others while her escort stood by, apparently getting more aggravated by the minute. Finally she said, "I have one more question. Was the water he had up there with him in liquid form?" While the man on duty said that to the best of his knowledge it was, her escort said, "Let's get out of here. What the hell do you think they send up, ice cubes or something?"

Then there was a little girl in Pierre, S. D., who refused to leave until she had a ride in the spacecraft. She was finally convinced that no rides could be given until after many more people had looked at it.

And the little boy in Bismarck, N. D., who refused to leave the scene until his father answered a question for him. The father turned and said, "He won't leave till he finds out where his ray gun is." The little fellow went happily on his way after being told the ray gun was in the astronaut's left hip pocket and couldn't be seen from that side.

There is constant amazement in store as proud parents go all out to impress their progenies with their vast knowledge—in these cases, all the attendant can do is turn his head and pretend it didn't happen. For instance, despite the sign on the plastic indicating that the honeycomb is cushioning material,

they may proclaim that the "lead" is to help absorb the heat and that part of it is melted, or that it is part of the air conditioning unit.

Then there are those who explain that the heat shield always went first in order to protect the pilot from heat—this presents an interesting theory and it takes rather a graphic imagination to picture the escape tower and the spacecraft nestled inside the Atlas launch vehicle.

One man, recently, pointed out to a young son, a crack in the plexiglass covering the heat shield, "Look son, where the heat cracked this when he came back in the atmosphere."

As a general rule, the spacecraft is well received by the public. There are many utterances of how wonderful it is that the people are being given an opportunity to see this historical item. Most are amazed that there is so little room available and at the compactness of the spacecraft, while an occasional visitor marvels at how much more room the pilot had than he had envisioned.

Two men were talking about "Faith 7" as they walked through the line. One said to his friend, "How much of your tax money do you think went into this?" The other replied, "I don't know how much but it was well spent."

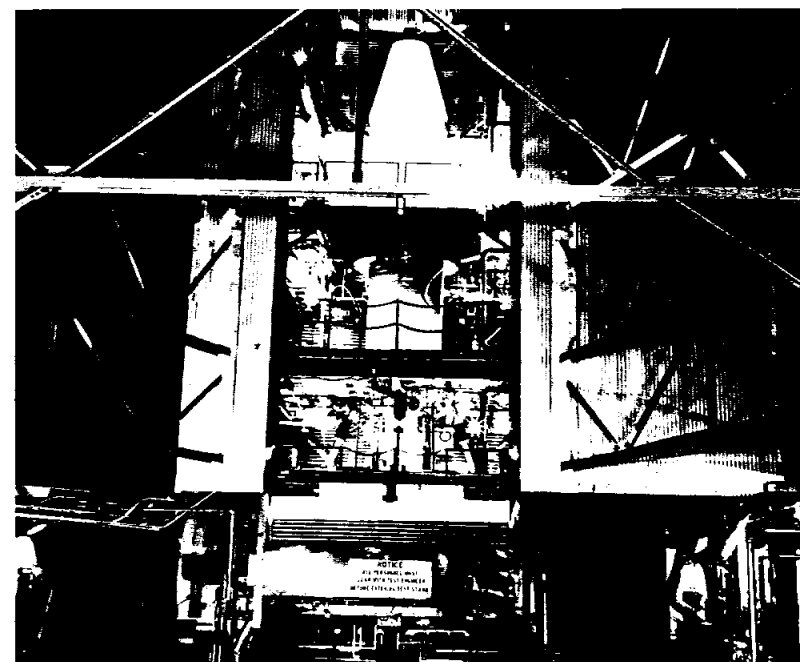
Then there is the contrast of philosophies of people and their consideration of others. A number of real fine people come through the line, get a look and hurry their party on saying, "Come on now, there are a lot of other people in line who want to look at it too." This contrasts sharply with one woman, for

example, who came through the line with three young teen-agers. She took a quick look herself, then turned to the boys and said, "Stay and look as long as you want to boys, I paid for it." (Wonder what kind of income she has.)

