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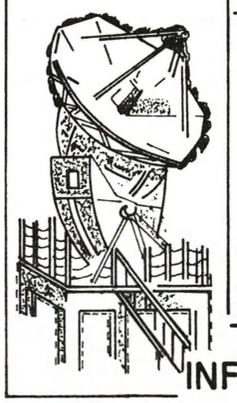

TECHNICAL INFORMATION BULLETIN

... THE MANNED SPACE FLIGHT NETWORK

Volume 5, Number 23 December 5, 1968
GODDARD SPACE FLIGHT CENTER

Orbital Mission Planned In 'Plateaus'

The AS-503 mission has been planned as "open-ended" mission conducted in "plateaus" or "commit points" to provide 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 and only when all conditions are satisfactory will the mission be committed to the next plateau. Commit points in AS-503 are:

- Prelaunch checkout, terminating in launch.
- Earth parking orbit, which ends

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Simulation Prepares Network For AS-503

A full-scale Network simulation on November 19, 20, and 21 served as rehearsal for the planned AS-503 manned lunar orbital flight later this month.

While the Network simulation brought the entire MSFN up for support--land stations, ships, and aircraft--the prime requirements of the three day effort was to exercise the 85-foot stations and wing sites on procedures and activities representative of a lunar mission. And, since AS-503 will be a significant departure from past Apollo missions--that is, support during lunar, translunar, and transearth phases--it was necessary to define and develop procedures peculiar to this mission as well as to familiarize the MSFNOC, the NST, station operating personnel, and the Aircraft Operations Control Center with these mission activities.

During the exercise, the Network simulated both earth orbital and lunar missions.

The three 85 foot stations, as well as the wing sites at Honeysuckle and Madrid, had an instrumented aircraft flyover to simulate the spacecraft during its translunar, lunar, and transearth phases of the mission. The aircraft downlinked PCM data from the AC-13 tape which allowed complete end-to-end configuration to be exercised. Unfortunately, aircraft problems at Honeysuckle allowed only 30 minutes of flyover at that site.

Other participation in the simulation included:

....The Aircraft Operations Control Center which was manned and participated according to a prepared time line. Airborn ARIA operations was limited to one aircraft which recorded data from the GSFC aircraft near Goldstone on the second

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AS-505 Is Big Test For Lunar Module

Astronauts Thomas P. Stafford, John W. Young and Eugene A. Cernan have been assigned as prime crewmen for theAS-505 mission, scheduled for the second quarter of 1969.

AS-505 is planned as the second manned flight of the lunar module. The mission possibilities for AS-505 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.

AS-505 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.

Three Experiments Set For Lunar Landing

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 Experiments 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 ALSEP by the astronauts in pressurized space suits on the Moon's surface.

During the first landing, plans call for the two 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 ensure 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.

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.

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 weights 70 pounds. Data obtained will improve

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Simulation

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day and performed a data transfer at TEX.

....The Cape Kennedy Real-Time Computer System processed IRV's for ARIA pointing data.

....The MSFN Operations Center was manned by the Network Support Team. The IST and the necessary flight control positions were simulated from the NT&TF. The three-day simulation proceeded as follows:

Day 1--Liftoff was at 2300Z at a launch azimuth of 88 degrees. Activities including a simulated earth-orbital mission which lasted about eight hours including a one-hour minus count.

Day 2--Liftoff at 2400Z at a launch azimuth of 83 degrees. Activities lasted about 13 hours including a simulated lunar orbital mission.

Day 3 was a continuation of the lunar orbital mission.

Ops Doc Status

Documentation distributed recently includes:

Network Operations Plan for Mariner Mars 69 Mission--distributed November 4.

Network Operations Plan for HEOS-A Mission--distributed November 7.

MSFN Simulation Handbook--distributed November 22.

Documentation scheduled for distribution:

Manned Space Flight Network Operations Center document.

Software Catalog for the Apollo Network.

Premission Briefing Report for the AS-503 Mission.

Planned In 'Plateaus'

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with translunar injection.

- Translunar coast, preceding lunar orbit injection.

Conducting the mission this way provides for alternate missions, including a low Earth orbit flight, a high apogee mission up to 60,000 miles, or a circumlunar operation.

The selection of the lunar orbit mission for AS-503, it was felt, would advance the Apollo Program by:

- Providing valuable experience in validating the Apollo CSM communications and navigation systems 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 AS-502 flight last Spring.

- Detailed analysis and review of the results of the AS-205 mission.

- Complete ground tests of Saturn V components, including insulation, structural and pressure tests, before the AS-503 command and service modules were certified ready for lunar flight.

Lunar Experiments

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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.

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 return to Earth for analysis. The one-pound experiment is developed and funded by the Swiss Government.

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.

The *Technical Information Bulletin* is published twice monthly by the Manned Flight Operations Division for Network personnel only. Since information contained herein may not have been released outside the project organization, it is to be considered privileged. Release of this information to others must be approved by the Public Information Office, GSFC. Address other communications to J. Mulvihill, TIB Editor, NASA, Goddard Space Flight Center, Code 820, Greenbelt, Maryland 20771, or use the MSFN teletype facilities.

NT & TF RESIDENT TRAINING SCHEDULE
JAN - JUNE 1969

COURSE	LENGTH WKS	JANUARY	FEBUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST
110 MSFTP-2	9							(SEE NOTE 1)	
132 NETWORK DATA FLOW	1								
200 642 B COMPUTER	8							(SEE NOTE 1)	
205 COMP. PROGRAMMING	6							(SEE NOTE 2)	
210 1218 COMPUTER	8							(SEE NOTE 1)	
230 RSDP PERIPHERAL	6								
320 LAND ANTENNA	6								
330 RECEIVER/EXCITER	7								
340 POWER AMP	7								
350 DIGITAL RANGING	5								
360 TDP/APP	7								
372 USB LEVEL II	3								
400 TELETYPE OPERATION	2								
410 TELETYPE MAINT	5								
510 RECORDERS	5								
520 TIMING	4								
600 APOLLO PROGRAM	1								
610 DIGITAL COMP FUNDAMENTALS	4								
620 M&O SUPERVISION	2								
640 MSFNOC	1								

NOTES:

1. LEVEL II CONCEPTS OF MSFTP-2, 642 B MOD COMPUTER, AND 1218 COMPUTER WILL CONSIST OF THE FIRST TWO (2) WEEKS OF THE SCHEDULED COURSE.

2. CONVENING DATE FOR THE FIRST SYSTEMS PROGRAMMING COURSE (205) IS TENTATIVE. ANY CHANGE FOR THIS COURSE WILL BE PUBLISHED.

REFERENCES:

1. GETC 008A 16/1715 OCTOBER
2. GETC 006A 4/1755 NOVEMBER