



FLIGHT PLAN FOR MA-8/16

NASA-MSC
HOUSTON, TEXAS

SEPTEMBER 10, 1962

REVISION A

FLIGHT OBJECTIVES

1. First Order Objectives -
 - a. To evaluate the effects on the astronaut of approximately one day in orbital flight.
 - b. To verify that man can function for an extended period in space as a primary operating system of the spacecraft.
 - c. To evaluate in a manned one-day mission the combined performance of the astronaut and a Mercury spacecraft specifically modified for the mission.
2. Second Order Objectives -
 - a. To obtain the astronaut's evaluation of the operational suitability of the spacecraft and supporting elements for extended manned orbital flight.
 - b. To assess the effectiveness of the Mercury World-Wide network and mission support forces during an extended manned orbital flight.

EXPERIMENTAL - ASTRONAUT PARTICIPATION (In order of priority)

1. Aeromedical Studies
2. Flashing Beacon Experiment
3. Dim Light Phenomenon Photographs
4. Horizon Definition Photographs
5. Radiation Measurements
6. Infrared Weather Photographs
7. Tethered Balloon Experiment
8. Television System Operation
9. Cabin Environmental Temperature Study
10. HF Antenna Test
11. Ground Light Experiment

EXPERIMENTAL - NON - ASTRONAUT PARTICIPATION

1. Micrometeorite Impact Studies
2. White Patch Temperature Experiment

FLIGHT OBJECTIVES

PRIME

1. To evaluate the performance of the MA-8/16 man-spacecraft system in a six-pass orbital mission.
2. To evaluate the effects of an extended orbital space flight on the astronaut and to compare this analysis with those of previous missions and astronaut-simulator programs.
3. To obtain additional astronaut evaluation of the operational suitability of the spacecraft and supporting systems for manned orbital flight.
4. To evaluate the performance of spacecraft systems replaced or modified as a result of the previous three-pass orbital missions.
5. To evaluate the performance of and further exercise the Mercury Network and mission support forces to establish their suitability for extended manned orbital flight.

EXPERIMENTAL - ASTRONAUT PARTICIPATION

1. High frequency antenna evaluation
2. Ground flare and light experiment
3. Terrestrial photographs
4. Weather photographs

EXPERIMENTAL - NONASTRONAUT PARTICIPATION

1. Apollo ablation material studies
2. Cosmic radiation studies

DISCUSSION

1. The flight plan assumes a nominal mission and any required changes during flight will be directed by the Flight Director.
2. Experiments, Observations and Studies have been scheduled and will be conducted in a manner that will not conflict with the mission operational requirements.
3. Eight hours have been allowed for the astronaut to rest. A period of approximately two hours has been setup during which the rest period can be started at the option of the astronaut. The end point allows a minimum of two hours for the astronaut to be alert before the 17-1 retrosequence point.
4. The times listed in the day-night column of the summary flight plan are equivalent first orbit times and are used to locate the spacecraft on the onboard star charts. The times replace the time computer used on MA-8.
5. In order to obtain engineering data on the ASCS, at frequent intervals the pilot will use external references such as the horizon or known stars to estimate spacecraft rates and attitudes; he will report these along with control mode switch settings and indicated rates and attitudes into the onboard tape. Gross disagreement between pilot's estimates and indicator values will be analyzed for scanner, ASCS, or gyro malfunctions.
6. The tape recorder has been programmed assuming the 22 hour tape recorder will be available in the spacecraft. The tape program has been carried throughout the entire mission; however, the continuous run curve should be crossed well prior to retrosequence.
7. Predicted RCS fuel usage and minimum fuel level plots for both the manual and automatic systems have been included in the MA-9 mission rules.

