

APOLLO

MISSION RULES

AS-201

REV B

PREFACE

THIS DOCUMENT HAS BEEN PREPARED BY THE FLIGHT CONTROL DIVISION, MANNED SPACECRAFT CENTER, HOUSTON, TEXAS. INFORMATION CONTAINED WITHIN THIS DOCUMENT REPRESENTS THE AS-201 MISSION RULES AS OF 9 FEBRUARY 1966.

THE FOLLOWING MSC ORGANIZATIONS ARE DIRECT CONTRIBUTORS TO THE AS-201 FLIGHT RULES (PART III): APOLLO SPACECRAFT PROGRAM OFFICE; APOLLO FLIGHT SYSTEMS BRANCH, FLIGHT DYNAMICS BRANCH, FLIGHT CONTROL OPERATIONS BRANCH, FLIGHT CONTROL DIVISION; LANDING AND RECOVERY DIVISION.

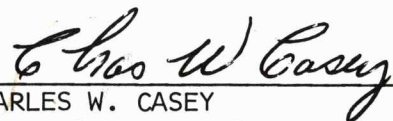
PART II, LAUNCH RULES, WILL NOT BE PREPARED OR ISSUED BY THE FLIGHT CONTROL DIVISION. THIS PART IS INCLUDED AS A CONVENIENCE FOR THE MISSION RULES USER TO ADD THE LAUNCH MISSION RULES FOR A COMPLETE MISSION RULES DOCUMENT.

QUESTIONS, SUGGESTIONS AND CORRECTIONS ABOUT THE CONTENTS OF THIS DOCUMENT SHOULD BE DIRECTED TO MR. LAWRENCE S. CANIN, FLIGHT CONTROL OPERATIONS BRANCH, FLIGHT CONTROL DIVISION.

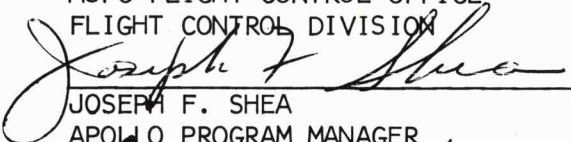
THIS DOCUMENT REVISION IS A PARTIAL ISSUE AND MUST BE INCORPORATED INTO THE MISSION RULES, AS-201, REV A, DATED 1 NOVEMBER 1966. THIS REVISION ALSO INCORPORATES THE MEMORANDUM DATED 30 NOVEMBER 1965, CHANGES TO THE AS-201 MISSION RULES.

THIS DOCUMENT IS NOT TO BE REPRODUCED WITHOUT WRITTEN APPROVAL OF THE FLIGHT DIRECTOR.

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REVISION INSTRUCTION SHEET

APOLLO

MISSION RULES

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UPDATE DOCUMENT IN ACCORDANCE WITH THE INSTRUCTIONS BELOW:

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BH

FL

MISSION	REV	DATE	PART 1	GR
AS-201	A	11-1-65	GENERAL GUIDELINES	INTRODUCT

MSC Form 364A (May 65)

