NEWS RELEASE LOG

AUG 20 1979

NUMBER	TITLE	RELEASE DATE
68-1	Flammability Testing	1/15/68
68-2	Two top-level management Positions Manned at MSC	1/19/68
68-3	Flammability Testing	1/2[illegible]/68
68-4	Apollo 5 Quick-look Release	1/27/68
68-5	Shipment of Second Apollo LM	1/30/68
68-6	Anthony J. Calio named Deputy Director for Projects for the Science & Applications Directorate	2/5/68
68-7	Third series of flammability tests announced	2/7/68
68-8	Five landing areas selected by NASA Apollo Site Selection Board	2/8/68
68-9	Relocation of MSC News Center	2/15/68
68-10	T-30 Apollo 6 news release	2/20/68
68-11	Slip in Apollo 6 launch date	2/28/68
68-12	Flight training to start for Scientist Astronauts	2/29/68 ~~XXXXXX~~
68-13	President Johnson's visit to MSC	3/1/68
68-14	Another slip in Apollo 6 launch	3/11/68
68-15	NASA NSTA Youth Science Congress - Oklahoma City	3/12/68
68-16	NASA NSTA Youth Science Congress - Houston	3/12/68
68-17	NASA NSTA Youth Science Congress - Enid, Oklahoma	3/12/68
68-18	NASA NSTA Youth Science Congress - El Campo, Texas	3/12/68
68-19	NASA NSTA Youth Science Congress - San Antonio, Texas	3/12/68
68-20	NASA NSTA Youth Science Congress - Breckenridge, Texas	3/12/68
68-21	NASA NSTA Youth Science Congress - Saginaw, Texas	2/12/68

NEWS RELEASE LOG

NUMBER	TITLE	RELEASE DATE
68-22	60/40 Launch Pad Atmosphere announced	3/14/68
68-23	Launch slip to April 1 announced	3/15/68
68-24	Launch slip to April 3 announced	3/21/68
68-25	William A. Parker appointer Manager, Center Support Planning and Control	3/21/68
68-26	$929,000 contract to U of California for development and testing of HAPPE announced	3/25/68
68-27	NASA MSC awards $649,249 contract ~~ak~~ to Space Incorporated	3/27/68
68-28	Kraft appoints 3 new Flight Directors	4/3/68
68-29	Iceland Mission "sea state"	4/3/68
-30	Apollo 6 Quick Look Mission Evaluation	4/9/68
68-31	Spacecraft 2TV-1 service module (Lusk)	4/9/68
68-32	Withdrawal of Scientist-Astronaut Brian T. O'Leary from astronaut program	4/23/68
68-33	Boeing Contract Announced	5/3/68
68-34	David Clarke Suit~~s~~ Contract	5/10/68
68-35	Reassignment of three MSC officials	5/14/68
68-36	Changes in Grumman Aircraft Engineering Cor. Contract	5/21/68
68-37	South Atlantic Anomaly Probe	5/22/68
68-38	LTA-8 Tests	5/24/68
68-39	Astronaut training at Perrin AFB	5/31/68
68-40	Job Fair Program	5/31/68
3-41	Rocketdyne injector to be used in Bell ascent engine of first manned LM	6/4/68
68-42	2TV-1 tests begin	6/10/68

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NUMBER	TITLE	RELEASE DATE
68-43	Lockheed Earth Orbital Escape Device study	6/10/68
68-44	SAAP is successful	6/12/68
68-45	Partial Gravity Simulator	6/19/68
68-46	NASA-ASEE Summer Faculty Fellowship Program	6/19/68
68-47	Apollo Applications Flammability Experiment, M-479	7/11/68
68-48	John Bull Leaves Astronaut Program	7/16/68
68-49	Facility installed in Gulf of Mexico for LRD	7/17/68
68-50	Saturn 5 POGO Problem Tests	7/18/68
68-51	ALSEP - Bendix Corporation	7/18/68
68-52	Dr. Jerry Modisette appointed Senior Staff Scientist	7/18/68
68-53	Astronaut Michael Collins to undergo surgery	7/22/68
68-54	Report on Astronaut Michael Collins	7/23/68
68-55	Report on Astronaut Michael Collins	7/25/68
68-56	MSC ducks vaccinated against Botulism	7/25/68
68-57	Water egress training for first manned Apollo crews	7/31/68
68-58	$10,651,200 contract modification awarded to Hamilton Standard Div., United Aircraft Corporation	8/2/68
68-59	NASA invites 23 aerospace firms to submit proposals for one-man Lunar Flying Machine	8/7/68
68-60	Announcement of Collins and Bull replacements	8/8/68
68-61	Manned checkout of 2TV-1	8/9/68
68-62	NASA modifies IBM Contract for RTCC	8/15/68
68-63	Withdrawal of Llewellyn from astronaut program	8/23/68

NEWS RELEASE LOG

NUMBER	TITLE	RELEASE DATE
68-64	Bell Aerosystems employee in'ured in lunar landing training vehicle accident	8/27/68
68-65	Pratt and Whitney fuel cell test completed	8/29/68
68-66	2TV-1 Manned testing begins	9/4/68
68-67	NASA contracts with Sperry Rand Corp. for CCATS processors	9/4/68
68-68	Paul Purser granted a one year leave of absence	9/11/68
68-69	Intermediate workshop by Stoney	9/13/68
68-70	two-day program marks 10th anniversary of NASA	9/24/68
68-71	NASA selects Rocketdyne in'ector for use in ascent engine of Apolb Lunar Module	9/25/68
68-72	Gilruth announces establishment of an Advance Missions Program Office	9/27/68
68-73	Karl Henize suffers a fractured collar bone	9/27/68
68-74	Tenth Anniversary had an estimated 25,000 persons attending	9/30/68
68-75	William E. Stoney named Deputy Director (Engineering) of Apollo manned landing program	10/1/68
68-76	LLTV Aircraft Test Run	10/3/68
68-77	$436,000 study contract awarded McDonnell Douglas	10/23/68
68-78	Steps that will lead to final decision on next Apollo outlined by administration	10/28/68
68-79	Plans call for U. S. Astronauts to place 3 scientific experiments on lunar surface	11/15/68
68-80	Completion of manned vacuum testing	11/15/68
68-81	Prime Crewmen for Apollo 10	11/13/68
68-82	NASA awards contract to Link Group, General Precision for maintenance & modification of MSC's simulator complex	11/18/68
68-83	NASA awards $3,500,000 contract to Allis Chalmers	12/3/68
68-84	NASA signs supplemental agreement with Grumman	12/4/68

NEWS RELEASE LOG

NUMBER	TITLE	RELEASE DATE
68-85	NASA awards 1-yr. contract extension to Lockheed	12/10/68
68-86	NASA Awards 2-yr. contract to TRW	12/17/68
68-87	William Schneider named AAP Director	12/19/68
68-88	Award of North American Contract	12/31/68

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

January 15, 1968
MSC 68-1

HOUSTON, TEXAS -- A mixture of oxygen and nitrogen will be used in a new round of Apollo command module fireproofing tests to get under way this week at the Manned Spacecraft Center.

This mixture, simulating a cabin atmosphere for operations on the pad, will consist of 60 per cent oxygen and 40 per cent nitrogen. (Air on the ground contains 21 per cent oxygen and 78 per cent nitrogen, plus traces of other gases).

The tests to begin about Wednesday and run 10 days to two weeks, follow by some three weeks a similar series of 38 tests conducted in a nearly pure oxygen environment at 6 pounds per square inch of pressure. In the new series, the oxygen nitrogen mixture will be kept at 16 pounds.

Tests using the specific mixture oxygen-nitrogen or "enriched air" were ordered by the Apollo Flammability Review Board in a meeting Saturday. The Board is headed by MSC Director Robert R. Gilruth.

Prior to Saturday's meeting, it had been planned that the next round of command module fireproof testing would be at 16 pounds per square inch in essentially pure oxygen.

"Based on medical, operational, and engineering data, the 60-40 mixture of oxygen and nitrogen is one we definitely want to investigate," said Apollo Spacecraft Program Manager George Low. "This is not to say that we will suspend investigations of other mixtures at various pressures. It is all part of a major effort to make the spacecraft as safe and efficient as possible."

On that point, Gilruth emphasized, "We retain three major options. They are: Launching with (1) regular air on the pad, or (2) enriched air of some blend of oxygen and nitrogen, or (3) pure oxygen." The spacecraft oxygen resupply system would replace in orbit the air or enriched air atmosphere used on the pad in either of the first two options cited by Gilruth.

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Mercury and Gemini spacecraft operated with pure oxygen atmospheres at all times.

Flammability testing consists of purposely short-circuiting or overloading wires at strategic points throughout the spacecraft to start fires. Once the fires are started, engineers study their self-extinguishing characteristics.

The spacecraft is normally tested prior to launch at a positive internal pressure of about 16 pounds to assure spacecraft sealing integrity. That is to overcome the 14.7 pounds of normal sea level atmosphere pressing on the spacecraft at launch. In orbit, a cabin pressure of from five to six pounds is maintained, in contrast to the zero pressure of outer space.

Flammability testing of the Apollo lunar module was conducted at MSC in November, 1967. A series of 41 tests was run in a nearly pure oxygen environment at a pressure of 6 pounds per square inch. The LM test results indicated that the LM interior is adequately protected against fire.

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER Houston 1, Texas
HU 3-5111

MSC 68-2
January 19, 1968

HOUSTON, TEXAS--Creation of two new positions to strengthen top-level management at the Manned Spacecraft Center was announced today by MSC Director Robert R. Gilruth.

Wesley L. Hjornevik, 41, has been named to the new position of Associate Director and will assist the Director and Deputy Director in the overall management of MSC. Hjornevik, a veteran of 18 years of government service, nine with NASA, will be responsible for overall MSC organizing and staffing, MSC-contractor relationships, and inter-center contacts.

Succeeding Hjornevik as Director of Administration is his former deputy, Philip H. Whitbeck, 44. Whitbeck will supervise those administrative and technical services support functions required by MSC, including personnel, financial management, management analysis, and other supporting administrative services. This also includes the supervision of technical shops, the photographic laboratory, and the support engineering effort.

Dave W. Lang, 47, has been named to the newly-created position of Director of Program Control and Contracts. Lang, formerly Chief of MSC's Procurement and Contracts Division, will be responsible to Associate Director Hjornevik and will be in charge of planning, analyzing, and coordinating those procurement, contract, and budget requirements necessary for the support of MSC's major spacecraft programs.

Dr. Joseph A. Kratovil will leave his job as Chief of the Resources Management Division to become Deputy Director of Program Control and Contracts.

William A. Parker succeeds Lang as Chief of the Procurement and Contracts Division with responsibility for all center procurement requirements except those major research and development programs for spacecraft and closely related equipment. This includes procurement activities in support of advanced missions, on going center operations, support contractor operations and other facilities, equipment, and supplies required for center operation.

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Russell C. Connelly replaces Kratovil as Chief of the Resources Management Division. Connelly had previously been deputy division chief.

Dr. Gilruth has also selected Aleck C. Bond, 46, to head two staff offices--Flight Safety and Reliability and Quality Assurance. Bond has been manager of systems tests and evaluation in the Engineering and Development Directorate.

The New Reliability and Quality Assurance Office consolidates the activities of several existing organizations. The majority of the R&QA personnel is from the Reliability, Quality and Test Division of the Apollo Spacecraft Program Office and from the Quality Assurance Branch formerly assigned to the Flight Safety Office.

Responsibility of the new office is to establish reliability and quality specifications for new manned space programs as well as to insure that current programs meet established quality and reliability levels.

Flight Safety Office will spell out the policies and procedures and will conduct continuing systems analysis from the standpoint of safety. It will advise program managers and the MSC director on all matters relating to flight safety.

The former head of the Flight Safety Office, F. John Bailey, Jr., has moved to the Kennedy Space Center, Florida, as Chief of Flight Safety Operations responsible to the MSC Flight Safety Office.

Bond's deputy for R&QA will be William M. Bland, Jr., who has been Chief of the R&Q Test Division, ASPO.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

68-3
January 27, 1968

HOUSTON, TEXAS--In September of 1967, a Senior Flammability Test Review Board was established by the Director of the Manned Spacecraft Center, Robert R. Gilruth, to determine if modifications to the Apollo spacecraft have made it sufficiently fireproof for manned tests in space chambers and manned flights. The test program summarized herein was conducted to provide the Board with the required information. The tests and the Board's decision constrain manned chamber tests of the CM and LM, which in turn constrain the first manned flights of these vehicles.

There are two conditions for a fire within a spacecraft to be of unacceptable magnitude. First, a fire must be ignited and second, the fire must spread or propagate beyond its immediate ignition point. Both of these factors have been, and continue to be, carefully investigated from a preventive and extinguishment standpoint. However, to demonstrate that the possibility of a castastrophic fire is so remote that it can be considered negligible, at least one of the two factors must be eliminated.

Since all spacecraft wiring and other electrical equipment may be potential ignition source, the only positive means of removing all potential electrical ignition sources is to eliminate all onboard electrical power. This, for obvious reasons, is impossible. The alternative is to demonstrate that any fire which might possibly occur will not and cannot propagate beyond the discrete region of ignition in the oxygen-rich interior environment. This was the approach selected for the validation tests of the Apollo Command and Lunar Modules.

Full scale boilerplate mockups of the CM and LM interiors were fabricated by the respective spacecraft contractors, the North American Rockwell Corporation and The Grumman Aircraft Engineering Corporation. The boilerplate

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vehicles simulate the flight and chamber test vehicles to a high degree of fidelity with respect to interior geometry, electrical wiring and components, flight hardware and crew equipment.

In October and November of 1967, a program of tests was conducted on the LM in which 41 deliberate ignitions were made in the interior of the vehicle. Four materials changes were recommended as a result of the LM tests, and the vehicle was judged to be adequately fire protected.

From December 18, 1967, to January 7, 1968, flammability tests were conducted on the CM under essentially the same conditions as tests on the LM. Thirty-seven deliberate ignitions of materials in the CM were made in a pure oxygen environment pressurized to approximately six pounds per square inch, the pressure used in orbital flight. Ignition points were carefully selected to occur in the proximity of at least one sample of each of the combustible materials found inside the cabin in more than minute quantities. MSC personnel then evaluated the flammability and propagation properties of spacecraft cabin materials, contractor fire hazard fixes, crew equipment and stowage areas, and apparent propagation paths.

The enclosed film shows the interior and exterior of CM boilerplate 1224, the vehicle used for the CM flammability testing. The film also shows the electrical ignition technique used in the three representative tests.

The electrical igniter sequence preceeding the three flammability tests shows the igniter, a piece of flammable silicone rubber about an inch long with a nichrome wire coiled about it. The wire coil is overloaded with an electrical current of about 11 amps at 28 volts DC, igniting the silicone rubber. The silicone rubber, as shown in the film, burns with a white-hot flame of at least 2500 degrees farenheit for 30 to 40 seconds. Igniters were used in virtually all of the tests rather than merely overloading spacecraft wiring, to insure that an open flame was produced adjacent to potentially flammable materials. It should be emphasized that the igniter is used to assure ignition for the test and is not a part of the spacecraft; it represents a very severe source of ignition.

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The first of the three flammability tests in the film was conducted in the lower left-hand equipment bay under the left crew couch. An external igniter was located on the sleeve over the wiring entering the electrical connecter to an electronic control unit. A clock in the upper right corner of the film frame shows elapsed time from initiation of electrical power to the igniter. In this test, flame was visible from T plus 30 seconds to T plus 1 minute 53 seconds. Damage was localized to the ignition area and was limited to the wire insulation and protective sleeve. There was no flame propagation and the fire self-extinguished.

In the second test, an external igniter was located at the end of the Teflon wrap on a wire bundle. This wire bundle is located in the right hand equipment bay. The purpose of this test was to determine the flammability of the Teflon wrap on the wire bundle under the Teflon clamp sleeve and the extent of flame propagation to adjacent connectors and to adjacent wire bundles. Although Teflon is a fire resistant material, it will burn reluctantly under severe conditions. In this test, flame was observed 45 seconds after electrical overload and lasted approximately 4 minutes. The flame was localized and no significant propagation occurred. Damage was localized and minor.

The first two tests shown in the film are representative of 32 of the 37 flammability tests conducted on the CM in a near pure oxygen environment. In these 32 tests self-extinguishment occurred with only minor damage in the region of ignition. The third test shown represents the worst-case flammability test for the CM and was one of five tests which produced fires of sufficient magnitude to require further consideration.

For this test an external igniter was located on fluorel material around the eyepiece of the space sextant. The purpose of the test was to determine the flammability characteristics of fluorel insulation, a spongelike material distantly related to Teflon. The fluorel began to drip flaming particles 40 seconds after ignition, and the charts below the eyepiece ignited 5 seconds later. The test was terminated by evacuating the vehicle 1 minute 20 seconds after it began, according to pre-established ground rules to prevent un-necessary damage to adjacent components.

It has been decided that prior to manned operations in the CM the fluorel insulation on the eyepiece will be replaced. Studies are also underway which may lead to development of a ncn-flammable paper for spacecraft log books and manuals.

Corrective action has alsc been determined for the four other CM flammability tests in which fires either did not extinguish themselves or spread beyond the immediate ignition area.

All of the fires produced in flammability testing could have been easily extinguished with planned on-bcard fire extinguishers. From ten to thirty minutes were required to produce significant burning in all but one case, which would give crewmen adequate time to locate and extinguish fires or to leave the spacecraft during ground test operations. In the case of the fluorel eyepiece, the fire grew to unacceptable size in about one minute. However, this fire would have been immediately visible to the crew, allowing them to take prompt action to extinguish the fire.

Flammability Test Review Board Chariman Robert Gilruth stated that the results of testing to date indicate a drastically reduced fire hazard has been achieved in the Apollo spacecraft.

Flammability testing of individual spacecraft components and of cabin interiors will continue. A current series of CM tests is investigating the possibility of using a mixed gas environment of about 60 per cent oxygen and 40 per cent nitrogen for launch pad operations, which must be conducted at a cabin pressure of about 16 pounds per square inch. With this system astronauts would continue to breathe pure oxygen in their spacesuits prior to launch. The air or mixed gas cabin atmosphere would be replaced with pure oxygen in orbit where cabin pressures of about 6 pounds per square inch are used as opposed to 16 pounds per square inch on the launch pad.

All three possibilities for spacecraft atmospheres on the launch pad, pure oxygen, mixed gas, or air, are still under consideration.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

68-4
January 27, 1968

HOUSTON, TEXAS--Quick-look grading of the Apollo lunar module's first flight test gives the spacecraft high marks.

In their first comprehensive report to program officials, engineers evaluating data said today the January 22-23 mission was completed successfully. Ascent and descent propulsion systems and the ability to abort a lunar landing and return to orbit were demonstrated.

Program officials were especially pleased with the maturity of the spacecraft's hardware. They had expected more problems in the unmanned first flight of a vehicle designed to be manned.

Studies to date indicate that the lunar module showed more maturity in its first flight than many previous spacecraft, including some designed to be manned.

A detailed review of the mission will continue for several weeks, but no major problems are apparent.

Cited as examples of excellent performance are the sublimator, or water boiler, in the environmental control system which extracts excess heat from the internal environment; the reaction control system; and instrumentation.

Overly conservative programming of the lunar module guidance computer (LGC) caused the early shutdown of the first descent propulsion system (DPS) burn. Data indicate there were no problems with the engine or with the computer itself.

The first DPS burn was commanded at 03:59:40 mission elapsed time. The LGC initiated shutdown 4.3 seconds later when the computer determined that the required velocity change had not been achieved in the time allowed. At shutdown, thrust had built to 9.5 per cent. A 10 per cent thrust level burn was planned.

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Premature cutoff of the burn resulted in flight controllers shifting to a previously planned alternate mission. This mission, called the minimum requirement sequence, was one of many possible pre-planned alternatives for LM-1 designed to guard against malfunctions. This particular sequence was designed nearly two years ago to meet all of the essential objectives of the LM-1 flight. Major differences between the planned and alternate missions were deletion of a long DPS burn (12 minutes) and substitution of program reader assembly (PRA) control for primary guidance control during propulsion burns.

The second DPS burn was commanded at 06:10:43 elapsed time. Duration was 26 seconds at the 10 per cent thrust level, followed by 7 seconds at maximum thrust. Performance was normal except for an engine shut-off valve indication. When the engine was throttled to a full thrust, instrumentation indicated that not all of the four valve actuaters were fully open. However, thrust chamber pressure was normal, indicating a possible instrumentation problem.

The third DPS burn was initiated 32 seconds after completion of the second burn. The sequence consisted of 26 seconds at 10 per cent thrust, 2 seconds at maximum thrust, and abort stage fire-in-the-hole, where the two stages are separated and the ascent stage engine is ignited simultaneously while the DPS is being shut down. DPS performance appeared normal.

Duration of the first ascent propulsion system (APS) burn during the abort staging was 60 seconds. No problems were encountered.

Spacecraft control was then returned to the primary guidance system for the second APS burn. However, excessive reaction control system (RCS) thruster firings began immediately. It was determined that since the digital autopilot was in an idling mode during PRA control, the system computed RCS commands based on prestaging inertias, which led to excessive RCS propellant usage. Subsequent ground simulations verified that RCS propellant usage was normal for the existing conditions.

The situation caused the RCS to operate well beyond its normal duty cycle, and system temperature limits were exceeded. Despite that, the RCS operated properly later in the mission. Engineers consider the situation an extra plus sign for the RCS, pointing out it proved itself better than if the mission had been nominal.

Insufficient time to properly set-up the primary guidance system and limited coverage by ground stations in the next revolution resulted in a decision to conduct the second APS burn under PRA control. The burn was started at 07:44:19 and was allowed to continue until fuel depletion, approximately 6 minutes.

The spacecraft was rate-stabilized in a retro attitude during the second APS burn, and the best information available at this time indicates that LM-1 ascent stage reentered the atmosphere west of Hawaii during the sixth revolution.

Vehicle structural integrity was maintained throughout the mission. There are no indications of any thermal control problems, and the environmental control system appears to have functioned properly.

The temperature measured at the water/glycol pump inlet reached a maximum of 56.2 degrees F prior to water boiler start-up at three minutes after lift-off. It stabilized within one revolution at approximately 40 degrees F for the remainder of the mission.

Cabin pressure sealed off at 5.4 pounds per square inch about 12 minutes after lift-off. Cabin leak rate was 0.4 pounds per hour at 5 psi as predicted.

The communication system appeared to operate satisfactorily throughout the flight. VHF telemetry contact was maintained during all available coverage.

The instrumentation system which furnished data on the fire-in-the-hole abort surpassed expectations and proveded very significant data during the most critical part of mission.

Engineers had been concerned that the ascent engine plume striking the descent stage during separation might impinge on antennas, causing information to be lost or garbled for a time. However, the pulse code modulation, or digital telemetry, continued uninterrupted. Only minor dropouts were experienced in the four FM/FM, or analog telemetry, links, and not all of them dropped out at the same time.

Both the Corpus Christi, Texas, and Guaymas, Mexico, tracking stations monitored the abort staging. Data from the Texas station has been reviewed. Tapes from the Mexico station are expected soon and will provide engineers with an important second look angle of the event.

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APOLLO 5 MISSION EVENTS

Event	Mission elapsed time, hr:min:sec Planned	Actual
Lift-off - 5:48:08 p.m. EST	00:00:00	00:00:00
S-IB inboard engines cutoff	00:02:19	00:02:19
S-IB outboard engines cutoff	00:02:22	00:02:22
S-IB/S-IVB separation	00:02:23	00:02:23
S-IVB ignition	00:02:25	00:02:25
S-IVB cutoff	00:09:39	00:09:53
Insertion	00:10:08	00:10:03
Aerodynamic shroud jettison	00:10:43	00:10:38
SLA panel deployment	00:19:43	00:19:44
LM/S-IVB separation command	00:54:00	00:53:55
First DPS burn start	03:59:44	03:59:40
DPS engine cutoff	04:06:26	03:59:44
Second DPS burn start		06:10:43
DPS engine off		06:11:15
Third DPS burn start		06:11:48
Fire-in-the-hole abort		06:12:14
APS engine off		06:13:14
Second APS burn engine on		07:44:35
APS propellant depletion		07:50:30

The following table shows orbital elements at four significant times during the mission.