DISCUSSION

LAUNCH PHASE

1. ATTAINMENT OF THE PRIMARY FLIGHT OBJECTIVE REQUIRES FUEL CONSERVATION MEASURES TO OVERRIDE ALL OTHER EXPERIMENTAL REQUIREMENTS.	0:00:00	Lift-off	A-	Report clock operating.
	0:00:20	Start backup clock	MCC-	Standby for 20 seconds. 2, 1, MARK!
2. CONTROL SYSTEM MANAGEMENT HAS BEEN PROGRAMMED TO ARRIVE AT RETROSEQUENCE WITH A MINIMUM OF 35 PER CENT IN BOTH AUTOMATIC AND MANUAL FUEL TANKS.			A-	Report backup clock operating.
	0:00:30	Report	A-	Fuel _____ Cabin pressure holding at _____. O ₂ _____
3. THE GYROS WILL NOT BE CAGED UNTIL THE ASTRONAUT DEMONSTRATES HIS ABILITY TO ALIGN YAW VISUALLY AND SIMULATES A GYRO UNCAGING PROCEDURE.			MCC-	Pitch angle _____
4. STATION REPORTING WILL UTILIZE CONCISE NEGATIVE REPORTING.				
	0:01:00	Report	A-	Fuel _____ Cabin pressure passing through _____. O ₂ _____
5. MEDICAL EXPERIMENTATION WILL BE MINIMAL. BLOOD PRESSURES WILL BE GIVEN THREE TIMES EACH ORBIT.			MCC-	Pitch angle _____ Report passing through max q.
6. HIGH FREQUENCY RADIO CHECKS WILL BE CONDUCTED AT 1:05, 3:20, 7:20, 7:50 and 8:12.				
	0:01:30	Report	A-	Fuel _____ Cabin pressure passing through _____. O ₂ _____
7. ONE FLARE SIGHTING WILL BE ATTEMPTED AT WOOMERA, AUSTRALIA ON THE FIRST ORBIT.			MCC-	Pitch angle _____
8. ONE LIGHT SIGHTING WILL BE ATTEMPTED AT DURBAN, SOUTH AFRICA ON THE SIXTH ORBIT.				
	0:02:10	BECO	A-	Report BECO. Fuel _____. Cabin pressure sealed and holding at _____. O ₂ _____
9. TERRESTRIAL PHOTOGRAPHS FOR GEOLOGICAL STUDY WILL BE TAKEN OF SPECIFIC REGIONS DURING ASCS AND DRIFTING FLIGHT.			MCC-	Pitch angle _____ Confirm staging.
10. WEATHER PHOTOGRAPHS FOR WEATHER SATELLITE DEVELOPMENT WILL BE TAKEN DURING A PERIOD OF DRIFTING FLIGHT.				
	0:02:33	Jett Tower	A-	Report Jett Tower GREEN. Observe tower separation. Auto Retro Jett - OFF.
11. ELECTRICAL POWER WILL BE CONSERVED BY POWERING DOWN THE ASCS AC BUS AND C & S BEACONS AT SPECIFIED INTERVALS.			MCC-	Pitch angle _____

0:03:00 Report A- Fuel _____.
Cabin pressure holding
at _____.
O₂ _____

MCC- Pitch angle ____.

0:03:30 Report A- Fuel _____.
O₂ _____.
Complete voltage check.

0:03:35 MCC GO-NO-GO MCC- Give GO-NO-GO.

A- Give astronaut GO-NO-GO.

MCC- Confirm astronaut GO-NO-GO.
Pitch angle ____.

0:04:00 Report A- Fuel _____.
O₂ _____

MCC- Pitch angle ____.

0:04:30 Report A- Fuel _____.
O₂ _____

MCC- Pitch angle ____.
Report when V/VR is over .8

0:05:05 SECO and Sep Cap A- Report SECO and Sep
Cap GREEN.

MCC- Confirm SECO and Sep Cap.

0:05:08 Turnaround (FBW) A- Report Aux Damp OK.
Go to FEW-Low.
Report turnaround complete.
Orbit attitude.

0:07 Orbit GO (ASCS Retro) A- Go to ASCS.

MCC- Confirm events.
Give orbit GO.

A- Electrical systems check.
Confirm orbit GO.
Start orbit checklist.
Blood pressure

FIRST ORBIT

0:08 MCC/EDA Report (ASCS Retro) MCC- Give GET mark.
Give 2-1 and 4-1 retro-
sequence times.
Give V/VR.

0:10 10 Min. Check Sustainer Tracking (FBW-Low) MCC- Advise astronaut of 10
min. check.

A- Confirm 10 min. check
complete.
Go to FEW-Low.
Track sustainer to approx.
-50° pitch.

0:12 Orbit Attitude (MP) A- Go to MP
Resume orbit attitude.
Go to ASCS Retro
Gyros - FREE.

0:15 CYI Report CYI- Report valid radar track.

A- Standard report.
Confirm Ts +5, ASCS,
and MP checked.
Gyros - NORMAL.

CYI- Give all sunset and
sunrise times.
Give apogee and perigee
altitudes and times.

0:21 KNO Report (ASCS Retro) A- Standard report.
Go to UHF Low and check

KNO- After UHF Low check,
instruct astronaut to go
to UHF High.

0:30 ZZB Report (ASCS Retro) A- Standard report.

ZZB- Give 2-1 retrosequence time.

A- After UHF LOS, select HF
and call ZZB and MUC.

