

Parker New Manager For Support Planning

William A. Parker, chief of the Procurement Division of the Administrative Directorate of MSC, has been appointed Manager, Center Support Planning and Control.

Gagarin Killed In Plane Crash Near Moscow

Soviet cosmonaut Yuri Gagarin was killed Wednesday when his MiG-15 jet fighter crashed after taking off from Chkalovskoe airfield near Moscow. Gagarin was the first man to fly in space when he piloted the one-orbit Vostok I mission April 12, 1961.

Killed with Gagarin in the MiG-15, converted to a two-place cockpit, was Col. Vladimir Seryogin.

Gagarin and Seryogin had flown some 25-30 miles east from Moscow when they lost contact with ground control.

The MSC space pilot group Thursday sent the following wire to the Academy of Sciences of the USSR: "We join you in mourning the loss of Yuri Gagarin. Nothing will ever dim the memory of his achievement in becoming the first pilot to fly in space. Our sympathy goes to Mrs. Valentina Gagarin, the children, and to the family of Col. Vladimir Seryogin."

A similar message was sent to Academician Anatoli A. Blagonravov by NASA Administrator James E. Webb.

Mozart Requiem Sung In Memory of Pilots

The Bay Area Chorus and 30 members of the Houston Symphony Sunday will present a performance of Wolfgang Amadeus Mozart's *Requiem Mass in D Minor* as a concert in memory of eight MSC pilots who have died in training and traffic accidents. The concert will be at 8 pm in the MSC Auditorium and is free.

Directing the chorus and orchestra is Texas Christian University choirmaster Bev R. Henson. Soloists include Diane Tabola, soprano, and Tommy Clark, tenor, who sing with the Christ Church Cathedral choir; Robert Bennett, bass, choirmaster and organist at St. Luke's Methodist Church, and Phyllis Hand, contralto, soloist at the First Presbyterian Church.

Mozart had partially completed the Requiem Mass in D Minor on a commission from a patron when he died in 1791 at the age of 36. One of his pupils completed the work for its first performance in Vienna.

Pilots who have died are Theodore C. Freeman, killed in the crash of a jet trainer near Ellington AFB October 31, 1964; Charles A. Bassett II and Elliot M. See Jr., killed February 28, 1966 when their jet trainer crashed in low-visibility condi-

Philip H. Whitbeck, MSC Director of Administration, announced Parker's appointment March 20. Parker Carroll, deputy chief of the Procurement Division under Parker, has become acting chief pending appointment of a permanent successor.

Whitbeck said Parker will assist him in areas of administrative operations of the center. Parker will be primarily responsible for policy formulation, planning, implementation and control of the Center's support contract program.

He will serve as principal advisor to Center management and focal point for the direct liaison with NASA Headquarters in matters relating to support contracting.

Parker, a native of Sulphur, La., joined MSC in May, 1961, and served as chief of the Apollo Procurement Branch and as deputy chief of the Procurement Division before becoming chief of the division this year.

Before moving to NASA, Parker held positions in program development, procurement and management analysis activities with the Air Force at Brookley AFB, Ala.

In 1964, he was nominated as Outstanding Young Man of the Year by the Chamber of Commerce and Junior Chamber of Commerce in the Clear Lake area. He holds membership in the American Society for Public Administration and the National Contract Management Association.

tions at St. Louis; Virgil I. Grisom, Edward H. White II and Roger B. Chaffee died January 27, 1967 in the Apollo spacecraft fire at Cape Kennedy; Edward G. Givens, Jr. died June 6, (Continued on page 8)

A Nose to Follow



ULTIMATE PROBOSCIS—An EC-135N jet aircraft sits on a drizzly Ellington AFB ramp during a five-week visit to MSC for Apollo spacecraft S-Band electronics compatibility tests conducted by Information Systems Division. The bulbous-nosed aircraft is one of eight Air Force Eastern Test Range Apollo Range Instrumented Aircraft (ARIA) based at Patrick AFB for deployment during missions to relay Apollo air-to-ground voice and telemetry data to the Mission Control Center. The planes provide coverage over remote ocean areas and normally fly at 35,000 feet at 450 knots with a crew of 11. They are also used in telemetry support for Department of Defense missile tests.

ROUNDUP

NASA MANNED SPACECRAFT CENTER

HOUSTON, TEXAS



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MARCH 29, 1968

Apollo VI Flight Next Week Aims to Man-Rate Saturn V

The second flight of the Apollo/Saturn V space vehicle is scheduled for launch from the John F. Kennedy Space Center, Fla., on or after April 3. The mission is designated Apollo VI.

Primary purpose of this second flight of the Saturn V is to qualify the launch vehicle for future manned flights.

The successful first flight of Saturn V in Apollo IV, last

November 9, verified spacecraft systems and tested the command module under heat conditions expected on a lunar return. Therefore, spacecraft objectives, including recovery, are secondary in the Apollo VI flight.

The majority of primary objectives will be met in the boost phase of flight. Events leading though the parking orbit stage and reignition of the launch vehi-

cle's third stage S-IVB engine will satisfactorily complete primary mission objectives.

These include:

- Demonstration of structural, thermal, propulsion and separation characteristics of the first, second and third stages of the Saturn V in powered flight.
- Qualification of the third-state continuous vent system, its auxiliary propulsion system and the J-2 engine restart capability while in orbit.

For this mission, the emergency detection system will be flown closed-loop (designed to operate without ground command) for the first time. It was not operational during the Apollo IV flight.

A new crew hatch will be flown aboard the spacecraft for the first time.

In Apollo VI, a different method will be used in shutting down the engines of the first stage from that used in Apollo 4.

The Apollo spacecraft and Saturn third stage will be placed in a 100 nm orbit.

Reignition of the third stage will occur about three hours, 10 minutes into the flight over the Eastern Test Range. The burn will last some five minutes 10 second and will place the vehicle on a simulated translunar coast ellipse with a 279,000 nm apogee. The actual apogee is dependent on the launch conditions.