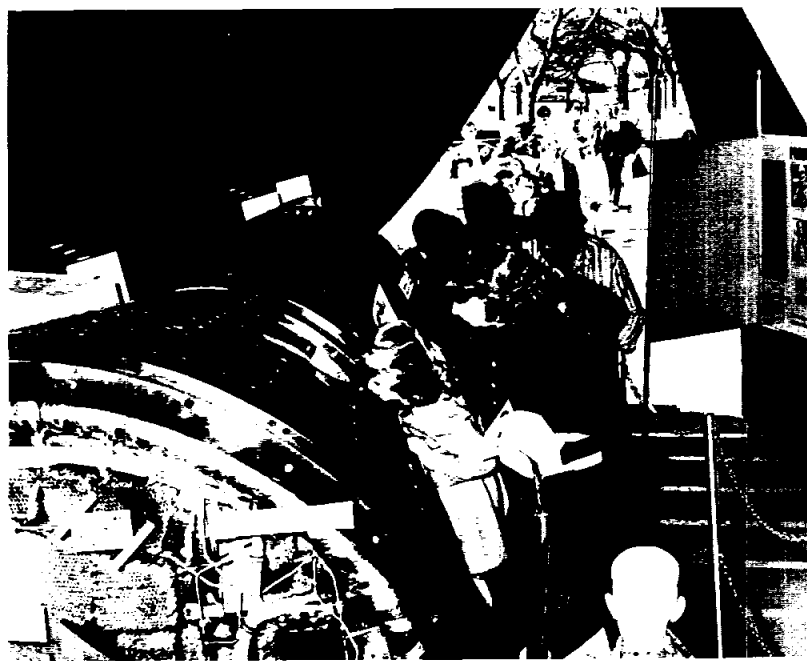
In Des Moines, several particular instances stand out. One lady brought her 13-year-old blind son through the long line and he obviously got a great thrill out of being able to examine the spacecraft with his fingers. He then stood at the heat shield and carefully explained the whole thing to his mother. He pointed out that the spacecraft was separated from the booster by explosive bolts after burnout, that it then executed a turnaround maneuver, the apogee and the perigee, how long the flight lasted, how far the spacecraft traveled, and many other facts. At moments like this, it can be realized just how much the program means to so many and offers additional proof of the normally unrecognized values.

In another case, a woman was allowed to break into the line with a young teen-age boy. She had taken him from the hospital and brought him to the exhibit in 95 degree heat because he wanted so badly to see a spacecraft. It was determined that he was suffering from leukemia and has only a short time left according to the doctors.

There are no age or sex barriers when it comes to interest. Old and young, male and female, everyone is intensely interested and many drive hundreds of miles for a few short seconds to see "Faith 7."



AGENA CHECKOUT—Just how will the Agena operate when it is joining with the two-man Gemini spacecraft 150 miles above the earth? Lockheed Missiles & Space Co. engineers are checking out the various systems of this test model Agena when its engines are fired at the company's test base in the Santa Cruz mountains near Sunnyvale, Calif. The main engine is fired at least five times in a test series to demonstrate its multiple restart ability. Also fired are the two secondary propulsion engines—peculiar to the Gemini Agena Target Vehicle—which will provide small (or vernier) changes in velocity and position when the Agena is in orbit. The current tests of the Agena are for the engine only. Later hot firings will be made of a complete flight-ready vehicle.



FAITH SEVEN ON TOUR—The Faith 7 spacecraft of Astronaut L. Gordon Cooper Jr., is shown being viewed in Austin, Tex.



LONG LINES FOR A SHORT LOOK—Long lines are commonplace on the tour of Faith 7 to the state capitals. Here a group of students line up for a look in Nashville, Tenn.

Extending Apollo's Useful Life Is Subject of Study Contract

A study to determine how to get literally more mileage from the Apollo spacecraft will be conducted by the Space & Information Systems Division of North American Aviation for the Manned Spacecraft Center on a fixed-price basis for \$700,000.

The major portion of the study will be directed toward finding ways to modify the Apollo lunar spacecraft to extend its useful lifetime in space beyond the 14-day lunar flight version without major redesign, and to explore fully the potential for using the Apollo for a logistics vehicle as well as a mission support vehicle.