NASA — Manned Spacecraft Center

MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		<u>INTRODUCTION:</u> THESE MISSION RULES ARE BASED ON THE TEST OBJECTIVES OUTLINED IN THE AS-201 MISSION DIRECTIVE. THEY ARE PREPARED IN THREE PARTS. PART I ESTABLISHES THE OVERALL GUIDELINES ON CRITERIA USED AS A BASIS FOR THE DEVELOPMENT OF THE DETAILED RULES IN PARTS II AND III. PART II CONTAINS THE LAUNCH MISSION RULES. PART III CONTAINS THE FLIGHT MISSION RULES. THE LAUNCH MISSION RULES AND THE FLIGHT MISSION RULES WILL PROVIDE GUIDANCE TO LAUNCH DIRECTOR AND FLIGHT DIRECTOR RESPECTIVELY. <u>OBJECTIVE:</u> THE PRIMARY OBJECTIVE OF MISSION RULES IS TO OUTLINE PREPLANNED ACTIONS TO ASSIST IN MAKING RAPID REAL-TIME DECISIONS DURING THE LATTER STAGES OF SPACE VEHICLE PREPARATION AND COUNTDOWN AND DURING FLIGHT WHEN UNFORESEEN OR ABNORMAL CONDITIONS ARISE.				
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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
		<u>DEFINITIONS:</u> <u>MANDATORY (M):</u> A MANDATORY ITEM IS ESSENTIAL TO THE ACCOMPLISHMENT OF THE PRIMARY OBJECTIVES. SHOULD A MANDATORY ITEM FAIL AT ANY TIME DURING THE COUNTDOWN, THE LAUNCH DIRECTOR OR FLIGHT DIRECTOR IN COORDINATION WITH THE MISSION DIRECTOR WILL CONTINUE THE COUNT, HOLD OR SCRUB DEPENDING ON THE TIME AND CIRCUMSTANCES. IN NO CASE WILL THE LAUNCH BE ATTEMPTED WITHOUT THE MANDATORY ITEM. CONFIRMATION OF ALL FAILURES WILL BE MADE IF TIME ALLOWS PRIOR TO INITIATING A HOLD REQUEST TO THE LAUNCH OR FLIGHT DIRECTOR. <u>HIGHLY DESIRABLE (HD):</u> A HIGHLY DESIRABLE ITEM SUPPORTS THE ACCOMPLISHMENT OF THE PRIMARY OBJECTIVES BUT IS NOT ESSENTIAL TO MISSION SUCCESS. SHOULD ANY ITEM DESIGNATED AS HIGHLY DESIRABLE FAIL DURING THE COUNT, A HOLD WILL BE CALLED BY THE LAUNCH DIRECTOR OR FLIGHT DIRECTOR TO REPAIR THE ITEM WHEN IT IS CONVENIENT AND IF THE ESTIMATED TIME TO REPAIR OR REPLACE THE ITEM IS ACCEPTABLE. IN NO CASE WILL A LAUNCH BE SCRUBBED FOR ANY SINGLE HIGHLY DESIRABLE ITEM, THE LOSS OR MALFUNCTION OF SEVERAL SUCH ITEMS COULD, HOWEVER, IN CONJUNCTION WITH OTHER AGGRAVATING CIRCUMSTANCES LEAD TO A SCRUB. <u>DESIRABLE (D):</u> A DESIRABLE ITEM IS NOT ESSENTIAL TO THE CONDUCT OF THE MISSION. A NONCONFORMING CONDITION SHOULD BE RECTIFIED WITHIN THE NORMAL COUNTDOWN PERIOD. THERE WILL BE NO HOLD OR SCRUB FOR DESIRABLE ITEMS. <u>PROCEED:</u> ACTIVITIES WILL CONTINUE IN ACCORDANCE WITH PRESCRIBED COUNTDOWN PROCEDURES. THE COUNT-DOWN WILL CONTINUE WHERE POSSIBLE CONCURRENTLY WITH CORRECTION OF AN EXISTING PROBLEM. <u>HOLD:</u> THE COUNTDOWN WILL BE INTERRUPTED UNTIL THE REASON FOR THE HOLD IS SATISFIED. <u>RECYCLE:</u> THE COUNTDOWN IS STOPPED AND RECYCLED TO A DESIGNATED POINT OR AS SPECIFIED IN PART II, THE LAUNCH RULES SECTION. <u>SCRUB:</u> THE LAUNCH WILL BE POSTPONED AND RESCHEDULED. <u>CUT-OFF:</u> THE AUTOMATIC OR MANUAL STOP COMMAND GIVEN AFTER INITIATION OF THE "AUTOMATIC LAUNCH SEQUENCE START."		
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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		<u>LIFT-OFF:</u> FIRST PERCEIVABLE MOTION OF SPACE VEHICLE AFTER HOLD-DOWN ARM RELEASE. <u>ABORT:</u> PREMATURE LAUNCH VEHICLE SHUTDOWN OR PREMATURE INTENTIONAL SPACECRAFT SEPARATION FROM LAUNCH VEHICLE PRIOR TO INSERTION.				
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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		<u>GENERAL GUIDELINES:</u>				
	1-1	THESE GUIDELINES DEFINE THE BASIC PHILOSOPHIES USED IN THE FORMULATION AND APPLICATION OF THESE MISSION RULES.				
	1-2	LAUNCH WILL NOT BE ATTEMPTED IF KNOWN GROUND OR SPACE VEHICLE SYSTEMS MALFUNCTIONS WOULD LIMIT THE MISSION TO LESS THAN ACCOMPLISHING THE PRIMARY TEST OBJECTIVES OR IF WEATHER CONDITIONS ARE NOT SATISFACTORY FOR LAUNCH OR RECOVERY OPERATIONS.				
	1-3	THE PRELAUNCH PHASE IS DEFINED AS THE TIME FROM START OF LAUNCH COUNTDOWN TO LIFT-OFF.				
	1-4	THE LAUNCH PHASE IS DEFINED AS THE TIME INTERVAL FROM LIFT-OFF TO S-IVB CUT-OFF.				
	1-5	THE COAST PHASE IS DEFINED AS THE TIME INTERVAL FROM S-IVB CUT-OFF TO FIRST SERVICE PROPULSTION SYSTEM (SPS) BURN.				
	1-6	THE REENTRY PHASE IS DEFINED AS THE TIME INTERVAL FROM FIRST SPS BURN TO IMPACT.				
	1-7	COMMAND HANDOVER WILL BE PASSED TO THE ROSE KNOT VICTOR (RKV) AT RKV TELEMETRY, ACQUISITION OF SIGNAL (AOS), OR IF RKV AOS OCCURS BEFORE MCC-H LOS, AS DIRECTED BY MCC-H.				
	1-8	THE RKV WILL ONLY ATTEMPT ACTIVE CONTROL OF THE MISSION PRIOR TO COMPUTED ENTRY INTERFACE (400,000 FT) TIME.				
	1-9	THE BASES FOR INHIBITING THE SPS BURN FROM THE GROUND IS A DEFINITE, CONFIRMED FAILURE IN THE CONTROL SYSTEM OR A VIOLATION OF TRAJECTORY LIMITS AS DEFINED IN THE SPECIFIC MISSION RULES.				
	1-10	IN THE EVENT OF COMMUNICATIONS LOSS FROM MCC-H TO RKV, THE CAPCOM ON THE RKV WILL ASSUME RESPONSIBILITY FOR MISSION CONTROL WITHIN THE MISSION RULES.				
	1-11	IN CERTAIN CASES, THE GENERAL GUIDELINES MAY DEVIATE FROM THE SPECIFIC MISSION RULES; IN ALL CASES OF CONFLICT, THE GENERAL GUIDELINES WILL APPLY.				
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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	1-12	THE LAUNCH DIRECTOR, FLIGHT DIRECTOR OR MISSION DIRECTOR MAY CHOOSE TO TAKE ANY NECESSARY ACTION REQUIRED FOR THE OPTIMUM CONDUCT OF THE MISSION.				
	1-13	WHENEVER POSSIBLE, THE LAUNCH SITE AND MCC-H WILL VERIFY TELEMETRY READOUT DISCREPENCIES. IF THE MCC-H HAS LOST A PARAMETER BUT THE LAUNCH SITE HAS A VALID READOUT, THE MCC-H WILL CONTINUE ON THE LAUNCH SITE READOUT. THIS IS TRUE EXCEPT FOR THOSE PARAMETERS UPON WHICH COMMAND ACTION IS TAKEN. IN THIS CASE, A HOLD WILL BE CALLED TO EVALUATE AND RECTIFY THE PROBLEM.				
	1-14	NO MANUAL CUT-OFF WILL BE ATTEMPTED AFTER T-3 SECONDS (ENGINE IGNITION).				
	1-15	THE TRANSFER OF PRIMARY MISSION CONTROL FROM THE LAUNCH DIRECTOR TO THE FLIGHT DIRECTOR WILL OCCUR WHEN THE SPACE VEHICLE REACHES SUFFICIENT ALTITUDE TO CLEAR THE TOP OF THE LAUNCH TOWER.				
	1-16	THE TRANSFER OF PRIMARY MISSION CONTROL FROM THE FLIGHT DIRECTOR TO THE RECOVERY DIRECTOR (DOD) WILL OCCUR WHEN THE SPACECRAFT LANDS ON THE SURFACE OF THE EARTH.				
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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S	
		<u>ABORTS:</u>			
	1-17	THE LAUNCH DIRECTOR POSITION AT THE LAUNCH SITE WILL HAVE ABORT COMMAND CAPABILITY.			
	1-18	THE FOLLOWING MCC-H MOCR POSITIONS WILL HAVE ABORT COMMAND CAPABILITY: FLIGHT DIRECTOR (FD); FLIGHT DYNAMICS OFFICER (FIDO); AND BOOSTER SYSTEMS ENGINEER (BSE). PROCEDURES WILL BE ESTABLISHED TO PRECLUDE AN ABORT COMMAND FROM THESE POSITIONS PRIOR TO LIFT-OFF.			
	1-19	THERE ARE NO SPACECRAFT FAILURES WHICH WILL REQUIRE ABORT DURING THE LAUNCH PHASE.			
	1-20	FIDO WILL SENT ABORT IF THE SPACE VEHICLE EXCEEDS ANY OF THE FIDO ABORT LIMIT LINES. FIDO ABORT LIMIT LINES WILL BE BASED UPON THE FOLLOWING CRITERIA:			
		A. MAXIMUM MODE I ABORT LIMIT EXCEEDED			
		B. 20g ENTRY EXCEEDED			
		C. MINIMUM SPS ABORT SEQUENCE LIMIT EXCEEDED			
	7	D. CROSSRANGE RANGE WATER IMPACT LIMIT EXCEEDED			
		E. DOWNRANGE WATER IMPACT LIMIT EXCEEDED			
	1-21	FIDO ABORT LIMIT LINES WHICH HAVE BEEN AGREED TO BETWEEN MSC-MSFC WILL NOT BE CHANGED PRIOR TO COORDINATION WITH OMSF.			
	1-22	BSE WILL SEND ABORT BASED UPON:			
		A. PREMATURE S-IVB STAGE EFFECTIVE THRUST LOSS			
		B. PREMATURE S-IVB STAGE EFFECTIVE THRUST LOSS OR NO IGNITION			
	1-23	PRIOR TO IGNITION THE LAUNCH DIRECTOR WILL BE RESPONSIBLE FOR ALL ACTIONS IN THE EVENT OF LAUNCH SITE EMERGENCIES INCLUDING SENDING ABORT.			
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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	1-24	AFTER IGNITION AND PRIOR TO SPACE VEHICLE REACHING SUFFICIENT ALTITUDE TO CLEAR THE TOP OF THE LAUNCH TOWER, THE LAUNCH DIRECTOR WILL BE RESPONSIBLE FOR ABORT ACTION IN THE EVENT OF MAJOR STRUCTURAL FAILURE OR EXPLOSION, LOSS OF POSITIVE VERTICAL MOTION, UNCONTROLLABLE VEHICLE TILTING AND TOWER COLLISION RESULTING IN DAMAGE NECESSITATING IMMEDIATE ABORT ACTION.				
	1-25	IN EVENT OF SPACE VEHICLE COLLISION WITH LAUNCH TOWER WHICH DOES NOT NECESSITATE IMMEDIATE ACTION, THE LAUNCH DIRECTOR WILL CONTINUE TO EVALUATE THE EXTENT OF THE DAMAGE AND PROVIDE INFORMATION OR ABORT RECOMMENDATION TO THE FLIGHT DIRECTOR FOR NECESSARY ACTION SUBSEQUENT TO FLIGHT DIRECTORS ASSUMPTION OF MISSION CONTROL FROM THE LAUNCH DIRECTOR.				
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APOLLO
MISSION RULES

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PREFACE

THIS DOCUMENT HAS BEEN PREPARED BY THE FLIGHT CONTROL DIVISION, MANNED SPACECRAFT CENTER, HOUSTON, TEXAS. INFORMATION CONTAINED WITHIN THIS DOCUMENT REPRESENTS THE AS-201 MISSION RULES AS OF 1 NOVEMBER 1965.

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THIS REVISION A IS A COMPLETE RE-ISSUE AND SUPERSEDES THE PREVIOUS AS-201 MISSION RULES DATED 1 AUGUST 1965.