(Continued on page 3)



CONCERT REHEARSAL—Texas Christian University choirmaster Bev R. Henson conducts a rehearsal of the Bay Area Chorus March 31 performance of Mozart's Requiem Mass in D Minor as an Astronaut Memorial Concert. The concert will be at 8 pm in the MSC Auditorium in memory of the eight NASA space pilots who have died in training and traffic accidents.

Heap Big Exodus But No Fire



DRY-RUN EVACUATION—Everyone was forewarned that on March 15 at 2 pm Bldg 2 would have an exercise in fire evacuation. The drill was the first such evacuation for Bldg 2 since it was occupied in 1964. Bldg 2 Fire Warden Everett Shafter, said, "The evacuation went exceptionally well. There was no confusion and 95 percent of the people were outside within seven minutes after the alarm sounded." All nine floors were emptied through the stair wells, and the four elevators were off limits to simulate use by fire and rescue crews. All

future Bldg 2 fire evacuation drills will be held without advance warnings except to floor wardens. In the photos above, employees found it easier to put legs into neutral and coast down the stairs than it is to climb several flights. In the center photo, people stand in the fall-back area in the mall waiting the all-clear. At right the all-clear reverses the flow of people back into the West door.

Sailing Club Begins Spring Racing Series

With its spring training program behind it, the Clear Lake Sailing Club tomorrow will hold a practice session in preparation for the first race in the spring racing series.

Special racing problems such as starting sequence, the start, the racing course, rounding marks, tactics and racing rules will be covered for new club members in tomorrow's practice session at the Ski and Sail boating facility on Clear Lake. The owners of Ski and Sail have agreed to charge reduced rates to those members who wish to compete but do not have a boat.

The first spring racing series of five races will begin April 6, followed by races on four consecutive Saturdays—April 13, April 20, April 27 and May 4.

There will be a minimum of two classes — centerboarders and board boats. These classes may be broken down further if four or more boats of the same type are entered.

Medaris Speaks At NCMA Meet

Retired Army Maj. Gen. John B. Medaris Wednesday will address the Space City Houston Chapter of the National Contract Management Association. Medaris until retirement was commander of the Army Ballistic Missile Agency when the nation's first satellite, Explorer I, was launched. He now heads Medaris Management, Inc.

His topic at the NCMA meeting will be "Management for Space Leadership."

The meeting will be held at the Holiday Inn on NASA Road 1 starting with a social hour at 5:30 pm followed by dinner (\$4.50/person). Non-members are invited to attend.

For reservations call Mrs. T. Hackenberg at HU 8-1270, Ext 248, or Mrs. Glen Anderson at HU 8-0850 Ext 3388.

Trophies will be presented to contestants in each class with the best score for the series when counting the best four out of five races. The number of trophies presented for each class will be determined by the number of entries in that class.

Club members Don Wiseman and Jay Legendre directed the spring training program of two classroom lectures and two sailing sessions. Lectures covered nomenclature, sailing basics, racing tactics and rules. Boating sessions applied classroom basics, and ran two practice starts and two practice races.

NHA-ISA Drive Hits 82% Mark

MSC participation in the recently-completed National Health Agencies-International Service Agencies joint campaign was 82 percent.

Campaign project officer Silvie Gaventa said, "Although we did not reach our goal of 100 percent participation, it does represent an increase over last year's campaign. MSC employees are to be commended for the conscientiousness of campaign chairmen and keymen who worked so diligently and played an important part in this achievement."

The NHA-ISA campaign and United Fund drive are the only solicitations permitted on Government installations.

Clear Creek Theater Produces Inge's *Picnic*

William Inge's award-winning play *Picnic* will open April 18 for a six-performance run at the Clear Creek Country Theater in League City. The curtain will go up at 8:15 pm on April 18, 19, 20, 25, 26 and 27.

Directing the production is Jo Simmons, wife of Bill Simmons of Propulsion and Power Division. She has directed Pasadena Little Theater productions of *The Diary of Anne Frank*, *Monique*, *The Hasty Heart* and *A Majority of One*. Mrs. Simmons also performed in the roles of Blanche in *A Streetcar Named Desire*, Rose in *Gypsy*, Hellen Keller in *The Miracle*

Worker, Christine in *The Bad Seed* and Amanda in *The Glass Menagerie* at Pasadena Little Theater, and as Constance in *Affairs of State* at Clear Creek Country Theater.

She also played Olivia in the Houston Shakespearean Society production of *Twelfth Night*, and is moderator of the daily KMSC-FM interview program "Pasadena Viewpoint."

In the cast of *Picnic* are David McCormick as Hal, Cynthia Redmond as Madge, Alan Glines as Seymour, Mary Campbell as Flo, Lindi Pierson as Millie, Edd Muths as Mrs. Potts, Joan Aldrin as Rosemary, David Miles as Howard, Kay Matteson as Irma, Sis Browning as Christine and Philip Matteson as Bomber.

Most of the action in *Picnic* takes place in the backyard between two houses in a small mid-western town. Scene designer Bill Simmons has built a two-story set on the Clear Creek Country Theater stage — first such set for the theater. The second-story window is 16 feet above the stage. Simmons has directed plays at CCT and is past president of the Pasadena group.

The Clear Creek Country Theater boxoffice on Old Galveston Road (Texas 3) in League City will be open from noon to 6 pm daily beginning April 15. Reservations may be made at the boxoffice or by calling 932-3714. Collect calls for reservations will be accepted.

EAA Sea-Arama Tickets Expire

The coming weekend will be the last opportunity to use Employee Activities Association discount tickets to the Sea-Arama marine show in Galveston. Employees having unused tickets may get a cash refund from EAA representatives.