INSERTION

Condition	Planned	Actual
Apogee, n. mi..........	123	120
Perigee, n. mi.........	88	88
Period, min............	88.4	88.3
Inclination, deg.......	31.62	31.63

LM/S-IVB SEPARATION

Condition	Planned	Actual
Apogee, n. mi..........	121	120
Perigee, n. mi.........	94	90
Period, min............	88.6	88.4
Inclination, deg.......	31.62	31.63

COMPLETION OF FIRST DPS BURN

Condition	Planned	Actual
Apogee, n. mi..........	174	120
Perigee, n. mi.........	116	92
Period, min............	89.9	88.4
Inclination, deg.......	31.63	31.64

COMPLETION OF APS-1

Condition	Planned	Actual
Apogee, n. mi..........		519
Perigee, n. mi.........		93
Period, min............		96.0
Inclination, deg.......		31.48

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU3-5111

68-5
January 30, 1968

HOUSTON, TEXAS--Shipment of the second Apollo Spacecraft Lunar Module and the associated Saturn IB rocket to the John F. Kennedy Space Center, Florida, has been postponed pending further evaluations of Apollo 5 Mission results.

The Apollo Spacecraft Lunar Module eventually will land two American astronauts on the moon's surface before the end of this decade in the United States Manned Lunar Exploration Program.

Initial evaluation of the first Lunar Module flight on January 22-23 indicates that a second unmanned flight may not be required to qualify the spacecraft for flight with men aboard.

Further detailed review of Apollo 5 flight data and deliberations by a NASA Design Certification Review Board in March will determine the final decision.

Lunar Module II and the Saturn IB rocket stages will be maintained ready for shipment to Cape Kennedy on 3 and 14 day notices respectively.

Refurbishment of Launch Complex 37B will proceed for a second unmanned Lunar Module flight. The Mission Control Center-Houston and tracking ships Coastal Sentry Quebec and Rose Knot Victor will maintain the operational capability to support another unmanned Lunar Module flight.

Currently the Lunar Module is completing factory testing at the Grumman Aircraft Engineering Corporation, Bethpage, Long Island and the Saturn IB stages are ready for shipment from various manufacturing facilities.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER Houston 1, Texas
HU 3-5111
MSC 68-6
February 5, 1968

HOUSTON, TEXAS--Anthony J. Calio, of the Office of Space Science and Applications, NASA Headquarters, has been named Deputy Director for Projects for the Science and Applications Directorate at the NASA Manned Spacecraft Center.

Calio, 38, has been Assistant Director for Planetary Explorations with the Office of Space Science and Applications, NASA Headquarters. As Deputy Director for Science and Applications Division, he will share the technical and managerial responsibility for the Science and Applications Directorate with Dr. Wilmot N. Hess, S&AD Director.

Calio joined NASA in 1963, as a member of the Electronic Research Task Group where he assisted in the development of scientific objectives for the new Electronic Research Center, Cambridge, Massachusetts. In 1965, he was assigned to the Manned Space Science Program as Chief of Systems Integration and Coordination for Manned Flight Experiments, where he had the responsibility of planning and directing experiment systems.

In his new post, Calio will assist in directing seven major offices and divisions within the Science Directorate, which plans and implements MSC programs in space science and applications.

Calio is a graduate of the University of Pennsylvania, where he received his BA in Physics in 1953. Prior to joining the NASA in 1963, he was with the Bettis Atomic Power Division of Westinghouse Electric Corp. (1956-59); Manager of the Nuclear Physics Section of the American Machine and Foundry Co., Alexandria, Virginia (1959-61); and Executive Vice-President and Manager of Operations for the Mount Vernon Research Center, Alexandria, Virginia (1961-63).

Calio's appointment is effective February 11, 1968.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-7
February 7, 1968

HOUSTON, TEXAS--A third series of Apollo command module flammability tests began this week at the Manned Spacecraft Center, Houston.

The tests are being conducted in a pure oxygen atmosphere at about 16 pounds per square inch pressure, simulating one set of conditions for spacecraft ground test and prelaunch operations.

Previous command module flammability tests were conducted at MSC in December and January with cabin atmospheres simulating orbital conditions using pure oxygen at 6 pounds per square inch pressure and a ground test and launch pad atmosphere of mixed oxygen and nitrogen at 16 pounds pressure.

Results of the three series of tests will help determine whether pure oxygen will continue to be used in spacecraft ground tests and prelaunch operations or whether a cabin atmosphere of a mixture of oxygen and nitrogen should be substituted to minimize fire hazards.

Mixed gas cabin atmospheres would be gradually replaced with oxygen in orbit, where cabin pressures of 5 to 6 pounds per square inch are used as opposed to 16 pounds per square inch pressure required for operations on the ground.

A NASA flammability test review board headed by MSC Director Robert R. Gilruth requested the third series of command module flammability tests after receiving a report, Monday, February 5, on the latest series of tests conducted with a mixed gas atmosphere of 60 per cent oxygen and 40 per cent nitrogen at 16 pounds per square inch pressure. Both the mixed gas tests at 16 pounds per square inch and pure oxygen tests at 6 pounds per square inch to date have shown the Apollo spacecraft to be generally well protected against fire.

The present series of flammability tests will follow procedures established for earlier tests. About 35 separate tests are scheduled in the pure oxygen environment at 16 pounds per square inch pressure.

Command module flammability tests are conducted in boilerplate 1224, a full scale mockup of the Apollo command module interior configured to represent the ground test vehicle and spacecraft for the first manned Apollo mission.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-8
February 8, 1968 p.m.

HOUSTON, TEXAS--The first Americans on the moon will land in one of five 3 X 5 mile landing areas selected by the National Aeronautics and Space Administration's Apollo Site Selection Board.

Each of the five landing areas satisfies criteria in which astronaut safety is the paramount consideration.

The places selected are ellipses around the following central points on the face of the moon:

Site One - 34 degrees east; 2 degrees, 40 minutes north;

Site Two - 23 degrees, 37 minutes east; 0 degrees, 45 minutes north;

Site Three - 1 degree, 20 minutes west; 0 degrees, 25 minutes north;

Site Four - 36 degrees, 25 minutes west; 3 degrees, 30 minutes south;

Site Five - 41 degrees, 40 minutes west; 1 degree, 40 minutes north.

The first two sites are in the Sea of Tranquillity, the third is in the Central Bay and the fourth and fifth are in the Ocean of Storms.

The five sites were selected from eight under study, from a choice of 30 original sites. Selection of the five will permit scientists and engineers to concentrate on the fewer areas in preparing data on the specific sites.

The Board studied material obtained by unmanned lunar orbiters and soft-landing Surveyor spacecraft. Lunar Orbiter returned high resolution photographs of all the sites and Surveyor provided closeup photos and surface data of the general areas in which they are located.

Following are the criteria considered by the Board:

--Smoothness of area. The sites should have relatively few craters and boulders;

--Approach paths. There should be no large hills, high cliffs or deep craters which would cause incorrect altitude signals to the landing radar;

--Propellant. The sites were selected to allow for the expenditure of the least amount of propellant by the lunar module propulsion system;

- more -

--Recycling during countdown. The sites were selected to allow for the recycling time of the Apollo/Saturn V necessary if the countdown for launch at Kennedy Space Center is delayed;

--Free-return. The sites must be within reach of the Apollo spacecraft in the "free-return" trajectory. On the free-return trajectory a spacecraft would coast around the moon and return safely to earth without requiring the operation of propulsion systems;

--Lighting. For optimum visibility by the astronauts, the sites selected will have sun-angle of from 7 to 20 degrees behind the lunar module as it approaches the landing;

--Slope. The general slope of the landing area and the approach of the landing site must be less than 2 degrees. All sites are within the Apollo Zone of Interest--that area of the visible side of the moon, and 5 degrees north and south of its equator.

The desired sun-angle range of 7 to 20 degrees results in a one-day launch opportunity per month for a given site.

Since there are five landing sites selected for the first Apollo moon landing mission, there will be five days during a month on which a launch can be made.

Before flight to the moon, three of the five sites will be chosen for the specific mission. This will make a three-day period each month available for launching the prime Apollo flight.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER Houston 1, Texas
HU 3-5111

MSC 68-9
February 15, 1968

HOUSTON, TEXAS--The News Center operation for the Manned Spacecraft Center will be relocated from Building Six (6) in the Nassau Bay Office Complex to Building One (1) on site, effective February 19, 1968.

The News Center telephone number will remain the same (HU 3-5111), and the hours of operation will be from 8 a.m. to 5 p.m. daily.

News media representatives will have access to the MSC site, as in the past, by showing their news media badge to the guard on duty at the gate during regular working hours.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-11
February 28, 1968

HOUSTON, TEXAS--Delays in the normal test and checkout procedure in the Apollo 6 space vehicle being prepared for launch at the Kennedy Space Center have resulted in a slip of the launch date from March 21 to March 25.

The problems encountered, none of which are major, include such items as modifications to the spacecraft service module propulsion tanks, problems in flowing cryogenics in the spacecraft, replacing the inertial measurement unit (IMU) in the spacecraft guidance and control system, changing four of the eight actuators on the first stage outboard engines and resulting interactions with normal test activities.

No one item can be exclusively identified as being the major delaying factor, but the accumulative effect of the corrective actions results in being four days behind in the checkout schedule.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-12
February 29, 1968

HOUSTON, TEXAS--Ten scientist-astronauts completed the first phase of their training today and prepared to enter a year-long course to earn jet pilot wings.

The ten, selected last August, have completed the academic portion of the general astronaut training program. It consisted of courses in science and technology, and familiarization with spacecraft and space flight operations.

Two scientist-astronauts have been assigned to each of five Air Force bases where they will receive 53 weeks of flight training as members of regular student pilot classes.

Reporting March 21 are: Brian T. O'Leary, 28, and Robert A. R. Parker, 31, Williams Air Force Base, Chandler, Arizona; and Joseph P. Allen, 30, and Karl G. Henize, 41, Vance AFB, Enid, Oklahoma.

Reporting April 4 are: Philip K. Chapman, 32, and William E. Thornton, 38, Randolph AFB, San Antonio, Texas; John A. Llewellyn, 34, and F. Story Musgrave, 32, Reese AFB, Lubbock, Texas; and Anthony W. England, 25, and William B. Lenoir, 28, Laughlin AFB, Del Rio, Texas.

An eleventh scientist-astronaut selected last August, Donald L. Holmquest, 28, is completing an internship at Methodist Hospital, Houston.

Each of the ten will log 240 hours of flying during the course. The first 30 hours will be in the T-41A, a propeller-driven light plane. The next 90 hours will be flown in the T-37 jet trainer, and the last 120 hours will be in the supersonic T-38 jet trainer, the same aircraft they will fly after returning to MSC.

Several hundred hours of classroom work will cover navigation, weather, radar, aviation physiology, and other related subjects. In addition, the ten will participate in the physical fitness part of the course. The only classes they will not attend are those dealing in specialized military officer training.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

HU 3-5111

MSC 68-13
March 1, 1968, 2 p.m.

HOUSTON, TEXAS--Itinerary of President Johnson's visit to the Manned Spacecraft Center:

Arrive Ellington Air Force Base	3:40 p.m. CST
Depart Ellington Air Force Base	3:55 p.m. CST
Arrive MSC and tour Lunar Receiving Laboratory	4:05 p.m. CST
Tour Centrifuge	4:25 p.m. CST
Tour Docking Simulator	4:45 p.m. CST
Address Employees beside auditorium	4:50 p.m. CST
Depart Ellington Air Force Base	5:20 p.m. CST

The $8.5 million Lunar Receiving Laboratory was completed November 1967. It will house for a period of several weeks after each mission, crews returning from lunar missions. Initial analysis also will be done on samples returned from the moon in this building. Among other areas the President was to be shown the Vacuum Laboratory wherein the lunar samples will undergo their first examination.

While visiting the Lunar Receiving Laboratory, the President was to be given a demonstration of the latest configuration of space suits astronauts will wear in Apollo missions. This briefing was by Mr. Richard Johnston, Chief of the Crew Systems Division, Engineering and Development Directorate. The space-suited subject working with Mr. Johnston was John Mays, a suit technician.

At the centrifuge, the President was to watch the crew who will fly the second manned Apollo mission, go through a 9-G re-entry profile simulating conditions after a launch abort. The astronauts in the cabin were James McDivitt, David Scott, Russell Schweickart (see biographies). The centrifuge, largest of its kind in the world, cost $10.5 million and has been operational since February 1966.

-more-

At the docking simulator, the President was to watch Astronaut Neil Armstrong dock an Apollo Command Module simulator with a lunar module simulator. Briefing the President on the exercise was Mr. Warren North, Chief of the Flight Crew Support Division, Flight Crew Operations Directorate. The docking simulator cost about $1.5 million. It has been in use, first in a Gemini configuration, since 1965. It was reconfigured to Apollo in 1967.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-14
March 11, 1968

HOUSTON, TEXAS--Launch of the Apollo 6 mission is now scheduled for no earlier than March 28 from Cape Kennedy Florida, the NASA announced today.

The date was changed from March 25 to allow additional time for preparation of the unmanned Apollo spacecraft, which will be launched on the 363-foot Saturn V vehicle.

This will be the second test flight of the Saturn V. The first Saturn V mission, the successful flight of both the launch vehicle and the Apollo spacecraft, was carried out November 9, 1967.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

NASA

Houston 1, Texas

MSC 68-15
March 12, 1968

Houston, Texas -- Six students from the U. S. Grant High School in Oklahoma City are among the fifteen students from Texas and Oklahoma participating in the NASA-NSTA Youth Science Congress being conducted at the Manned Spacecraft Center, Houston, Texas, March 13-15.

The Houston conference, jointly sponsored by the National Aeronautics and Space Administration and the National Science Teachers Association, is one of twelve such regional congresses being conducted at NASA facilities throughout the United States this spring. During the congress at the Manned Spacecraft Center, participants will tour the Center facilities, engage in discussion sessions with fellow students and NASA scientists, and will attend a luncheon at the Center cafeteria where an astronaut will informally speak with them.

Participants of the Youth Science Congress will present an oral report on the scientific project or research-type project on which the trip to Houston was won. The U. S. Grant students are taught by Mr. Bradley Brauser, 1200 E. Main, Edmond. The students and their projects are:

Deborah Lynn Denton, 1107 S. W. 42nd Street, "The Effect of the Various Drugs and Surgical Procedures on Circadian Rhythm of Plasma Cortisol in Rats."

Arthur Dayle Hancock, 1432 S. W. 63rd Street, "Pair Production."

Sandra K. Hanger, 1517 S. W. 40th Street, "The Characteristics and Geological Significance of Liesegang Rings."

Martin Paul Hendren, 16 West Ranchwood Drive, "Effects of Radiation and Gravitational Force on Living Ova and Zygote."

Phyllis E. Shockley, 2232 S. W. 38th Street, "Learning of a Maze Habit by Sizmese Fighting Fish."

Linda E. Weed, 1432 Johnston Drive, "Particles Which Move Faster Than the Speed of Light."

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas

MSC 68-16
March 12, 1968

Houston, Texas --- Three students from Robert E. Lee High School in Houston are among the fifteen students from Texas and Oklahoma participating in the NASA-NSTA Youth Science Congress being conducted at the Manned Spacecraft Center, Houston, Texas, March 13-15.

The Houston conference, jointly sponsored by the National Aeronautics and Space Administration and the National Science Teachers Association, is one of twelve such regional congresses being conducted at NASA facilities throughout the United States this spring. During the congress at the Manned Spacecraft Center, participants will tour the Center facilities, engage in discussion sessions with fellow students and NASA scientists, and will attend a luncheon at the Center cafeteria where an astronaut will informally speak with them.

Participants of the Youth Science Congress will present an oral report on the scientific project or research-type project on which the trip to the Manned Spacecraft Center was won. The Robert E. Lee students are taught by Mr. Homa Hill, 4111 Wuthering Heights. The students and their projects are:

David S. Elder, 741 Rocky River, "Sea Anemones."

Randall F. Hafer, 6403 Redding Road, "The Effect of Extreme Temperature Change on the Killifish, *Fundulus heteroclitus*."

William B. Morefield, III, 6666 Chimney Rock Road, "Observations on a Crustacean Muscle."

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
MSC 68-17

March 12, 1968

Houston, Texas -- Two students from Enid High School, Enid, Oklahoma, are among the fifteen students from Texas and Oklahoma participating in the NASA-NSTA Youth Science Congress being conducted at the Manned Spacecraft Center, Houston, Texas, March 13-15.

The Houston conference, jointly sponsored by the National Aeronautics and Space Administration and the National Science Teachers Association, is one of twelve such regional congresses being conducted at NASA facilities throughout the United States this spring. During the congress at the Manned Spacecraft Center, participants will tour the Center facilities, engage in discussion sessions with fellow students and NASA scientists, and will attend a luncheon at the Center cafeteria where an astronaut will informally speak with them.

Participants of the Youth Science Congress will present an oral report on the scientific project or research-type project on which the trip to Houston was won. The Enid students and their projects are:

Kenneth Lee Jones, 1402 Munger Drive, "Development of a Two-Dimensional Ocean Wave Gauge for Surf Studies."

Marvin H. Kopp, 1609 East Cyprus, "The Effects of Dilantin on the Nervous System of Mice."

Mr. Nolen Harsh, 1311 West Cherokee, is Jones' teacher and Kopp is taught by Mr. Harold Duckett, 1610 East Cherokee.

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas

MSC 68-18

March 12, 1968

Houston, Texas --- Melvin Reeves Motal, 303 Newport Street, El Campo, Texas, a student at El Campo High School, is among the fifteen students from Texas and Oklahoma participating in the NASA-NSTA Youth Science Congress being conducted at the Manned Spacecraft Center, Houston, Texas, March 13-15.

The Houston conference, jointly sponsored by the National Aeronautics and Space Administration and the National Science Teachers Association, is one of twelve such regional congresses being conducted at NASA facilities throughout the United States this spring. During the congress at the Manned Spacecraft Center, participants will tour the Center facilities, engage in discussion sessions with fellow students and NASA scientists, and will attend a luncheon at the Center cafeteria where an astronaut will informally speak with them.

Participants of the Youth Science Congress will present an oral report on the scientific project or research-type project on which the trip to the Manned Spacecraft Center, Houston, was won.

Motal's teacher is Mr. Ed Springs, 801 Avenue F. His project is "Design, Construction, and Application of an Analog Computer for Determining Formation Boundary Orientation from Standard Dipmeter Curves."

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas

MSC 68-19

March 12, 1968

Houston, Texas --- Charles H. Bowden, 811 Utopia Road, a student at Highland High School, San Antonio, is mong the fifteen students from Texas and Oklahoma participating in the NASA-NSTA Youth Science Congress being conducted at the Manned Spacecraft Center, Houston, Texas, March 13-15.

The Houston conference, jointly sponsored by the National Aeronautics and Space Administration and the National Science Teachers Association, is one of twelve such regional congresses being conducted at NASA facilities throughout the United States this spring. During the congress at the Manned Spacecraft Center, participants will tour the Center facilities, engage in discussion sessions with fellow students and NASA scientists, and will attend a luncheon at the Center cafeteria where an astronaut will informally speak with them.

Participants of the Youth Science Congress will present an oral report on the scientific project or research-type project on which the trip to Houston was won.

Bowden's teacher is Miss Mary Lundeen, 3118 Elgin. His project is "Homeostatic Response of the Contractile Vacuole."

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

MSC 68-20

March 12, 1968

Houston, Texas -- Karen Ann Harbison, Ivan Star Route, Breckenridge, Texas, a student at Breckenridge High School, is among the fifteen students from Texas and Oklahoma participating in the NASA-NSTA Youth Science Congress being conducted at the Manned Spacecraft Center, Houston, Texas, March 13-15.

The Houston conference, jointly sponsored by the National Aeronautics and Space Administration and the National Science Teachers Association, is one of twelve such regional congresses being conducted at NASA facilities throughout the United States this spring. During the congress at the Manned Spacecraft Center, participants will tour the Center facilities, engage in discussion sessions with fellow students and NASA scientists, and will attend a luncheon at the Center cafeteria where an astronaut will informally speak with them.

Participants of the Youth Science Congress will present an oral report on the scientific project or research-type project on which the trip to Houston was won.

Harbison's teacher is Mrs. Inez E. Robinson of Breckenridge. Her project is "Relating Echinoderms Through a Systemic Analysis of Enzyme Patterns."

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

Houston 1, Texas

MSC 68-21

March 12, 1968

Houston, Texas -- Hannah I. Smith, 205 Worthy (Box 351), Saginaw, Texas, a student of W. E. Boswell High School, Saginaw, is among the fifteen students from Texas and Oklahoma participating in the NASA-NSTA Youth Science Congress being conducted at the Manned Spacecraft Center, Houston, Texas, March 13-15.

The Houston conference, jointly sponsored by the National Aeronautics and Space Administration and the National Science Teachers Association, is one of twelve such regional congresses being conducted at NASA facilities throughout the United States this spring. During the congress at the Manned Spacecraft Center, participants will tour the Center facilities, engage in discussion sessions with fellow students and NASA scientists, and will attend a luncheon at the Center cafeteria where an astronaut will informally speak with them.

Participants of the Youth Science Congress will present an oral report on the scientific project or research-type project on which the trip to the Manned Spacecraft Center, Houston, was won.

Smith's teacher is Mr. Arthur Wilcock, 713 Thersa Drive, Fort Worth, Texas. Her project is "Reactions to Anti-A and Anti-B Serum in Man and Animal Red Blood Cells."

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-22
March 14, 1968

HOUSTON, TEXAS--The Spacecraft for the first manned Apollo mission will use a launch pad cabin atmosphere of 60 per cent oxygen and 40 per cent nitrogen, rather than pure oxygen which will continue to be used in orbit, the National Aeronautics and Space Administration announced today.

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.

Astronauts 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 sixty/forty cabin atmosphere with pure oxygen.

More than 140 flammability tests conducted with a full-scale simulated spacecraft at NASA's Manned Spacecraft Center Houston 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 a new hatch for crew egress have been developed.

Tests were conducted in a pure oxygen atmosphere at pressures of six pounds per square inch encountered in space flight, 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.

-more-

In evaluating an atmosphere for pre-launch 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 per cent 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 per cent oxygen-40 per cent 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 systems 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 per cent 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 pre-launch phases the oxygen content in the mixture supplied to the spacecraft is accurately determined and continuously maintained and that the oxygen supply to the crew in their suits 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 on-board oxygen measuring instrumentation, the crew will close this valve.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

MSC 68-23
March 15, 1968

HOUSTON, TEXAS--Launch of the Apollo 6 mission from Kennedy Space Center, Florida, has been rescheduled from March 28 to April 1.

The delay is the result of the decision to replace helium check valves in the Apollo spacecraft service propulsion system. This work is expected to take about 80 hours.

The valves prevent propellants from backing into the helium tanks in the propellant feed system of the service propulsion system. Helium is used to pressurize the propellant tanks which feed fuel and oxidizer to the service propulsion system rocket engine.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-24
March 21, 1968

HOUSTON, TEXAS--The National Aeronautics and Space Administration has rescheduled its Apollo 6 launch from April 1 to April 3.

Reason for the 2-day slip in the unmanned Saturn V earth orbital mission is to change a quick-disconnect coupling in ground-support equipment. The mechanism is on the ground side of the valve through which liquid hydrogen is fed to the second stage (S-II) of the launch vehicle.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER Houston 1, Texas
HU 3-5111
MSC 68-25
March 21, 1968

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

Philip H. Whitbeck, MSC Director of Administration, announced Parker's appointment today. 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 Manned Spacecraft Center 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 Air Force Base, 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.

Parker received a Bachelor of Science degree from Louisiana State University in 1961 and a Master of Arts degree in Public Administration from the University of Oklahoma in 1967. He is a visiting professor in the Department of Political Science at the University of Oklahoma.

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1.	AP3	Mr. Gibbons
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PER TELEPHONE CONVERSATION	
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Per our phone conversation this date, regarding Mr. Whitbeck signing the announcement.

MAIL CODE	NAME	TEL. NO.	DATE
BP	Elizabeth Sadler	4358	3/19/68

KEY PERSONNEL ASSIGNMENT

Effective March 18, 1968, Mr. William A. Parker is assigned to the Office of the Director of Administration and appointed Manager of Center Support Planning and Control. Mr. Parker will serve as an assistant to the Director of Administration in areas of administrative operations.

Mr. Parker will be primarily responsible for policy formulation, planning, implementation, and control of the Center's support contract program. In this capacity, he will serve as the principal advisor to Center management and the focal point for direct liaison with NASA Headquarters in matters relating to support contracting. He is responsible for coordination and integration of the efforts of the Administration Directorate Divisions as well as other elements of the Center in the areas of support contract policy, implementation, and control. He will be delegated the authority to act for the Director of Administration in accomplishment of his responsibilities.