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0:50	MUC Report (ASCS Retro)	A-	Hold retro attitude for MUC radar. Blood pressure. Standard report. Extinct standard light and record values.	1:29	Day Yaw Checks (FBW-Low)	A-	<u>Day, terrestrial - Window</u> Check indicator system. Go to FBW-Low. Gyros - FREE. Manuever - OFF. Report control mode. Cover periscope. Yaw away from 0° (20° - 30°) Pitch down (-50° to -60° maximum). Cover rate and attitude indicator. Visually align yaw from ground. Start pitch up and align roll on horizon. Stabilize attitude at: -34° pitch 0° yaw All rates zero 0° roll Go to: Gyros - NORMAL. Manuever - OFF. Allow scanners to correct gyro attitude. Uncover indicator and periscope. <u>Day, terrestrial - Periscope</u> When gyros are correct, go to: Gyros - FREE. Manuever - OFF. Yaw away from 0° (20° - 30°) Cover indicator and window. Manuever to: 0° pitch 0° roll All rates zero 0° yaw Uncover indicator. Go to: Gyros - NORMAL. Manuever - OFF. Allow scanners to correct gyro attitude. Uncover window. If time and fuel allow, repeat entire procedure once before sunset.
		MUC-	Report valid radar track. Emergency voice check. Give astronaut missing sunrise and sunset times. Advise astronaut of flare experiment status.				
0:55	Flare Experiment (FBW-Low)	A-	Go to FBW-Low. Gyros - FREE. Report control mode. Pitch down to 75° while holding yaw and roll zero.				
0:58	Flare Ignition (FBW-Low)	WOM-	Report flare ignition.				
		A-	Report acquisition of WOM flare. Report extinction times and values.				
1:02	WOM Report (ASCS Retro)	A-	Go to ASCS Retro. Gyros - NORMAL. Report control mode. Extinct standard light and record values.				
1:05	HF Check (ASCS Retro)	A-	Transmit on HF for approximately 60 seconds. Include call sign, purpose, and CET time check.				
1:10	CIN Report (ASCS Retro)	A-	Standard report. Blood pressure.				
1:27	GYM GO-NO-GO (ASCS Retro)	A-	Standard Report				
		GYM-	Give GO-NO-GO decision. Give 3-1 and 6-1 retro sequence times.				

SECOND ORBIT

				2:20	Night Yaw Checks (FBW-Low)	A-	<u>Night, star - Window</u> Check indicator system Go to FBW-Low. Gyros - FREE. Maneuver - OFF. Report control mode. Cover periscope. Yaw away from 0° (20° - 30°) Cover indicator. Realign spacecraft to: 0° pitch (or -14°) 0° yaw All rates zero 0° roll using a known star or star pattern Uncover scope and indicator. Go to: Gyros - NORMAL. Maneuver - OFF. Allow scanners to correct gyro attitude. <u>Night, terrestrial - Periscope</u> When gyros are correct, Go to: Gyros - FREE. Maneuver - OFF. Yaw away from 0° (20° - 30°) Cover indicator and window. Align spacecraft to: 0° pitch 0° yaw All rates zero 0° roll Uncover indicator and window. Note: Requires a moonlit condition, may be interchanged with night window check.
1:34	MCC Report (FBW-Low)	A-	Blood pressure. Standard report.				
		MCC-	Emergency voice check.				
1:40	MCC/BDA Report (FBW-Low)	A-	Report yaw checks. If MCC Reports fuel satisfactory, continue yaw checks. If MCC reports fuel low, commence limited drifting flight (i.e. flight within scanner limits).				
1:49	CYI Report (FBW-Low)	A-	Standard report. Report yaw checks.				
1:55	KNO Report (FBW-Low)	A-	Standard report. Report yaw checks.				
2:00	Limited Drifting Flight (MP)	A-	When yaw checks are complete, go to MP and commence limited drifting flight (within scanner limits). Report control mode.				
2:04	ZZB Report (MP)	A-	Standard report.				
2:08	IOS Report (MP)	A-	Standard report.				
				2:24	MUC Report (FBW-Low)	A-	Standard report. Blood pressure.
						MUC-	Give 3-1 retrosequence time.
				2:32	WOM Report (FBW-Low)	A-	Report yaw checks. If WOM reports fuel satisfactory, continue yaw checks. If WOM reports fuel low, commence limited drifting flight.