MSC Awards Development Contract For Balloon Experiment System

MSC last week announced the award of a \$929,000 contract to the University of California for the development and test of a prototype balloon flight system for performing future high altitude scientific experiments.

Under terms of the contract University of California, Berkeley, will design, develop, and test a prototype gondola and flight systems scheduled for use in NASA-sponsored High Altitude Particle Experiment (HAPPE) program. Professor Luis W. Alvarez, of U of C's Space Sciences Laboratory, is the principal investigator with the scientists and engineers of MSC's Science and Applications Directorate, cooperating in the project.

The gondola, prototype of the scheduled craft which will carry a scientific payload to altitudes of 90,000 feet, will be 50 feet tall, eight feet in diameter and weigh approximately 10,000 pounds. Prime objective of

HAPPE is to use naturally occurring radiation to investigate the interactions of elementary particles in the high energy domain. Prime element in the more than 10,000 pound HAPPE payload is a cryogenic superconducting magnet which has an effective field region of one meter in diameter, one and a half meters in length and a maximum magnetic field value of 10 Kilogauss.

This contract calls for the development and test of the gondola, balloon, descent, recovery and associated flight systems only. Further flights with a full HAPPE scientific package are planned with the proven flight systems.

The prototype flight is tentatively scheduled for late summer of 1968 after detailed systems and performance evaluations are completed by MSC scientists and engineers. The Structures and Mechanics Division of MSC will prepare, test and install the

parachute system and MSC's Landing and Recovery Division will plan, test and implement the water recovery phase of the operation.

Three Apollo parachutes are being considered for the descent of the 5-ton gondola and dummy scientific payload. The chutes will be mounted on a platform above the gondola and deployed at about 40,000 feet.

Testing of the parachute system is scheduled to be conducted at El Centro, California by SMD's Landing and Docking Mechanics Branch early this summer with sea recovery trials concluding tests prior to the late summer flight of prototype HAPPE.

The helium-filled balloon, with its 50 foot high gondola, will be launched from the Chico Municipal Airport, Chico, California and rise to a height of 90,000 feet for the checkout flight. Recovery of the gondola is expected to be made in the Pacific Ocean, approximately 100 miles from the coast of California.

Apollo VI Mission

(Continued from page 1)

dent upon the day of launch.

Following third-stage shutdown, the Apollo VI third stage-spacecraft combination will be maneuvered 180 degrees by the stage's auxiliary propulsion system in preparation for separation of the third stage from the command and service module.

Three minutes after third-stage engine cutoff, the command and service module will separate from the third stage which will continue on its path to lunar distance moving at more than 23,850 mph.

Meanwhile the first spacecraft service-propulsion-system engine burn will slow Apollo VI to about 19,200 mph and lower its apogee to 12,000 nm which will be achieved at six hours 22 minutes after liftoff.

The second firing of the SPS engine—3 minutes 8 seconds duration—will occur 9 hours 22 minutes into the flight. This burn is intended to increase entry velocity to 24,900 mph.

Entry will be less steep than on Apollo IV, giving a greater heat load to the command module heat shield.

The command module will travel 2,500 nm after reentering the atmosphere.

Following separation from the service module and deployment of the Earth-landing system, the Apollo VI command module is scheduled to land 340 nm north-northwest of Kauai, Hawaii, 9 hours 49 minutes after liftoff.

The Saturn V launch vehicle consists of three propulsive stages and an instrument unit (IU).

The first stage (S-IC) is 138 feet tall, 33 feet in diameter and fuel and oxidizer tanks hold 4,400,000 pounds (214,200 gallons of RP-1 kerosene, and 346,400 gallons of liquid oxygen). Its five F-1 engines develop a combined 7.5 million pounds thrust at liftoff and burn almost 15 tons of propellant per second.

The second stage (S-II), 81.5 feet tall and 33 feet in diameter, weighs 88,200 pounds dry. Fully loaded it weighs 1,033 million pounds including 267,700 gallons of liquid hydrogen fuel and 87,400 gallons of liquid oxygen. Its five J-2 engines provide 1 million pounds of thrust.

The third stage (S-IVB) is 58.4 feet tall, 21 feet 8 inches in diameter and weighs 26,454 pounds dry. It carries 230,000 pounds of propellant—66,900 gallons of liquid hydrogen and 20,400 gallons of liquid oxygen. Its single J-2 engine develops 200,000 pounds of thrust in space.

The instrument unit, 3 feet high and 21 feet 8 inches in diameter, weighs 4,763 pounds and contains six major systems—structural, thermal control, guidance and control, measuring and telemetry, radio frequency and electrical.

The Apollo VI spacecraft includes the conical command module, 12 feet high and 12 feet 10 inches in diameter at the base. It weighs 12,500 pounds.

The service module is a cylinder 22 feet high, 12 feet 10 inches in diameter and weighs 55,000 pounds including propellant at launch. It contains the service propulsion system engine which develops 21,500 pounds of thrust.

The lunar module test article, weighing 26,000 pounds, is contained within the spacecraft lunar module adapter (SLA) which weighs 3,900 pounds, measures 28 feet high, and tapers from 22 feet in diameter at the base to 12 feet 10 inches at the top.

The spacecraft launch escape system, atop the command module, is 33 feet tall with a base diameter of 4 feet. It weighs 8,200 pounds including a cover over the apex of the command module to protect against aerodynamic heating during launch and against the rocket exhaust of the launch escape system motors. The system provides the capability to lift the command module from the remainder of the space vehicle in event of an emergency on the pad or shortly after launch. The launch escape system is jettisoned soon after the second stage ignites.

Champions of the Hoop



UNDEFEATED—Mission Planning and Analysis Division's American League basketball team, The Association, was undefeated at the end of the league and tournament season with a 12-0 record. The team was top in the league and went on to win the playoff between the American and National leagues. Left to right are Tommy Keeton, Al Morrey, Gid Weber, Ken Young, Phil Shannahan, Gene Ricks, Richard Kruse and Bob Regelbrugge. Not in photo: Ham Ratcliff.