Mission durations up to 600 days, made possible through modifications to the Apollo spacecraft and its systems, will be analyzed in the course of the study. Testing and operational techniques for spacecraft subsystems operating for such long periods in space will also be developed by the engineers conducting the study.

Among the questions for which answers will be sought are such unknowns as how long can the present subsystems support the extended time in orbit, and can the time be extended with minimum modifications and inclusion of on-board spare components. A close look will be taken at the critical subsystems or components that limit the time that can be spent in orbit.

Another phase of the study

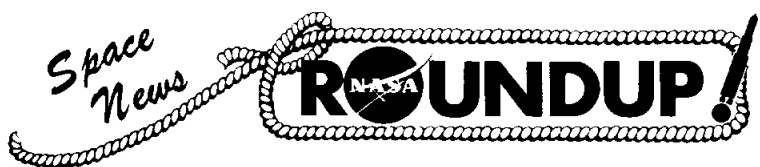
will look at the feasibility of combining the best features of two earlier extended mission Apollo concepts, the so-called Apollo X vehicle for logistics support and the Extended Apollo Concept II mission support vehicle.

Cost and scheduling estimates resulting from modifications and changes in the Apollo and its systems will be included.

Spaceflight missions that will be considered in the study include earth orbits in conventional west-to-east planes as well as polar orbits, and lunar orbits. Lunar missions require a higher degree of reliability and ease of aborting a mission, and thereby more system redundancy, than do missions in near earth orbit.

Extensive research and testing will be carried out in such areas as space food for long-duration missions, increasing the operational lifetime of reaction control rockets and the effects of long exposure to vacuum and radiation on materials for space use.

North American is scheduled to complete the study early in 1965.



SECOND FRONT PAGE

Wes Messing Named Advisor To MSC-FO Manager

Dr. Robert R. Gilruth, Director of NASA's Manned Spacecraft Center in Houston, announced July 23 the appointment of Wesley E. Messing as

MSC-WSMR until a new manager is named.

In his new role with the 450-man Florida Operations group, Messing will serve as advisor to Preston on a wide range of technical matters. The Florida group, charged with final preparation of Gemini and Apollo spacecraft for flight, is moving into new \$60 million facilities this summer in the Merritt Island area of Cape Kennedy.

Messing has managed the 120-man White Sands MSC unit since its beginning in July 1962. In that period, he has overseen the construction and activation of approximately \$25,000,000 worth of Apollo propulsion systems test facilities there. In addition, three successful Apollo flight tests have been carried out at White Sands.