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				<u>THIRD ORBIT</u>			
2:44	CTN Report (FBW-Low)	A-	Standard report. Report yaw checks, if appropriate.	3:10	MCC Report (Drift)	A-	Blood pressure. Standard report. Orientation Test - with eyes closed reach for: (1) manual fuel handle, (2) rate indicator, and (3) emergency O ₂ rate handle. Note accuracy of reach and record results on onboard tape.
2:50	HAW Report (ASCS Retro)	A-	Go to ASCS Retro. Gyros - NORMAL. Maneuver - OFF. Standard report. Blood pressure.				
2:59	CAL GO-NO-GO (ASCS Retro)	A-	Standard report.				
		CAL-	Give GO-NO-GO decision. Give 4-1 retrosequence time.	3:14	MCC/EDA Report (Drift)	A-	Standard report. Eat and drink.
		A-	Commence drifting flight if yaw checks have been satisfactory. Select FBW-Low or Manual. Cage gyros Power down ASCS bus and beacons. If yaw checks were not satis- factory, commence limited drifting flight.	3:41	IOS Report (Drift)	A-	Confirm faceplate closed. Power up ASCS bus and beacons. Standard report.
				3:57	MUC Report (Limited Drift)	A-	Blood pressure. Standard report. Uncage gyros. Gyros - NORMAL. Maneuver - OFF. Commence limited drifting flight within scanner limits.
						MUC-	Give 4-1 retrosequence time.
				4:05	WOM Report (Limited Drift)	A-	Standard report.
				4:07	Star Extinction (Limited Drift)	A-	Identify and extinct a star (two, if time permits). Record identification and extinction value.
				4:23	HAW Report (ASCS Retro)	A-	Go to ASCS Retro. Gyros - NORMAL. Maneuver - OFF. Standard report.
				4:32	CAL GO-NO-GO (ASCS Retro)	A-	Standard report.
		CAL-	Give GO-NO-GO decision.				

4:34 Drifting Flight (Drift) A- Commence drifting flight if foregoing yaw checks were satisfactory. Cage gyros. Power down ASCS bus and beacons. Report powering down. If yaw checks were not satisfactory, commence limited drifting flight. Commence terrestrial photography (terminate at 4:50).

FOURTH ORBIT

4:41	MCC Report (Drift)	A-	Standard report. Blood pressure.
		MCC-	Give 4-2 and 6-1 retro-sequence times.
4:46	MCC/BDA Report (Drift)	A-	Standard report.
5:00	Intermediate Report (Drift)	A-	Note standard report on knee pad.
5:15	IOS Report (Drift)	A-	Standard report. Blood pressure. Give 5:00 intermediate report. Orientation Report - with eyes closed reach for: (1) manual fuel handle, (2) rate indicator, and (3) emergency O ₂ rate handle. Note accuracy of reach and record results on onboard tape.
5:23	Star Extinction (Drift)	A-	Identify and extinct a star (two, if time permits). Record identification and extinction value.
5:35	Intermediate Report (Drift)	A-	Note standard report on knee pad.
5:40	WAT/UTV Report (Drift)	A-	Standard report. Give 5:35 intermediate report.
5:51	HAW Report (Drift)	A-	Standard report. Blood pressure.
6:05	CAL Report (Drift)	A-	Standard report.
6:07	GYM Report (Drift)	A-	Standard Report. Blood pressure. Power up ASCS bus.
		GYM-	Give 5-1 retrosequence time.
6:10	Weather Photography (Drift)	A-	Commence weather photography (terminate at 6:30).

FIFTH ORBIT

				7:47	TEX Report (ASCS Retro)	A-	Standard report.
6:15	MCC Report (Drift)	A-	Standard report.	7:50	HF Check Terrestrial Photography (ASCS Retro)	A-	Transmit on HF for approxi- mately 30 seconds. Include call sign, purpose, and CET time check. Commence terrestrial photo- graphy (terminate at 8:05). Go to Gyros - NORMAL. Maneuver - OFF. (Allow scanners to correct gyros.
6:30	Uncage Gyros (MP)	A-	Align gyros. Gyros - NORMAL. Maneuver - OFF. Go ASCS Retro.				
6:35	Intermediate report (ASCS Retro)	A-	Note standard report on knee pad.				
6:48	IOS Report (ASCS Retro)	A-	Standard report. Blood pressure. Give 6:35 intermediate report.				
7:03	Power up (ASCS Retro)	A-	Power up beacons.				
7:05	Intermediate Report (ASCS Retro)	A-	Note intermediate report on knee pad.				
7:15	PCS GO-NO-GO (ASCS Retro)	A-	Standard report.				
		FCS-	Give GO-NO-GO decision.				
		A-	Give 7:05 intermediate report.				
7:20	HF Check (ASCS Retro)	A-	At sunrise transmit on HF for approximately 30 seconds. Include call sign, purpose, and CET time check.				
7:21	WAT Report (ASCS Retro)	A-	Standard report. Go to Gyros - FREE. Maneuver - OFF.				
7:32	HAW Report (ASCS Retro)	A-	Standard report. Blood pressure. Eat and drink.				
		HAW-	Confirm faceplate closed.				
7:39	CAL Report (ASCS Retro)	A-	Standard report.				
7:45	GYM Report (ASCS Retro)	A-	Standard report. Blood pressure.				
		GYM-	Give 6-1 retrosequence time.				