NATIONAL LEAGUE CHAMPS—The Instrumentation and Electronics Systems Division team bested all others in the National League with an 8-0 record and placed third in the National-American playoffs. Front row, left to right, are Jim Pawlowski, Kathy Cannon, (would you believe she's the team mascot?) and Jerry Woodfill. Back row: Terry Neal, Burt Davila, John Miller, Perry Sloan and Ragan Edmiston. Not in photo are co-op employees Jack Boykin, University of Houston, and Bill Boyer, University of Missouri.

Lunar Highland Found Less Dense

Material in the highlands area of the Moon's surface near the Crater Tycho may be less dense than in the lunar maria, scientists reported recently in a review of results from the flight of Surveyor VII.

The highlands material is believed lighter due to lower content of iron and heavy elements.

Chemical analysis of the Surveyor VII landing site 20 miles north of Tycho indicates that some lunar material once had been in a molten state. Surveyor was launched by NASA from

Cape Kennedy on January 7 and landed January 9.

Photographs show debris ejected from Tycho and what scientists describe as a "sequence of flows."

"Evidence from Orbiter V and Surveyor VII pictures suggests the flows were derived from shock-heated, partially melted ejecta." Dr. Eugene Shoemaker of the U.S. Department of Interior, Geological Survey said. "A younger layer of debris about four inches thick

and produced mainly through bombardment by small meteoroids partly covers the older ejected material and flows."

Receives SSP



Lily LeCara
RASPO-Bethpage

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PERHAPS THE MOST universally discussed topic affecting everyone directly or indirectly is the science of meteorology — commonly called “the weather.”

The comparatively short history of manned spaceflight is peppered with incidents that illustrate the importance of weather in planning. During the Mercury and Gemini programs, there were times when weather conditions and forecasts influenced critical decisions made by the mission director and his staff.

During the Mercury program, Virgil “Gus” Grissom’s sub-orbital flight had to be postponed twice due to unfavorable weather conditions, and John Glenn’s orbital flight also had to be postponed twice because of the weather. Glenn’s first scrub was called at T minus 29 minutes in the countdown.

Weather conditions were a greater factor in the Mercury program since mission rules permitted aborting the mission in more areas. But as confidence in the spacecraft hardware increased, many weather require-

ments became highly desirable instead of mandatory.

Affects Missions

A notable example of weather’s influence was when the Gemini V crew was instructed to land one revolution early to avoid the possibility of landing too close to a hurricane in the Atlantic. A favorable utilization of weather was when Gemini VIII had to be cut short, and the weather people were able to give a go for landing in the planned secondary area in the western Pacific.

The first Apollo flight on an uprated Saturn launch vehicle was delayed three times, 24 hours at a time, because of predicted cloud cover at the launch site which restricted mandatory photo coverage of the liftoff.

Weather will be of importance in Apollo at times other than launch, in-flight, and landing.

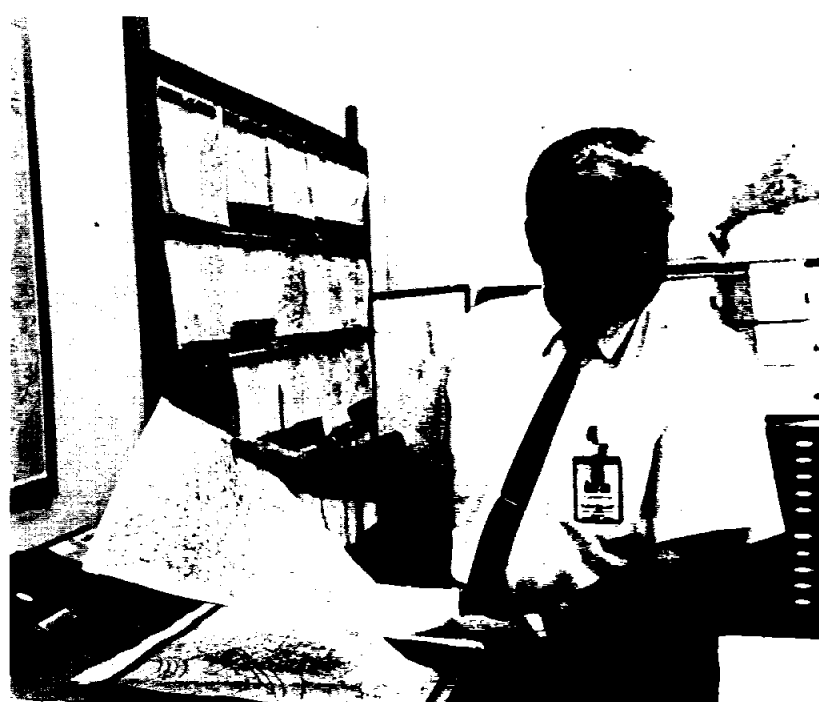
The Saturn V vehicle standing on the launch pad for as much as thirty days prior to launch has little weather protection. During the Florida hurricane season from June through November the Saturn V would have to be returned to the Vehicle Assembly Building if hurricane force

winds were predicted at Cape Kennedy.

Big Lightning Rod

Extending nearly 400 feet above ground level, the Saturn V is a natural target for lightning. During the time that the Saturn V vehicle is being transported from the Vehicle Assembly Building to the launch pad, and before the actual launch, weather conditions must be watched carefully to safeguard people and equipment against lightning or strong winds.

At launch time, the cloud ceiling must be high enough above the ground to allow proper positioning of recovery people and equipment for a possible off-the-pad abort and rapid recovery of the crew and spacecraft. If certain wind conditions are exceeded at launch or during the early stages of flight, the launch vehicle may fail to perform properly. Also important in the performance evaluation of the launch vehicle is the ability to photograph the vehicle during the early portion of the flight. Visibility and sky conditions are determining factors as to whether the desired camera coverage may be obtained.