Mr. Parker will also be responsible for the program control function for the Administration Directorate requiring substantive, in-depth participation on his part into the operations organizationally under the Director of Administration.

Mr. Parker L. Carroll has been detailed to the position vacated by Mr. Parker and will serve as Acting Chief of the Procurement Division until further notice.

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[illegible] [illegible]beck

Philip H. Whitbeck
Director of Administration

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-26
March 25, 1968

HOUSTON, TEXAS--The NASA Manned Spacecraft Center announced Monday the award of a $929,000 contract to the University of California for the development and test of a prototype balloon flight system.

The system is scheduled for use in NASA sponsored High Altitude Particle Experiment (HAPPE) Program. Professor Luis W. Alvarez, of U of C's Space Science Laboratory, is the principal investigator with the scientists and engineers of MSC's Science and Applications Directorate, cooperating in the project.

The payload in this flight is 50 feet tall, 8 feet in diameter, weighs approximately 10,000 pounds, and will fly at an altitude of approximately 90,000 feet. Prime objective of HAPPE is to use naturally occuring radiation to investigate the interactions of elementary particles in the high energy domain. Prime element in the HAPPE payload is a cryogenic superconducting magnet which has an effective filed region of one meter in diameter, one and a half meters in length and a maximum magnetic field value of approximately 10 kilogauss.

After prototype testing 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 descent systems 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 implement the water recovery phase of the operation.

Three Apollo parachutes are being considered for the descent system.

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.

(more)

The prototype system will be launched from the Chico Municipal Airport, Chico, California. Recovery of the gondola is expected to be made in the Pacific Ocean, approximately 100 miles from the coast of California.

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NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

Houston 1, Texas

HU 3-5111

MSC 68-27
March 27, 1968

HOUSTON, TEXAS--The NASA Manned Spacecraft Center 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.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

MSC 68-28
April 3, 1968

HOUSTON, TEXAS--Eugene F. Kranz and Glynn S. Lunney have been designated as lead flight directors for the first two manned Apollo missions, Christopher C. Kraft, Jr., Director of Flight Operations, announced today.

Lunney will be the flight director for the first manned Apollo flight. He was a flight director for Gemini missions 9 through 12 and lead flight director on Apollo 201 and on Apollo 4, the first flight of the Saturn V.

Kranz will be the flight director for the second manned Apollo mission. He was a flight director on Gemini missions 4 through 9 and directed the Apollo 5 mission, the flight of the first lunar module.

The appointment of three new flight directors for the Apollo program was also announced by Kraft. The longer and more complex Apollo missions of the future will require more advance planning involving the flight director, and the duty of flight directing will become more of a full time job, Kraft explained.

Named were M. P. (Pete) Frank, Gerald D. Griffin, and Milton L. Windler. The three new flight directors will be assigned to the staff of John D. Hodge, Chief, Flight Control Division.

The new flight directors are all from divisions in the Flight Operations Directorate, and each will be relieved of his current duties for the new assignment.

Frank, 37, was born in Bryan, Texas. He was graduated from the University of Texas with a BS degree in aero engineering and received a MS degree in mechanical engineering from the Drexel Institute of Technology in Philadelphia. He joined NASA in October 1962. He is married to the former Barbara Rumph of Ft. Valley, Georgia and the couple has two children and reside in La Porte, Texas. His current assignment at MSC is Chief, Lunar Mission Analysis Branch, Mission Planning and Analysis Division.

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Griffin, 33, was born in Athens, Texas, and was graduated from Texas A&M University with a BS degree in aeronautical engineering. He joined NASA in June 1964. He is married to the former Sandra Jo Huber of Brownwood, Texas, and the couple has two children and reside in Nassau Bay across from the Center. His current assignment at MSC is Assistant Chief, Command and Service Module Systems Branch, Flight Control Division.

Windler, 36, was born in Hampton, Virginia, and was graduated from Virginia Polytechnic Institute with a BS degree in aeronautical engineering. He joined NACA (NASA's predecessor) in June 1954, and except for a tour of duty with the Air Force from February 1955 to December 1958 has been with NASA. He is married to the former Betty Selby of Sherman, Texas, and the couple has three children and reside in Friendswood, Texas. His current assignment at MSC is Chief, Operational Test Branch, Landing and Recovery Division.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-29
April 3, 1968

HOUSTON, TEXAS--The National Aeronautics and Space Administration and the U.S. Navy are conducting a feasibility study of using specialized equipment in recording the "sea state" of the North Atlantic.

The survey, which is being carried out by a NASA aircraft equipped with scientific equipment, is to determine if the concept of airborne "sea state" sensing with radar scatterometer is feasible. The aircraft, a converted Lockheed Electra, will be flying over the North Atlantic for the next two weeks collecting data on the roughness of seas in excess of 15 feet. Previous test missions flown from Newfoundland indicate this equipment is successful in recording seas of 13 feet and less.

This oceanography mission is a portion of the Earth Resources Aircraft Survey Program being performed by the NASA Manned Spacecraft Center, Houston, Texas. The Spacecraft Oceanographic Project Office of the Navy's Oceanographic Office, New York University and the University of Kansas are working together on this project.

Prime purpose of the mission is to determine if the scientific equipment aboard the aircraft might have a possible space application. Continuous global monitoring of sea state conditions, through a satellite system, might enable safer routing of marine surface vessels.

The survey aircraft, which is based at Keflavik, Iceland, will fly within a triangular-shaped area bounded by Keflavik, Iceland, and the oceanographic vessels "Alpha" and "Item". The "Alpha" is positioned southwest of Keflavik and the "Item" is southeast.

Approximately 20 personnel from the NASA, the Navy and the two participating Universities will be working on the mission which is scheduled to be completed by April 15. The NASA Aircraft, equipped with a radar scatterometer and an assortment of cameras, will fly at an altitude of 10,000 feet

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(at 290 MPH) approximately 500 nautical miles over the test area.

Date collected during the two week mission will be returned to the NASA Manned Spacecraft Center in Houston, where it will be reduced and processed for scientific analysis.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER Houston 1, Texas
MSC 68-30
HU 3-5111 April 9, 1968

HOUSTON, TEXAS--Evaluation of preliminary data indicates that the spacecraft successfully accomplished the Apollo 6 mission on April 4.

Although an alternate mission was selected because of Saturn V launch vehicle problems which prevented achievement of some major objectives, spacecraft accomplishments were impressive, engineers reported today after studying preliminary data. The evaluation will continue for several weeks, and early results are subject to change, but it is obvious that spacecraft systems survived severe tests in good condition, engineers said.

Major accomplishments include:

-- The longest single inflight burn of the service propulsion system, seven minutes, 25 seconds, which exceeds the most severe requirement on a lunar mission.

-- The guidance and navigation system controlled the long burn perfectly, guided the spacecraft to the proper apogee, and early evidence indicates the system worked well during entry.

-- The reaction control system held the spacecraft in proper attitude, including during the long cold soak period.

-- Spacecraft heat protection was demonstrated again. Even though entry velocity was not as great as originally planned, the value reached exceeded earth orbital entry velocity by a considerable margin.

-- The new unified crew hatch and seals withstood the mission in good condition.

-- The fuel cells performed well despite a long storage period and considerable open-circuit operation during preflight activities.

Some relatively minor problems were found, but they did not affect the course of the mission.

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Shortly after the three-hour mark in the mission, the essential electrical load automatically transferred from ac bus 1 to ac bus 2. Preliminary information does not provide the reason, and it is still under investigation.

Telemetry data became erratic for several minutes during the launch phase, so that further data are required to verify the emergency detection system sequence during operation of the second and third stages of the launch vehicle. In general, the instrumentation system performed satisfactorily, and data show the EDS operated properly during liftoff and first stage thrusting.

About two minutes after liftoff, vibrations, accelerations and outrigger strains indicated an unexpected change in LTA-2R dynamic characteristics. This may have been an instrumentation problem and thus not a significant event. The test article was flown in place of a lunar module.

Entry velocity was about 4,000 feet per second less than planned (36,500), but the velocity that was achieved (32,776) was midway between the entry velocities of command module 017 on the Apollo 4 mission (36,545) and command module 011 on the Apollo/Saturn 202 mission (28,512). Engineers deem this a valuable point in the overall evaluation of the heat shield characteristics and entry guidance performance.

After the launch vehicle's third stage failed to fire for the simulated translunar injection, the SPS was used to achieve the desired spacecraft apogee. The SPS was fired continuously for seven minutes, 25 seconds under guidance and navigation control, and the engine operated normally throughout the burn. It was the longest single SPS inflight firing to date and demonstrated the capability of the system to accomplish the burn necessary to take the Apollo spacecraft out of a translunar trajectory and place it into an orbit around the moon.

A second firing of the SPS was inhibited because not enough of the desired velocity change could have been gained with the propellant remaining after the long burn.

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The six-hour cold soak was accomplished as planned to achieve minimum temperature of the command module ablator before entry. Minimum at the ablator bondline was approximately -80 degrees F, indicating that the pre-set cold soak attitude was correctly maintained.

Charring of the heat shield was similar to that seen on the Apollo 4 spacecraft. Figures on charring and entry temperatures are not yet available. The extravehicular activity handles and the sea anchor attach point were in essentially preflight condition.

The unified crew hatch and seals were in good condition, and the opening mechanism operated properly. No structural damage was found during the initial visual observation of the spacecraft. The windows appeared relatively clean, with condensation on the inside of the heat shield panes.

Performance of the environmental control system was satisfactory. Cabin pressure stabilized at about six pounds per square inch after cabin pressure relief valves seated at $8\frac{1}{2}$ minutes into the mission. Pressure decayed to 5.8 psia prior to entry, indicating that the cabin leakage rate was negligible.

No attempt was made to control cabin temperature, and the control valves were set at the full cold position. The average cabin temperature remained at 64 degrees F until start of the cold soak period and decreased to 56 degrees F prior to entry.

Fuel cell performance compared favorably with Apollo 4 data and preflight predictions. All fuel cells performed properly after having been stored for approximately two years and after having been operated in an open-circuit condition for an extended time during launch preparations. The fuel cells maintained dc bus voltages between 27.5 and 29.5 throughout the flight. The ac bus voltages were maintained within 114 to 117. The cryogenic system functioned satisfactorily.

Performance of the stabilization and control system and the mission control programmer was nominal throughout the mission.

Recovery forces reported that all drogue and pilot parachute mortars and main parachute disconnects functioned. The main parachutes were sighted in the water, but sank before they could be recovered. The command module was upright when first sighted; however, it may initially have floated upside down, and then righted itself automatically, since the uprighting bags were deployed. Normally, the bags do not function unless the command module is floating inverted.

All recovery aids were deployed and operating. The high frequency antenna was bent,and the HF signal was weak. However, there are no plans to use the HF recovery beacon on manned flights.

Spacecraft landing point was estimated to be 27 degrees 40 minutes North, 157 degrees 55 minutes West, about 50 miles from the onboard targeted landing point. Retrieval coordinates were 27 degrees 38 minutes North, 158 degrees 00 minutes West. Sea conditions were moderate to rough.

Figures on entry heating, lift-to-drag ratio and G forces are not yet available.

Both onboard cameras functioned well. The 70 mm Maurer still camera exposed more than 750 frames and returned exceptional photographs of the earth. The 16 mm Millikan motion picture camera captured the fiery entry into the earth's atmosphere in vivid color. The Millikan camera exposed about 700 feet of film.

All times in the tables which follow are referenced to range zero, the integral second before lift-off. Range zero was 07:00:01 EST. Lift-off was at 07:00:01.5 EST.

SEQUENCE OF EVENTS

	Planned	Actual
Third stage reignition command	03:10:09.4	03:13:35
Third stage engine cutoff command	03:15:36.7	03:13:50
Spacecraft/third stage separation	03:18.38.6	03:14:28.8
SPS ignition	03:20:16.9	03:16:06
SPS cutoff	03:24:30.9	03:23:31
Apogee	06:21:57.5	06:28:57
SPS ignition	09:22:13.8	None
SPS cutoff	09:25:22.3	None
CM/SM separation	09:27:54	09:37:05
400,000 feet altitude	09:29:24	09:38:34
Begin blackout	09:29:49	09:38:59
End blackout	09:39:15	09:48:25
Drogue parachute deployment	09:43:34	09:52:44
Main parachute deployment	09:44:23	09:53:24
Landing	09:49:45	09:58:44

TRAJECTORY PARAMETERS

Orbital Insertion	Planned	Actual
Time	00:10:58.6	00:12:38
Altitude, nautical miles	103.4	100.9
Velocity, ft/sec	25,561	25,743
SPS Ignition		
Time		03:16:06
Altitude, nautical miles		103.6
Velocity, ft/sec		25,743
SPS Cutoff		
Time		03:23:31
Altitude, nautical miles		279
Velocity, ft/sec		31,630
Apogee		
Time		06:28:57
Altitude, nautical miles		12,019.6
Velocity, ft/sec		7,403
Entry Interface		
Time		09:38:24
Altitude, feet		400,000
Velocity, ft/sec		32,776
Space-fixed flight path angle, degrees		-5.94

ORBITAL ELEMENTS

PHASE	CONDITION	PLANNED	ACTUAL
Initial Parking Orbit	Apogee, nm	106	196
	Perigee, nm	101	96
	Period, minutes	88.28	90.00
Parking Orbit at Third Stage Reignition Attempt (after third stage venting)	Apogee, nm	111	200
	Perigee, nm	106	100
	Period, minutes	88.47	90.13
Coast Ellipse	Apogee, nm	12,013	12,019
	Perigee, nm	18	18
	Period, minutes	384.4	384.8

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RECOVERY

Mission Elapsed Time Hours:minutes	Event
09:38	S-band contact by recovery aircraft
09:53	VHF contact by recovery aircraft
09:58	Radar contact by USS Okinawa
10:29	Visual sighting by recovery aircraft
11:43	Flotation collar installed and inflated
15:55	Spacecraft aboard USS Okinawa

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Released by NASA Headquarters, Kennedy Space Center, and Marshall Space Flight Center -- April 11, 1968.

Early evaluations of the data on the April 4 launch of the second Saturn V vehicle provides further information relating to the propulsion troubles in the two upper stages, but has not yet revealed the basic source of the difficulties.

Despite propulsion problems, the Saturn V succeeded in placing a total of more than 264,000 pounds into earth orbit. The vehicle was launched at 7 a.m. EST from the Kennedy Space Center.

Preliminary results of the flight were contained in an early report issued by the NASA Marshall Space Flight Center, in charge of Saturn development.

Second stage engines 2 and 3 cutoff prematurely at 408.7 and 410 seconds after liftoff, respectively, causing a 58-second longer than normal second stage burn and larger than expected deviations from second stage (S-II) flight end conditions.

One candidate cause for the two engines cutoff was the responsibility of the S-II aft interstage having struck the engines when it was jettisoned at second plane separation. Onboard camera film recovered after the launch ruled out this possibility by showing a normal and smooth separation.

First burn of the third stage (S-IVB) was 29.2 seconds longer than planned to compensate for the early cutoff of the two second stage engines. The result was a high cutoff velocity and an elliptical parking orbit. The attainment of this orbit was a demonstration of the unusual flexibility designed into the Saturn V.

All engine and stage restart conditions appeared normal, but the S-IVB's J-2 engine did not restart in orbit. The restart was to have propelled the S-IVB and Apollo spacecraft into a simulated translunar trajectory.

Evaluation of early data indicated that the first stage (S1C) performed as planned. Stage thrust was essentially the same as predicted during the first portion of the flight.

The data indicated satisfactory S-II performance through first stage boost, S-II ignition and the early portion of the S-II powered flight.

The earliest observed deviations were decreasing temperatures on the main oxydizer valve and its control line on engine 5 and a steady increase in engine 2 yaw actuator pressure, occuring at 278.4 seconds.

Several engine parameters indicated a sudden 5,000 pound thrust decrease in engine 2 at 318.4 seconds. At the same time there was a sudden increase in pressure in both pitch and yaw actuators.

Analysis of the data indicated the cutoff signal from engine 2 caused the number 3 engine to shut down by incorrectly closing the engine 3 liquid oxygen prevalve. It is possible that wires carrying cutoff commands to the number 2 and 3 engines were interchanged.

Quick look data indicates that the third stage performed satisfactorily through first burn and orbital coast. Shortly after orbit insertion a cold helium supply leak was observed but bottle pressure was sufficient to meet second burn requirements.

Even though normal engine and stage prestart conditions were observed, the engine received the start signal and the engine valves opened properly, the engine did not restart.

The initial study of data relating to the S-IVB reignition problem suggest that there may have been a leak in one of the two propellant lines-- probably fuel leading to the J-2 engine's augmented spark igniter (ASI). If that was the case, the propellants reaching the spark plugs were probably insufficient, or inadequate in mixture, to achieve the proper start conditions.

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Hydraulic system performance was satisfactory on the first stage. It was satisfactory on the second stage until about 140 seconds before premature shutdown of the two engines. At this time there was an increase in the yaw and pitch actuator differential pressures.

Third stage hydraulic systems performance was normal thru first burn. Shortly before spacecraft separation, a programmed command to initiate the auxillary hydraulic pump was given but the pump failed to operate. Ground commands after spacecraft separation also failed to start the systems. Pump operation was not a requirement for engine restart.

A longitudinal oscillation of the vehicle, measured at 5 cycles per second, was experienced during the later portion of the SIC stage burn. This phenomenon was also recorded on the first Saturn V flight, but it was greater on AS 502. Investigations are also continuing in this area.

Guidance and other instrumentation unit functions were satisfactory. Flight profile was nominal up to the loss of engine 2 on the second stage. At second stage cutoff, the altitude was high and velocity was low. This led to a longer burn of the third stage and a slightly higher velocity than normal, causing the third stage and spacecraft to go into an elliptical orbit.

Preliminary inspection of the telemetry record indicates that few measurements failed. There were 29 measurements waived prior to launch, 9 known failures and 19 questionable measurements. Telemetry performance was good on all lengths. Some 2,800 measurements were planned originally.

Onboard television cameras gave good data. Only two of the six onboard film cameras have been recovered. The two cameras recovered viewed the separation of the first and second stages.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas

HU3-5111

MSC 68-31
April 9, 1968

HOUSTON, TEXAS..

Spacecraft 2TV-1 service module arrived at the Manned Spacecraft Center this week with the command module to be delivered soon for a series of manned thermal vacuum tests which will help verify that the Apollo Spacecraft is ready for its first manned flight.

One of the many people who assisted in readying 2TV-1 for its coming test program was Marion Lusk, a systems engineer for MSC's Space Environment Simulation Laboratory. Lusk was recently commended by Apollo Spacecraft Program Manager George M. Low for a suggestion credited with avoiding a delay of a week or more in the delivery of the test vehicle to MSC.

Lusk was assisting in the final checkout of 2TV-1 at the North American Rockwell facility at Downey, California late in March when a water glycol leak was discovered in a valve seal of the spacecraft environmental control unit. The normal procedure would have been to remove the environmental control unit and repair the seal. This would have caused at least a week's delay.

Lusk suggested cutting out the section of the ECU control panel with the leaking valve, replacing the faulty seal and re-installing the panel section with its repaired valve.

This somewhat unique approach was tried and was proved successful in subsequent testing. William Bergen, President of NR's Space Division, called attention to Lusk's contribution to the Apollo Program in a letter to Low pointing out that as a result of Lusk's suggestion the leak was repaired and tested the day after it was discovered.

Low offered his personal congratulations to Lusk for what he called "a very significant contribution to the Apollo Program" and one that "is very much appreciated."

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-32
April 23, 1968

HOUSTON, TEXAS--Scientist-Astronaut Brian T. O'Leary has withdrawn from NASA's astronaut training program because, he says, "Flying just isn't my cup of tea."

The 28-year-old Boston native who holds a doctorate in astronomy has been learning to fly for the past month at Williams Air Force Base, Chandler, Arizona. He and 10 other civilian scientist-astronaut candidates comprised the most recent group to join the astronaut corps at Houston's Manned Spacecraft Center in August 1967.

Dr. O'Leary soloed and had about 15 hours of flying time when yesterday he advised his NASA superiors in Houston and Air Force authorities at Williams AFB that he had decided to drop out of the program in order to pursue a career in planetary research.

"It is true," Dr. O'Leary said in a letter to friends, "that in my present youth.....I might be overlooking a promising opportunity to conduct planetary research either from earth orbit or in situ (on location) 10 to 15 years hence.

"But meanwhile I will be in an age range in which a scientist performs his most productive and creative research." Also, he said, "the recent budgetary delays are disappointing."

In the letter, he went on to emphasize the key point on which his decision turned--flying. "In spite of the problems cited, I was still reasonably content to stay with the program and let my attitude depend on my reaction to flying. Somewhat to my surprise, I found I just don't care for it."

"Finally," he said, "I want to make it clear that while I am leaving the astronaut program, I am not leaving the space program. I think I can better serve that effort as a full-time researcher in planetary astronomy."

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MSC Director of Flight Crew Operations Donald K. Slayton said NASA would work with Dr. O'Leary in trying to find the proper slot for him.

Dr. O'Leary got a bachelor's degree in physics from Williams College, a master's in astronomy from Georgetown University and a doctorate from the University of California at Berkeley in 1967.

He is the fourth astronaut to resign. The others were Col. John Glenn, Cmdr. Scott Carpenter and Dr. Duane Graveline. His resignation leaves 54 astronauts active in the program.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-33
May 3, 1968

RELEASED BY NASA HEADQUARTERS

HOUSTON, TEXAS--The National Aeronautics and Space Administration has completed contract negotiations with the Boeing Company, Seattle, Washington, for technical integration and evaluation in support of the Apollo Program. This agreement covers work which Boeing initiated under a NASA letter contract issued last June 15.

Total value of the work under the cost-plus-fixed-fee agreement through December 31, 1968, is $73 million. The contract may be extended as necessary.

Under the contract, Boeing will assist and support the NASA Headquarters and the manned space flight centers.

The company will supply technical analysis and evaluation which assists NASA in arriving at technical decisions involving Apollo systems engineering, space vehicle integration, and flight readiness. Boeing has rendered this type support for Apollo 4, 5 and 6 flights.

Tasks under this agreement group into engineering evaluation, configuration management, production planning and scheduling, and readiness review.

Boeing analyses and evaluations are generally based upon data developed by NASA and other Apollo contractors.

The new agreement is in addition to Boeing's previously contracted Saturn V work which includes engineering, construction and test of the Saturn V first stage booster; support of assembly and system integration of the vehicle's second and third stages with the first; and design engineering support of certain ground support equipment at the Kennedy Space Center in Florida.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER Houston 1, Texas
HU 3-5111

MSC 68-34
May 10, 1968

HOUSTON, TEXAS -- The National Aeronautics and Space Administration announced the award of $301,000 contract to the David Clark & Co., Worcester, Mass., for the design of a new Apollo soft suit.

The contract calls for the design, development and delivery of a prototype intravehicular pressure suit for test and evaluation for possible use by an Apollo crewman in the command module. The NASA Manned Spacecraft Center, Houston, Texas awarded the contract to Clark , supplier of the pressure suits worn by Gemini astronauts, following non-competitive sole-source negotiations.

The Crew System Division of MSC is asking Clark to design a light-weight suit that will be less bulky than the one presently scheduled for use by Apollo astronauts who will perform lunar surface and extravehicular activities. In many ways the new suit concept is similar to the soft suit worn by Astronauts Frank Borman and James Lovell during their 14-day Gemini VII mission, December 4-18, 1965.

Specifications call for the suit, a hybrid of the Apollo and Gemini pressure garments, not to exceed 20 pounds, to interface with existing suit hardware and interface with the couches in the command module.

Considerations are for the garment to be worn only in the command module during launch and reentry and for intravehicular utilization. The present Apollo extravehicular garment (manufactured by International Latex Corporation, Dover, Del.) will be worn during EVA portions of Apollo.

The new suit utilizes all safety requirements incorporated into the Apollo garments following the fatal spacecraft fire in January 1967. Such items as teflon-coated Beta fiber and aluminized kapton are among the many changes.

Delivery of the first prototype soft suit is scheduled for June 1968. It will be considered as a backup only to the current intravehicular suit made by ILC.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-35
May 14, 1968

HOUSTON, TEXAS--Reassignment of three Manned Spacecraft Center officals aimed at closer coordination of advanced lunar exploration planning and strengthening of the Center's system testing activities was announced today by Dr. Robert R. Gilruth, Center Director.