MSFC COORDINATION BY:

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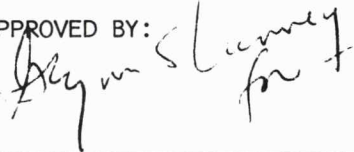
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MISSION RULES

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		SECTION 5 ENVIRONMENTAL PRELAUNCH/LAUNCH/COAST/ENTRY		5-1		
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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		<u>MCC SOP'S</u>				
	1-1	WHENEVER POSSIBLE, THE BLOCKHOUSE AND MCC WILL VERIFY TELEMETRY READOUT DES- CREPENCIES. IF THE MCC HAS LOST A PARAMETER BUT THE BLOCKHOUSE HAS A VALID READOUT, THE MCC WILL CONTINUE ON THE B/H READOUT. THIS IS TRUE EXCEPT FOR THOSE PARAMETERS UPON WHICH COMMAND ACTION IS TAKEN. IN THIS CASE, A HOLD WILL BE CALLED TO EVALUATE AND RECTIFY THE PROBLEM.				
	1-2	AMBER STATUS TO FLIGHT A FLIGHT CONTROLLER HAS OBSERVED A MALFUNCTION WHICH COULD POSSIBLY LEAD TO AN ABORT OR NO-GO SITUATION BUT AT PRESENT IS STILL A GO CONDITION. FLIGHT WILL GO TO THE FLIGHT CONTROLLER AS SOON AS POSSIBLE. THE FLIGHT CONTROLLER CAN GO TO FLIGHT AFTER A REASONABLE TIME IF FLIGHT HAS NOT CONTACTED HIM.				
	1-3	RED STATUS TO FLIGHT FLIGHT CONTROLLER HAS OBSERVED A SERIOUS MALFUNCTION WHICH IS CAUSE FOR ABORT ACTION. THE FLIGHT CONTROLLER WILL FOLLOW UP HIS STATUS LIGHT WITH A VOICE REPORT TO FLIGHT AND RECOMMENDED ABORT TIME.				
	1-4	VOICE REPORTS ALL VOICE REPORTS TO AND FROM THE FLIGHT DIRECTOR WILL BE MADE ON THE FD LOOP. ALL VOICE EXCHANGES BETWEEN MOCR SYSTEMS FLIGHT CONTROLLERS WILL BE MADE ON THE MOCR SYSTEMS LOOP. ALL VOICE EXCHANGES BETWEEN FLIGHT DYNAMICS PERSONNEL WILL BE MADE ON THE MOCR DYNAMICS LOOP. WHEN INITIATING A VOICE CONTACT WITH SOMEONE NOT ON YOUR PRIME LOOP, ALWAYS CONTACT THAT FLIGHT CONTROLLER ON HIS PRIME LOOP.				
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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		<u>VOICE COMMUNICATIONS</u>				
	2-1	FD LOOP MOCR DYNAMICS LOOP } MOCR SYSTEMS LOOP }	1 OF 3 MANDATORY			
	2-2	MCC-H TO CAPE B/H LAUNCH DIRECTOR	DESIRABLE			
		COUNTDOWN COORD } TEST SUPV } STC } LVTC }	1 OF 4 MANDATORY			
		IU VEH ELEC LV GUID FLT COMPUTER CSM ELEC PWR & SEQ CSM S & C CSM RF & COMM CSM TM & INST CSM RCS CSM ECS CSM SPS	DESIRABLE DESIRABLE DESIRABLE DESIRABLE DESIRABLE DESIRABLE DESIRABLE DESIRABLE DESIRABLE			
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		<u>VOICE COMMUNICATIONS (CONT'D)</u>				
	2-3	MCC-H TO IP COORD	HIGHLY DESIRABLE			
	2-4	MCC-H TO SUPT RANGE OPNS	HIGHLY DESIRABLE			
	2-5	MCC-H TO RANGE SAFETY OFFICER	1 OF 2 MANDATORY			
		<u>VIDEO CIRCUITS</u>				
	2-6	CAPE TO MCC-H	DESIRABLE			
	2-7	<u>PNEUMATIC TUBE SYSTEM</u>	DESIRABLE			
		<u>DISPLAY/CONTROL</u>				
	2-8	TRAJECTORY SCRIBERS	1 OF 3 MANDATORY (IF 1 OF 3 TRAJ PROJ. TV HAS FAILED), OTHERS HIGHLY DESIRABLE			
		<u>D/TV DISPLAY SYSTEMS</u>				
	2-9	TRAJECTORY PROJECTION TV	1 OF 3 MANDATORY (IF 1 OF 3 TRAJ SCRIBERS HAS FAILED), OTHERS HIGHLY DESIRABLE			
	2-10	MOCR #1	14 OF 28 CHANNELS MANDATORY			
	2-11	ADEG #1	2 CHANNELS MANDATORY			
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	2-12	CLOSED CKT TV	DESIRABLE			
	2-13	VIDEO RECORDING	DESIRABLE			
		<u>TELEMETRY</u>				
	2-14	SLV TM DISPLAY (40.8)	MANDATORY			
	2-15	S/C TM DISPLAY (40.8)	MANDATORY			
	2-16	SLV TM DISPLAY (BDA)	DESIRABLE			
	2-17	PCM GROUND STATIONS	1 OF 2 MANDATORY OTHER HIGHLY DESIRABLE			
	2-18	BUFFER FORMATTER	1 OF 2 MANDATORY OTHER HIGHLY DESIRABLE			
	2-19	RECORDING	DESIRABLE			
		<u>TIMING</u>				
	2-20	MISSION INST. TIMING EQUIP AND RELATIVE TIME ACCUMULATORS	ONE OF TWO MANDATORY OTHER HIGHLY DESIRABLE			
		<u>POWER</u>				
B	2-21	A ₁ BUS (UNINTERRUPTABLE) }	1 OF 2 MANDATORY			
B	2-22	A ₂ BUS (UNINTERRUPTABLE) }				
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B	2-23	B ₁ BUS (UNINTERRUPTABLE) FOR 25 SEC	1 OF 2 MANDATORY	HARDWARE REQUIREMENTS FOR THIS RULE ARE DETAILED ON PAGE 2-5.		
B	2-24	B ₂ BUS (UNINTERRUPTABLE) FOR 25 SEC				
B	2-25	MANDATORY REQUIREMENTS FOR LIFT-OFF				
			A. ONE PCM T/M STREAM FROM S-IB, S-IVB, IU AND CSM TO MCC-H			
			B. ONE TRACKING STREAM TO MCC-H			
			C. ONE TONE COMMAND STREAM TO MCC-H			
			D. ONE PCM T/M STREAM TO RKV			
			E. ONE TONE COMMAND STREAM TO RKV			
			F. ONE VOICE STREAM (2-WAY) FROM MCC-H TO RKV			
B	2-26	NO HOLDS FOR MANDATORY INSTRUMENTATION WILL BE CALLED BY FLT AFTER THE AUTOMATIC COUNTDOWN SEQUENCE BEGINS (AT T-2 MIN 43 SEC).				
B	2-27	CAPE TEL III FINE MONITOR HIGHLY DESIRABLE AND 2-WAY VOICE TO MCC-H				
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	PRELAUNCH REQUIREMENTS	MCC-HOUSTON	2-4

E/O - EITHER OR

MSC FORM 1359 (April 65)

CH80

CH8021V

CH8022V

CH8023V

CH8024V

CH8025V

CH8026V

CH8027V

P-

P-YAW A.