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SIXTH ORBIT

8:05	HF Check Intermediate Report (ASCS Retro)	A-	At sunset, transmit standard report on HF (minimum duration of 30 seconds). Also, note standard report on knee pad.	8:50	Retrosequence (ASCS Retro)	PCS-	Countdown to retrosequence "Mark".
						A-	Standby to backup with MP and control retrosequence events. Report sequence light illuminations.
8:15	Light Extinction (ASCS Retro)	A-	Extinct standard light source and record values.	8:51	Retrofire (ASCS Retro)	PCS-	Confirm retrosequence. Countdown to retrofire "Mark". Confirm retrofire.
8:22	Light Experiment (MP)	A-	Go to MP Gyros - FREE. Pitch down to 75° while holding yaw and roll zero.			A-	Mark each retro-rocket firing.
8:22	IOS Report (MP)	A-	Standard report. Report acquisition of Durban light. Report extinction times and values. Give 8:05 intermediate report. Blood pressure.	8:52	Retro Jettison (FEW)	A-	Go FEW. Execute pre-retro jett checklist. Report retro jett. Report control mode. Pitch up to reentry attitude.
						PCS-	Confirm reentry attitude.
8:25	Light Extinction (MP)	A-	Extinct standard light source and record values.	8:55	WAT Report (RSCS)	A-	Go RSCS. Report control mode. Blood pressure.
8:27	Retro Attitude Pre-Retro Checklist (ASCS Retro)	A-	Check FEW High Thrusters (if required). Go to ASCS Retro. Gyros - NORMAL Maneuver - OFF. Report control mode. Execute pre-retro checklist. Orientation Test - with eyes closed reach for: (1) manual fuel handle, (2) rate indicator, and (3) emergency O ₂ rate handle. Note accuracy of reach and record on onboard tape.			WAT-	Give landing and recovery information: Landing position Landing time Location and identity of nearest recovery units Estimate time of recovery Wind velocity Wave height Sea temperature Air temperature If astronaut is on HF, instruct him to go to UHF for relay communications.
8:35	Stowage Checklist (ASCS Retro)	A-	Execute stowage checklist.	8:58	Blood pressure (RSCS)	A-	Blood pressure.
8:48	PCS Report (ASCS Retro)	A-	Standard report. Report checklists complete.	9:00	.05 G (RSCS)	A-	Mark .05 G Standby to select aux. damp.
		PCS-	Confirm astronaut ready for retrosequence. Confirm retrosequence time settings.				

COMMUNICATIONS

9:02	Blood pressure (RSCS)	A-	Blood pressure.
9:04	Max G (RSCS)		
9:05	Drogue Chute (RSCS)	A-	Deploy drogue chute manually at 40,000 ft. Execute checklist (as re- quired).
9:07	Main Chute	A-	Execute checklist.
9:11	Landing	A-	Execute post impact checklist.

1. If superior results are obtained, HF will be used in preference to UHF for all voice communications (including station passes) except communications involving relay aircraft. If more than one ground station is in communication with the spacecraft, the astronaut will select the preferred ground station.

2. UHF will be used for all station pass communications involving relay aircraft to extend contact times. These passes are:

- a. Beginning of 4th orbit MCC contact
- b. Beginning of 5th orbit MCC contact
- c. Beginning of 6th orbit 7:50 to 7:56 (if 5th orbit Panama relay is satisfactory).
- d. 4th orbit HAW pass from 5:50
- e. 5th orbit HAW pass from 7:25

3. UHF will be used from .05 until landing.

4. The astronaut will transmit a standard call on HF lasting for approximately 30 seconds at the following times:

1:05	- Night (60 second transmission)
7:12 - 7:20	- Sunrise
7:50	- Day
8:04 - 8:12	- Sunset

The call will include the call sign, the purpose of the call, and a CET time check. The stations will not reply to this call, but should record the signal strengths received.

5. The ground stations will make sequential HF transmissions at times shown in the table below. The transmissions will be of approximately 15 second duration and will include the station call sign, the purpose of the call, and the GET time of the call. The spacecraft will not reply to the calls, but will record them on the onboard voice tape.

<u>Starting Time (GET)</u>	<u>Station</u>
3:20:00	MCC
3:20:15	CYI
3:20:30	KNO
3:20:45	ZZB
3:21:00	IOS
3:21:15	MUC
3:21:30	WOM
3:21:45	CTN
3:22:00	WAT
3:22:15	PCS
3:22:30	HAW
3:22:45	CAL
3:23:00	GYM

Total Duration - 3 minutes 15 seconds

6. Initial contact will be made by the station Com Tech on HF at TM AEC time based on nominal time from the computer.
7. After initial contact, call signs will be eliminated.
8. The astronaut will ensure that the Cap Com is on the air/ground loop prior to transmitting data.
9. If the astronaut does not answer voice calls, the Com Tech will instruct him to check his VOX switch position and to key TM.
10. When over a station, if the astronaut does not hear the ground, or is informed that the ground does not hear him, he will transmit his standard report in the blind and will key appropriate TM messages.
11. The astronaut will transmit three BT's prior to his TM CW messages to allow the TM monitor time to switch on the CW tone for the Cap Com.
12. TM CW messages will be transmitted at approximately five words per minute, using the attached code.
13. No R and Z calibration reports will be transmitted to the astronaut.
14. No requests for blood pressures will be transmitted to the astronaut except in emergency.