John Hodge, Flight Control Division chief, has been assigned as Director of a newly-established Lunar Exploration Working Group. Eugene F. Kranz, deputy chief, Flight Control Division, will serve as acting chief.

Aleck C. Bond, Manager of the Reliability and Quality Assurance Office and the Flight Safety Office, has been reassigned, effective June 1, 1968, as Manager, Systems Test and Evaluation, Engineering and Development Directorate.

Martin L. Raines, Manager, White Sands Test Facility, will become acting manager of the Reliability and Quality Assurance Office and the Flight Safety Office, in addition to his White Sands assignment.

Dr. Gilruth said that the Lunar Exploration Working Group will be responsible for planning, coordinating and directing all aspects of the Lunar Exploration Program at MSC.

As Director of the group, Hodge will be responsible for coordination and direction of all MSC activities relating to lunar exploration and representing MSC with the Apollo Lunar Exploration Office in the Office of Manned Space Flight, NASA Headquarters, and other groups outside MSC involved in the Lunar Exploration Program.

The group will be charged with reviewing and coordinating all Center activities which support future missions, including advanced technology, experiment definition and other related activities.

Dr. Gilruth said other members of the Lunar Exploration Working Group will be named at a later date.

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The reassignment of Bond to his former position in the Engineering and Development Directorate is to enable him to assist Dr. Maxime Faget, E&D Director, in planning, directing and managing the very large volume of test activity carried out by the directorate, Dr. Gilruth said. This activity is now at its peak in the Apollo Program, Dr. Gilruth pointed out.

Raines' assignment as acting chief of the Reliability and Quality Assurance Office and the Flight Safety Office recognizes the value in that position of Raines' experience during the past six months as a member of a special team headed by Dr. Eberhard Rees of Marshall Space Flight Center, which has been assisting George M. Low, Manager, Apollo Spacecraft Program, with manufacturing problems arising in that program.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-36
May 21, 1968

HOUSTON, TEXAS---The National Aeronautics and Space Administration has signed supplemental agreements with the Grumman Aircraft Engineering Corporation valued at approximately $161,124,000 for changes in the Apollo Lunar Module contract.

The agreements formally incorporate into the Grumman contract some 250 changes previously authorized by NASA for modifications to flight and ground-test hardware, test programs, documentation procedures and mission requirements. They include changes recommended by the Apollo 204 Review Board to make the vehicle more fire-resistant, and they cover increased personnel costs resulting from program delays following last year's spacecraft fire at Cape Kennedy.

The supplemental agreements also modify the basis for determining fee in the cost-plus-incentive-fee contract, giving more weight to the quality of contractor performance as evidenced by flight results and placing less emphasis on delivery schedules.

The modifications bring the total estimated value of the Grumman contract since January, 1963, to $1,580,000,000.

Grumman performs the majority of work on the Lunar Module contract at its Bethpage, New York facility with support from its field offices in Houston, White Sands and at the Kennedy Space Center.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-37
May 22, 1968

HOUSTON, TEXAS--A rocket probe is scheduled for launching over the South Atlantic from Natal, Brazil on June 10 to obtain data useful to scientists in studying the dynamics of the inner radiation (Van Allen) belt. The project is a cooperative effort of the National Aeronautics and Space Administration and the Brazilian National Space Commission (CNAE). The information obtained by the probe should also be useful in safeguarding astronauts in relatively low altitude missions in the vicinity of the radiation belts.

The project, known as the South Atlantic anomaly probe, will be carried out by CNAE scientists and technicians from the Barreira do Inferno range near Natal, with launching services being provided by Brazilian Ministry of Aeronautics crews. The project takes its name from a region over the South Atlantic where the radiation belts come uniquely close to the earth's surface.

Launch vehicle for the probe is the Canadian manufactured Black Brant IV, a two-stage, solid propellant rocket designed for scientific soundings of the upper atmosphere and the near space environment. The 37-foot-tall Black Brant will boost the payload to an altitude of 535 nautical miles above the South Atlantic.

The experiment package, which weighs approximately 80 pounds, consists of magnetometers for magnetic field measurements, five-channel electron spectrometer for defining the electron flux of the anomaly, three ion chambers for radiation dose measurements and a heavy ion detector.

Measurements within the anomaly will begin when the rocket reaches 360,000 feet at 50 seconds into the flight. The experiment package will transmit data to ground stations at Barreira do Inferno range. Data will be collected by the Brazilian team on magnetic tapes for evaluation by the NASA Manned Spacecraft Center (MSC), Houston, Texas which is managing the program for NASA.

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MSC 68-37
May 22, 1968

The second stage of the Black Brant IV is scheduled to land in the ocean 200 miles downrange from the launch site. It is not planned to recover the instrument package.

Launch window is from June 10-18 based on the correct position of the Moon for the lunar aspect (sensor) device aboard the rocket.

Under the cooperative agreement, MSC's Space Physics Division, of the Science and Applications Directorate, which designed and fabricated the experiment instrumentation, is directing the program. The Sounding Rocket Branch of NASA's Goddard Space Flight Center, Greenbelt, Maryland, is assisting in the launch and data recovery. For Brazil, the CNAE is providing overall management direction and scientific coordination and the Brazilian Ministry of Aeronautics is carrying out launching and data recovery operations.

The Black Brant is manufactured by Bristol Aerospace Limited, Winnipeg, Canada. In addition to furnishing the rockets and related hardware, Bristol is responsible for the training of Brazilian launch crews at Natal.

Subsequent flights are planned to obtain similar data in the future.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-38
May 24, 1968

HOUSTON, TEXAS--Astronaut James Irwin and Gerald Gibbons, a Grumman Aircraft Engineering Corporation pilot, are scheduled to simulate the first manned flight of an Apollo Lunar Module in a large vacuum chamber at the Manned Spacecraft Center beginning Monday, May 27.

The test is to help verify that the LM is ready for its first manned flight in earth-orbit late this year. Subsequent testing at MSC will check out the vehicle for its primary mission--landing two astronauts on the surface of the moon and returning them to an orbiting command module.

Irwin and Gibbons will man LTA-8 a total of four times under simulated space conditions in Chamber B. The first manning May 27 is expected to last about 12 hours with the crew entering and leaving the spacecraft in their pressurized spacesuits under vacuum conditions.

Irwin and Gibbons will perform many of the same functions aboard the test spacecraft on the ground that astronauts will perform in flights around earth and in landing on the moon. During the first manning the crew will activate and checkout the spacecraft systems while test conductors monitor vehicle and crew performance through electronic sensors and closed circuit television. Irwin and Gibbons will also simulate a firing of the LM's 10,000 pound thrust descent engine in their first manning, carrying out all functions except actual engine ignition.

In three subsequent mannings over a two-week period Irwin and Gibbons will simulate other engine ignitions and maneuvers with the LM which future astronauts will perform in Lunar landings and flights in earth orbit.

The primary purpose of LTA-8 thermal-vacuum testing is to verify that the Lunar Module design provides an adequate thermal environment for crewmen and equipment in the simulated vacuum and temperature extremes of space.

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Chamber B will be pumped down to an atmosphere the same as would be encountered about 80 miles above earth, and its walls will be cooled with liquid nitrogen at a temperature of about 350 degrees below zero farenheit to simulate the cold of space. Electric heater elements attached to the surface of the LM simulate heating from the sun and engine firings.

Although LTA-8 was never intended to fly, it is built of the same materials and contains nearly all of the same flight qualified equipment as will be carried aboard the first Lunar Module to be flown by astronauts in earth orbit. The vehicle is not equipped with flight-type engines and attitude control thrusters since these engines cannot be fired in the vacuum chamber. Its propellant tanks are filled with a simulated propellant (freon), and it is much more heavily instrumented than it would be for space flight. To crewmen Irwin and Gibbons, however, LTA-8 will look and perform very much like a flight LM. The test craft contains all of the crew equipment and displays that will be used by astronauts on future flights, including space food which Irwin and Gibbons will have for lunch during their day in the vehicle. In addition, the crewmen will wear the latest model Apollo spacesuit for the test.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-39
May 31, 1968

HOUSTON, TEXAS--A four-day course in life support training for pilots was compacted into two days of rigorous sessions for sixteen astronauts and five other Manned Spacecraft Center people at Perrin Air Force Base Monday and Tuesday of this week.

The course, conducted by the Air Defense Command life support school near Sherman, Texas, was oriented toward surviving, without serious injury, an emergency ejection from a high performance aircraft.

The training included classroom sessions, demonstrations, participation in simulated emergency conditions connected with ejection from aircraft, and parasailing over the waters of Lake Texhoma.

Astronauts taking part in the training were from the fourth and fifth groups selected for the space program, the first group of scientists and the last group of pilots selected.

Classroom sessions included a briefing on equipment issued for the training, the will to survive, pre/post ejection procedures, personal/survival equipment, and rescue procedures and self aid.

Techniques on how to get loose from the parachute after it is no longer needed and the proper procedures to follow in ejecting from the aircraft, preceded simulated ejection training from a tower. A simulated ejection, including sound effects, was followed by jerky plunging rides down a cableway from a 35-foot tower for about a five-second ride that ended in an abrupt swinging twisting halt and then release from the parachute harness. Each man took four rides on this simulator and during the short descent was required to do a simulated check of his canopy, release and deploy his survival pack, and open the safety covers over the two parachute releases in order to be prepared for landing after a low altitude aircraft ejection.

-more-

Helicopter-hoist training was used as the means of getting the trainees to the top of the jump tower for the simulated ejection training.

Sessions on other trainers included procedures and demonstrations on how to steer a parachute for a landing site, the proper way to fall when hitting the ground at various angles and the use of a tree-letdown device while suspended from the parachute harness.

In another session, each trainee was dragged on the ground in various positions by a full parachute canopy billowed by a wind machine that produced 30 to 60 mph winds. The subject was required to release at least one of his chute attach points in order to collapse the canopy.

The trainees were also required to make jumps forward and backward, from a platform on a moving boat, into the water with their parachute harness attached to straps on the rear of the boat. The subjects were then dragged through the water on their backs or face down until they were able to activate the parachute releases. Boats were in the water to pick up the wet remains of the trainees.

The above training filled out the first day of activities and on the second day parasail training occupied most of the time.

Launching of the trainees on a parasail was from the shore of the lake on an 800 foot tow rope attached to a power boat. Altitudes of up to 400 feet were reached by the trainees before their descent and splash into the lake and pickup by boat.

The final parasail ride of each trainee was with a survival pack. They were required to deploy packs while airborne and after landing, get into one-man rafts and paddle ashore.

Astronauts taking the training at Perrin were Vance Brand, Gerald Carr, Joe Engle, Ronald Evans, Owen Garriott, Edward Gibson, Don Lind, Jack Lousma, Thomas Mattingly, Bruce McCandless, F. Curtis Michel, Edgar Mitchell, William Pogue, Stuart Roosa, Paul Weitz, and Alfred Worden.

Others from MSC taking the training were Conway Roberts and Lawrence Gaventa, staff pilots; Donald White, flight engineer and quality control inspector for MSC aircraft; Jerald Rackley, parachute and personal equipment specialist; and Dr. Clarence Jernigan, who rides as a passenger in aircraft with astronauts.

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NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

Houston 1, Texas

HU 3-5111

MSC 68-40
May 31, 1968

HOUSTON, TEXAS--Ninety area youths will be provided summer employment by the Manned Spacecraft Center through the Job Fair program, which was conducted recently in Houston.

Most of the jobs will be in the clerical field in offices throughout the Center. Five of the young men in the program will be assigned to a junior apprentice program, on basic shop practices, in the Technical Services Division.

To coordinate the activities of the Job Fair employees at MSC, Mrs. Erma Evans, a teacher from M. C. Williams High School in Houston has been hired for the summer months.

In addition to this new program, MSC has four other programs providing employment and/or training to about one hundred economically deprived young people of high school and college age.

These programs are: The Junior Student Trainee Program; Job Opportunity for Youth (JOY); Vocational Office Education Program (VOE); and Back-to-School Youth Opportunity Campaign (YOC). All five programs are administered under the direction of Stanley Goldstein, Chief, Employee Development Branch of the MSC Personnel Division.

"These four programs, plus the Job Fair, constitute MSC's efforts toward an active, balanced approach cf placing economically disadvantaged youth," Goldstein said.

Twelve youths are in the Junior/Student Trainee Program. It is designed to provide meaningful work experience and compensation to selected minority high school graduates to enable them to begin college careers,Goldstein stated. This program, in its fourth year, also encourages and provides an opportunity for promising high school graduates to participate in the MSC Cooperative Education Program for college students.

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The Job Opportunites for Youth (JOY) program is now in its second year at MSC, and is providing useful work experience for fifty previously unemployed high school dropouts from low income families, according to Goldstein. The JOY program's purpose is to motivate and prepare these young men and women to obtain regular gainful employment. This is done through work experience, academic (classroom) training and guidance counseling.

The Vocational Office Education (VOE) program is conducted at MSC in cooperation with the Houston Independent School District. The program is in its second year at MSC, and twenty-three students are currently enrolled, twenty-one girls and two boys.

Participating in the VOE program are C. H. Milby and E. E. Worthing High Schools. The students spend three hours or more per day in an approved and supervised training station, which is the place of employment, and each student earns one cradit toward graduation for the on-the-job-training. The program is designed for senior students in business education whose curriculum combines on-the-job training with occupationally related classroom instruction in a simulated business office laboratory.

Goldstein stated that a major objective of the VOE program is the eventual placement of qualified Negro and Latin American secretaries in permanent positions within the Manned Spacecraft Center.

The Back-to-School Youth Opportunity Campaign (YOC) at MSC includes students between the ages of 16 and 21 who work a maximum of 16 hours a week and attend high school classes. This program is in its fourth year at MSC and has twelve students. The primary purpose of YOC is to enable the students to finance their own education.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

MSC 68-41
June 4, 1968

HOUSTON, TEXAS--The Rocketdyne injector will be used in the Bell ascent engine of the first manned lunar module, it was announced by the National Aeronautics and Space Administration Apollo Program officials today.

The Bell engine powers the lunar module in its ascent from the surface of the moon. Injectors deliver fuel and oxidizer into the engine combustion chamber.

Qualification testing will continue on the original injector made by Bell Aerosystems Co., Buffalo, N.Y., as well as on the injector made by North American Rockwell Corp.'s Rocketdyne Division, Canoga Park, California. These tests are expected to be completed in August. A decision has not yet been made as to which injector will be used for the lunar mission.

Bell manufactures the ascent engine under a subcontract to the Grumman Aircraft Engineering Corp., prime contractor for the lunar module.

On August 2, 1967, NASA selected Rocketdyne to design, develop, and qualify an alternate injector after the Bell injector experienced developmental difficulties. A joint NASA and Grumman team conducted a review of both injector programs in April and May 1968. This evaluation led to selection of the Rocketdyne injector for the first manned lunar module mission.

The Bell engine has been fitted with the Rocketdyne injector at the Rocketdyne Canoga Park facility. This engine is being installed in the lunar module by Grumman at Bethpage, Long Island, prior to its shipment to Kennedy Space Center, Florida, later this month.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-43
June 10, 1968

HOUSTON, TEXAS--A study of an Emergency Earth Orbital Escape Device will be made by the Lockheed Missiles and Space Company, Space Systems Division, Sunnyvale, California, under a $200,000 contract with the National Aeronautics and Space Administration's Manned Spacecraft Center.

Under terms of the fixed-price contract, Lockheed is to develop a conceptual design of a three-man entry vehicle in earth orbit (up to 300 miles). The escape device could be launched with future space vehicles, to remain in orbit until needed.

During the first part of the eight-month study, several concepts are to be developed. Midway through the contract performance period, one or more concepts will be selected by NASA for a detailed conceptual design. An analysis will then be performed to determine an optimum integrated selection of subsystems, aerodynamic shape and stability, and division of operational responsibility between automatic systems and manual astronaut control.

Comparisons will be made between the three-man escape vehicle and concepts developed under other study contracts. In addition, variations to the basic design will be considered to determine the effects of increasing the crew capacity and also of re-entering from higher altitudes including emergency re-entry from a 19,400-mile-high synchronous earth orbit.

Lockheed was one of the three companies responding to a NASA request for proposals on the study.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-44
June 12, 1968

HOUSTON, TEXAS--The first in a series of sounding rocket probes of the South Atlantic inner radiation belt launched from Natal, Brazil, was described as successful by NASA officials Wednesday.

The probe, which carried an 80-pound experiment package 502 miles over the Atlantic, was launched at 6:41 p.m. CDT Tuesday from the Barreira do Inferno range near Natal. The project--South Atlantic Anomaly Probe (SAAP)--is a cooperative effort of the National Aeronautics and Space Administration and the Brazilian National Space Commission (CNAE).

Data obtained from the flight, which lasted 15 minutes, will be useful to scientists in studying the dynamics of the inner radiation belt (Van Allen) and provide information useful in safeguarding Apollo astronauts in relatively low altitude missions in the vicinity of the radiation belts.

Preliminary analysis of the data indicates that the experiments carried in the nose cone of the Canadian manufactured Black Brant IV launch vehicle performed according to plan. A detailed analysis of data will be carried out at the NASA Manned Spacecraft Center, Houston, Texas.

Project officials report from Brazil that the two-stage, solid propellant vehicle performed "better than expected." The 37-foot tall rocket launched the experiment package into the anomaly on a ballistic trajectory.

The experiment package splashed down 328 miles southeast of the launch site. Recovery of the package was not planned.

The Space Physics Division of MSC directed the program. The Sounding Rocket Branch of NASA's Goddard Space Flight Center, Greenbelt, Maryland, assisted in the launch and data recovery. For Brazil, the CNAE provided overall management direction and scientific coordination and the Brazilian

-more-

Ministry of Aeronautics carried out the launch and data recovery operations.

Similar flights are planned later to obtain further data on the radiation belt.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111
MSC 68-45
June 19, 1968

HOUSTON, TEXAS--Simulating zero G or partial G on earth in a situation that would be suitable for training astronaut crews to perform duties on the lunar surface or in a weightless state, has proven to be a difficult task.

Most of the devices or techniques developed in the past rely on vertical fall, suspension at odd angles in a sling, use of an aircraft flying a Keplerian trajectory (parabola), or the buoyancy of water. Disadvantages are encountered in simulating realistic subgravity conditions by these methods.

A recently developed partial gravity simulator designed to overcome the attendant disadvantages of prior methods and devices is now in operation in Building 5 at the NASA Manned Spacecraft Center.

The Partial Gravity Simulator (PGS), comprises a gimballed body support system which suspends the trainee from one end of a piston in a vertically arranged pneumatic cylinder and piston assembly. Mounted atop the cylinder and piston assembly is a pneumatic servo mechanism which includes a spring suspended from an overhead monorail on an air bearing which weighs the assembly from which the trainee is suspended.

A small vane, mechanically linked to the main supporting spring, moves between two opposing jets and controls a twin pneumatic servovalve arrangement. The two pneumatic servovalves meter the flow of compressed air into the cylinder to cause the piston to apply a constant uplifting force to the trainee, irrespective of the relative position of the cylinder and piston or the vertical motion of the trainee.

For simulating lunar gravity, the uplifting force is always equal to five-sixths of the trainee's weight. He thus exerts a force of only one-sixth his weight on the walking surface, which is the expected lunar gravitational force.

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Harold I. Johnson and Arthur G. Trader invented the "Subgravity Simulator." Both are with the MSC Flight Crew Support Division.

The gimbal body support system provides the trainee with three full degrees of freedom in attitudes and is attached to the lower end of the 19-foot piston rod of the 20-foot long pneumatic cylinder, which, in turn, is rotatable within the 3-inch diameter cylinder. Two full translational degrees of freedom are provided by the monorail in the horizontal direction and by the cylinder in the vertical direction, respectively. A limited degree of freedom is provided in the lateral direction by the simulator acting as a 50-foot pendulum supported on air bearings from the monorail.

The gimbal system consists of yaw and pitch gimbals which are half circle members pivotally joined at their diameter ends, and a roll gimbal in the form of an axially rotatable rigid rod which at one end is secured to a back plate strapped to the body of the trainee, and its other end is journalled to the center of the arc defined by the pitch gimbal. The back plate is part of the harness assembly which supports the trainee's torso while leaving his arms and legs free. The attachment of the rod to the adjustable back plate is such that the rod extends through the trainee's center of gravity.

The pneumatic piston and cylinder assembly and the pneumatic servo mechanism are suspended by the spring arrangement which positions the twin valves to control gas feed to the cylinder and the exhaust therefrom. Through use of a separate control system for moving the opposing jets relative to the vane, the lift of the simulator can be adjusted from zero lift to any lift desired and can therefore simulate gravitational forces of zero G to one G for any weight up to 500 pounds.

The PGS unit operates above a ramp eight-feet wide and 30-feet long which is hinged at one end and can be elevated to simulate any lunar slope up to 30 degrees. The steps on the leg of the Lunar Module are located at one end of the ramp and also within range of the PGS is a 4-foot square by 9-foot deep box filled with simulated lunar material for using a lunar drill at one-sixth G by a trainee.

A fore and aft travel of 50-feet is possible with the PGS and vertical travel of 19-feet. The lateral travel is limited to five-feet either side of center while suspended from the piston rod. The usable side to side motion of a trainee for accurate simulation is 2-feet on either side of the center of the pendulum movement.

Two gimbal mounts for trainees are used with the PGS. One weighs 12 pounds and is used for partial gravity simulations. It provides full freedom in yaw, plus or minus 30 degrees freedom in roll and unlimited (360 degrees) freedom in pitch. The other gimbal weighs 25 pounds and is used for zero G training. It provides full angular freedoms in yaw, pitch and roll.

The ramp beneath the PGS is to be covered with a simulated lunar surface material for walking by the trainees at one-sixth G. A fabric cover will be placed over the lunar surface material while extravehicular (EVA) or zero G training is in progress to prevent the compressed air jets from the maneuvering unit from blowing the lunar surface material.

The feeling of friction that will be transmitted to the trainee using the PGS will be no more than plus or minus one-ounce when making vertical or fore and aft movements.

Lighting will be provided by two sets of lights to simulate Sun and Earth shine. They will be sized to look about the actual size that would be seen from the lunar surface. One set of lights will simulate the sun and earth from the top of the room at a 45-degree angle. The other set will be on movable stands and represent incident angles on the moon from 5 to 15-degrees. The light source for the sun will be a collimated light which will produce a circle of light 10-feet in diameter and will be about one-third the actual brightness of the sun. The light will not simulate the heat of the sun's rays, but it will cause temporary blinding of the trainee if he looks directly into the light source.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

MSC 68-46
June 19, 1968

HOUSTON, TEXAS--More than 60 engineering and science professors, instructors and research staffers from colleges and universities from across the nation are attending three summer faculty fellowship programs at the Manned Spacecraft Center. The programs are aimed toward stimulating idea exchanges between NASA and the teachers while refreshing the research outlook of their home institutions.

A total of 35 participants are enrolled in the NASA-ASEE Summer Faculty Fellowship Program, including 11 who are second-year recipients. Under this program, directed by Assistant to the MSC Director for Academic Relations Dr. James L. Youngblood, each faculty fellow is assigned to an MSC senior engineer or scientist who acts as his research advisor. The fellow spends eight weeks on a research and development assignment and two weeks in orientation, classwork and seminars.

The second program is the NASA Faculty Fellowship Program in Systems Engineering Design, and is conducted in cooperation with the University of Houston and Rice University. In the program, also directed by Youngblood, the 21 participating fellows are assigned to design teams for selecting and designing a complex space system to meet a given set of mission objectives.

The third program is the MSC Summer Visiting Faculty Appointments Program in which there are six participants who are assistant, associate or full professors in the fields of public or business administration, economics and management. Fellows in the program are assigned to either research or operational tasks in MSC organizations.

Harold W. Whittington of the Management Analysis Branch directs the Visiting Faculty Appointments Program.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-47
July 11, 1968

HOUSTON, TEXAS--The zero-gravity environment of space may be a natural fire extinguisher. Limited results from aircraft studies show that during periods of weightlessness convective air currents are not produced by a flame as they normally are on earth. As a result, oxygen supplies are not replenished, and a fire tends to suffocate in the products of its combustion.

J. H. Kimzey of the NASA Manned Spacecraft Center's Structures and Mechanics Division has developed an experiment which may be flown on Apollo Applications missions to learn more about how fires behave in a zero-g environment.