MISSION	REV	DATE	SECTION	GROU
AS-201	A	11/1/65	TRAJECTORY AND GUIDANCE	PRELAUNCH

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NASA — Manned Spacecraft Center
MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	3-1	PRELAUNCH INSTRUMENTATION				
		<u>MEAS. NO.</u>	<u>MEAS. DESCRIPTION</u>	<u>RULING</u>		
		H60-603	PITCH TOTAL GIMBAL ANGLE	MANDATORY		
		H60-603	ROLL TOTAL GIMBAL ANGLE	MANDATORY		
		H60-603	YAW TOTAL GIMBAL ANGLE	MANDATORY		
		H60-603	PITCH GUIDANCE COMMAND	HIGHLY DESIRABLE		
		CH8020V	ROLL ATT REF 1 (ARS)	MANDATORY		
		CH8021V	ROLL ATT REF 2 (ARS)	MANDATORY		
		CH8022V	PITCH ATT REF 1 (ARS)	MANDATORY		
		CH8023V	PITCH ATT REF 2 (ARS)	MANDATORY		
		CH8024V	R-YAW ATT REF 1 (ARS)	MANDATORY		
		CH8025V	R-YAW ATT REF 2 (ARS)	MANDATORY		
		CH8026V	P-YAW ATT REF 1 (ARS)	MANDATORY		
		CH8027V	P-YAW ATT REF 2 (ARS)	MANDATORY		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		A	11/1/65	TRAJECTORY AND GUIDANCE	PRELAUNCH	3-1

NASA — Manned Spacecraft Center
MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		<u>FIDO RULES</u>				
		<u>LAUNCH PHASE</u>				
	3-2	MAXIMUM MODE I ABORT LIMIT EXCEEDED	FIDO SENDS ABORT COMMAND	PRIMARY LINE DISPLAYED ON γ VS. V PLOT		
	3-3	20 g ENTRY EXCEEDED	FIDO SENDS ABORT COMMAND	SECONDARY LINE DISPLAYED ON γ VS. V PLOT, PRIMARY LINE DISPLAYED ON γ_{EI} VS. V_{EI} PLOT		
	3-4	MINIMUM SPS ABORT SEQUENCE LIMIT EXCEEDED	FIDO SENDS ABORT COMMAND	PRIMARY LINE DISPLAYED ON THE T_{ff} VS. R_{IP} PLOT		
B	3-5	AFTER TOWER JETTISON CROSSRANGE WATER IMPACT LIMIT OF ± 450 N.M. EXCEEDED A. T_{ff} GREATER THAN 14 MIN, 36 SEC B. T_{ff} LESS THAN 14 MIN, 36 SEC	A. FIDO REQUEST RSO TO SEND MFCO B. FIDO SEND ABORT	PRIMARY LINE DISPLAYED ON THE ϕ VS. λ PLOT		
B	3-6	DOWNRANGE WATER IMPACT LIMIT OF 5700 N.M. EXCEEDED A. T_{ff} GREATER THAN 14 MIN, 36 SEC B. T_{ff} LESS THAN 14 MIN, 36 SEC	A. FIDO REQUEST RSO TO SEND MFCO. B. FIDO SEND ABORT.	PRIMARY LINE DISPLAYED ON THE γ VS. V PLOT, SECONDARY LINE DISPLAYED ON THE T_{ff} VS. R_{IP} PLOT		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	TRAJECTORY AND GUIDANCE	FIDO	3-2

NASA — Manned Spacecraft Center
MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION			RULING	NOTES/COMMENTS/SOP'S
B	3-7	COAST PHASE TIME ABOVE 400,000 FEET IS LESS THAN 14 MINUTES, 36 SEC AT S-IVB CUT-OFF.			FIDO WILL SEND "ABORT" COMMAND TO THE S/C	THIS DOES NOT ALLOW SUFFICIENT TIME FOR THE CONTROL PROGRAMER TO COMPLETE THE SEQUENCE BEFORE REACHING 400,000 FT
B	3-8	TIME ABOVE 400,000 FEET IS GREATER THAN 14 MIN, 36 SEC AT S-IVB CUTOFF. A. GUIDANCE INFORMS FIDO THAT THE BOOSTER HAS NOT PITCHED SUFFICIENTLY. B. GUIDANCE INFORMS FIDO THAT THE BOOSTER IS PITCHING			A. FIDO SENDS ABORT B. FIDO WILL REPORT TO THE FLIGHT DIRECTOR: (1) LENGTH OF SPS BURN (2) ATTITUDE AND ALLOWABLE PREBURN ATTITUDE DISPERSIONS FOR THE GIVEN SPS BURN DURATION	A. PROGRAMER WILL ENTER THE NORMAL SEQUENCE 60 SECONDS AFTER S-IVB CUT-OFF. B. THE REPORT TO FLT WILL BE BASED ON THE FOLLOWING: (1) IP REPORT FROM THE RETRO-FIRE OFFICER TO MAINTAIN MAXIMUM 5700 N.M. DOWN-RANGE DISTANCE (2) V_{EI} VS. Y_{EI} PLOT AND ASSOCIATED TABLE FOR: (A) THE TIME OF SPS BURN PLUS TIME TO ENTRY INTERFACE MUST BE GREATER THAN 4 MIN, 35 SEC (B) MAXIMUM 20 g ENTRY (C) ATTAINING MAXIMUM HEATING RATE WITHIN OTHER CONSTRAINTS.
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	TRAJECTORY AND GUIDANCE	FIDO	3-3

NASA — Manned Spacecraft Center
MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		<u>GUIDO RULES</u> <u>LAUNCH/COAST PHASE</u>		ITEMS NO. 3-9 TO 3-13 HAVE BEEN RESERVED FOR FURTHER FIDO RULES.		
B	3-14	ARS ATTITUDE VS. ST-124 ATTITUDE DIFFERENCE GREATER THAN 5 DEGREES	INFORM FLIGHT OF DIFFERENCE	BSE #2 AND GNC REPORT NO MALFUNCTIONS IN ST-124 REFERENCE SYSTEM OR ARS GYROS		
B	3-15	CONFIRMED SLV CONTROL SYSTEM FAILURE AFTER PITCHDOWN MANEUVER INITIATED	GUIDANCE SEND <u>GC-38</u> , <u>SLA SEP</u> WHEN SLV PASSES THE NOMINAL SPS BURN ATTITUDE OF 173.5° (SLV) OR 186.5° (ARS)	CUE: BSE #2 RPT OF CONFIRMED FAILURE CUE: SLV ATTITUDES		
B	3-16	CONFIRMED LOSS OF SLV INERTIAL PITCH ATTITUDE REFERENCE AFTER PROGRAMED PITCHDOWN MANEUVER INITIATED	GUIDANCE SEND <u>GC-38</u> , <u>SLA SEP</u> WHEN SLV PASSES 186.5° PITCH ATTITUDE (ARS)	CUE: BSE #2 RPT OF CONFIRMED REFERENCE FAILURE CUE: ARS ATTITUDES		
B	3-17	S-IVB PROGRAMED PITCH ATTITUDE MANEUVER FAILURE TO STOP FOR OTHER THAN RULE 3-15 OR 3-16	GUIDANCE SEND <u>GC-38</u> , <u>SLA SEP</u> WHEN PITCH ATTITUDES EXCEEDS NOMINAL BY 12° (SLV=161.5 OR ARS=198.5)	CUE: ATTITUDES CUE: RATES FROM BSE #2 OR GNC		
B	3-18	PITCH RATE IS LESS THAN 0.2°/SEC OR PITCH ATTITUDE IS LESS THAN 105° (ARS) OR LESS THAN 255° (IU) BY S-IVB CUTOFF +50 SEC	GUIDANCE INFORM FIDO THAT PITCH-DOWN MANEUVER IS NO-GO.	A. BSE AND/OR GNC MONITORS RATES B. GUIDANCE MONITORS ARS AND/OR IU ATTITUDES. C. FIDO WILL SEND ABORT (REF RULE 3-8).		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	TRAJECTORY AND GUIDANCE	GUIDO	3-4

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING		NOTES/COMMENTS/SOP'S	
B	3-20	<u>RETRO RULES</u> RANGE EXCEEDS 5700 N.M. FOR PLANNED BURN.	RETRO WILL DETERMINE MAXIMUM ALLOWABLE BURN DURATION AND ATTITUDE DISPERSION TO MEET RANGE LIMITS AND ADVISE FIDO.			
MISSION	REV	DATE	SECTION	GROUP	PAGE	
AS-201	B	2/9/66	TRAJECTORY AND GUIDANCE	RETRO	3-5	

ENG
ENG 3.