STANDARD REPORT

Astronaut

1. Status _____.
2. Control mode _____.
3. Gyros _____.
4. Maneuver _____.
5. CET time check _____.

Cap Com

1. Confirm report.
2. Retrosequence times (if applicable).
- *3. Inverter temperatures _____.
- *4. Thruster temperatures _____.
- *5. Time check error _____.

* Report only abnormal readings.

C W Code

AAA	-. -. -	Affirmative, I concur, yes	RE (Followed by contingency area)	Reentering at indicated contingency area
AL	-. . .	Abort light		
AR	-. . .	End of message	REO	-. . . - - - Reentering at end of this orbit
BT	- . . . -	Message follows	RS	-. Retrosequence
CP	- -	Cabin pressure	SP	. . . . . Suit pressure
EEEE. . E	. . . . .	Error	T	- Temperature
EF	. . . .	Emergency O ₂ rate flow	UUUU	. . . . . Aborting or reentering immediately
F	. . . .	Off	X	- . . . Out of operation
FA	. . . . -	Automatic fuel	Mark	Long dash with Mark at end of dash
13 FM	. . . . - -	Manual fuel		
GMT	- . . - - -	Clock GMT		
IMI	. . - . . .	Repeat your last transmission		
K	- . -	Over		
L	. . . .	Leaking		
MAN	- - . - - .	Operated manually		
NO	- . - - -	No, negative		
O	- - -	On		
O ₂ (Followed by four numbers)		Oxygen primary and secondary quantities		
OK 1, 2, 3	- - - - . - 1, 2, 3	Status green for 1, 2, 3 orbits		
Q	- . . -	Request, question		
R 1, 2, 3	. . - . 1, 2, 3	End of 1, 2, 3 orbit retrosequence time		
RRR	. . . . .	Roger, Wilco		

ATTITUDE CHECKS

Yaw Orientation Check and Simulated Gyro

Uncaging Procedure

Purpose

To quantitatively determine the effectiveness of the window and the periscope, separately, as external reference ports for aligning the spacecraft to 0° in yaw and for orientation to the proper gyro uncaging attitude.

Control System

low thrust Fly-By-Wire

Conditions

A. Day, terrestrial

1. Window
2. Periscope

B. Night, star

1. Window

C. Night, terrestrial

1. Periscope (a moonlit condition is required)

Note: The procedure is primarily designed to obtain data, therefore, the gyros are not caged throughout the maneuvers.

Procedure

A. Day, terrestrial - Window

1. Verify that the gyro indicating system is in proper operation.
2. Note starts and stops of capsule motion, specified readings, external view, and piloting actions required throughout the maneuver on the onboard voice tape and transmit to ground simultaneously.
3. Switch to

FEW select switch - LOW

ASCS switch - FEW

Gyro switch - FREE

Maneuver switch - OFF

4. Cover periscope.
5. Yaw away from 0° (20° - 30° maximum) holding pitch at approximately -34° and roll at approximately 0°. Stop all rates. Record rates and attitudes.
6. Pitch down to -50° to -60° (maximum).
7. Cover entire rate-and-attitude indicator.
8. Pick a prominent feature which lies, as nearly as possible, directly on the spacecraft track. Begin yaw alignment with chosen reference using window and yaw reticle.
9. Start pitch up. When horizon becomes visible in the window (approximately -44° pitch) align roll to 0°. Continue holding or adjusting yaw attitude.
10. Mark each transfer to a new yaw reference point, if the previous point did not appear to lie directly on the flight path.

11. Continue pitch up and yaw and roll alignment. Stabilize the spacecraft at

-34° pitch
 0° yaw All rates zero
 0° roll

12. If time allows, switch to

Gyro switch - NORMAL

Maneuver switch - OFF

and allow scanners to correct gyro attitudes.

13. Uncover periscope and estimate yaw error, if any.
14. Uncover rate-and-attitude indicator and record all readings.

B. Day, terrestrial - Periscope

1. Immediately following window check and any gyro realignment go to

Gyro switch - FREE

Maneuver switch - OFF

Periscope - Low magnification

Periscope filter - Clear

2. Yaw away from 0° (20° - 30° maximum) holding pitch at approximately -34° and roll at approximately 0° . Stop all rates. Record rates and attitudes.
3. Cover entire rate and attitude indicator. Remove yaw reticle from window and cover the window with the shutters.
4. Using the periscope, maneuver and stabilize the spacecraft at

0° pitch
 0° roll All rates zero
 0° yaw

5. Switch periscope to high magnification and refine all rates and attitudes as required. Comment on onboard voice tape.
6. Uncover rate-and-attitude indicator and record all readings.
7. Switch to

Gyro switch - NORMAL

Maneuver switch - OFF

and allow scanners to correct gyro attitudes.