Of particular interest is the kinetic energy which, as observed in aircraft studies, is still present after the visible flame is extinguished. MSC engineers want to know how long after a flame is smothered it could be rekindled if a fresh supply of oxygen is furnished by forced convection or a return to gravity. They also will want to learn more about how fires spread in a weightless environment. Will gases of combustion propel burning materials into new areas creating secondary fires? And how far must two flammable objects be separated in zero-g to prevent a fire's spreading from one to the other.

Methods of extinguishing fires in space are also of interest, particularly fires which must be extinguished in a breathable cabin atmosphere, with a minimum of toxic or irritating by-products.

The MSC experiment plan calls for installation of a 1.1 cubic foot pressure chamber in the Apollo Applications, S-IVB Multiple Docking Adapter (MDA). AAP crewmen would conduct the experiments, observing, photographing and taking radiometric readings on some one hundred flammability tests.

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Fuels such as polyethylene, mylar, nylon, polyurethane, polycarbonate, cellulose and teflon will be electrically ignited inside the chamber while the results are observed and recorded through glass ports.

The atmosphere of the chamber will be oxygen at 5 PSIA, and the chamber will be equipped with a fan to reproduce convective air currents that would normally be set up by spacecraft ventilating systems and astronaut movement. There will also be provisions for evaluating water, helium and vacuum extinguishment systems.

The equipment will be designed for six months life in orbit so that revisits may enable further testing after replenishing fuels, film and extinguishing agents.

Most of the design, development and production of the chamber and its support equipment will be done in-house at the Manned Spacecraft Center. Pending final definition of the experiment, it is expected NASA will award a contract for fabrication of an emission spectrometer. The spectrometer will be used to measure infra-red, visible light and ultra-violet energy levels during flammability tests.

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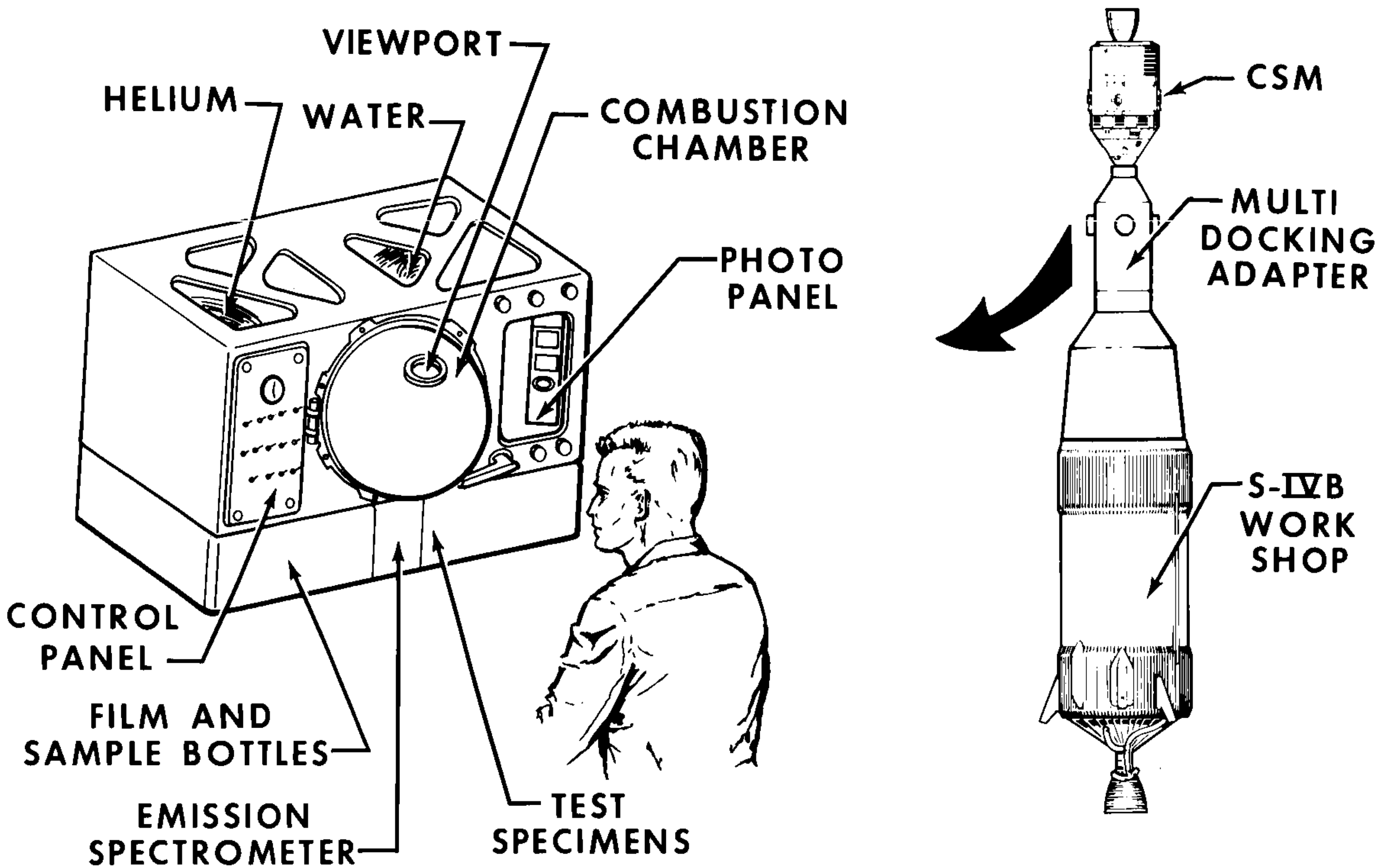
NASA-S-68-2635

AAP EXPERIMENT M-479
ZERO GRAVITY FLAMMABILITY



NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER NASA Houston 1, Texas
HU 3-5111

MSC 68-48
July 16, 1968

HOUSTON, TEXAS--A pulmonary disease about which little is known has forced Lt. Cdr. John S. Bull, 33, to withdraw from the astronaut program, the National Aeronautics and Space Administration announced today.

Bull reported today to the National Naval Medical Center, Bethesda, Maryland, for an examination to determine whether he is medically fit to remain on active duty in the Navy. He has been placed on non-flying status.

MSC medical authorities said the disease is uncommon and has been defined in only the past few years. It has no medical name, but is sometimes called "Aspirin Asthma." Its cause is unknown, and there is no cure.

The disease is characterized by three factors: (1) chronic sinusitus, (2) chronic obstructive pulmonary disease, and (3) marked sensitivity and intolerance to aspirin.

Doctors said the disease is not a true allergy and is much more serious than asthma. It most frequently strikes young men in the late 20's and early 30's and is a progressive disease, they said.

Lack of knowledge of the disease restricts treatment to alleviation of the symptoms. Medical research on the disease is being conducted. Climate and environment apparently do not cause the disease or affect its progress, doctors said.

Bull's problem first became apparent in August 1967, when he was treated for sinusitus. In November, he developed a slight cough, and in January 1968, he experienced his first asthma-like attack.

Bull is one of the 19 astronauts selected by NASA in April 1966. He was assigned to the crew for Lunar Test Article-8 thermal vacuum tests,

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but was replaced because of the medical problem. In addition, he has been a member of the support team for the third manned Apollo mission.

Bull's departure leaves 53 astronauts active in the NASA program.

Bull, a native of Memphis, Tennessee, is married and has a 2-year-old son. He has a Bachelor of Science degree in mechanical engineering from Rice University. Prior to joining the astronaut team, Bull was a Navy test pilot.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-49
July 17, 1968

HOUSTON, TEXAS--A new facility recently installed in the Gulf of Mexico by the Manned Spacecraft Center's Landing and Recovery Division, as an aid to test schedules for qualifying spacecraft and supporting recovery equipment, will no doubt be of interest to area boating enthusiasts and fishermen.

The installation, located about 25 miles south of Galveston on a Shell Oil Company rig, is an automatic weather station which measures and transmits wave height, wind speed and direction, relative humidity, air and water temperature.

This information is transmitted to the U.S. Weather Bureau Office at Galveston, where the data are recorded and the information is then supplied to the Spaceflight Meteorology Group at MSC as required to support LRD test programs in the Gulf.

The U.S. Weather Bureau at Galveston will also make this information available to the public. Initially, the data will include wind direction, velocity and wave height and later temperature and relative humidity will be added. This information will be available every three hours and if weather conditions should warrant, will be disseminated hourly.

MSC's Landing and Recovery Division is involved in numerous operational test programs requiring the at-sea testing and qualification of spacecraft and supporting recovery equipment. These tests are normally carried out in the Gulf of Mexico, from the NASA Motor Vessel Retriever, under operating conditions which closely simulate the actual ocean environment in spacecraft recovery operations.

-more-

The majority of the LRD tests are performed subject to specific minimum and maximum weather constraints and some tests require an accurate knowledge of the actual wave heights and periods. Initially, the tests were conducted on weather forecasts with visual observation and estimations during the actual test.

To facilitate this type of testing and to improve test schedules and quality of information, it was decided to install a weather transmission site onboard an offshore oil platform in close proximity to the area where testing is normally carried out. The Shell Oil Company authorized MSC to install this equipment on its Buccaneer Platform A, located approximately 25 miles south of Galveston. Shell has provided this, as well as other assistances in the past, at no cost to the government.

The weather station is automatic in operation and normally transmits for 21 minutes every three hours. Provision is made to transmit on a continuous mode if required, and also from external battery packs if power is lost aboard the Shell platform.

By utilizing electronic equipment on hand in the Electronics System Section of the LRD Recovery Electronics Branch, the cost for the weather recording and transmission facility was kept to a minimum. Actual cost was less than $7,000. Leroy Penn of LRD was the project engineer for the installation.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-50
July 18, 1968

ALSO RELEASED AT NASA HEADQUARTERS AND
MARSHALL SPACE FLIGHT CENTER

HOUSTON, TEXAS--The National Aeronautics and Space Administration has completed tests associated with the "longitudinal oscillations" problem of the Saturn V launch vehicle and has mapped out a means of preventing excessive oscillations. The solution will be verified in a test firing of a flight stage early next month.

The solution will be the use of "accumulators" or small gas reservoirs in the liquid oxygen prevalves of the first stage to change the frequency of oscillation in the propulsion system.

The oscillations resonating with the vehicle structure natural frequency caused considerable concern among rocket engineers during a portion of the flight of the second Saturn V. It was launched from the NASA-Kennedy Space Center last April 4.

The Saturn V--a three-stage rocket 363 feet tall with the Apollo spacecraft in place--was developed by the NASA-Marshall Space Flight Center as the launch vehicle for the manned lunar landing mission.

Engineers working on the problem encountered during the flight of the second Saturn V have completed analyses, studied flight data and conducted hundreds of tests in identifying the cause of the up-down motion of the vehicle.

The natural frequency of the vehicle structure is about four cycles per second. The frequency of the propulsion system was between four and five cycles per second.

Changes in mass, such as when propellants are being drained from the tanks, increase the frequency level of the structure. The frequency level of the propulsion system also increases as the flight progresses but at a slower rate.

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Since the propulsion system frequency was only slightly above that of the structure, and since the structure frequency increased faster, the frequencies grew closer together and finally coincided.

When two frequencies are the same or very near, the amplitude, or severity, of the oscillations are multiplied. This is what happened during the flight of the second Saturn V.

The task facing the engineers was finding the best method of keeping the frequencies apart. Several possible methods were considered but these were narrowed to two "candidate fixes" which received maximum attention.

One possible solution was to inject helium into the liquid oxygen feed lines to change the frequency of the propulsion system.

The decision was made, however, to use "shock absorbers" in the LOX prevalves to dampen out any oscillations that might occur in the feed ducts. This would reduce the natural frequency of the propulsion system to about two cycles per second, lower than that of the structure.

Prevalves are located in the five LOX ducts just above the engines. They serve to detain the LOX in the feed ducts until late in the countdown, when the fluid is admitted to the main LOX valves on the engines in preparation for ignition.

Each prevalve has a cavity in which a gas pocket will be maintained. Filling the cavities with helium will begin ten minutes before liftoff and will continue after start-up of the first stage engines.

A relatively small amount of gas is required--about 2.1 cubic feet in all five of the first stage engine feed systems. The only modification required to the stage is provision of a means of injecting helium into the prevalve.

The helium is fed into the accumulator initially from a ground source; after launch the small amount needed for replenishing comes from the on-board helium vessels which are used to supply gas for the operation of certain valves, for pressurizing the fuel tank and other purposes.

-more-

Kits for modifying the vehicle to accept either of the two candidate fixes were prepared and tested early in the study to save time.

Modifications are being made now in the first stage of the third Saturn V launch vehicle, now at Kennedy Space Center, and to the first stage of the sixth Saturn V. The latter stage is in a test stand at the Mississippi Test Facility being prepared for test firing early in August.

Lee B. James, Saturn V Program Manager at the Marshall Center, said about 1000 engineers working on the problem included those from MSFC, the Boeing Company, the Martin Company, TRW, Inc., Aerospace Corp. and Rocketdyne Div. of North American Rockwell. Martin and TRW personnel worked on the problem from independent positions, and Aerospace Corp. engineers served as consultants.

James said the unanimous decision of all involved to use the accumulator method indicates how thoroughly the test, propulsion and analysis work was done.

Results of the work and the recommendation were presented to Lt. Gen. Samuel C. Phillips, Apollo Program Director and Dr. George Mueller, NASA Associate Administrator for Manned Space Flight during a conference Monday. Both accepted the recommendations.

The conference included representatives of the industry team involved, the Marshall Center, Kennedy Space Center, the NASA-Manned Spacecraft Center and NASA Headquarters.

James said tests indicate that the oscillation levels for the upcoming flight of the third Saturn V will not exceed those of the first Saturn V, which made a "textbook" flight on Nov. 9, 1967.

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(Attached is a sketch of the LOX prevalve.)

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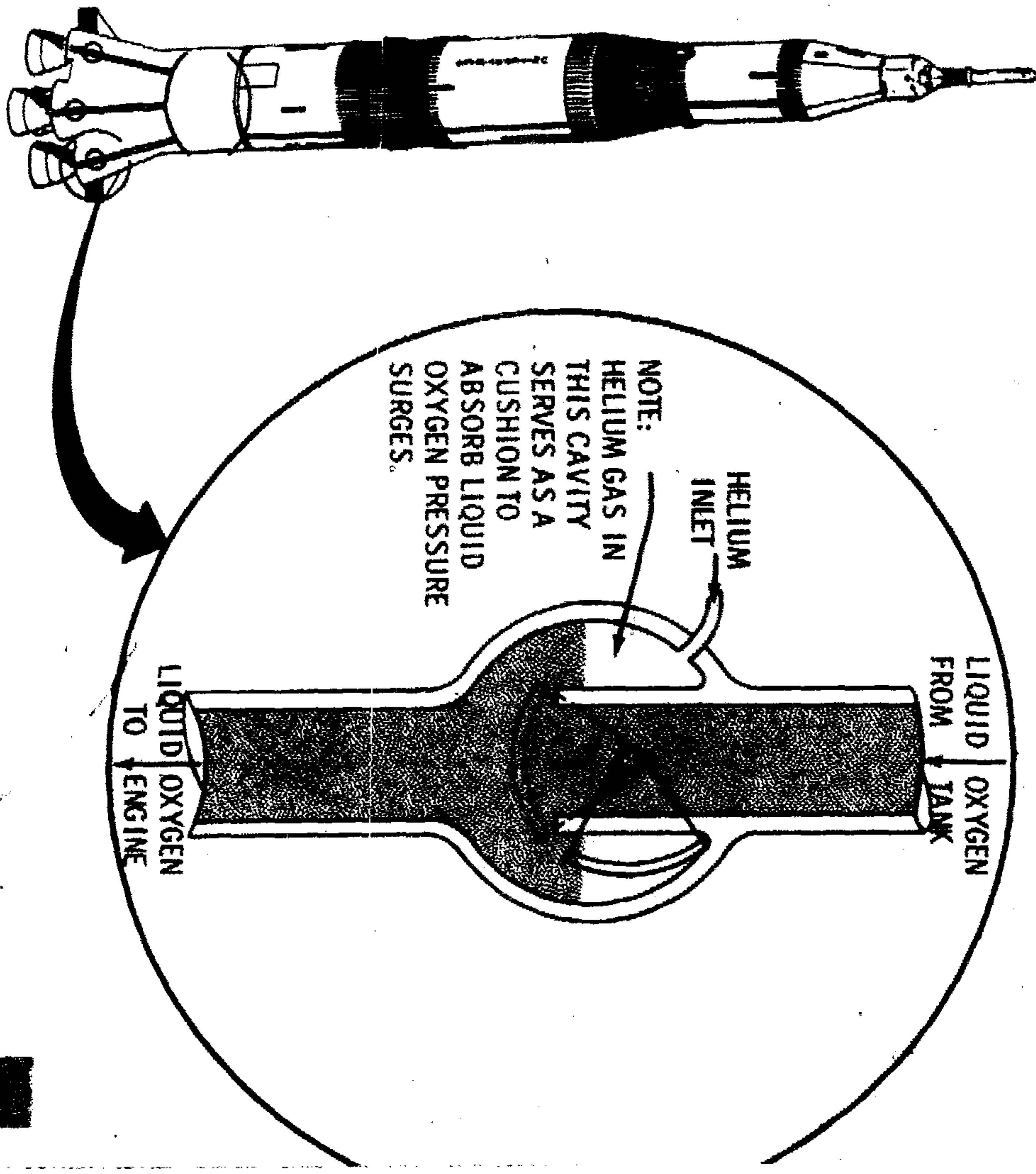
(Attached is a sketch of the LOX prevalve.)



NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER NASA Houston 1, Texas

HU 3-5111

MSC 68-51
July 18, 1968

HOUSTON, TEXAS--The National Aeronautics and Space Administration has officially accepted delivery of the first flight system of the Apollo Lunar Surface Experiment Package (ALSEP) from the Aerospace Systems Division of the Bendix Corporation.

The ALSEP system, a series of scientific experiment instruments, which American astronauts will place on the surface of the moon, is designed to collect and transmit scientific data to Earth for one to two years after its emplacement on the lunar surface. It is composed of nine separate experiments which are scheduled to provide the scientific community with unprecedented knowledge of the lunar environment and interior -- especially in the areas of geophysics, particles and fields and the lunar atmosphere.

The first flight system, which passed acceptance tests this week at the Bendix plant at Ann Arbor, Michigan, is composed of five experiments: Passive Seismometer, Magnetometer, Solar Wind, Spectrometer, and Suprathermal Ion Detector and Cold Cathode Gauge.

The Passive Seismometer is a three-axis seismometer which will measure lunar tremors to study the moon's interior to its center -- whether it has a crust and core and whether it is layered in structure like the earth. The principal investigator is Dr. Gary Latham, Columbia University's Lamont Geological Observatory. Dr. George Sutton of the University of Hawaii, Dr. Frank Press of Massachusetts Institute of Technology and Dr. Maurice Ewing of Columbia University are co-investigators.

(more)

The Magnetometer will measure the strength, direction and gradient of the moon's internal magnetic field as well as the interaction of the solar wind's magnetic field with the lunar body. Pricipal investigator is Dr. Charles P. Sonett of NASA Ames Research Center, and co-investigators are Dr. Jerry Modisette of NASA's Manned Spacecraft Center and Dr. Palmer Dyal of Ames.

The Solar Wind experiment will measure the energy, velocity, and direction of medium energy protons, electrons and alpha particles in the solar wind as they arrive at the moon. Dr. Conway W. Snyder is principal investigator and co-investigators are Dr. Douglas Clay and Dr. Marcia Neugebauer all of the Jet Propulsion Laboratory.

The Suprathermal Ion Detector (SIDE) will measure the temperature and density of positive ions existing in the moon's ionosphere by sampling ions in a wide range of energies. The Cold Cathode Gauge Experiment (CCGE), will determine the pressure of neutral particles by measuring the density of the ambient lunar atmosphere. Principal investigator for SIDE is Dr. John Freeman of Rice University, CCGE principal investigator is Dr. Francis Johnson of the Southwest Center for Advanced Studies with Dallas Evans of NASA's Manned Spacecraft Center as co-investigator.

The Apollo astronauts will deploy the first flight system, which will be carried to the Moon on the Lunar Module, in a prescribed arrangement. Each experiment will be connected to a central station which will collect and transmit data to the Manned Space Flight Network (MSFN). Telemetry data from the ALSEP will be received by various MSFN sites and relayed to the Apollo Mission Control Center, Houston, Texas. The MSFN can command the ALSEP to perform various functions as required by the principal investigators.

Electric power for the ALSEP will be furnished by a Radio-isotope Thermoelectric Generator (RTG) which was developed by the Atomic Energy Commission. It will provide adequate power for up to two years.

The first flight system is part of the overall Bendix contract which is currently valued at approximately $30-million.

end

NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-52
July 18, 1968

HOUSTON, TEXAS--Dr. Jerry Modisette, Chief of the Space Physics Division, has been appointed Senior Staff Scientist on the staff of the Director of Science and Applications at the NASA Manned Spacecraft Center, Houston, Texas.

Dr. Stanley C. Freden, former scientist with the Aerospace Corporation, El Segundo, Califromia, has been named Dr. Modisette's successor.

The two appointments were announced today by Dr. Wilmot N. Hess, Director of Science and Applications at MSC.

In his new post, Dr. Modisette, 34, will serve as a senior advisor and consultant to the Director of Science and Applications for all directorate programs in space physics. Dr. Modisette, who is a 1956 graduate of Louisiana Polytechnic Institute, received a Master of Science in Physics from Virginia Polytechnic Institute in 1960 and a Ph. D. in Space Science from Rice University in 1967. He joined the Langley Research Center, Langley Field, Virginia, in 1956 and later transferred to Houston with the Manned Spacecraft Center.

Before his appointment as Chief of Space Physics Division in November 1966, Dr. Modisette served as Chief of the Radiation and Fields Branch at MSC.

Dr. Freden, 40, who will assume his new duties as Chief of the Space Physics Division on or about August 1, 1968, has been senior staff scientist at Aerospace since May 1961. From July 1957 to May 1961, he was senior physicist at the University of California's Lawrence Radiation Laboratory at Livermore, California. Dr. Freden, a native

-more-

of New York, is a graduate of UCLA where he received a BA in math and and his Masters and Ph. D. degrees in the field of physics.

As Chief of the Space Physics Division, Dr. Freden will be responsible for developing space science programs in the area of space rediation, meteoroids, atmosphere, solar and interplanetary medium physics, and astronomy.

Dr. Modisette is a native of Shreveport, Louisiana.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-53
July 22, 1968

HOUSTON, TEXAS--Astronaut Michael Collins, 37, will undergo surgery this week to remove a bone spur growth that has developed in his cervical spine. He entered the Air Force's Wilford Hall Hospital, San Antonio, Texas, last night.

The spinal condition was discovered in tests last week after Collins noticed abnormal physical sensations. Cause of the boney growth is unknown. X-rays have confirmed its presence.

Whether the problem will affect Collins' assignment as prime command module pilot for the third manned Apollo mission will not be known until after surgery when the amount of time required for recuperation can be established.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-54
July 23, 1968

HOUSTON, TEXAS--The recuperative period for Astronaut Michael Collins will be three to six months, medical authorities estimated today.

The estimate makes it obvious that Collins will not be able to remain the prime command module pilot for the third manned Apollo mission, scheduled early next year, MSC officials reported. They said a replacement will be announced in a few days.

Collins is in good condition at the Air Force's Wilford Hall Hospital, San Antonio, Texas, following surgery this morning to remove bone spur growth from his spine. Attending doctors said the surgery was successful with no complications.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-55
July 25, 1968

HOUSTON, TEXAS--Medical authorities at the Air Force's Wilford Hall Hospital, San Antonio, Texas, expect that Astronaut Michael Collins will be released from the hospital by the end of next week.

Collins' recovery continues to be good following surgery to remove a bone spur growth from his spine. He was out of bed and walking briefly yesterday and again today for a longer period of time.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-56
July 25, 1968

HOUSTON, TEXAS--The flock of ducks at the Manned Spacecraft Center will be "rounded up" and vaccinated against Botulism, a type of food poisoning.

The ducks, which number approximately 150, have probably been exposed to Botulism. About 14 ducks have died recently from what is suspected to be the disease Botulism. The disease is caused by the organism Clostridium-Botulinum.

Vaccine has been obtained and the ducks will be collected, vaccinated and identified. The National Communicable Disease Center, Atlanta, Georgia, after an examination of blood samples reported the cause of death may be Botulism. Botulism is not contagious to humans, but can be transmitted to a person by his eating a diseased duck, if it is improperly cooked. There is no danger of transmission to humans otherwise.