AMONG THE ISOBARS—Spaceflight Meteorology Group chief Alan N. Sanderson examines a sheaf of surface weather charts showing lines of equal barometric pressure (isobars) over land masses. Pockets of low and high barometric pressure have effects upon movement of weather systems and can be used in forecasting.

ESSA Staffs Group

Weather guidance for each Apollo flight is provided by the Environmental Science Service Administration Weather Bureau through its Spaceflight Meteorology Group. Using information gathered from many areas around the world, the group’s weathermen forecast winds, sea state, cloud cover, visibility, and temperatures for Cape Kennedy, for the planned and emergency landing areas, and for other areas beneath the orbital paths.

The Cape Kennedy and Houston sections of the Spaceflight Meteorology Group are primarily briefing offices utilizing the data and assistance provided by the other three offices in the group—Miami, Fla.; Honolulu, Hawaii; and Suitland, Md. The Cape Kennedy section is concerned with launch weather conditions, and the Houston office is primarily concerned with recovery weather and weather information in support of in-flight experiments.

Certain experiments conducted onboard the spacecraft depend upon the weather conditions along the orbital ground tracks. The locations and extent of cloud areas must be monitored and forecast on a worldwide basis for scheduling these in-flight activities most effectively.

A number of areas in the Atlantic are vitally important since there is some possibility of an abort landing in the early stages of flight, or of flight termination after the first, second, or third revolutions. Accordingly, wind, sea, ceiling, and visibility must be forecast. The Miami section of the Spaceflight Meteorology Group prepares these forecasts and furnishes information to other sections of the group at Cape Kennedy and Houston. The Miami section also assists in the preparation of the launch area forecast prior to launching.

The Apollo spacecraft can safely land on water when the wind and sea conditions are below certain values. If conditions are above these values, it would be difficult to effect crew and spacecraft recovery. Low clouds or poor visibility would also hamper search and rescue operations.

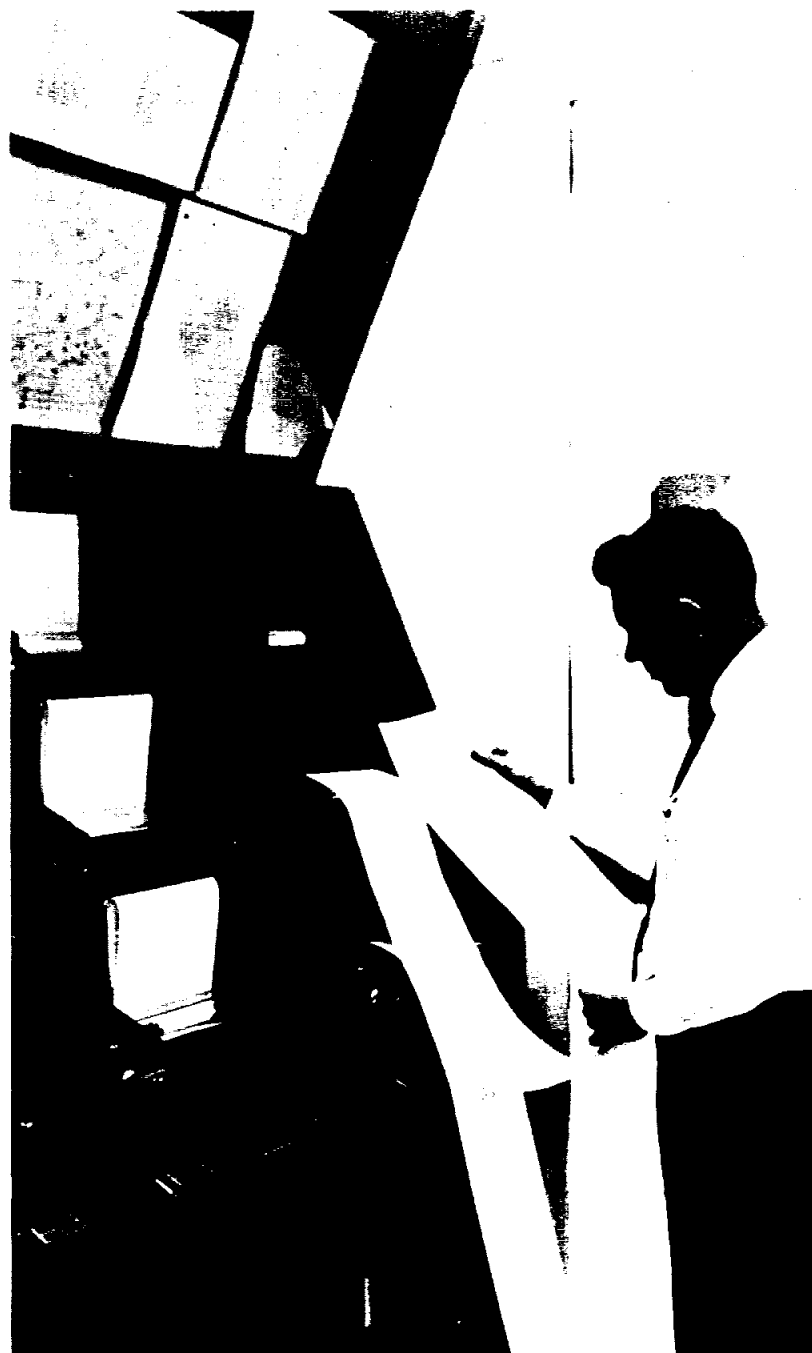
Many of the Apollo flights will land in the Pacific. The Honolulu office of the Spaceflight Meteorology Group is responsible for providing these forecasts to the Houston office. These forecasts are prepared with the close cooperation of the Pacific weather services of both Weather Bureau and military, and with the Suitland section of the Spaceflight Meteorology Group.