THRUST CH
ENG 4TH PRE
ENG 4TH PRESS

THRUST CHAMBER PRE
ENG 5TH PRESS SW 1
ENG 5TH PRESS SW 2 THR

THRUST CHAMBER PRESSURE EN
ENG 6TH PRESS SW 1 THRUST OK
ENG 6TH PRESS SW 2 THRUST OK

THRUST CHAMBER PRESSURE ENG #7
ENG 7TH PRESS SW 1 THRUST OK
ENG 7TH PRESS SW 2 THRUST OK

MISSION	REV	DATE	SECTION
AS-201	B	2/9/66	BOOSTER SYSTEMS

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	4-1	<u>INSTRUMENTATION</u> <u>PARAMETER</u> ACCELERATION LOG - COURSE THRUST CHAMBER PRESSURE ENG #1 ENG 1ST PRESS SW 1 THRUST OK ENG 1ST PRESS SW 2 THRUST OK THRUST CHAMBER PRESSURE ENG #2 ENG 2ND PRESS SW 1 THRUST OK ENG 2ND PRESS SW 2 THRUST OK THRUST CHAMBER PRESSURE ENG #3 ENG 3RD PRESS SW 1 THRUST OK ENG 3RD PRESS SW 2 THRUST OK THRUST CHAMBER PRESSURE ENG #4 ENG 4TH PRESS SW 1 THRUST OK ENG 4TH PRESS SW 2 THRUST OK THRUST CHAMBER PRESSURE ENG #5 ENG 5TH PRESS SW 1 THRUST OK ENG 5TH PRESS SW 2 THRUST OK THRUST CHAMBER PRESSURE ENG #6 ENG 6TH PRESS SW 1 THRUST OK ENG 6TH PRESS SW 2 THRUST OK THRUST CHAMBER PRESSURE ENG #7 ENG 7TH PRESS SW 1 THRUST OK ENG 7TH PRESS SW 2 THRUST OK	HIGHLY DESIRABLE INSTRUMENTATION MANDATORY ON 6 OF 8 ENGINES	<u>MEAS. NO.</u> A2-603 D1-1 VK138-1 VK139-1 D1-2 VK140-2 VK141-2 D1-3 VK142-3 VK143-3 D1-4 VK144-4 VK145-4 D1-5 VK146-5 VK147-5 D1-6 VK148-6 VK149-6 D1-7 VK150-7 VK151-7		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	BOOSTER SYSTEMS	PRELAUNCH	4-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	4-1 (CONT'D)	THRUST CHAMBER PRESSURE ENG #8 ENG 8TH PRESS SW 1 THRUST OK ENG 8TH PRESS SW 2 THRUST OK X TOTAL ACTUAL GIMBAL ANGLE Y TOTAL ACTUAL GIMBAL ANGLE Z TOTAL ACTUAL GIMBAL ANGLE	} INSTRUMENTATION MANDATORY ON 6 OF 8 ENGINES MANDATORY MANDATORY MANDATORY	D1-8 VK152-8 VK153-8 H60-603 H60-603 H60-603		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	BOOSTER SYSTEMS	PRELAUNCH	4-1a

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S	
B	4-1 (CONT'D)	ANGULAR VELOCITY PITCH (EDS) } ANGULAR VELOCITY PITCH (EDS) } ANGULAR VELOCITY YAW (EDS) } ANGULAR VELOCITY YAW (EDS) } BOTH HIGHLY DESIRABLE BOTH HIGHLY DESIRABLE		VR10-602 VR13-602 VR11-602 VR14-602	
MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	B	2/9/66	BOOSTER SYSTEMS	PRELAUNCH	4-2

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	4-1 (CONT'D)	ANGULAR VELOCITY ROLL (EDS) } ANGULAR VELOCITY ROLL (EDS) }	BOTH HIGHLY DESIRABLE	VR12-602 VR15-602		
		MAIN STAGE OK NO. 1	HIGHLY DESIRABLE	K14-401		
		ATTITUDE ERROR SIGNAL, PITCH	HIGHLY DESIRABLE	VH71-602		
		ATTITUDE ERROR SIGNAL, YAW	HIGHLY DESIRABLE	VH70-602		
		ATTITUDE ERROR SIGNAL, ROLL	HIGHLY DESIRABLE	H69-602		
		S-IVB BURN (CONTROL COMPUTER MODE)	HIGHLY DESIRABLE	K20-602		
		S-IB BURN (CONTROL COMPUTER MODE)	HIGHLY DESIRABLE	K21-602		
		ATTITUDE CONTROL OXID MOD #1 - LEVEL	HIGHLY DESIRABLE	N37-414		
		ATTITUDE CONTROL OXID MOD #2 - LEVEL	HIGHLY DESIRABLE	N38-415		
		ATTITUDE CONTROL FUEL MOD #1 - LEVEL	HIGHLY DESIRABLE	N39-414		
		ATTITUDE CONTROL FUEL MODE #2 - LEVEL	HIGHLY DESIRABLE	N40-415		
		ATTITUDE CONTROL REGULATED HE MOD #1 - PRESSURE	HIGHLY DESIRABLE	D65-414		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	BOOSTER SYSTEMS	PRELAUNCH	4-3

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		ATTITUDE CONTROL REGULATED HE MOD #2 - PRESSURE	HIGHLY DESIRABLE	D69-415		
		FWD BATT #1 - VOLTAGE	HIGHLY DESIRABLE	M016-411		
		AFT BATT #1 - VOLTAGE	HIGHLY DESIRABLE	M014-404		
		IU BUS #1 - VOLTAGE	HIGHLY DESIRABLE	M12-601		
		MEASURING VOLTAGE	HIGHLY DESIRABLE	M1-602		
		MEASURING VOLTAGE FORWARD S-IVB	HIGHLY DESIRABLE	M24-411		
		MEASURING VOLTAGE AFT S-IVB	HIGHLY DESIRABLE	M25-404		
		ID11 BUS VOLTAGE	HIGHLY DESIRABLE	M17-12		
		GUIDANCE STATUS WORD	HIGHLY DESIRABLE	H60-603		
		GUIDANCE MODE WORD	HIGHLY DESIRABLE	H60-603		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		A	11/1/65	BOOSTER SYSTEMS	PRELAUNCH	4-4

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	4-1 (CONT'D)	ENGINE READY SIGNAL	HIGHLY DESIRABLE	K12-401		
		OXID TANK ULLAGE PRESS #1	1 OF 2 HIGHLY DESIRABLE	D0179-424		
		OXID TANK ULLAGE PRESS #2		D0180-424		
		FUEL TANK ULLAGE PRESS #1	1 OF 2 HIGHLY DESIRABLE	D0177-410		
		FUEL TANK ULLAGE PRESS #2		D0178-410		
		PITCH ACTUATOR POSITION	HIGHLY DESIRABLE	G1-403		
		YAW ACTUATOR POSITION	HIGHLY DESIRABLE	G2-403		
		THRUST CHAMBER PRESSURE (S-IVB)	MANDATORY	D1-401		
		ERROR MONITOR REGISTER	HIGHLY DESIRABLE	H60-603		
		MAINSTAGE NOT OK #1 } MAINSTAGE NOT OK #2 }	1 OF 2 MANDATORY, OTHER HIGHLY DESIRABLE	K158-401		
				K159-401		
						ITEMS 4-2 TO 4-4 ARE RESERVED FOR FURTHER BOOSTER PRELAUNCH RULES.
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	BOOSTER SYSTEMS	PRELAUNCH	4-5

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	4-5	S-IB TOTAL LOSS OF THRUST PRIOR TO L.0 + ____MIN. ____SEC.	BSE #1 SEND ABORT	CUE: THRUST OK SWITCHES CUE: THRUST CHAMBER PRESSURES CUE: LONGITUDINAL ACCELERATION THE MISSION SEQUENCE WILL NOT ALLOW STAGING AND J-2 IGNITION PRIOR TO L.0 + ____MIN. ____SEC.		
B	4-6	S-IVB FAILURE TO ATTAIN THRUST BY S-IB OECO + <u>00</u> MIN. <u>20</u> SEC.	BSE #1 SEND ABORT	CUE: MAINSTAGE OK SWITCHES CUE: LONGITUDINAL ACCELERATION CUE: THRUST CHAMBER PRESS		
B	4-7	S-IVB LOSS OF THRUST AFTER MAINSTAGE OK BUT PRIOR TO 100 SEC TO GO TO S-IVB CUTOFF	BSE #1 SEND ABORT	CUE: MAINSTAGE OK SWITCHES CUE: LONGITUDINAL ACCELERATION CUE: THRUST CHAMBER PRESS		
B	4-8	S-IVB LOSS OF THRUST AFTER 100 SEC TO GO TO S-IVB CUTOFF	BSE #1 INFORM FLIGHT AND FIDO (FOR FIDO ACTION)	CUE: MAINSTAGE OK SWITCHES CUE: LONGITUDINAL ACCELERATION CUE: THRUST CHAMBER PRESS		
	4-9	S-IB ANY ENGINE(S) OUT	CONTINUE MISSION. BSE #1 INFORM FLIGHT AND FIDO	CUE: THRUST CHAMBER PRESSURES CUE: THRUST OK SWITCHES		
ITEMS 4-10 TO 4-14 ARE RESERVED FOR FURTHER PROP LAUNCH RULES.						
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	BOOSTER SYSTEMS	PROP-LAUNCH	4-6

NASA — Manned Spacecraft Center
MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
	4-15	S-IB LOSS OF THRUST VECTOR CONTROL	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: FCC DROPS OUT OF S-IB BURN MODE PRIOR TO L.O. + 2 MIN. 20 SEC. CUE: ATTITUDE AND RATES CUE: ENGINE ACTUATOR POSITION
	4-16	S-IVB LOSS OF THRUST VECTOR CONTROL	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: LOSS OF HYDRAULIC SYSTEM CUE: FCC NOT IN S-IVB BURN MODE AFTER S-IVB MAINSTAGE OK. CUE: ATTITUDE AND RATES CUE: ENGINE ACTUATOR POSITION
ITEMS 4-17 TO 4-20 ARE RESERVED FOR FURTHER ACS LAUNCH RULES.				

MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	A	11/1/65	BOOSTER SYSTEMS	ACS-LAUNCH	4-7

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	4-21	S-IVB PROGRAMED PITCH MANEUVER FAILS TO INITIATE	CONTINUE MISSION BSE #2 INFORM FLIGHT AND GUIDANCE (SEE RULE 3-8)	CUE: LOSS OF APS (1) HE PRESSURE, (2) FUEL QUANTITY, (3) OXIDIZER QUANTITY CUE: LOSS OF S-IVB AFT BATTERY #1 CUE: PITCH ATTITUDE AND PITCH RATES		
B	4-22	S-IVB PROGRAMED PITCH ATTITUDE MANEUVER FAILURE TO STOP	CONTINUE MISSION BSE #2 ADVISE FLT AND GUIDANCE (SEE RULE 3-17)	CUE: PITCH RATES CUE: PITCH ATTITUDE ERROR CUE: PLATFORM GIMBAL ANGLES CUE: IU COMMANDED PITCH ANGLE X_Z		
B	4-23	S-IVB PROGRAMED PITCH ATTITUDE MANEUVER LESS THAN NOMINAL	CONTINUE MISSION BSE #2 ADVISE FLT AND GUIDANCE AND REPORT THE PITCH TOTAL GIMBAL ANGLE	CUE: SAME AS 4-22		
ITEMS 4-24 TO 4-25 ARE RESERVED FOR FURTHER ACS COAST RULES.						
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	BOOSTER SYSTEMS	ACS-COAST	4-8

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	4-26	ATTITUDE REFERENCE FAILURE	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE STATUS WORD CUE: ATTITUDE AND RATES LOSS OF ATTITUDE CONTROL		
	4-27	GUIDANCE FAILURE - ACCELEROMETER	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE STATUS WORD NO EFFECT ON TRAJECTORY DURING S-IB BURN. INCORRECT TER- MINAL VELOCITY AT S-IVB ENGINE CUTOFF.		
	4-28	LVDC FAILURE	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: ERROR MONITOR REGISTER LOSS OF ATTITUDE CONTROL COMMANDS AND SEQUENCING		
	4-29	ROLL PROGRAM FAILS TO INITIATE AT L.O. + 12 SEC.	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE MODE WORD CUE: ROLL ATTITUDE AND ROLL RATES		
	4-30	ROLL PROGRAM FAILS TO TERMINATE AT L.O. + 18 SEC.	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE MODE WORD CUE: ROLL ATTITUDE AND ROLL RATES		
	4-31	PITCH PROGRAM FAILS TO INITIATE AT L.O. + 12 SEC.	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE MODE WORD CUE: PITCH ATTITUDE AND PITCH RATES		
	4-32	PITCH PROGRAM FAILS TO TERMINATE AT L.O. + 2 MIN. 15 SEC.	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE MODE WORD CUE: PITCH ATTITUDE AND PITCH RATES		
	4-33	IGM FAILS TO INITIATE BY OBCO + <u>35</u> SEC.	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE MODE WORD CUE: ATTITUDE		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		A	11/1/65	BOOSTER SYSTEMS	GND-LAUNCH	4-9

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION			RULING		NOTES/COMMENTS/SOP'S	
	4-34	I.U. SWITCH SELECTOR FAILURE PRIOR TO OBCO +25.5 SEC.			CONTINUE MISSION BSE #2 ADVISE FLT AND INFORM EECOM TOWER JETTISON BACKUP GROUND COMMAND REQUIRED.		CUE: LOSS OF IU BATTERY SYSTEM #1 CUE: IU SWITCH SELECTOR FAILURE CUE: LOSS OF COMPUTER <	

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	4-38	LVDC FAILURE PRIOR TO S-IVB CUTOFF + 1 MIN.	CONTINUE MISSION BSE #2 INFORM FLT., FIDO, AND EECOM	CUE: ERROR MONITOR REGISTER LOSS OF SEQUENTIAL SYSTEM PRIOR TO CUTOFF + 1 MIN. RESULTS IN FAILURE TO ISSUE CP START COMMAND.		
	4-39	ATTITUDE REFERENCE FAILURE	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE STATUS WORD INCORRECT SPS FIRING ATTITUDE CUE: ATTITUDE AND RATES		
	4-40	I.U. SWITCH SELECTOR FAILURE AFTER MANEUVER INITIATE BUT PRIOR TO CP START	CONTINUE MISSION BSE #2 INFORM FLIGHT AND EECOM. EECOM SEND CP START (GC37) IF REQUIRED.	CUE: LOSS OF IU BATTERY #1 CUE: IU SWITCH SELECTOR FAILURE. CP START COMMAND WILL NOT BE ISSUED.		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	BOOSTER SYSTEMS	GND - COAST	4-11

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	4-38	LVDC FAILURE PRIOR TO S-IVB CUTOFF + 1 MIN.	CONTINUE MISSION BSE #2 INFORM FLT., FIDO, AND EECOM	CUE: ERROR MONITOR REGISTER LOSS OF SEQUENTIAL SYSTEM PRIOR TO CUTOFF + 1 MIN. RESULTS IN FAILURE TO ISSUE AUTOMATIC SEPARATION SEQUENCE START COMMAND.		
	4-39	ATTITUDE REFERENCE FAILURE	CONTINUE MISSION BSE #2 INFORM FLIGHT AND FIDO	CUE: GUIDANCE STATUS WORD INCORRECT SPS FIRING ATTITUDE CUE: ATTITUDE AND RATES		
	4-40	I.U. SWITCH SELECTOR FAILURE AFTER MANEUVER INITIATE BUT PRIOR TO S-IVB SEP	CONTINUE MISSION BSE #2 INFORM FLIGHT AND EECOM. EECOM SEND CP START (GC37) IF REQUIRED.	CUE: LOSS OF IU BATTERY #1 CUE: IU SWITCH SELECTOR FAILURE AUTOMATIC START SEPARATION SEQUENCE WILL NOT BE ISSUED.		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		A	11/1/65	BOOSTER SYSTEMS	GND - COAST	4-11

MISSION		REV	DATE				PAGE
AS-201		A	11/1/65	E			/LAUNCH/COAST/ENTRY 5-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
	5-1	THE ENVIRONMENTAL SYSTEM HAS BEEN ANALYZED. NO POST LIFT-OFF MALFUNCTIONS REQUIRE REAL-TIME DECISION OR MISSION RULE APPLICATION.		

MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	A	11/1/65	ENVIRONMENTAL	PRELAUNCH/LAUNCH/COAST/ENTRY	5-1

MISSION		GROUP	PAGE
AS-201		PRELAUNCH/LAUNCH/COAST/ENTRY	6-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
	6-1	THE ELECTRICAL SYSTEM HAS BEEN ANALYZED; NO POST LIFT-OFF MALFUNCTIONS REQUIRE REAL-TIME DECISION OR MISSION RULE APPLICATION.		

MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	A	11/1/65	ELECTRICAL	PRELAUNCH/LAUNCH/COAST/ENTRY	6-1

	GROUP	PAGE
PROPULSION (SPS)	PRELAUNCH/LAUNCH/COAST/ENTRY	7-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	7-1	THE SPS PROPULSION SYSTEM HAS BEEN ANALYZED. NO POST LIFT-OFF MALFUNCTIONS REQUIRE REAL-TIME DECISIONS OR MISSION RULE APPLICATION. VERIFICATION OF THE SPS ENGINE READINESS FOR IGNITION IS BASED ON STABILIZATION AND CONTROL SYSTEM AND ELECTRICAL SYSTEM TELEMETRY DATA. FAILURES OF THE SPS ENGINE TO START OR STOP ARE SEQUENTIAL IN NATURE.				
		THESE MALFUNCTIONS WILL BE TREATED IN ACCORDANCE WITH MISSION RULES IN THE SEQUENTIAL/CONTROL PROGRAMER AND STABILIZATION AND CONTROL SYSTEM SECTIONS, RESPECTIVELY.				
B	7-2					
B	7-3					
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	PROPULSION (SPS)	PRELAUNCH/LAUNCH/COAST/ENTRY	7-1

MISSION	REV	DATE	SECTION	GRO
AS-201	A	11/1/65	CM-REACTION CONTROL SYSTEM	PRELAUNCH,

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION			RULING		NOTES/COMMENTS/SOP'S	
	8-1	THE CM-RCS SYSTEM HAS BEEN ANALYZED. NO POST LIFT-OFF MALFUNCTIONS REQUIRE REAL-TIME DECISION OR MISSION RULE APPLICATION.						
MISSION		REV	DATE	SECTION		GROUP		PAGE
AS-201		A	11/1/65	CM-REACTION CONTROL SYSTEM		PRELAUNCH/LAUNCH/COAST/ENTRY		8-1

1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
	9-1	THE SM-RCS SYSTEM HAS BEEN ANALYZED. NO POST LIFT-OFF MALFUNCTIONS REQUIRE REAL-TIME DECISION OR MISSION RULE APPLICATION.		

MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	A	11/1/65	SM-REACTION CONTROL SYSTEM	PRELAUNCH/LAUNCH/COAST/ENTRY	9-1

B 10-2

TOW.
30 SE

OF Q TEMP BALL

FROM AFD

BALL TEMP DATA IS IN-
VALID FOR ANY REASON, CMD
WILL BE SENT ON AFD MARK.

MS 10-3 TO 10-5 ARE RESERVED
FOR FURTHER PRELAUNCH/LAUNCH RULES.

MISSION	REV	DATE	SEC		PAGE
AS-201	B	2/9/66	SEQUEN	LAUNCH/LAUNCH	10-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	10-1	<u>INSTRUMENTATION REQUIREMENTS</u> BS0030X ENGINE NO. 1 OUT A CD0101X TOWER MTR FIRE A CD0102X TOWER MTR FIRE B CH8031X NORMAL TIMER BRAKE CH8032X ABORT TIMER BRAKE CH8061X CAGE PITCH BMAG CH8062X CAGE ROLL BMAG CH8063X CAGE YAW BMAG CS0100X CM-SM SEPARATION A SP0061P PRESSURE ENGINE CHAMBER SP0022H F/O VALVE #1 POS SP0023H F/O VALVE #2 POS SP0024H F/O VALVE #3 POS SP0025H F/O VALVE #4 POS SC0219C DC CUR BATT 1 SC0221C DC CUR BATT 2 SC0226C DC CUR BATT 3 CH0034V PITCH POS F/B IN CH1034V YAW POS F/B IN	HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE 1 OF 5 MANDATORY OTHERS HIGHLY DESIRABLE 1 OF 3 MANDATORY OTHERS HIGHLY DESIRABLE 1 OF 2 MANDATORY OTHER HIGHLY DESIRABLE	USE TO VERIFY LV-S/C SEPARATION USED TO VERIFY NORMAL TIMER START USED TO VERIFY ABORT TIMER START		
	10-2	TOWER JETTISON FAILURE BY OBCO + 30 SEC	EECOM SENDS <u>GC-31 LET JETTISON</u> AND CONTINUE MISSION.	CUES: NO DROPOUT OF Q TEMP BALL DATA COUNT FROM AFD NOTE: IF Q BALL TEMP DATA IS INVALID FOR ANY REASON, CMD WILL BE SENT ON AFD MARK. ITEMS 10-3 TO 10-5 ARE RESERVED FOR FURTHER PRELAUNCH/LAUNCH RULES.		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	SEQUENTIAL/CONTROL PROGRAMER	PRELAUNCH/LAUNCH	10-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	10-6					
B	10-7					
B	10-8	NORMAL TIMER START DOES NOT OCCUR BY S-IVB CUTOFF + 1 MIN, 05 SFC	EECOM SEND <u>GC-37</u> <u>NORMAL TIMER START</u>	CUES: NORMAL TIMER START EVENT TAPE MOTION EVENTS COUNT FROM AFD.		
B	10-9	NORMAL TIMER START DOES NOT OCCUR AFTER GC-37 IS SENT	FLT SEND <u>GC-25</u> <u>ABORT</u> WHEN S-IVB HAS MANEUVERED TO A STABILIZED ARS PITCH ATTITUDE OF APPROXIMATELY 123°	CUES: NORMAL TIMER START EVENT TAPE MOTION EVENTS NO LV/SC SEP SEQUENCE ARS DATA SCS RATE DATA IU ATTITUDE DATA		
B	10-9A	BOTH NORMAL TIMER AND ABORT TIMER HAVE FAILED TO START (PER RULES 10-8 AND 10-9)	EECOM SEND <u>GC-30</u> <u>CM-SM SEP</u> ON DIRECTION FROM FLT	CUES: N/T START EVENT TAPE MOTION EVENTS LV/SC SEP SEQUENCE ABORT SEQUENCE EVENTS IU ATTITUDE DATA ARS DATA SCS RATE DATA NOTE: FLT WILL CALL FOR CM-SM SEP AS SOON AS NO ABORT IS CONFIRMED		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	SEQUENTIAL/CONTROL PROGRAMER	COAST	10-2

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	10-10	THE NORMAL TIMER HAS STARTED AND SLV/CSM SEP FAILS TO OCCUR AND/OR ANY SCS ATTITUDE GYROS FAIL TO UNCAGE	EECOM SEND <u>GC-38</u> <u>SLV/CSM SEPARATE</u>	CUES: +X TRANSLATION LV/SC SEP EVENTS GYRO UNCAGING EVENTS EDS ENG OUT EVENT EDS BUS DROPOUTS SPS OFF LITE ON COUNT FROM AFD		
B	10-11	THE NORMAL TIMER HAS STARTED AND SLV/CSM SEP FAILS TO OCCUR AFTER GC-38 SLV/CSM SEP IS SENT	EECOM SEND <u>GC-30</u> <u>CM-SM SEPARATE</u> ON DIRECTION FROM FLT	CUES: LV/SC SEP SEQUENCE ARS ATTITUDE DATA SCS RATES SCS ATT ERRORS (IF UNCAGED) IU ATTITUDE DATA NOTE: FLT WILL CALL FOR CM-SM SEP AS SOON AS POSSIBLE AFTER S-IVB MANEUVER STARTS AND ATTITUDE DATA CONFIRMS THE CSM ATTACHED TO THE S-IVB. GUIDO WILL REPORT THE ABOVE TO FLT.		
B	10-12	4 SEC DIRECT ULLAGE FOR SLV/CSM SEP DOES NOT OCCUR	WAIT AND OBSERVE OCCURRENCE OF +X TRANSLATION	CUES: NO DIRECT ULLAGE EVENTS		
B	10-13	+X TRANSLATION 4 SEC AFTER SLV/CSM SEP DOES NOT OCCUR	GNC SEND <u>GC-18</u> <u>DIRECT ULLAGE</u> FOR 18 SEC	CUES: NO THRUSTER FIRING EVENTS NO +X TRANSLATION EVENT		
B				ITEMS 10-14 TO 10-19 ARE RESERVED FOR FURTHER COAST RULES.		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	SEQUENTIAL/CONTROL PROGRAMER	COAST	10-3