MSC employees and visitors are cautioned not to feed the ducks.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-57
July 31, 1968

HOUSTON, TEXAS--Water egress training for the first manned Apollo crews is scheduled for next Monday and Tuesday in the Gulf of Mexico off Galveston, Texas.

The prime crew for Apollo 7, Walter M. Schirra Jr., Donn F. Eisele and Walter Cunningham will take the training in the Gulf on Monday with the backup crew, Thomas P. Stafford, John W. Young and Eugene A. Cernan taking the egress training on Tuesday.

An Apollo egress trainer, configured like the interior of the Apollo 7 spacecraft, and manned by the crew, will be placed in the water, apex down or in a Stable 2 attitude, from the deck of the NASA Motor Vessel Retriever.

Swimmers will be in the water and communications capability will be maintained at all times between the spacecraft crew and the training crews on the Retriever.

The first order of business for the crew in the egress trainer will be to activate the system to inflate the uprighting bags and bring the spacecraft to a Stable 1 attitude for egress.

The crew will then go through the post-landing Stable 1 egress check list, then egress through the side crew hatch, get into the three-man liferaft and await pickup by the U. S. Coast Guard helicopter and return to Ellington Air Force Base. Time in the water should not take more than one hour.

Prior to placing the spacecraft in the water, the Apollo crew will don their space suits and be briefed on the deck of the Retriever. Personnel from Crew Systems Division, Flight Crew Support Division, Landing and Recovery Division and Technical Services Division will assist with the training.

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MSC 68-57
Add 1

The training for the prime crew is scheduled to begin around noon, Monday, when the Retriever arrives on station about six miles south of the end of the Galveston south jetty. The training for the backup crew is scheduled to begin about 10:30 a.m. on Tuesday.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

MSC 68-58
August 2, 1968

HOUSTON, TEXAS--Hamilton Standard Division, United Aircraft Corporation, of Windsor Locks, Connecticut has been awarded a $10,651,200 contract modification by the NASA Manned Spacecraft Center, Houston, Texas.

The cost-plus-incentive-fee contract encompasses the development, qualification, and flight phases of the Apollo Portable Life Support System and Oxygen Purge System. The Apollo Portable Life Support System will be used during earth orbital Apollo flights and ultimately on the moon to sustain astronaut life while outside the spacecraft.

The modification definitizes contract changes incorporating the use of non-flammable materials based upon Apollo flammability test results, component replacement, redesign, and qualification testing, and the configuration changes necessary for integrating these modifications. The modification also includes development and qualification of the Oxygen Purge System.

The total value of Hamilton Standard contract since August 1965 is $37,979,200. The contract calls for delivery of 29 Portable Life Support Systems and 34 Oxygen Purge Systems.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-59
August 7, 1968

HOUSTON, TEXAS--The National Aeronautics and Space Administration, Manned Spacecraft Center has invited 23 aerospace firms to submit proposals for a study of a one-man Lunar Flying Vehicle.

In requesting the proposals, MSC noted that a total overview of the lunar program, including study of payloads and capabilities required on various missions, indicates a potential need for a lunar flying vehicle on early lunar landings.

The lunar flying vehicle would significantly increase man's capability to investigate a number of scientifically interesting sites on the moon and would provide a rescue vehicle for certain failure conditions. It would allow astronauts to reach otherwise inaccessible sites such as the walls of a crater or the top of a central crater peak. And it could be used for reconnaissance, exploration and traverses over rough terrain in a minimum of time.

Preliminary studies by NASA indicate that the lunar flying vehicle should have an approximate dry weight of 180 pounds, which could be delivered to the lunar surface on single or dual launch missions, and a propellant weight of approximately 300 pounds.* The vehicle would have a range of up to 10 miles, with a maximum payload, for shorter ranges, of 370 pounds, which could be scientific instruments, additional propellant supply, or an inactive suited astronaut.

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* All weights are in earth pounds

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The vehicle is to be capable of operation for several weeks including at least 30 sorties. It is to utilize Lunar Module descent stage propellants, must withstand at least three months dormant storage on the lunar surface, and should, wherever possible, use parts qualified from other vehicles such as LM tanks for propellants.

Industry proposals are to be received at MSC by August 30, 1968.

It is anticipated a six-month, fixed-price research and development study contract will be awarded for analysis, cost study and preliminary design of a lunar flying vehicle--one of several possible lunar mobility approaches being considered by NASA. However, a follow-on hardware development project will not begin until specific post-Apollo lunar surface missions and mission support systems have been approved.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

MSC 68-60
August 8, 1968

HOUSTON, TEXAS--Astronaut James A. Lovell, Jr., a Navy Captain, has replaced Astronaut Michael Collins as prime command module pilot for the third manned Apollo mission, the National Aeronautics and Space Administration announced today. Lovell, 40, held the same position on the mission's backup crew.

Collins, 37, a U. S. Air Force Lieutenant Colonel, underwent successful spinal surgery on July 23. The recuperative period is estimated to be three to six months.

Astronaut Edwin E. Aldrin, Jr., 38, a U. S. Air Force Colonel, backup lunar module pilot, has been moved to the command module pilot position on the backup crew.

Astronaut Fred W. Haise, Jr., 34, has been assigned to the backup crew as lunar module pilot. A civilian, he is the first member of the astronaut group selected in April, 1966, to be assigned to a flight crew. Haise has been a member of the astronaut support team for the second manned Apollo mission and has specialized in the lunar module. He is married, has three children, and is a native of Biloxi, Mississippi.

Lovell joins Astronauts Frank Borman, 40, an Air Force Colonel, commander, and William A. Anders, 34, an Air Force Major, lunar module pilot, on the prime crew for the mission scheduled in the first quarter of next year. Commander of the backup crew is Astronaut Neil Armstrong, 38, a civilian.

Astronaut Jack R. Lousma, 32, has replaced Haise on the support team for the second mission. He is a Marine Corps Major.

Astronaut Vance D. Brand, 37, a civilian, has joined the support team for the third mission. He succeeds Navy Lieutenant Commander John S. Bull, 33, who was forced to withdraw from the astronaut program recently because of a pulmonary problem.

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NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER Houston 1, Texas

HU 3-5111

MSC 68-61
August 9, 1968

HOUSTON, TEXAS--Spacecraft 2TV-1 Command and Service Modules began two to three days of manned checkout today, August 9, in preparation for a five-day manned thermal-vacuum test at the Manned Spacecraft Center in September.

Three crewmen from MSC's Flight Crew Support Division, Air Force Majors Turnage R. Lindsey, Lloyd Reeder and Alfred H. Davidson, will man the vehicle during the series of tests in chamber A of MSC's Space Environment Simulation Laboratory.

The manned checkout beginning today is aimed at verifying test procedures and spacecraft systems prior to manned thermal-vacuum testing. The checkout will be conducted with spacecraft and vacuum chamber at ambient temperature and pressure.

The crew boarded the spacecraft inside the 120 foot high, 65 foot diameter chamber A at 1 p.m. They are wearing the latest model Apollo pressure suits and will remain in the vehicle up to five hours.

The 2TV-1 thermal-vacuum test scheduled to begin next month will help verify CSM 103 and follow-on spacecraft in a simulated space environment for Apollo earth orbital and lunar missions.

The 2TV-1 test vehicle has undergone modifications to the forward and side hatches and the forward heat shield and has been equipped with a docking probe since completing CSM 101 support testing at MSC in June.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-62
August 15, 1968

HOUSTON, TEXAS--The National Aeronautics and Space Administration has modified its contract with the IBM Corporation, Gaithersburg, Maryland, for the Real Time Computer Complex (RTCC), which will support Apollo-Lunar landing missions. The modification is valued at about $45.5 million.

The modification definitizes a number of changes required to support the Apollo Program. Work under the contract will continue to be performed under a multiple-incentive arrangement covering cost, performance, schedule, and equipment management.

The contract, with IBM Federal System Division, Gaithersburg, Maryland, includes design, development, implementation, maintenance and operation of the RTCC through June 30, 1971.

The RTCC in the Mission Control Center at NASA, Manned Spacecraft Center Houston, provides the computer capabilities required for mission monitoring, in-flight mission planning and simulation activities.

In the mission monitoring and planning functions raw data are converted and displayed in formats easily interpretable by the mission control team. Flight plan recommendations are computed and displayed for mission controller analysis and selection.

The RTCC also generates simulated raw data required for pre-flight readiness testing and training.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

RELEASED BY NASA HEADQUARTERS August 19, 1968 68-148

Apollo Program Changes

NASA Acting Administrator Dr. Thomas O. Paine announced today that lunar module operations will be dropped from the first manned Apollo Saturn V flight, Apollo 8.

Dr. Paine also stated that the National Aeronautics and Space Administration's Office of Manned Space Flight will begin planning for an alternate command and service module mission for launch in December.

Dr. Paine emphasized that no final decision will be made on the precise mission planned for the alternate flight until after the first manned Apollo flight (Apollo 7)this fall. Apollo 7 is a mission of up to 10 days duration to complete flight qualifications of the command and service modules.

To assure greatest value from the mission, planning and training for Apollo 8 must begin in the period before the Apollo 7 mission is flown but the final content of the mission plan will be selected only after Apollo 7 mission results are evaluated.

Lunar Module 3 which has been delayed in checkout will be flown next year on the fourth Saturn V (AS-504) with command and service modules No. 104. This decision is based on preliminary studies which indicate that many Apollo program objectives scheduled for later flights can be obtained by utilizing the Apollo 8 command and service module mission.

Lieutenant General Samuel Phillips, Apollo Program Director, said one very important advantage of flying Apollo 8 this year is the opportunity for earlier experience in the operation of the Saturn V and command and service modules than can otherwise be obtained.

Two problems previously experienced in the Saturn Apollo systems--vertical oscillation or "POGO effect" in the first stage of the Saturn V and the rupture of small propellant lines in the upper stages--have been corrected and the solutions verified in extensive ground tests.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-63
August 23, 1968

HOUSTON, TEXAS--Dr. John A. Llewellyn, 35, has withdrawn from the astronaut training program because he was having trouble learning to fly jets.

A member of the scientist-astronaut group selected in August 1967, Dr. Llewellyn has been in flight training at Reese Air Force Base, Lubbock, Texas, since April 4, 1968. He completed the first phase of training involving 30 flying hours in the T-41A, a propeller-driven light plane and soloed in that aircraft. He had received approximately 40 hours of dual flight instruction in the T-37 jet trainer, but had not soloed.

Dr. Llewellyn said it became apparent several weeks ago that he was not progressing as he should. This week he withdrew after discussions with NASA and Air Force officials.

He said he is considering several opportunities within NASA and elsewhere.

A native of Cardiff, Wales, Dr. Llewellyn is a naturalized U. S. citizen. He is married and has three children. He has a doctor of philosophy degree in chemistry, and prior to joining NASA, was an associate professor at Florida State University.

His departure reduces the total number of NASA astronauts to 52. Nine of the 11 scientist-astronauts selected last year are now in flight training. Dr. Brian T. O'Leary, 28, withdrew April 23 because he disliked flying.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-64
August 27, 1968

HOUSTON, TEXAS--One Bell Aerosystems employee was slightly injured at 10:45 a.m. today when a lunar landing training vehicle fuel tank apparently ruptured while being pressurized at Ellington AFB.

No immediate estimate of vehicle damage was available.

Eugene Szkutak, a Bell engineer, was treated for a minor ankle sprain in the MSC dispensary and released. Two other Bell employees were also taken to the dispensary where they were examined and released.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-65
August 29, 1968

HOUSTON, TEXAS--A fuel cell used to supply electrical power to the Apollo spacecraft has operated for more than three times its design lifetime in a test completed this week at the NASA Manned Spacecraft Center.

The Apollo Command and Service Module fuel cell manufactured by Pratt & Whitney Aircraft Division - United Aircraft Corporation, performed for a total of 1,526 hours in the three-phase test conducted at MSC's Thermochemical Test Facility and at the contractor's facility in East Hartford, Connecticut.

The first phase of the test was designed to duplicate fuel cell launch pad heat-up, power profile and cool-down conditions that would be experienced if launch were delayed by numerous holds. Three launch window profiles, each lasting seven-and-a-half days and providing a total of nine launch opportunities, were simulated. At the end of the third launch window the fuel cell was shipped to Pratt & Whitney Aircraft for vibration tests to simulate an Apollo/Saturn V launch.

The only significant anomaly in the more than 1,500 hours of testing on the fuel cell occurred at 600 hours after the unit was shut-down following the vibration test. Cooling and subsequent contraction in individual cells allowed small nickel particles, which normally collect on the cell electrodes, to make contact and cause internal short circuits.

The short circuits caused by the nickel particles were not apparent when the fuel cell was re-heated and powered-up in the third phase of testing at MSC, and they caused no problems during more than 900 hours of subsequent operation under power profiles representative of a lunar mission.

David Bell of MSC's Propulsion and Power Division, who is sybsystem manager for the Apollo fuel cell, said the tests at MSC and at Pratt & Whitney demonstrated reliability for the fuel cell and its major components well beyond specification requirements of 550 hours hot time and six starts.

Two other Pratt & Whitney fuel cells being developed for possible use in long-duration post-Apollo missions are also being tested at MSC's Thermochemical Test Facility.

An Apollo fuel cell with several changes designed to extend the lifetime and increase the average power output to meet requirements of long-duration missions has successfully completed more than 900 hours of a test scheduled to last at least 1,500 hours. And an advanced, low-temperature, asbestos matrix fuel cell under development by Pratt & Whitney has shown considerable promise after more than 700 hours of testing.

The asbestos matrix fuel cell delivers up to 3,000 watts for the Apollo fuel cell. It weighs about 80 pounds less than the Apollo fuel cell and uses an asbestos matrix to contain the electrolyte solution of potassium hydroxide rather than a free solution of potassium hydroxide as in Apollo, reducing operating temperatures from a nominal 420 degrees Fahrenheit to about 195 degrees Fahrenheit. Current tests at MSC are aimed at determining the capabilities and life expectancy of this type of fuel cell.

Three Pratt & Whitney fuel cells provide primary electrical power to the Apollo CSM and, as a by-product, produce highly pure water for crew consumption and food preparation.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-66
September 4, 1968

HOUSTON, TEXAS--An Apollo command and service module representative of the spacecraft to be flown on the second manned Apollo mission and on lunar missions began five days of manned testing today in the Manned Spacecraft Center's 120 foot high, 65 foot diameter space simulation chamber.

Three crewmen from MSC's Flight Crew Support Division, Air Force Majors Turnage R. Lindsey, Lloyd Reeder and Alfred H. Davidson, boarded the vehicle--designated Apollo 2TV-1--at 10:30 a.m. The large vacuum chamber in MSC's Space Environment Simulation Laboratory will be pumped down beginning at about 12 noon and is expected to reach test conditions simulating an altitude of at least 65 miles some 19 hours later.

The five-day test will subject the spacecraft to temperature and vacuum extremes expected on manned flights up to lunar distances from earth in order to help verify spacecraft structure and pressure vessel, environmental control system, and unified hatch.

The test will include a simulated period of extra-vehicular activity (EVA) during which the crew will depressurize the spacecraft cabin and open the side hatch for up to four hours. Hatch operation--opening and resealing--will be checked out under space conditions; and after re-closing the hatch, the crew will exercise the spacecraft emergency repressurization system. Water purification procedures to be used on the first manned Apollo mission scheduled for mid-October will also be checked out in the test.

The vacuum chamber is to be repressurized Monday, September 9, with crew egress expected about noon Monday.

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This is the second series of thermal-vacuum tests conducted with spacecraft 2TV-1 since its arrival at MSC in April 1968.

Astronauts Joseph Kerwin, Vance Brand and Joe Engle participated in an eight-day test of the vehicle June 16 - June 24, helping clear the way for the first manned Apollo flight.

The 2TV-1 test vehicle has undergone modifications to the forward and side hatches and the forward heat shield and has been equipped with a docking probe since completing the June test.

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NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

Houston 1, Texas

HU 3-5111

MSC 68-67
September 4, 1968

HOUSTON, TEXAS--The National Aeronautics and Space Administration has contracted with the Sperry Rand Corporation, St. Paul, Minn., for the Communications, Command and Telemetry System (CCATS) processors, which will support Apollo lunar landing missions.

The contract is valued at about $2.7 million. This follow-on contract provides for programming, engineering, and operations of the CCATS through June 30, 1969. The CCATS in the Mission Control Center at NASA, Manned Spacecraft Center at Houston, Texas, is the nerve center to which the entire function of the Control Center is keyed.

The cost-plus-fixed-fee contract is for a 13-month period with two one-year options extending to June 30, 1971. The second option may be exercised in quarterly increments.

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September 6, 1968

HOUSTON, TEXAS--Itinerary of Richard M. Nixon's visit to the NASA Manned Spacecraft Center, with tentative times:

Arrive MSC, Greeting by Director Robert R. Gilruth and view displays in Building 1, Auditorium . . . . 3:10 p.m.

Tour Mission Control Center and briefing by Christopher C. Kraft, Director Flight Operations . . . . 3:30 p.m.

Depart MSC . . . . 4:00 p.m.

Richard M. Nixon, Republican candidate for President of the United States, is scheduled to arrive at the NASA Manned Spacecraft Center at 3:10 p.m. today for a tour of the facility and briefings by top MSC officials.

Mr. Nixon will be greeted on his arrival at MSC by Director Robert R. Gilruth and will be accompanied by Astronaut L. Gordon Cooper, Jr. while viewing manned space flight displays in the MSC auditorium.

Astronaut Cooper will describe his May 1963 flight aboard Mercury spacecraft Faith 7 and his eight-day Gemini V mission flown with Astronaut Charles Conrad, Jr. in August 1965.

Cooper's Mercury and Gemini spacecraft are on display in the auditorium.

Mr. Nixon will also see a model of the Apollo Lunar Surface Experiments Package (ALSEP) which will be left on the moon's surface by U.S. astronauts to provide detailed scientific information about the moon for up to a year.

Apollo Command Module 017, flown during the first unmanned Saturn V mission in November 1967, is situated next to the lunar surface display.

Mr. Nixon is also expected to view a full-scale model of an Apollo Lunar Module on display outside the auditorium. The two-stage lunar module will be used to land U.S. astronauts on the surface of the moon and return them to an orbiting Apollo Command Module for the flight back to earth.

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At the Mission Control Center, Mr. Nixon will be briefed on the U.S. manned space flight program by Christopher C. Kraft, Jr., Director of Flight Operations.

The Mission Control Center was completed in March 1965 at a cost of $11 million and contains an additional $29 million worth of permanent equipment. This three-story structure is the focal point for a world-wide communications, tracking and data network. Flight controllers in either of two identical control rooms and supported by a high-speed computer complex, monitor the prelaunch checkout of spacecraft and luanch vehicle, perform operations and engineering analysis during flight, communicate with astronauts and control vital spacecraft functions.

The Manned Spacecraft Center had its origins in the Space Task Group formed at Langley Field, Virginia, in November 1958, to design and develop manned spacecraft, select and train astronauts and control manned space missions from liftoff through recovery.

The Center was relocated to Houston in 1962 and now employs about 4,600 civil servants, with about 10,000 contractor personnel. working on-site and in the surrounding Clear Lake area.

MSC is one of 11 major NASA centers and was built at a cost of about $200 million.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-68
September 11, 1968

HOUSTON, TEXAS--Robert R. Gilruth, Director of the NASA Manned Spacecraft Center, announced today the Center is granting Paul E. Purser, Special Assistant to the Director, a one year leave of absence to assist Dr. Philip G. Hoffman, President of the University of Houston.

Richard S. Johnston, Chief of MSC's Crew Systems Division, will serve as Special Assistant to the Director during Mr. Purser's year of absence. Robert E. Smylie, who is presently Assistant Chief for Apollo Support, Crew Systems Division, will serve as Acting Chief of the Crew Systems Division.

In announcing Mr. Purser's leave of absence, Dr. Gilruth noted that it is NASA policy to cooperate with the Nation's universities in every way possible in order to realize maximum benefits to both NASA and the academic community.

In view of Mr. Purser's abilities and long-time interest in university affairs, Dr. Gilruth said NASA has agreed to this leave of absence.

Mr. Purser will begin his duties as Special Assistant to President Hoffman on October 1, 1968.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-69
September 13, 1968

HOUSTON, TEXAS--A concept for a modular earth orbital space laboratory which could follow and take advantage of knowledge gained from the Apollo Applications Program was described today by William E. Stoney, Chief of the Manned Spacecraft Center's Advanced Spacecraft Technology Division.

Stoney said the modular space station would use a building block technique, with individual modules or segments assembled in space. A second approach also being considered by NASA, he said, is a single large space station which would be placed in orbit by the Saturn V launch vehicle.

Either approach to space station development could be carried out largely with existing technology, said Stoney, adding that by studying both concepts NASA hopes to improve its flexibility in meeting the nation's future space needs.

Stoney said the modular laboratory could be launched and re-supplied by the Saturn IB rocket and could use a modified Apollo Command Module to transport crews and supplies to and from the laboratory.

Two major objectives of the modular laboratory, he said, would be to determine man's needs and abilities for extended stays in space and to define the requirements for a significant follow-on earth orbital program. Secondly, it would seek to provide modular components or systems which, when used in a building block fashion, could directly support future large-scale space stations.

A preliminary feasibility study of a three-man modular space laboratory is being conducted by MSC, and several full-scale mock-ups of laboratory modules have been constructed by MSC's Technical Services Division.

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The mock-ups include a crew quarters module, a subsystems module and a biomedical experiments module. Each of the modules is a 15-foot-diameter, 12-foot-high cylinder. The crew quarters module contains individual sleep stations for the three crewmen, waste management and bathing facilities, galley, ward room and suit donning area.

The subsystems module mock-up includes five swing-out equipment cabinets, a control console and a suit donning area; and the biomedical experiments module contains a control console, experiment cabinet, a body mass measuring device, and cardiovascular, metabolic, bone and muscle experiment equipment.

The modules, called Mission Operations Modules or MOM's, would be placed in low earth orbit by existing launch vehicles such as the Saturn IB or Titan III-M and would be interconnected in space by axial tunnels and/or hatches.

Crewmen and provisions would be carried to the modular laboratory by a modified Apollo Command Module or a Big G, Gemini-type logistics spacecraft, either of which would be equipped with a propulsion and auxiliary attitude control system and would carry provisions for three crewmen for up to three months.

The replacement crew would dock its logistics spacecraft at the opposite end of the laboratory, and the first crew would return to earth in the original logistics vehicle.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-70
September 24, 1968

HOUSTON, TEXAS--Ten years of progress in space exploration will be marked this weekend as the Manned Spacecraft Center conducts a two-day program on the tenth anniversary of the National Aeronautics and Space Administration.

Saturday's program will be an open house for MSC employees and their families and invited business, government and civic leaders. The Sunday program, beginning at noon, will be for the general public and will include visits to the Mission Control Center, the manned centrifuge in the Flight Acceleration Facility and the large vacuum chambers in the Space Environment Simulation Laboratory.

In his letter to invited guests, MSC Director Robert R. Gilruth said, "Over the past ten years, NASA has successfully accomplished many programs including Projects Mercury and Gemini. We are presently engaged in the Apollo Program to land men on the lunar surface. Out of these programs have come new technology and facilities. We welcome this opportunity to show you some of these new developments."

NASA's first official operating day as an agency was October 1, 1958. The new agency was created by the National Aeronautics and Space Act of 1958 which President Dwight D. Eisenhower signed into law on July 29, 1958. Employees and facilities of the National Advisory Committee for Aeronautics (NACA), created in 1915, formed the nucleus of NASA.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-71
September 25, 1968

RELEASED BY NASA HEADQUARTERS

HOUSTON, TEXAS--The National Aeronautics and Space Administration has selected the Rocketdyne injector for use in the ascent engine of the Apollo lunar module.

The ascent engine was designed and developed by Bell Aerosystems Co., Buffalo, N. Y., under a subcontract with the Grumman Aircraft Engineering Corp., Bethpage, N. Y., prime contractor for the Apollo lunar module.

Both Bell and Rocketdyne, a division of North American Rockwell Corp., at Canoga Park, Calif., have been conducting intensive injector development programs since August 1967 after the original Bell injector experienced developmental difficulties.

Rocketdyne will manufacture the injector, assemble the engine and provide associated field support, documentation and testing under a subcontract with Grumman. Value of the subcontract is estimated to be about $10 million.

Bell, also under a subcontract with Grumman, will continue to provide associated engine hardware for assembly with the injector by Rocketdyne.