GLOBAL WEATHER OUTLOOK—Richard K. Siler, head of the Houston section of the Spaceflight Meteorology Group, inks in on a light table overlays of weather conditions around the world based upon information from satellite photos and ground observations.





RECOVERY GO/NO-GO—A global weather chart is pored over at the Flight Director's console in the Mission Control Center for possible weather constraints on recovery operations. From left to right are Kenneth M. Nagler, chief of the Weather Bureau Space Operations Support Division, Assistant Flight Director Joe Roach, Flight Director Gene Kranz and Operations and Procedures Officer Bill Platt. Weather conditions in the launch, abort recovery and prime recovery areas have a bearing on the decision to launch. In a long mission, weather in the recovery zone can deteriorate between launch day and the end of the mission.



PRINTOUT—Weather conditions at stations all over the world—cloud cover, wind velocity/direction, temperatures, barometric pressures, sea states — come in symbol language into teletype printers in the weather room of Mission Control Center. Houston section meteorological technician Edward Mitros scans the printouts in a bank of teletypes.

Global Weather Forecast
The worldwide weather picture is compiled in the Suitland, Md. section, taking advantage of any and all weather information that can be gathered by any means. Close coordination is maintained with Miami and Honolulu sections. All facilities of the Weather Bureau, the National Environmental Satellite Center, the Department of Defense, and the military weather services, are utilized to compile global weather forecasts.

Weathermen at the various sections of the group receive observations from several sources to supplement the forecasts prepared at Suitland, Miami, and Honolulu. Air Force reconnaissance aircraft make special weather flights over the Atlantic and Pacific and Navy ships in the recovery area frequently send special reports of wind, sea, and cloud conditions

ON THE WIRE—Facsimile transmitting and receiving machines allow weather charts to be relayed from one station to another. Here, Harlan G. Higgins of the Cape Kennedy section of the Spaceflight Meteorology Group coordinates by telephone the transmission of a surface weather chart.

to the offices at Cape Kennedy and Houston. The Apollo weathermen also maintain close cooperation with the Air Force Weather Detachment at Patrick Air Force Base, Fla.

It was first demonstrated during John Glenn's flight that weather observations could be made from an orbiting spacecraft. Since that time hundreds of cloud photographs have been made during spaceflights. These photos have added much to weather scientist's knowledge of the nature of certain cloud patterns.

Several scientific papers based upon these pictures taken from space have been published. Weathermen hope that sometime during the Apollo flights that there will be an opportunity to photograph the "eye" of a hurricane on successive revolutions. Studies could then be made of the changes that have occurred in the storm during a comparatively short time interval. Such studies may lead to a better understanding of these storms and allow more accurate forecasts.

The weathermen for Apollo are headed up by Kenneth M. Nagler, chief of the Space Operations Support Division and former chief of the Spaceflight Meteorology Group. He is also one of the principal experimenters for Apollo and has been with the weather group since its inception in 1960.

Alan N. Sanderson is chief of the Spaceflight Meteorology Group with offices in the Mission Control Center. Prior to joining the group in 1962 as Meteorologist-in-Charge of the Houston section, he served twenty years as a meteorologist with the Air Force, commercial airlines, and the Weather Bureau.

The Houston section of the Spaceflight Meteorology Group is headed by Richard K. Siler. Prior to assuming this position

last November, he was a forecaster in Honolulu and also with the Suitland and Cape Kennedy sections.

The Meteorologist-in-Charge of the Cape Kennedy section is Ernest A. Amman. The Miami section is headed by Jesse R. Gulick, and the Suitland section is headed by Richard A. Brintzhofer. The Honolulu weather representative for the Apollo program is Oliver A. Gorden Jr.

MAN'S INPUT—Photos made in the Gemini XI Synoptic Weather Photography experiment are analyzed by crewmen Charles "Pete" Conrad and Richard Gordon, MSC photo analyst Richard Underwood and Kenneth M. Nagler, one of the principal investigators in the S-6 experiment. It is hoped that Apollo crews will be able to photograph the growth of a hurricane during successive revolutions to gain additional knowledge on hurricane behavior.



JIM THRIFT SAYS...

BOWL OVER WASTE



JOIN THE COST REDUCTION TEAM

Blood Program Nets 959 Pints Since Inception

Almost 1000 pints of blood have been collected in the MSC Group Blood Deposit Program since the first bloodmobile visit to the Center on June 2, 1966 netted 12 pints. Since that first collection day, 959 pints have been collected up through the last bloodmobile visit during the latter part of February.

Of the 959 pints collected, 421 pints have been released for 68 cases involving MSC and contractor Group members and their families—an annual usage rate less than one percent of persons eligible to service under the MSC Blood Deposit Program, or about one quarter of the national population usage rate.

An additional 133 pints were released for use by charitable organizations, such as the Leukemia Society, American Heart Association and the Shrine Burn Institute in Galveston.

Since the one-day bloodmobile visit in June 1966, visits have been lengthened to several days and include stops at contractor firm locations as well as at MSC and Ellington AFB.

Bloodmobile visit periods and pints collected are as follows: September 14-October 5, 1966-148 pints; January 23-31, 1967-184 pints; April 24-May 2, 1967-208 pints; July 17-26, 1967-123 pints; October 17-24, 1967-125 pints, and February 19-28-1968-148 pints. In addition, 11 pints were deposited to the MSC account by walk-in donors at Blood Services of Houston during January and February 1968.

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Partial Rebuild Okayed For M2 Lifting Body

The NASA Office of Advanced Research and Technology has authorized partial restoration of the primary structure of the M2-F2 lifting body to permit its removal from the inspection jig and return to NASA's Flight Research Center, Edwards, California.

After the M2 lifting body was damaged in a landing accident on May 10, 1967, Northrop Norair made a detailed inspection to determine the extent of damage.