8. Uncover window.

Note: If time and fuel allows the above two procedures are to be repeated once before sunset.

C. Night, star - Window

1. Verify that the gyro indicating system is in proper operation.
2. Mark starts and stops of spacecraft motion, specified readings, and the piloting actions required throughout the maneuver on the onboard voice tape and transmit simultaneously to the ground.
3. Switch to
FBW select switch - LOW
ASCS switch - FEW
Gyro switch - FREE
Maneuver switch - OFF
4. Cover periscope.
5. Yaw away from 0° (20° - 30° maximum) holding pitch at

approximately -34° and roll at approximately 0° . Stop all rates. Record rates and attitudes.

6. Cover entire rate and attitude indicator.
7. Locate a known star or star pattern and determine where it should be with respect to the window for 0° pitch, roll, and yaw change reference star or star pattern as required. Record the star or star pattern on the onboard voice tape.
8. Align the spacecraft to 0° in pitch, roll, and yaw. All rates zero.
9. Uncover periscope and estimate yaw error, if possible. Uncover rate-and-attitude indicator and record readings.
10. If time allows, switch to
Gyro switch - NORMAL
Maneuver switch - OFF
and allow scanners to correct gyro attitudes.

Note: A -14° pitch attitude may be substituted for the 0° pitch attitude in the attitude realignment.

D. Night, terrestrial - Periscope

(a moonlit condition is required)

1. Following the night window check and gyro realignment, go to
Gyro switch - FREE
Maneuver switch - OFF
Periscope - Low magnification
Periscope filter - Clear
2. Comment on the external view and reference points visible.
3. Yaw away from 0° (20° - 30° maximum) holding pitch and roll constant. Stop all rates. Record rates and attitudes.
4. Cover rate-and-attitude indicator and window.
5. Using the periscope, maneuver the spacecraft to
 0° pitch
 0° roll All rates zero
 0° yaw
6. Switch periscope to high magnification and refine all rates and attitudes, as required. Comment on onboard voice tape.

7. Uncover rate-and-attitude indicator and record all readings.

8. Switch to

Gyro switch - NORMAL

Maneuver switch - OFF

and allow scanners to correct gyro attitude.

9. Uncover window.

Note: This periscope maneuver requires a moonlit earth. It may be interchanged with the night window check, if the moon conditions require.

GROUND FLARE AND LIGHT EXPERIMENT

Purpose

1. To determine the capability of the astronaut to acquire a ground light of known intensity.
2. To obtain a quantitative measure of the light attenuation through both the atmosphere and the spacecraft window.

Control System

Low thrust Fly-By-Wire

Time

A. Flare and Light

1. First orbit 0:58:00 to 1:02:00 (Flare)
2. Sixth orbit 8:22:00 to 8:27:00 (Light)

B. Stars in the following periods

1. 4:05 to 4:20
2. 5:23 to 5:40

Procedure

A. Ground flare and ground light

1. Pitch down to 75°, yaw and roll approximately zero
2. Locate flare, comment
3. Using photometer, extinct known light source in spacecraft. Record index reading.
4. Extinguish ground flare as it moves away from spacecraft as many times as possible (a minimum of three). Pitch up as required. Record on the onboard tape both the

point when the flare is extinguished by the photometer and the index reading.

5. After the last ground light reading, repeat the extinction of the spacecraft light source.

B. Star

1. Locate a known star and record the name on the onboard tape.
2. Using the photometer, extinct the star. Record the index setting on the onboard tape.
3. Extinguish the spacecraft light source. Record the index reading on the onboard tape.
4. Repeat the extinction of the star.

NOTE: A minimum of three stars should be used.

TERRESTRIAL PHOTOGRAMS

Purpose

1. To build up a catalogue of space photographs of various terrestrial physiographic features, such as folded mountains, fault zones, and volcanic fields. One particular use may be to aid in interpreting the physiography of Mars when better photographs become available.
2. To investigate the photometric properties of various land surfaces.

Time and Control System

1. 4:34 to 4:50 (U.S. and Mexico)
Drifting Flight
2. 7:54 to darkness (South America)
ASCS

Type of Film

Super Anscochrome

Procedure

1. Photograph, with the terrestrial film pack, the areas listed below when they become visible.
2. During drifting flight, the photographs should be taken at low oblique angles whenever possible. When in ASCS, the areas should be photographed as soon as they are visible.
3. The spacecraft will not be maneuvered during either of these periods to obtain photographs of specific items.
4. The onboard voice tape will be marked when each photograph is taken.