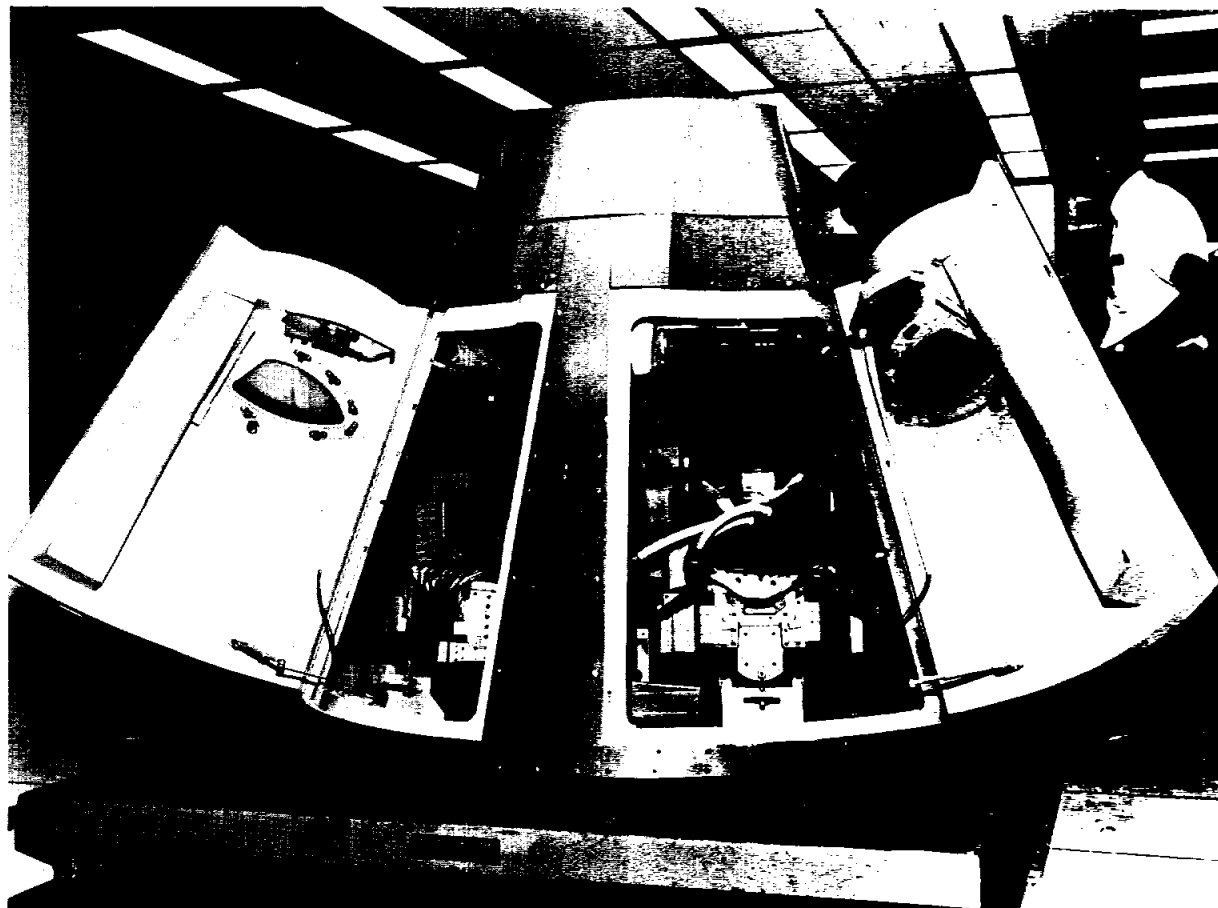
Prior to going to White Sands as manager, Messing headed a group charged with design and development of MSC's new thermo-chemical test facility in Houston. Earlier, at NASA's Edwards Flight Research Center, Edwards, Calif., he was associate research project engineer in the X-15 program.



WESLEY MESSING

technical assistant to G. Merritt Preston, manager of MSC-Florida Operations at Cape Kennedy.

Messing has been manager of MSC's White Sands Operations in New Mexico. Paul E. Purser, special assistant to Dr. Gilruth, will serve as acting manager of



GEMINI SIMULATOR TO MSC—The Gemini Simulator which will provide the training ground for astronauts going on Gemini flights in the near future was moved to the Manned Spacecraft Center from St. Louis last week. The simulator is built by McDonnell Aircraft and is a duplicate of the interior of the Gemini spacecraft that will be launched from Cape Kennedy. Here two McDonnell technicians assemble the simulator in Building Four.

Desert Survival Training Sessions To Start Monday For 14 Astronauts

Fourteen of the 29 NASA astronauts here at the Manned Spacecraft Center will undergo a week of desert survival training at Stead Air Force Base, near Reno, Nev., beginning next Monday.

The nation's newest astronauts will be taking similar instruction to that given at two previous training sessions last August and in 1961.

The men will report early Monday, August 10, and spend all day getting classroom instruction from Air Force experts of the 3637th Combat Crew Training Squadron (Survival and Special Training). On Tuesday, another three hours of classroom work is scheduled.

Astronauts and instructors move to the main desert site by helicopters at noon Tuesday, then spend Tuesday afternoon and Wednesday morning participating in demonstrations in the building of shelters, and improvisation of clothing and signal equipment.

The men will move to two-man sites Wednesday afternoon and spend the next day and a

half practicing survival techniques under realistic conditions, such as might be encountered if a two-man Gemini spacecraft were to parachute into the desert.