The inspection required removal of the outer skin and portions of the secondary structure. The primary structure was placed in a jig to check alignment and to determine what parts were reusable. The M2 is still in the inspection jig pending completion of the inspection which is expected in the next 60 days.

The M2 structure is expected to be returned to Flight Research Center in late summer where it will remain pending a decision from OART on its future. This decision will depend on the results of studies, now underway, which will define the future research work required for lifting

bodies on the basis of the flight results and other experience obtained from both the M2 and the HL-10.

Contract Let For Post-Apollo Data System

MSC has awarded a \$649,249 contract to Spacecraft Incorporated of Huntsville, Alabama, for production of a prototype stored program data processor for possible use on board spacecraft in post-Apollo programs.

The contract requires Spacecraft Incorporated to develop, fabricate and test a microminiature Stored Program Data Processor (SPDP) system and to deliver a single prototype by August 27, 1969.

Work under the fixed-price contract will be performed at Spacecraft Incorporated's facilities in Huntsville and Houston.

The SPDP is to be capable of operation under launch, orbital, and deep space environments. It will consist of a digital control and combiner unit, a flexible format generator and up to sixteen remote acquisition units, and will have a memory of 2048 words.

The SPDP is a highly flexible, programmable format, pulse code modulation data acquisition system which can be used for both operational and experimental spacecraft data handling needs.

Apollo Postlanding Test Set in Gulf Next Week

If temperatures and wave heights are acceptable, Landing and Recovery Division next week will conduct a 48-hour Apollo postlanding qualification test in the Gulf of Mexico some 80 miles south of Galveston. Spacecraft 007A will be manned by MSC pilots James A. Lovell, Charles Duke and Stuart Roosa.

The test will be conducted from the deck of the NASA Motor Vessel *Retriever*, and will be aimed toward qualifying spacecraft systems and devices used during postlanding phases of Apollo missions.

Spacecraft 007A is a production command module in a post-landing configuration with a representative heatshield. Systems are identical or similar to those on Spacecraft 101—spacecraft for the first manned Apollo mission.

The weight, center of gravity, and moments of inertia are the same for both vehicles. The external shape and size of both S/C are the same, conforming to design for the manned Apollo flights (upper deck area structure and equipment on S/C 007A is simulated for non-postlanding items).

Other items that are identical on both spacecraft include: the uprighting system; VHF, and UHF antennas; beacons and communication equipment; swimmer interphones and sea dye markers; and the postlanding ventilation system. Items that are similar include: couches, paneling, switches, and interior arrangement, and the crew suits and connectors.

Now Basking in Florida Sun



RETIREES—Wallace R. MacGregor, chief of the MSC White Sands Test Facility Laboratories Branch, recently retired after 19 years in federal service. MacGregor speaks to some 85 WSTF employees attending a retirement luncheon in his honor. At left is Mrs. MacGregor, center is L. Maurice Clelland, chief of the WSTF Operations Support Office. MacGregor joined WSTF in 1964 after a year and a half in the NASA Office of Manned Space Flight. His earlier professional experience included seven years with Patrick AFB, Fla., five years with the Federal Communications Commission in Washington, D.C., five years with RCA International and Lenkurt Electric, San Carlos, Calif., and 20 years with Bell System Communications, of New Jersey. Mr. "Mac" is now living in Florida fishing and relaxing in the sun.

Share Winner

Earl Rubenstein
Acct. No. 805
won free Credit Union
share in monthly drawing

Bridge Club Holds Tournament Series

The MSC Duplicate Bridge Club March 12 held a mixed-pairs championship. Winners in the 17-pair tournament were Charles and Eugenia Brown 1st, and tied for second were Alice Gowdey and Bill DeGeorge, and Susan Reno and Eric Magnusson.

The March 19 fractional game was a 6-table Howell movement with David Sklar and Jim Raney placing first, and Joe Snyder and Mark Powell, second.

The second in a series of beginner bridge classes begins April 1 and lasts for 10 weeks. An intermediate bridge class is planned for the early summer months. Class information can be had from Jim Raney at Ext 4015 or at 488-0324.

Scheduled tournaments in April include fractional games on April 2, 16 and 23, a charity game of April 9, and a club master point game on April 30.

Presidential Congratulations



AWARDEE—MSC Flight Control Division chief John D. Hodge is congratulated by President Lyndon Johnson at a White House reception for recipients of the Washington D.C. Junior Chamber of Commerce 1968 Arthur S. Flemming Award to the 10 outstanding young men in federal service in scientific/technical and administrative fields. Prior MSC recipients of the Flemming Award include Director of Flight Operations Christopher C. Kraft, Jr., MSC Associate Director Wesley L. Hjernevik, Director of Engineering and Development Maxime A. Faget, Director of Science and Applications Dr. Wilmot N. Hess, Apollo Spacecraft Program manager George M. Low and former ASPO manager Dr. Joseph F. Shea.

Decision Made to Man Second LM Mission

NASA announced March 15 that a second unmanned flight of the Lunar Module is not considered necessary and that the first manned Lunar Module flight will be launched later this year on a Saturn V vehicle.

The decision to man the Lunar Module's next flight followed a detailed evaluation of the first unmanned Lunar Module flight January 22, 1968 and of data from a comprehensive examination of the Lunar Module structural and ground test results analyzed by the OMSF Flight Safety Office.

The determining factor in whether the third Saturn V mission will be manned hinges upon the success of next Wednesday's launch of Apollo VI—the second flight of the Saturn V stack.

The Apollo VI Countdown Demonstration Test began Wednesday night, and at *Roundup* press time, T-O in the CDDT was scheduled for 6 am today. The lengthy terminal count for the actual launch is scheduled to begin Monday at Kennedy Space Center.

Hypergolic propellants were loaded March 19 into the Apollo VI spacecraft reaction control system and service propulsion system tankage.