The injector delivers both fuel and oxidizer into the combustion chamber of the engine. Proper injector design is necessary to insure smooth and reliable ignition and stable combustion in the 3,500-pound thrust ascent engine that will lift the two astronauts in the lunar module off the lunar surface to the orbiting Apollo command module for return to earth.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-72
September 27, 1968

HOUSTON, TEXAS--Director Robert R. Gilruth announced the establishment of an Advanced Missions Program Office and reorganization of the Engineering and Development Directorage and of the Science and Applications Directorate at the Manned Spacecraft Center.

John D. Hodge, currently Director of the Lunar Exploration Working Group at MSC will head the newly-formed Advanced Missions Program Office, with responsibility for planning, coordinating, and directing all aspects of the Lunar Exploration Program and other advanced programs involving MSC.

The new program office will also represent MSC with the Apollo Lunar Exploration Office and other groups at NASA Headquarters in Washington, D. C. responsible for advanced planning.

Three new positions have been created within the Engineering and Development Directorate to assist Dr. Maxime A. Faget in the management of spacecraft design, development and testing.

Aleck Bond, presently Manager of Systems Tests and Evaluation will become Assistant Director for Chemical and Mechanical Systems and will supervise the Propulsion and Power Division, the Crew Systems Division, the Structures and Mechanics Division and a newly-formed Space Environment Test Division.

Robert A. Gardiner, currently Chief of the Guidance and Control Division has been named Assistant Director for Electronic Systems with responsibility for the Information Systems Division, the Guidance and Control Division, the Computation and Analysis Division and the Information and Electronic Systems Division, which has been renamed the Space Electronic Systems Division.

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A new position of Assistant Director for Spacecraft Integration has not yet been filled. This organization will be responsible for performing spacecraft integration and systems analysis for the Apollo Spacecraft Program Office. It will also support the Apollo Applications Program Office and all other advanced missions by performing advanced spacecraft design, spacecraft integration, systems analysis, and systems engineering.

The Advanced Spacecraft Technology Division has been abolished and its personnel will be reassigned to the new organization for Spacecraft Integration and to the Structures and Mechanics Division.

The new Space Environment Test Division will be created from the Structures and Mechanics Division and will include the space environment testing and analysis functions conducted in the Space Environment Simulation Laboratory.

James C. McLane, currently Assistant Chief, Structures and Mechanics Division, has been named Chief of the Space Environment Test Division.

In announcing the reorganization of the Engineering and Development Directorate, Dr. Gilruth noted that all the Center's capability in spacecraft design and development and systems tests is now located in this directorate under Dr. Faget. By contrast, he said, we have three separate directorates involved in the conduct of our flight program. This, he said, has placed unusual demands on Dr. Faget without giving him the depth in top management assistance required to carry out his responsibilities.

In the Science and Applications Directorate, Dr. Gilruth announced formation of an Earth Resources Division and a Mapping Sciences Laboratory. Currently, work in the earth resources area is being conducted by a number of different groups under Dr. Wilmot N. Hess, Director of Science and Applications.

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Robert O. Piland, who has been Technical Assistant to Dr. Hess, will be Acting Chief of the Earth Resources Division.

James H. Sasser, currently Assistant Chief of the Mapping Sciences Branch, will serve as Acting Chief of the new Mapping Sciences Laboratory.

The Mapping Sciences Program, said Dr. Gilruth, is of increased interest and importance to a large segment of the scientific community. He added that establishing this group as a separate laboratory will be helpful in MSC's work with the outside scientific community.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-73
September 27, 1968

HOUSTON, TEXAS--Dr. Karl G. Henize, 41, a scientist-astronaut in flight training at Vance Air Force Base, Enid, Okla., has been placed on non-flying status for an estimated five weeks after suffering a fractured collar bone.

The injury occurred yesterday afternoon in a touch football game during a physical development class. Dr. Henize is not hospitalized and is expected to be able to continue ground school activities and graduate with his class.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-74
September 30, 1968

HOUSTON, TEXAS--An estimated 25,000 persons attended weekend activities September 28 and 29 at the Manned Spacecraft Center marking the tenth anniversary of the National Aeronautics and Space Administration.

MSC Public Affairs Officer Paul Haney expressed appreciation to the large numbers of Houston-area residents and invited guests who contributed to what was one of the largest turnouts to a public event at the Center since the initial MSC open house in June of 1964.

NASA was created by an act of Congress in 1958 and began operating as an agency October 1 of that year.

The two-day program observing the agency's tenth anniversary began Saturday morning with open house for MSC employees and their families. Saturday afternoon a special program was presented by Director Robert R. Gilruth and other senior MSC officials for invited and MSC supervisory personnel and their families.

Sunday the Center was open to the general public from noon to five p.m. During the day some 16 to 17 thousand Houston-area residents viewed displays and films in the MSC auditorium and walked through facilities housing a three-man centrifuge, giant vacuum chambers used for testing spacecraft, astronaut ground-based trainers, a radio frequency anechoic chamber, the new Lunar Receiving Laboratory and the Mission Operations Control Room from which manned spaceflights are directed from liftoff to recovery.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

MSC 68-75
October 1, 1968

RELEASED AT NASA HEADQUARTERS

HOUSTON, TEXAS--William E. Stoney, Jr. has been named Deputy Director (Engineering) of the Apollo manned lunar landing program, NASA Headquarters Office of Manned Space Flight, Washington, D. C.

Stoney is responsible for technical and engineering aspects of the program, reporting to Lt. General Samuel C. Phillips, Apollo Program Director. The appointment was effective September 23.

Prior to this assignment, Stoney was Chief of Advanced Spacecraft Technology Division at the Manned Spacecraft Center, Houston, Texas.

Stoney was previously assigned as chief of advanced vehicle conceptual studies in the Office of Advanced Research Technology at NASA Headquarters in Washington, D. C.

In August 1949, Stoney joined the staff of the NASA Langley Research Center in the Applied Materials and Physics Division. Nine years later he was appointed head of the Heat Transfer Section and in 1960 took over the helm of Langley's Scout (four-stage rocket) Project Group.

Stoney was born in Terre Haute, Indiana, and attended the Polytechnic Preparatory School in Brooklyn, N. Y., and earned a BS degree in aeronautical engineering from MIT. In 1951 he received his MS degree from the University of Virginia.

Stoney served with the U. S. Army Air Corps from March 1944 to March 1946. His two years of military service included a tour of duty in the Marianna Islands.

Stoney was awarded a Sloan Fellowship in executive development at MIT and spent one year there studying the fundamentals of management action.

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NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

Houston 1, Texas

HU 3-5111

MSC 68-76
October 3, 1968

HOUSTON, TEXAS--The Lunar Landing Training Vehicle (LLTV) was successfully flown for the first time today at Ellington AFB. The flight was of about eight minutes duration and a maximum altitude of about 50 feet was reached.

Pilot for the flight was Joseph S. Algranti, Chief of Manned Spacecraft Center's Aircraft Operations Office. The flight lifted off about 1:15 p.m.

The LLTV's will be flown by astronauts to train for lunar landings with the Lunar Module (LM).

An earlier research version of the LLTV was flown at Flight Research Center, Edwards, Calif. and here at Ellington AFB before crashing during a training flight May 6. The pilot, Neil Armstrong, safely ejected from the craft.

In all, three LLTV's, built by Bell Aerosystems, Buffalo, N.Y., under contract to MSC, are now at Ellington AFB. The other two vehicles are being prepared for future flights.

An number of test checkout flights will be flown by pilots from Aircraft Operations in the LLTV's before astronauts begin training flights in the vehicles.

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FOR RELEASE BY NASA HEADQUARTERS: THURSDAY, P.M. OCTOBER 17, 1968

RELEASE NO: 68-182

NOTE TO EDITORS:

Attached is a summary of the combined findings of a NASA Investigating Board and a Review Board appointed to reexamine and report on the accident last May 6, which resulted in the destruction of the Lunar Landing Research Vehicle. The pilot escaped without serious injury.

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10/16/68

FOR RELEASE BY NASA HEADQUARTERS: THURSDAY, P.M. OCTOBER 17, 1968

RELEASE NO: 68-182

LLRV ACCIDENT REPORT

On May 6, 1968, at 2:38 p.m. EDT, while on a training flight, Lunar Landing Research Vehicle No. 1 crashed at Ellington Air Force Base, Tex. After losing control of the vehicle on a simulated lunar landing approach, the pilot, Astronaut Neil Armstrong, ejected from the vehicle and landed by parachute with only superficial injuries. The LLRV was damaged beyond repair.

Two investigation boards have cited a loss of attitude control as the cause of an accident that destroyed the National Aeronautics and Space Administration's experimental Moon landing trainer. One board was appointed to determine what caused the accident, the other to review and study its effects on the lunar landing program.

-more- 10/16/68

In the mishap last May 6, Astronaut Neil Armstrong escaped with minor injuries when he ejected just before the crash and landed by parachute. The Lunar Landing Research Vehicle (LLRV), a flying simulator built to train pilots for landing operations on the Moon, was a total loss.

An accident board appointed by Dr. Robert R. Gilruth, Director of NASA's Manned Spacecraft Center, Houston, found that the pilot was forced to escape a few seconds after the loss of helium pressure in the propellant tanks caused premature shutdown of the attitude control rocket system.

The other board, appointed by NASA Deputy Administrator Dr. T. O. Paine to review the mishap and study its possible impact on the Apollo program discovered no bad effects on the lunar landing project, particularly the Lunar Module which will be landed by two astronauts on the Moon.

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The Review Board agreed with the Accident Board in calling for certain design improvements and operating practices in the LLRV, and urged more stringent control over such flying programs and greater attention to all of NASA's lunar landing simulators.

The accident at Ellington Air Force Base, near Houston, took place shortly after Armstrong began flying the LLRV in a simulated lunar landing. The wingless vertical flying vehicle has a conventional jet engine for normal use on Earth. When flying as a lunar vehicle, its jet engine compensates for 5/6 of the LLRV's weight, thereby simulating the Moon's gravity. Lift rockets propel the craft and 16 small rockets in clusters give the pilot control of attitude. The LLRV carries enough propellant to fly eight minutes on its jet engine and 80 seconds on its lift rockets.

The mishap occurred when the vehicle reached a hovering position about 30 feet above ground. Due to a loss of thrust from the lift rockets, the LLRV started to descend, but when the pilot shifted controls back to normal Earth flight operations, it began climbing. Then, apparently because the pilot was warned too late of running low on propellant for his attitude control rockets, he lost control of the vehicle. The pilot immediately ejected, when the craft was about 200 feet above ground and beginning to nose up and roll over.

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A large quantity of data on operation of the vehicle, collected by telemeter, furnished complete information on the LLRV's complicated control system and components. It showed that the helium was inadvertantly depleted earlier than normal.

Both boards noted that the source of trouble was the loss of helium pressure through the hydrogen peroxide propellant from the tanks to the lift rockets and the small thrusters operated by the pilot to control attitude.

Normally the LLRV can be flown and landed safely with its gimbal-mounted jet engine and attitude control thrusters even after the propellant supply to the lift rockets is depleted, but this calls for quick action by the pilot as soon as warning comes.

The MSC Board said this action amounted to a "critical pilot task during the heavy workload period which developed on this flight." It laid the basic difficulty on design deficiency because the helium pressurization for attitude control is not protected against loss through the lift rocket system.

Although a standpipe system provided reserve hydrogen peroxide for the attitude control system, the board said there was no automatic backup pressurization which is necessary to force the propellant into the control engines.

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As set up in the LLRV, the helium can escape through the standpipe outlet into the lift engines when the propellant level falls below the top of the standpipe. Because of circumstances on this flight, helium was being lost one second before the pilot's warning light came on steadily.

The MSC report noted that the LLRV pilot handbook indicates the pilot has enough propellant for about six seconds of normal flight time after the "propellant low" warning comes on.

A fraction of a second before the pilot's warning light came on, the control van crew noted a flicker of the "propellant low" warning light and directed the pilot to end his simulated lunar landing and transfer lift control to his jet engine.

"By the time the pilot could react and check his corresponding light," the report said, "the helium pressurization gas was already venting overboard and rocket lift was beginning to decay. The early onset of a problem with no warning caught the pilot by surprise and undoubtedly added some confusion to a most time-critical situation in the control van."

Among contributing causes, the MSC board concluded that the sensing system in one propellant tank failed to warn the pilot of a low level of propellant, so that he could revert safely to normal Earth operation.

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It also said the operating crew in the ground control van had inadequate warning of the abnormally low propellant supply, and that the crew failed to diagnose the loss of pressure in the tanks; that the pilot failed to shift one control handle at a critical point, and that the high and gusty winds prevailing had an adverse effect on propellant consumption.

The Board also asserted the pilot's handbook contained confusing and contradictory information on the subject of control rocket propellant, and said the LLRV's double attitude control system was used excessively, resulting in abnormally high propellant consumption.

In its report on the case, the Review Board criticized the design of the control system because it failed to protect against loss of helium pressurization into the lift rocket system. The combination of circumstances produced the rapid and complete loss of helium pressurization.

The Review Board also found the LLRV's warning system too small and poorly placed to be adequate. It said the ground crew had not perfected and practiced for such contingencies.

The Review Board recommended improved organization and management of the LLRV project, because of its importance to the Apollo program.

The MSC Board listed 16 recommendations -- six of them directly concerned with improvements in the LLRV and its systems -- and called for a safety review of the entire LLRV program; operational criteria for wind conditions and for use of the two attitude control systems in combination; for control van crew and operations; for a computer and other improvements in the control van; for review of pilot training; modification of the pilot's handbook; addition of fire and rescue equipment and added manpower, particularly for use on the control van team.

The Review Board said additional sensing probes to measure propellant level -- one of the most important items in the cause of this accident -- should be installed before any more flights of either the LLRV or its advanced version, the Lunar Landing Training Vehicle (LLRV).

That Board also called for a master warning light in better position for pilot vision, for safety wind criteria for all such flights, and for establishment of better communications, responsibilities and emergency procedures in the astronaut training program.

In addition, the Review Board said all critical vehicle systems in the program should be examined, and criteria set up clearly for their operation, including "red-lines" and "go-no go" limits.

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MSC management, the board said, should take whatever steps are necessary to improve the integration of the lunar landing simulator project into the Apollo program, in order to enhance its value in training astronauts for lunar landing operations, and to make sure adequate resources are applied.

Because the Lunar Landing Training Vehicle has the same rocket fuel systems as the LLRV, the Review Board recommended it be corrected in similar ways.

Following a comprehensive study of the Lunar Module, the Review Board said it could find "no significant problems as a result of the LLRV accident," and recommended no changes to the LM. On the contrary, it suggested that the ascent propellant level detector on the LM's propulsion system be examined for possible use on the simulators.

"Generally," the Review Board concluded, "technical rigor has been instilled into the Apollo Program to a remarkable degree. Hardware, design, test and operation procedures for normal and emergency events, provision for reliability and safety, and training of ground and flight crews are specified in detail by formal documentation and are closely controlled by program personnel."

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In its follow-up actions, NASA has initiated or completed work on all recommendations raised by the two boards. To carry out a comprehensive review of the safety of the lunar flight simulators, a flight readiness evaluation board had been formed in the Office of Manned Space Flight, at Headquarters. The review is being fully operated at the Manned Spacecraft Center. All actions are being monitored by the Headquarters Director of Safety.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111
October 28, 1968
MSC 68-78

RELEASED BY NASA HEADQUARTERS

The National Aeronautics and Space Administration outlined today the steps that will lead to a final decision on the next Apollo manned mission in the week of November 11.

Apollo 8, scheduled for December, is now planned as a manned earth orbital mission on a Saturn V launch vehicle. As a result of the success of Apollo 7, NASA is giving serious consideration to three alternative mission possibilities previously announced: an earth orbital mission deeper into space, a circumlunar fly-by, and a lunar orbit mission.

Dr. George E. Mueller, Associate Administrator for Manned Space Flight, and Lt. Gen. Samuel C. Phillips, Apollo Program Director, have laid out these steps leading to a decision:

-Detailed analysis and review of the results of the Apollo 7 mission to determine whether any major spacecraft changes are necessary.

-Final certification of solutions to the problems encountered during the Apollo 6 unmanned flight last spring. Modifications included strengthening of fuel lines in the second and third stages and elimination of objectionable oscillations or "pogo" in the first stage of the Saturn V.

-Complete ground tests (insulation, structural, pressure tests) before the Apollo 8 command and service modules are certified ready for lunar flight.

-Complete flight computer programs for deep space and lunar mission Targeting must be checked out; the operational trajectory established, and the computer programs delivered to Kennedy Space Center, Florida, and verified.

-Rehearse command and service module operations through computer simulations of the Mission Control Center ground system, tests with mathematical models, and delivery of the computer program for the Apollo 8 command module.

-Complete design certification reviews of the launch vehicle and spacecraft subsystems.

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"The final decision on whether to send Apollo 8 around the moon will be made after a thorough assessment of the total risks involved and the total gains to be realized in this next step toward a manned lunar landing," said Dr. Thomas O. Paine, Acting Administrator. "We will fly the most advanced mission for which we are fully prepared that does not unduly risk the safety of the crew."

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October 28, 1968

Itinerary of Spiro T. Agnew's visit to the NASA Manned Spacecraft Center, with tentative times:

Arrive MSC, Greeting by Director Robert R. Gilruth and view displays in Building 1, Auditorium	3:15 p.m.
Briefing by Dr. Gilruth in Director's office, Building 2 . . .	3:35 p.m.
Depart MSC	3:55 p.m.

HOUSTON, TEXAS--Spiro T. Agnew, Republican candidate for Vice President of the United States, is scheduled to arrive at the NASA Manned Spacecraft Center at 3:15 p.m. today.

Mr. Agnew will be escorted from Hobby airport by MSC Deputy Director George S. Trimble and will be greeted on his arrival at the Center by Director Robert R. Gilruth.

The Vice Presidential candidate will view displays of the U. S. manned space flight program in the auditorium of Building 1. He will see the command module used in the unmanned Apollo 6 flight of April 1968, a full-scale mockup of the lunar module which will land two Americans on the lunar surface and return them to an orbiting command module and a model on the Apollo Lunar Surface Experiments Package (ALSEP) which will be left on the moon's surface by U. S. astronauts to provide detailed scientific information about the moon for up to a year.

Mr. Agnew will also see the Mercury 9 spacecraft flown 22 revolutions around earth by Astronaut L. Gordon Cooper in May 1963 and the Gemini V spacecraft which Cooper and Astronaut Charles Conrad piloted on an eight-day mission in August 1965.

After viewing the auditorium displays, Mr. Agnew will be briefed on the manned space flight program by Dr. Gilruth in the Director's office in Bldg. 2.

He is scheduled to depart MSC at 3:55 p.m.

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The Manned Spacecraft Center had its origins in the Space Task Group formed at Langley Field, Virginia, in November 1958, to design and develop manned spacecraft, select and train astronauts and control manned space missions from liftoff through recovery.

The Center was relocated to Houston in 1962 and now employs about 4,600 civil service workers, with about 10,000 contractor personnel working on-site and in the surrounding Clear Lake area.

MSC is one of 11 major NASA centers and was built at a cost of about $200 million.

Perhaps the best known MSC facility is the Mission Control Center. This three-story structure is the focal point for a world-wide communications, tracking and data network. Flight controllers in either of two identical control rooms and supported by a complex array of high-speed computers, monitor the pre-launch checkout of spacecraft and launch vehicle, perform operations and engineering analysis during flight, communicate with astronauts, and control vital spacecraft functions from liftoff through recovery.

Large thermal-vacuum chambers up to 65 feet in diameter and 120 feet high provide simulated space environments for checking out spacecraft and astronaut crews prior to missions. Other facilities house vibration and acoustic equipment which can produce responses in spacecraft similar to those encountered in the vibration and acoustic environment of launch and the powered phases of flight. A three-man centrifuge configured like the interior of an Apollo Command Module can be used to train astronauts and checkout equipment under the gravitational forces or so-called "G" loads of launch and re-entry phases of space flight. Other astronaut trainers at MSC simulate varying degrees of weightlessness, and others permit crewmen to rehearse under realistic conditions, virtually every phase of spaceflight including missions to the moon.

An anechoic chamber and antenna test range permit engineers to checkout spacecraft communications systems and antenna patterns in an electromagnetic environment similar to space. And one of MSC's newest facilities, the Lunar Receiving Laboratory (LRL) will house astronauts for approximately two weeks following flights to the moon while the crewmen and the samples they bring back are observed and analyzed to insure no potentially harmful organisms from the moon are introduced on earth. Preliminary investigation of lunar samples will also be made in the LRL before the samples are divided and sent to scientists throughout the United States and in foreign countries for detailed analysis.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

RELEASED BY NASA HEADQUARTERS
October 31, 1968

RUBY LUNAR SCIENCE INSTITUTE HEAD

Dr. William W. Ruby, Professor of Geology and Geophysics at the University of California, Los Angeles, has been named Director of the Lunar Science Institute in Houston, Dr. Frederick Seitz, President of the National Academy of Sciences announced today.

The Academy has accepted interim responsibility for operation of the Institute until a consortium of universities can be formed to take over its direction. The formation of the Lunar Science Institute was announced by President Lyndon B. Johnson in Houston, March 1, 1968.

The chief objective of the Institute is to provide a base for academic scientists participating in the lunar exploration program or who will be working in the Lunar Receiving Laboratory or using other facilities of the Manned Spacecraft Center devoted to study of the Moon.

Lunar samples gathered by U. S. astronauts will be brought first to the Lunar Receiving Laboratory. The Institute will also serve as a center for the analysis and study of lunar data obtained as a result of NASA's unmanned missions, such as Surveyor and Orbiter.

As director, Ruby will be responsible for the day-to-day scientific management of the Institute. A national board of governors, appointed by the President of the Academy as broadly representative of academic institutions interested in lunar science, will establish policy and review operations at stated meetings. All managerial responsibilities will be subcontracted to Rice University.

-more-

The Institute will eventually be established in a converted residence adjoining Rice University property. Until these facilities are ready (in about a year), the Institute will occupy space in or near the Manned Spacecraft Center. Present plans call for a staff of about six professionals (including the director and an administrative officer); adequate library, secretarial, and custodial staff; and office space to accomodate 10 to 12 visiting scientists as the program gets underway.

In making the announcement, Seitz said, "The appointment of Dr. Ruby, who has been a member of the Academy since 1945, in a significant starting point for what should certainly be an influential demonstration of university-government collaboration in the laboratory."

"The establishment of an academic facility as an adjunct to a unique government laboratory will benefit university researchers with unequalled opportunities to explore another celestial body. The collaboration will benefit the laboratory staff by providing opportunities for direct, personal access to the best academic science. Science and the nation will benefit by enhanced communication between the two groups. I speak as well for our Committee on NASA-University Relations, whose ideas are now being given substance, when I express my great delight that Dr. Ruby has been persuaded to accept this post."

Ruby went to UCLA after 38 years with the U. S. Geological Survey. He also served as Chairman of the Division of Geology and Geography of the National Research Council, 1943-46, as well as Chairman of the NRC, 1951-54. He has twice been elected to the Council of the Academy for three-year terms, in 1951 and 1965. He was a member of the National Science Board from 1960 to 1966. The President of the United States awarded him the National Medal of Science in 1965. During his tenure as Director of the Lunar Science Institute, he will also serve as adjunct Prcfessor of Geology at Rice.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

RELEASED BY NASA HEADQUARTERS
November 12, 1968

The National Aeronautics and Space Administration today announced that the Apollo 8 mission would be prepared for an orbital flight around the Moon.

This decision was reached following a thorough review of the Apollo Program and NASA's overall readiness to undertake the next step toward the national objective of a manned lunar landing next year.

Apollo 8 will be launched from Cape Kennedy no earlier than December 21. Timing of the "launch window" is solely dependent on technical considerations. Among these are the Moon's monthly swing around the Earth, launch restrictions at Cape Kennedy, daylight conditions in the launch and recovery areas, and preferred photographic lighting for sites of interest on the Moon.

Crewmen for the Apollo 8 mission are Commander Frank Borman, Command Module Pilot James A. Lovell, Jr., and Lunar Module Pilot William A. Anders. There will be no Lunar Module on this mission, but Anders will fly in the position reserved for the Lunar Module pilot on fully configured Apollo missions.

The Apollo 8 mission will be an "open-ended" mission conducted in steps referred to as "plateaus" or "commit points." Conducting the mission in this manner provides both maximum crew safety and maximum benefit through alternate flight mission selection as the flight proceeds.