Areas

1. Baja California (interested in volcanic fields).
2. Big Bend area north of Rio Grande and Marathon uplift north of Big Bend area.

WEATHER PHOTOGRAPHS

3. Central Texas
4. Southern California
5. Southern Arizona
6. West Texas about 100 miles northeast of El Paso, 80 miles north of Big Bend area.
7. South America

Purpose

To determine how the earth appears through three separate parts of the visible spectrum and one part of the infrared.

NOTE: This experiment has direct bearing on the selection of filters to be used with the Nimbus meteorological satellite.

Time and Control System

Fifth Orbit - 6:10 to darkness

Drifting flight

Type of Film

Black and white TRI-X. \sqrt{A} removable five filter mosaic will be placed in front of the film in the film pack.

Procedure

1. Photograph, with the weather film pack, the various weather phenomena as they become visible during the period given.
2. Photographs are desired of weather with land and water backgrounds during this entire period.
3. The onboard tape shall be marked when each photograph is taken.

Change Sheet 1 - Write-in Changes

NASA - Manned Spacecraft Center
 Atlantic Missile Range Operations
 Port Canaveral, Florida
 28 September 1962

The following are write-in additions and deletions to the MA-8/16
 Flight Plan Revision A:

Page 4	0:07	second section A-	delete line 3
Page 5	0:08	MCC-	Change lines 2 and 3 to read "Give IB, 2-1, and 4-1 retrosequence times."
Page 5	0:15	second section CYI-	delete all items.
Page 6	0:50	MUC-	delete lines 3 and 4.
Page 6	1:02		Title should read "WOM Report (ASCS Reentry)"
Page 6	1:02	A-	line 1 should read "Go to ASCS Reentry."
Page 6	1:05		Title should read "HF check (ASCS Reentry)".
Page 8	1:49	A-	delete line 2.
Page 8	1:55	A-	delete line 2.
Page 9	2:24	MUC-	delete all items.
Page 10	2:59	second A-	add time 3:10 to left-hand column.
Page 11	after 3:14 add 3:20	HF Ground Check (Drift)	A- VOX Switch - OFF.
Page 11	3:57	A-	after line 2 add "Go FBW - Low or MP."
Page 11	4:23	A-	after line 1 add "Prepared for Retro Seq. with ARM Squib - OFF."
Page 13	5:57	A-	delete line 2.

MEMORANDUM for Holders of MA-8/16 Flight Plan

Subject: Revision B to MA-8/16 Flight Plan

- Attached are write-in revisions to the MA-8/16 Flight Plan Revision A.
- Any comments should be forwarded to the Flight Activities Section, Flight Crew Operations Division.

Richard E Day

R. E. Day
 Assistant Chief for Training
 Flight Crew Operations Division

JBJ:bas

Enc: 3 change sheets

WORD ONE/KEYSEARCH

DATA							
REF	#	I	DCM	SUBJECT	DATE		
D:09-28-62	MSC	N 100	g D	M&K Manned - Atlas 5 Flight Plan Revision B MA 8	MSC	R 1000	

Change Sheet 2 - Write-in Changes

Page 13 6:05 delete all items.

Page 14 6:30 A- delete line 4.

Page 14 6:35 Title should read "Intermediate Report (MP)."

Page 14 6:48 Title should read "IOS Report (Optional)."

Page 14 6:48 A- change to read, "Standard Report, Blood Pressure, Go FBW-Low or MP, Give 6:35 intermediate report, Limited drift within scanner limits."

Page 14 7:03 A- add line 2 to read "Prepared for Retro Seq. with ARM Squib-OFF."

Page 14 7:32 delete HAW section.

Page 14 7:39 after section A- add CAL section to read "CAL - Confirm faceplate closed."

Page 15 7:47 delete all items.

Page 16 8:05 Change title to read "HF check, Intermediate Report, (ASCS Reentry)".

Page 16 8:15 change title to read "Light Extinction (ASCS Reentry)".

Page 16 8:25 change title to read "Light Extinction (ASCS Retro)".

Page 17 8:50 PCS- add line 2 to read "Arm Squib - ARM at Retroseq. - 5 sec."

Page 17 8:55 Change title to read "WAT Report (FBW)".

Page 17 8:55 A- delete lines 1 and 3

WAT delete lines 12, 13, and 14.

Page 17 8:58 A- add line 1 to read "Go RSCS".

Change Sheet 3 - Write-in Changes

Page 19 paragraph 1 add final sentence to read "Astronaut will communicate with PRIME station only, during horizon time".

paragraph 3 change to read "UHF will be used prior to Retroseq. until landing."

Page 20 paragraph 6 delete "...Com Tech on HF...."

Page 20 paragraph 9 delete all items.

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