Apollo VI flight controllers Tuesday completed their mission simulation training with a series of launch simulations. The day before, flight controllers took part in the final full network simulation.

In other Apollo developmental testing for later missions, manlocks in the Space Environment Simulation Laboratory

Chorus Concert

(Continued from page 1)

1967 in a one-car accident in Pearland, and Clifton C. Williams Jr. was killed October 5, 1967 in a jet trainer crash near Tallahassee, Florida.

Chamber B last week were successfully tested in manned runs in preparation for manned thermo-vacuum testing of Lunar Module Test Article 8 (LTA-8). Manrating of the entire Chamber B facility in vacuum conditions was to have begun late this week and last about two weeks.

The first manned LTA-8 tests are expected to begin in early April with James Irwin and John Bull taking part as spacecraft crewmen.

In the continuing testing of the modified Apollo drogue parachutes at the Naval Air Facility, El Centro, Calif., an ultimate load test failed March 23. Initial data indicated that failure occurred when a parachute riser parted.

The two-drogue system stabilizes the spacecraft before the main chutes are deployed. In last week's test, the drogues were deployed from a 13,000-pound cylindrical test vehicle at an altitude of 15,000 feet. The test was to have loaded the system to the ultimate load of 135 percent of operational design limits.

Equipment for crew quarantine and recovery from the lunar mission will get a thorough workout during interface and compatibility testing of the Mobile Quarantine Facility with Air Force C-141 and a Navy aircraft carrier and destroyer.

The MQF will be loaded Monday aboard a C-141 at Ellington AFB for local test flights before going on to Norfolk, Va. the following day for loading aboard the carrier USS *Randolph* for in-port interface tests. The MQF will be loaded aboard the Destroyer USS *Wood* April 8 for a 24-hour sea test in the Atlantic. Returning April 10 to MSC, the MQF will undergo a simulated crew offloading through the quarantine transfer tunnel to the Lunar Receiving Laboratory.

Diluted Oxygen Is Approved For Apollo Cabin at Launch

The spacecraft for the first manned Apollo mission will use a launch pad cabin atmosphere of 60 percent oxygen and 40 percent nitrogen, rather than pure oxygen which will continue to be used in orbit.

NASA announced the change March 14.

The change will apply only to the spacecraft cabin atmosphere during ground operations and will require no changes to the existing spacecraft environmental control system, which supplies pure oxygen in flight.

Crews will continue to breathe pure oxygen in their space suits before and during the launch phase, at a pressure slightly higher than the cabin to avoid leakage into the suit. After insertion into orbit the spacecraft environmental control system will gradually replace the 60/40 cabin atmosphere with pure oxygen.

More than 140 flammability tests conducted with a full-scale boilerplate spacecraft at MSC since October 1967 show that modifications to the Apollo spacecraft since the Apollo 204 accident of January 1967 have drastically reduced the hazard of fire in the vehicle.

Ignition sources have been minimized and many materials have been changed to prevent flame propagation. Several new materials not available during initial Apollo design have been introduced. A fire extinguisher and new hatch for crew egress have been developed.

Tests were conducted in a pure oxygen atmosphere at orbital pressures of six pounds per square-inch, a 60/40 diluted oxygen atmosphere at launch pad pressures of 16 psi, and 16 psi in pure oxygen.

Tests of pure oxygen at pressures of 16 psi showed that although ignition was difficult, intentionally ignited fires tended to spread in that atmosphere. In about half the tests the fires failed to extinguish themselves and instead, spread beyond acceptable limits. In the other two test conditions the modified spacecraft was judged acceptable.

In evaluating an atmosphere for prelaunch use in the Apollo spacecraft cabin, a major consideration was to provide an adequate amount of oxygen to assure man's ability to perform, while reducing the danger of the fire to an acceptable level. A 60 percent oxygen mixture will be livable at all times in flight, thus providing a backup to the space suit system for the crew.

Detailed physiological review of the 60 percent oxygen-40 percent nitrogen atmosphere on the launch pad included considerations of the operational characteristics of the spacecraft and life support equipment. Test data on the spacecraft and equipment will be obtained in full-scale manned altitude chamber runs to substantiate the operational procedures developed for checkout, launch and flight.

Shortly before liftoff the spacecraft will be separated from the

ground system supplying the 60/40 atmosphere. Following launch, the cabin atmosphere will be replenished by pure oxygen, while the nitrogen level continues to decrease because of controlled leakage. A level of approximately 95 percent oxygen will be reached in four to six days. The crew will be adequately protected from a physiological standpoint during all phases of the atmosphere change.

The decision to use a diluted-oxygen atmosphere while in Apollo launch pad operations will require changes in spacecraft operation, but no changes in the spacecraft and only moderate engineering changes in ground support equipment.

The principal new requirement will be to assure that during prelaunch phases the oxygen content in the mixture supplied to the spacecraft is accurately determined and continuously maintained and that the oxygen supply to the suit loop is not contaminated through inward leakage of the cabin atmosphere.

The crew procedures during the period the diluted-oxygen atmosphere is in the cabin will be only slightly affected by the use of this atmosphere. Before launch, a vent valve must be opened to permit the controlled slow venting which will gradually change the cabin atmosphere. Within eight hours of flight, and after verification by existing onboard oxygen measuring instrumentation, the crew will close this valve.

Scholarship Review



SELECTION COMMITTEE—MSC Exchange Council 1968 Scholarship Selection Committee members review applications for financial assistance to college-age children of MSC employees. Each of the two scholarships to be awarded will pay up to \$600 per academic year for four years, provided high school grade averages meet certain minimums and the employee-parent's base income does not exceed \$8000 per year. Evon A. Collins, center is committee chairman. She is chief of the Resources Management Division's Administration and Finance Unit. Committee members are Donald D. Blume, left, chief of Management Services Division, and Stanley H. Goldstein, chief of Personnel Division Employee Development Section.