Each plateau includes a thorough check of crew, system and equipment operations. Only when all conditions are satisfactory will the decision be made to commit to the next plateau. The commit points in the Apollo 8 mission are:

- Prelaunch checkout, terminating in launch.
- Earth parking orbit, which ends with translunar injection.
- Translunar coast, preceding lunar orbit injection.

-more-

Conducting Apollo 8 in this manner provides for various alternate missions, which include a low Earth orbit flight, a high apogee mission up to 60,000 miles, or a circumlunar operation.

Launch will be from Complex 39A at Kennedy Space Center on an easterly azimuth between 72 and 108 degrees. The Saturn V launch vehicle will place the spacecraft and the SIVB third stage into a 115-statute-mile high parking orbit around the Earth during which third stage and spacecraft checkout will be accomplished.

The third stage will then be reignited during the second or third parking orbit to inject the space vehicle into a translunar trajectory. The injection will provide a circumlunar "free return" to Earth if the decision is later made not to insert the spacecraft into lunar orbit.

Within two hours after translunar injection, the command and service module will separate from the rocket's third stage. Midcourse corrections may be made using the spacecraft's reaction control system. The translunar coast will take about 66 hours from Earth orbit to the Moon.

At translunar injection from Earth orbit the Spacecraft speed will be increased from approximately 17,500 to about 24,200 miles per hour. During coast to the Moon, the speed will decrease to about 2,120 mph when the spacecraft is about 30,000 miles from the Moon. At this point lunar gravity will cause the spacecraft to accelerate as it approaches the Moon.

The spacecraft service propulsion system will be used to slow the spacecraft from about 5,700 mph to 3,720 mph, inserting it into a 196 by 70 statute mile lunar orbit. Approximately two revolutions later the system will be fired again to circumlarize the orbit at 70 statute miles above the surface of the Moon.

Crew activities during lunar orbit will include navigation and landmark sightings and photography. After ten trips around the Moon (each orbit lasting about two hours) the service propulsion system will be fired again to boost the spacecraft out of lunar orbit onto a trans-Earth trajectory. The return flight from the Moon to Earth will take about 57 hours.

Prior to reentry into the Earth's atmosphere, the command module will be separated from the service module using the latter's reaction control syste. Elapsed time from launch to landing in the Pacific Ocean will be

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about six days.

The decision to fly the lunar orbit mission followed a full review of the readiness of the hardware, crew and support systems by Dr. Thomas O. Paine, Acting Administrator of NASA.

The intensive review process has been underway since Aug. 19, when NASA announced that Lunar Module (LM) operations would be rescheduled from Apollo 8 to Apollo 9 because LM 3 had been delayed in checkout. LM 3 will now be flown next year on the fourth Saturn V (AS 504), which will be the first manned flight of the LM and third manned mission for the command and service modules.

In the announcement, Lt. Gen. Samuel C. Phillips, Apollo Program Director, said the purpose of the change in the flight schedule was to permit the program to make the maximum progress with the Apollo-Saturn space system, while working out all problems encountered in the LM 3 checkout.

He said in the Aug. 19 announcement that the Apollo 8 flight would be prepared as an Earth orbital mission, but that training and planning would include the possibility of a high Earth orbit, circumlunar or lunar orbit mission.

In recommending the selection of the lunar orbit mission for Apollo 8, Dr. George R. Mueller, Associate Administrator for Manned Space Flight, told Dr. Paine that it would advance the Apollo Program by:

- Providing valuable experience in validating the Apollo CSM communications and navigation system at lunar distance.

- Completing the final verification of ground support elements and onboard computer programs.

- Increasing the understanding of environmental conditions in deep space and the proximity of the Moon.

- Confirming the ability of the crew to see, use and photograph landmarks during a lunar mission.

- Providing new measurements of variations in lunar gravitational potential discovered in NASA's lunar orbiter program.

The decision to undertake a flight around the Moon was reached after a long series of reviews which included:

- Final certification of solutions to the anomalies revealed during the unmanned Apollo 6 flight last Spring.

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- Detailed analysis and review of the results of the Apollo 7 mission.
- Complete ground tests of Saturn V components, including insulation, structural and pressure tests, before the Apollo 8 command and service modules were certified ready for lunar flight.
- Complete design certification reviews of all launch vehicle and spacecraft subsystems.

The final review yesterday by Dr. Paine, with all top NASA officials participating, included an assessment of the total risks involved, readiness of all flight and support systems and the degree to which the recommended lunar orbit flight would advance the Apollo Program toward the nation's long-standing objective of a manned lunar landing and return by the end of next year.

"After a careful and thorough examination of all systems and the risks and benefits involved in each of the mission alternatives," Dr. Paine stated, "we have concluded that we are ready to fly this advanced mission around the Moon. Frank Borman and his crew are eager to proceed, our engineers unanimously recommend this mission, and, without being overconfident, we believe that we understand the hazards involved and are now ready to take this next step forward in the nation's space program."

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
483-5111

MSC 68-79
November 15, 1968

HOUSTON, TEXAS--Plans now call for the first United States astronauts to land on the moon next year to place three scientific experiments on the lunar surface in addition to carrying out their primary tasks of photography and collecting samples of the lunar soil and rocks which will be returned to earth for detailed scientific analysis.

The experiments will replace the more complex Apollo Lunar Surface Experiment Package (ALSEP) that was to have been carried on the mission. The change is being made because of the uncertainties involved in the workload necessary to deploy the full ALSEP by the astronauts in pressurized space suits on the moon's surface.

The National Aeronautics and Space Administration is in the process of planning the detailed tasks to be performed by the astronauts. The planning is based on the desire to obtain the maximum scientific return consistent with the primary purpose of the first manned lunar landing mission.

Primary objective of the mission is to prove out the Apollo system by achieving a successful moon landing and safe return to earth.

During the first landing, plans call for the astronauts to leave the spacecraft and spend up to three hours on the moon's surface. During this time they will make observations and photograph the area in the vicinity of the landed spacecraft in addition to collecting the samples and deploying the experiments.

The astronauts will perform their tasks in an order of increasing complexity. At each level of activity, scientific and medical data on the expenditure of energy by the astronauts will be obtained. This will insure adequate monitoring of their ability to perform in the vacuum, extreme temperature and one-sixth gravity of the moon and will provide important data which will permit the planning of longer and more complex missions for the future.

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The scientific experiments are a passive seismometer, a laser ranging retro-reflector and a solar wind composition experiment.

The passive seismometer is a self-contained 100-pound seismic station with its own earth-moon communications link. It is powered by solar cells and may be provided with radioisotope heaters to enable it to survive the extremely cold lunar nights for up to a year. It will provide data on the internal activity of the moon. If the moon is seismically active, information on its structure can be obtained. These data will assist in determining the validity of current concepts about the moon and its origin and perhaps lead to new concepts. Dr. Gary Latham of Columbia University's Lamont Geological Observatory, Palisades, N. Y., is experimenter.

The laser ranging retro-reflector is a wholly passive experiment consisting of an array of precision optical reflectors which serve as a target for earth-based laser systems. It weighs 70 pounds. Data obtained will improve the measurement of earth-moon distance and the fluctuation of the earth's rotation rate. Measurements of the variations in the gravitational constant "G" also will be improved. The theory of intercontinental drift can be tested by direct measurements from different continents. Dr. Carroll O. Alley of the University of Maryland, College Park, and Dr. Donald Eckhardt of the Air Force Cambridge Research Laboratory, Cambridge, Mass., have experiments of this type under development.

The solar wind composition experiment is designed to entrap the noble gases (Helium, Neon, Argon, Krypton, Xenon) in the solar wind. It consists of a sheet of aluminum foil which is placed across the solar wind. It is retrieved before the astronauts leave the moon and returned to earth for analysis. The one-pound experiment is developed and funded by the Swiss Government. Dr. Johannes Geiss of the University of Berne is experimenter.

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In the second lunar landing mission, NASA plans to have the astronauts deploy a full geophysical station or Apollo Lunar Surface Experiments Package (ALSEP) and conduct a detailed field geology investigation.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

November 15, 1968
MSC 68-80

HOUSTON, TEXAS--The Apollo Lunar Module successfully completed a manned vacuum chamber test yesterday, November 14, to help clear the way for manned lunar missions with the vehicle.

Astronaut James B. Irwin and Gerald P. Gibbons, a Grumman Aircraft Corporation consulting pilot, were crewmen for the final manned portion of the test, which simulated liftoff from the moon's surface and rendezvous with an orbiting command module.

Five mannings, each about 13 hours long, were conducted in the test series, with Irwin and Gibbons serving as crewmen for two of the mannings and Gibbons and fellow Grumman pilot Glennon M. Kingsley the crew for the other three mannings.

Lunar Module Test Article 8 (LTA-8), which was specially built by Grumman for vacuum chamber testing, was operated under simulated space conditions for a total of 21 days during the test to prove out the vehicle's thermal design and life support systems for lunar missions.

The test, which consisted of both manned and unmanned phases, was conducted in Chamber B of MSC's Space Environment Simulation Laboratory beginning October 15. The entire LM mission was simulated twice including flight to the moon, lunar orbit and a manned lunar landing followed by liftoff from the moon and rendezvous with the orbiting command module.

Dr. Maxime A. Faget, Director of Engineering and Development at the Manned Spacecraft Center, said all major test objectives had been met. He said the spacecraft and test facility performed extremely well, permitting the test to be completed more than two weeks ahead of schedule.

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LTA-8 was built of the same materials, with nearly all the same flight-qualified equipment as vehicles being readied for manned lunar missions. It was not equipped with flight-type engines and attitude control thrusters since these engines cannot be fired in the vacuum chamber. Its propellant tanks were filled with simulated propellant (freon) and it was much more heavily instrumented than a flight vehicle.

The 35-foot-diameter, 43-foot-high Chamber B maintained a vacuum equivalent to space more than 100 miles above earth throughout most of the test. Temperature extremes of spaceflight were simulated by electric heaters attached to the skin of the spacecraft to reproduce heating from the sun and engine firings, while liquid nitrogen at a temperature of 300 degrees below zero Fahrenheit was circulated through the walls of the vacuum chamber to simulate space cold.

The crewmen, wearing pressurized suits, entered and left the spacecraft while the chamber remained at hard vacuum, to avoid upsetting the delicate thermal balance required for the test.

A previous series of manned chamber tests with the Lunar Module May 27 - June 1, 1968 at MSC helped verify the vehicle for manned earth orbital flights.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

November 13, 1968
MSC 68-80

HOUSTON, TEXAS--Astronauts Thomas P. Stafford, John W. Young and Eugene A. Cernan have been assigned as prime crewmen for the Apollo 10 mission, scheduled for the second quarter of 1969.

Apollo 10 is planned as the second manned flight of the lunar module. The mission possibilities for Apollo 10 range from Earth orbital operations to a lunar orbit flight.

The backup crew consists of Astronauts L. Gordon Cooper, Donn F. Eisele and Edgar D. Mitchell. Flight crew support team members are Astronauts Joe H. Engle, James B. Irwin and Charles M. Duke, Jr.

The crew is training for a lunar orbit mission in which the complete Apollo spacecraft--command and service modules and the lunar module--will be flown. However, if an earlier Apollo mission must be repeated or plans are changed, the crew will be prepared for the complete range of Apollo missions.

Apollo 10 will be launched by a Saturn V into low Earth orbit. In the case of the most forward mission, at the end of the second or third orbit, the third stage of the Saturn V will be reignited to place the space vehicle on a trajectory to the Moon. The command and service module will separate from the third stage and the spacecraft lunar module adapter panels will be jettisoned.

The command and service module then will dock with the lunar module and extract it from the rocket stage. The combined spacecraft modules will continue to the Moon and enter an orbit around the Moon.

Spacecraft Commander Stafford and Lunar Module Pilot Cernan will enter the lunar module, detach it from the command and service modules, descend to approximately 50,000 feet above the Moon's surface, then return to the orbiting command and service module. The lunar module will be left in orbit around the Moon and the crew will return to Earth in the command module.

The Apollo 10 prime crew served as the backup crew for Apollo 7.

Stafford, 38, an Air Force colonel, was the pilot of Gemini 6 in December, 1965, and the command pilot of Gemini 9 in June, 1966. He has logged more than 98 hours of spaceflight.

Young, 38, is a Navy commander. He was the pilot of Gemini 3, the first manned flight in that program in March, 1965, and he was the command pilot of Gemini 10 in July, 1966. He has more than 75½ hours of spaceflight.

Cernan, 34, a Navy commander, flew with Stafford in Gemini 9, during which he became the second American to "walk in space." His spaceflight time totals more than 72 hours.

Cooper, 41, an Air Force colonel, commands the backup crew. One of the original seven United States astronauts, he flew the last mission in the Mercury Program, MA-9, in May, 1963, and he was command pilot of Gemini 5 in August, 1965. He has more than 225 hours in space.

Eisele, 38, is an Air Force lieutenant colonel. He was command module pilot on the 11-day Apollo 7 flight last month. He has the same assignment on the Apollo 10 backup crew.

Mitchell, 38, a Navy commander, has not yet flown in space. Prior to his assignment as backup LM pilot for Apollo 10, he was a member of the astronaut support team for Apollo 8.

None of the Apollo 10 support team has flown in a spacecraft, although Engle, 36, has earned Air Force astronaut wings by piloting the X-15 experimental rocket aircraft to an altitude of more than 50 miles. Major Engle was a test pilot in the X-15 program prior to becoming a NASA astronaut.

Irwin, 38, an Air Force lieutenant colonel, participated in several altitude chamber tests which helped qualify the LM for manned flight.

Duke, 33, is an Air Force major. He has had technical responsibilities in launch vehicle and crew safety areas.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
483-5111

RELEASED BY NASA HEADQUARTERS

November 15, 1968

The National Aeronautics and Space Administration presented 39 individuals and six groups with medals and certificates at the space agency's annual awards ceremony today.

The presentations were made by Dr. Thomas O. Paine, Acting NASA Administrator, at the Dept. of Health, Education and Welfare Headquarters auditorium.

Principal speaker was the Hon. Alexander H. Flax, Assistant Secretary of the Air Force for Research and Development. Mr. Flax was also the recipient of the NASA Distinguished Service Medal, the agency's highest award, for his contributions to the USAF and NASA in the field of research and development. DSMs went also to Edmond C. Buckley, former NASA Associate Administrator for Tracking and Data Acquisition; Paul G. Dembling, NASA General Counsel and Abe Silverstein, Director of the NASA Lewis Research Center, Cleveland.

Receiving awards for exceptional scientific achievement were G. Mervin Ault, Edmund E. Bisson and John C. Evvard, all of Lewis; Richard M. Goldstein of NASA's Jet Propulsion Laboratory, Pasadena, Calif.; Otto H. Hoberg and Hans H. Hosenthien, both of Marshall Space Flight Center, Huntsville, Ala.; Robert D. Jastrow, Director of the Goddard Institute for Space Studies, New York City; Louis D. Kaplan of JPL; Mark R. Nichols of the NASA Langley Research Center, Hampton, Va; William A. Page and John A. Parker of NASA's Ames Research Center, Mountain View, Calif.; and Alan Rembaum and Conway W. Snyder, both of JPL.

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Exceptional Service Medals were awarded Dr. Mac C. Adams, former NASA Associate Administrator for Advanced Research and Technology; Walter F. Boone, Admiral, USN (Ret.), former NASA Assistant Administrator for Defense Affairs; Richard L. Callaghan, former NASA Assistant Administrator for Legislative Affairs; Robert J. Darcey of Goddard Space Flight Center, Greenbelt, Md.; Philip Donely of Langley Center; Robert C. Duncan from NASA's Electronics Research Center, Cambridge, Mass. Also Fred H. Felberg of JPL; Arnold W. Frutkin, NASA Assistant Administrator for International affairs; Paul F. Fuhrmeister and Harry H. Hamilton, both of Langley; Alfred S. Hodgson, NASA Headquarters Administration Office Director; Herman E. Lagow of Goddard, Greenbelt; Alvin R. Luedeck of JPL; Glynn S. Lunney of Manned Spacecraft Center, Houston; Robert J. McCaffery of Goddard, Greenbelt; Mildred V. Morris and Boyd C. Myers, Deputy Assistant Administrator for Administration both of Headquarters; Arthur Rudolf of Marshall Center; William R. Schindler of Goddard, Greenbelt; Hubert R. Stanley of NASA's Wallops Station, Wallops Island, Va.; and Michael J. Vaccaro of Goddard, Greenbelt.

The late Robert M. Crane of Ames Research Center was awarded the Exceptional Service Medal posthumously.

Group Achievement Awards went to Apollo 7 Flight Operations Team, Instrumentation Ships Team, Mariner Occultation Experiment Team, OGO Project Team, Sonic Boom Investigation Team and Surveyor Team.

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NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

Houston 1, Texas

483-5111

MSC 68-82

November 18, 1968

HOUSTON, TEXAS--NASA has awarded a $9.8 million contract to the Link Group, General Precision Systems, Inc., Binghamton, New York, for maintenance and modification of the Manned Spacecraft Center's simulator complex in Houston. The contract covers the period September 1, 1968 through August 13, 1969.

Under terms of the contract, Link will provide maintenance and necessary modifications for MSC Apollo command module mission simulators, lunar module mission simulators and other Apollo simulator and training equipment located both at MSC and at Kennedy Space Center, Florida. The contract provides for two options of one year and six months respectively, allowing for extension of the contract through February 28, 1971.

The Apollo command module simulators provide flight training for astronaut crews assigned to a specific mission. Nearly every detail of the flight, with the exception of weightlessness, can be simulated. This gives flight crews extensive on-the-ground training before the actual flight and gives them training in instant reaction to emergencies which may occur during the flight.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas

HU 3-5111

MSC 68-83
December 3, 1968

The National Aeronautics and Space Administration has awarded a $3,500,000 contract to Allis-Chalmers, Milwaukee, Wisconsin, to flight qualify an improved fuel cell electrical power system for the Apollo Applications Program.

The power system, called a Multi-mission Fuel Cell Assembly, has been developed by Allis-Chalmers under three previous NASA contracts since 1962.

Under terms of this contract, Allis-Chalmers will produce four fuel cell assemblies, two for use in the qualification program and two to be delivered to MSC.

The qualification program will, in part, attempt to verify a fuel cell lifetime of 2,500 hours to insure adequate margins for 1,500 hour missions.

The Allis-Chalmers fuel cell assembly is similar in size and operation to the present Apollo fuel cell. Three of the advanced fuel cells can be installed in the same location in the Apollo Service Module as the three fuel cells currently used in the Apollo program.

The Multi-mission Fuel Cell Assembly offers significant improvements in performance over the Apollo fuel cell. Tests have shown the unit to produce about 2,800 watts of electrical power at 27 volts DC -- about twice the power output of the present fuel cell. It operates at a lower temperature, about 190 degrees Fahrenheit compared with about 400 degrees for current models, and it weighs about 185 pounds compared with about 240 pounds for the Apollo fuel cell.

The Multi-mission Fuel Cell Assembly uses cryogenically stored hydrogen and oxygen which react electro-chemically to produce electricity and water. Like the Apollo fuel cell, it uses potassium hydroxide as the electrolyte; however, the electrolyte is contained in an asbestos matrix at reduced concentrations rather than in a free molten state, permitting lower temperature operation.

Flight qualification of the fuel cell will be done by Allis-Chalmers' Advanced Electrochemical Products Division, Milwaukee, Wisconsin. Work under the contract is to be completed by February 20, 1970.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

MSC 68-84
December 4, 1968

HOUSTON, TEXAS--The National Aeronautics and Space Administration has signed a Supplemental Agreement with the Grumman Aircraft Engineering Corporation valued at $21,477,120 for changes in the Apollo Lunar Module contract.

The agreement formally incorporates into the Grumman Contract 94 changes previously authorized and 24 amendments to previously definitized changes by NASA for modification to the contractor's documentation and reporting procedures for test and checkout of the LM, for modifications to flight and ground test hardware, for additional test and effect analysis, and for crew safety hardware changes.

The modifications bring the total estimated value of the Grumman contract since January, 1963, to $1,602,521,120.

Grumman performs the majority of work on the Lunar Module contract at its Bethpage, New York facility with support from its field offices in Houston, White Sands and at the Kennedy Space Center.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas

HU 3-5111

MSC 68-85
December 10, 1968

HOUSTON, TEXAS--The NASA Manned Spacecraft Center has awarded a one year contract extension to the Lockheed Electronics Company, Division of Lockheed Aircraft Corporation, for general electronic, instrumentation, and engineering support services at the Center.

The cost plus award fee contract represents the fourth year of an approved five year program initially awarded to Lockheed Electronics Company, Houston, Texas.

The one year extension is valued at about $16.4 million and brings the total estimated value of the contract since September 1965 to about $46.4 million.

Services to be performed under the contract include operational support in the areas of instrumentation and electronic systems, information systems, guidance and control, space physics, and lunar and earth sciences. The contract provides operational support of facilities in the Engineering and Development and the Science and Applications Directorates.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas
HU 3-5111

MSC 68-86
December 17, 1968

Houston, Texas--The NASA Manned Spacecraft Center announced today the awarding of a two-year contract to TRW Inc., TRW Systems Group, Redondo Beach, California, for Mission Trajectory Control Program and Spacecraft Systems Analysis Program.

The Mission Trajectory Control Program to be accomplished will cover analysis of space flight trajectories and mission simulations. It will consist of flight control computer program development, trajectory analysis, orbital maneuvers, range safety analysis, operational software and mission error analysis.

The Spacecraft Systems Analysis Program will cover systems engineering and analysis of spacecraft systems and subsystems. It will consist of analytical studies, technical fact finding and evaluation of spacecraft systems and associated equipments to provide a basis for technical decision making by NASA.

Contract period to be covered will be from July 1, 1968, through June 30, 1970. Total amount of the cost-plus-incentive/award fee contract is estimated at $68,458,801, which includes $20,961,537 transferred from predecessor contract NAS 9-4816.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
Houston 1, Texas
HU 3-5111

December 18, 1968
MSC 68-87

HOUSTON, TEXAS--William C. Schneider, Apollo Mission Director, has been appointed Director of the Apollo Applications Program at the National Aeronautics and Space Administration.

Schneider, who succeeds the late Harold T. Luskin in the Apollo Applications post, will assume his new duties after the completion of the Apollo 8 lunar orbit mission. Luskin, who was a world aerospace leader, died November 25, 1968.

Replacing Schneider will be George Hage, Deputy Director of the Apollo Program, who will be Acting Mission Director in addition to his present duties.

In his new post, Schneider will have overall responsibility for the Apollo Applications Program. Apollo Applications is designed to make use of the hardware developed for the Apollo manned lunar landing program to carry out extensive and long duration earth orbital operations.

Flights in Apollo Applications are scheduled to begin in 1971. Missions include the establishment of the Saturn I workshop in earth orbit and the later attachment to the workshop of the Apollo Telescope Mount. Three-man crews will occupy the workshop and operate the telescope system for periods of up to 56 days.

Schneider became Apollo Mission Director in July 1967. Prior to that he had been Apollo Applications Mission Director from January 1967. He was Gemini Mission Director for nine of the manned Gemini missions and also served as Deputy Director of the Gemini Program.

As Apollo Mission Director, Schneider was responsible for management, direction and coordination of mission and flight plans, schedules and associated activities. He was mission director for the unmanned Apollo 4, 5 and 6 missions and the manned Apollo 7 flight, and will be Mission Director for Apollo 8.

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Schneider holds the NASA Exceptional Service Medal for his work as deputy director of the Gemini Program.

Hage has been deputy director of the Apollo Program since January 1968. He serves as general manager of the Apollo Program and assists the Apollo Program Director in the management of the many Apollo developmental activities

Before his present position, Hage was deputy director (engineering) of the Apollo Program since October 1967. Prior to that he was Deputy Associate Administrator for Space Science and Applications (Engineering) since July 1967 when he first joined NASA.

Before joining NASA, Hage was engineering manager for the Boeing Company's Lunar Orbiter Program.

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NEWS RELEASE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NASA
Houston 1, Texas

HU 3-5111

December 31, 1968
MSC 68-88

HOUSTON, TEXAS--The National Aeronautics and Space Administration has awarded a contract to North American Rockwell Corporation (NR), Downey, California, for the preliminary design of modifications to the Apollo Block II Command and Service Modules (CSM) for use in long-duration Apollo Applications missions.

The 6-month, cost-plus-fixed-fee contract is valued at about $7 million.

The contract will require the preliminary design of the modifications to the Block II CSM; fabrication of mock-ups of the CM, SM, and controls and display panels; and preparation of program documentation plans and specifications.

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