Compass work will be practiced on the final day, August 14, to prepare the astronauts to find their spacecraft — containing food, water, signaling equipment — in the event they eject from it and land separately with personal parachutes.

Scheduled to attend the course are: Edwin E. Aldrin Jr., William A. Anders, Charles A. Bassett II, Alan L. Bean, Eugene A. Cernan, Robert D. Chaffee, Donn F. Eisele, Michael Collins, R. Walter Cunningham, Theodore C. Freeman, Richard F. Gordon Jr., Russell L. Schweickart, David R. Scott, and Clifton C. Williams Jr.

NASA's Educational Programs Presented To Educators In Conference Held Here

A planning conference for officers of the national and regional organizations of the Association of Summer Session Directors, held here last week,

was attended by representatives of eight universities, from as many states.

The purpose of the meetings, held on July 27 and 28, was to

provide the directors of summer sessions of colleges and universities concerned with teacher education, an opportunity to learn about NASA's scientific objectives and educational programs and services.

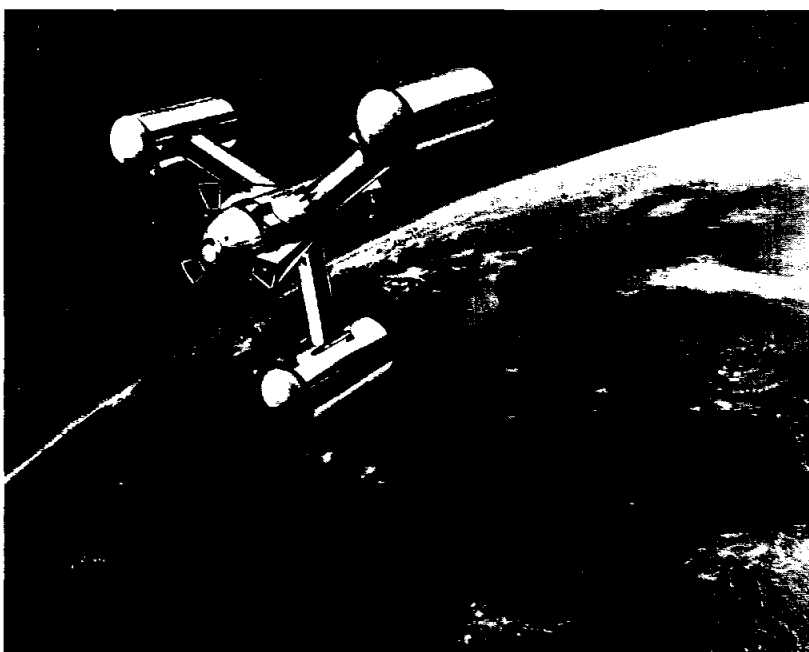
Also attending the conference were representatives from NASA Headquarters and the Manned Spacecraft Center.

An opportunity for insight into what action educators participating in the conference can undertake to bring space education information and understanding to the schools was provided to the NASA people taking part in the meetings.

Scientific objectives of MSC in the following areas were presented to the group: Flight Crew Operations by Lee R. Nichols; Engineering and Development by Norman F. Smith; Space Medical Support by Dr. Charles A. Berry; and Crew Systems by Richard S. Johnston.

A discussion of NASA's mission in education was presented by Dr. Frederick B. Tuttle from NASA Hq.

Plans were made by the group to hold a meeting of top educators from all over the nation here at the Center the latter part of November.



PROPOSED SPACE STATION—This artist's rendering of OLYMPUS, the Lockheed Missiles & Space Company's new concept of a multi-manned space station is shown as it will appear after it has erected itself following separation from its Saturn V booster. The cylindrical units at the end of each spoke are 18 feet in diameter and 40 feet long. Each unit has two complete decks for instruments and living quarters for a crew of 10 to 24 depending on the mission. Its life support system will be capable of sustaining the crew for space voyages of up to one year duration.



LAST YEAR'S SURVIVAL CLASS—Astronauts attending the desert survival training instruction at Stead AFB, Nevada, last year, are shown in one of the training sessions. Emphasis was placed on the means and methods of living off the natural resources of the land.