NASA — Manned Spacecraft Center **MISSION RULES**

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	10-20	+X TRANSLATION PRIOR TO FIRST SPS BURN DOES NOT OCCUR	RKV CAPCOM SEND <u>GC-18</u> DIRECT ULLAGE UNTIL SPS IGNITION OCCURS	CUES: NO +X TRANSLATION EVENT NO THRUSTER FIRING EVENTS		
	10-20A	SPS ENGINE GIMBAL MOTORS NOT RUNNING BY 10 SEC PRIOR TO FIRST SPS BURN AS CONFIRMED BY SM BATT AMPS AND FIRST GIMBAL POSITION SET	RKV CAPCOM SEND <u>GC-17</u> <u>DIRECT THRUST OFF</u>	CUES: SM BATT AMPS SPS PITCH GIMBAL POSITION SPS YAW GIMBAL POSITION		
	10-21	FIRST SPS BURN DOES NOT OCCUR AT PROGRAMER TIME + 5 SEC AND: A. GYROS UNCAGED B. GYROS CAGED AS CONFIRMED BY EVENTS AND ATTITUDE CONTROL SYSTEM	A. RKV CAPCOM SEND <u>GC-16</u> <u>DIRECT THRUST ON</u> B. NO ACTION	CUES: THRUST ON EVENT SPS TCP SPS NOZZLE TEMP ΔV COUNTER (4600 FT/SEC) GYRO CAGED EVENTS ATTITUDE CONTROL SYSTEM F/O VALVE POSITION NOTE: IF ANY GYRO REMAINS CAGED, THE SPS BURN IS INHIBITED BY S/C.		
B	10-22	FIRST SPS BURN TERMINATES PRIOR TO 02:45	RKV CAPCOM SEND <u>GC-17</u> <u>DIRECT THRUST OFF</u>	CUES: THRUST ON EVENT SPS TCP ΔV COUNTER F/O VALVE POSITION NOTE 1: SECOND SPS BURN IS INHIBITED BY GC-17 NOTE 2: EARLY FIRST BURN TERMINATION WOULD CAUSE AN ERROR IN SECOND GIMBAL POSITION SET (DUE TO FUEL MASS) AND COULD RESULT IN VEHICLE TUMBLING IF THE SECOND BURN WERE ALLOWED TO OCCUR.		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	SEQUENTIAL/CONTROL PROGRAMER	ENTRY	10-4

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
	10-23	ALLOWABLE SPS BURN IS LESS THAN 03:00 MINUTES	RKV CAPCOM SEND <u>GC-17</u> <u>DIRECT</u> <u>THRUST OFF</u> AT MNV MSG TIME	CUES: THRUST ON EVENT SPS TCP ΔV COUNTER F/O VALVE EVENTS MNV MSG NOTE: SECOND SPS BURN IS INHIBITED BY GC-17
B	10-24	FIRST SPS BURN DOES NOT TERMINATE BY 03:05 IF MNV MSG TIME IS 03:10	RKV CAPCOM SEND <u>GC-17</u> <u>DIRECT</u> <u>THRUST OFF</u> AT 03:10	CUES: THRUST ON EVENT SPS TCP ΔV COUNTER F/O VALVE EVENTS MNV MSG NOTE: SECOND SPS BURN IS INHIBITED BY GC-17
B	10-25	+X TRANSLATION PRIOR TO SECOND SPS BURN DOES NOT OCCUR	RKV CAPCOM SEND <u>GC-18</u> <u>DIRECT</u> <u>ULLAGE</u> UNTIL SPS IGNITION OCCURS	CUES: +X TRANSLATION EVENT THRUSTER FIRING EVENTS
B	10-25A	SECOND SPS GIMBAL POSITION SET DOES NOT OCCUR	RKV CAPCOM SEND <u>GC-17</u> <u>DIRECT</u> <u>THRUST OFF</u>	CUES: SPS PITCH GIMBAL POSITION SPS YAW GIMBAL POSITION
B	10-26	SECOND SPS BURN DOES NOT OCCUR AFTER ULLAGE MANEUVER	RKV CAPCOM SEND <u>GC-16</u> <u>DIRECT</u> THRUST ON UNTIL NOMINAL BURN CUTOFF TIME	CUES: THRUST ON EVENT SPS TCP ΔV COUNTER F/O VALVE EVENTS

MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	B	2/9/66	SEQUENTIAL/CONTROL PROGRAMER	ENTRY	10-5

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	10-27	SECOND SPS BURN DOES NOT TERMINATE AT EXPECTED TIME PLUS 2 SEC	RKV CAPCOM SEND <u>GC-17</u> DIRECT THRUST OFF.	CUES: THRUST ON EVENT SPS TCP F/O VALVE EVENTS ΔV COUNTER MNV MSG		
	10-28	CM-SM SEP DOES NOT OCCUR AT EXPECTED TIME + 5 SEC	RKV CAPCOM SEND <u>GC-30</u> <u>CM-SM SEP</u> .	CUES: CM-SM ACTUAL SEP EVENT LOSS OF SM PARAMETERS		
	10-29	CM ENTRY ROLL MANEUVER COMPLETED	RKV CAPCOM SEND <u>GC-26</u> <u>ELS</u> <u>ACTIVATE</u>	CUES: ARS ATTITUDE SCS RATES SCS ATTITUDE ERRORS GYRO TORQUING EVENTS		
ITEMS 10-30 TO 10-35 ARE RESERVED FOR FURTHER ENTRY RULES.						
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	SEQUENTIAL/CONTROL PROGRAMER	ENTRY	10-6

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	10-36					
B	10-37	SPS ABORT INITIATED BUT ABORT SEQUENCE DOES NOT OCCUR AND S-IVB HAS CUTOFF	EECOM SEND <u>GC-38 SLV-CSM SEPARATE</u> ON DIRECTION FROM FLT. GNC SEND <u>GC-18 DIRECT ULLAGE</u> FOR 30 SECONDS EECOM SEND <u>GC-30 CM-SM SEPARATE</u> AT ABORT + 1 MIN EECOM SEND <u>GC-26 ELS ACTIVATE</u> 1 MIN AFTER CM-SM SEP	CUES: VOICE LOOP ABORT SEQUENCE EVENTS S-IVB CUTOFF		
	10-38	SPS ENGINE DOES NOT CUT OFF AFTER 10 SEC BURN	GNC SEND <u>GC-17 DIRECT THRUST OFF</u>	CUES: THRUST ON-OFF EVENTS SPS TCP ΔV COUNTER		
B	10-39	CM-SM SEPARATION DOES NOT OCCUR AT ABORT + 54 SEC	EECOM SEND <u>GC-30 CM-SM SEPARATE</u> AT ABORT + 1 MIN	CUES: CM-SM SEP EVENTS LOSS OF SM PARAMETERS		
B	10-40	CM ENTRY ROLL MANEUVER COMPLETE	EECOM SEND <u>GC-26 ELS ACTIVATE</u> ON CONFIRMATION FROM GNC.	CUES: ARS ATTITUDE SCS RATES SCS ATTITUDE ERRORS GYRO TORQUING EVENTS		
B	10-41	LES ABORT	EECOM SEND <u>GC-26 ELS ACTIVATE</u> IF NO INDICATION BY 24K FEET	CUES: LES ABORT SEQ RETRO ALTITUDE MARK		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	SEQUENTIAL/CONTROL PROGRAMER	LAUNCH ABORT	10-7

B

MISSION	GROUP	PAGE
AS-201	PRELAUNCH/LAUNCH/COAST/ENTRY	11-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	11-1	<u>INSTRUMENTATION REQUIREMENTS</u> CH0024V PITCH RATE CH1024V YAW RATE CH2024V ROLL RATE CH0075V PITCH SCS ATT ERROR CH1075V YAW SCS ATT ERROR CH2075V ROLL SCS ATT ERROR CH0087X PITCH +X SOL DR OUT CH0088X PITCH +X SOL DR OUT CH1087X YAW +X SOL DR OUT CH1088X YAW +X SOL DR OUT CH8020V ROLL ATTITUDE REF 1 (ARS) CH8021V ROLL ATTITUDE REF 2 (ARS) CH8022V PITCH ATTITUDE REF 1(ARS) CH8023V PITCH ATTITUDE REF 2(ARS) CH8024V R-YAW ATTITUDE REF 1(ARS) CH8025V R-YAW ATTITUDE REF 2(ARS) CH8026V P-YAW ATTITUDE REF 1(ARS) CH8027V P-YAW ATTITUDE REF 2(ARS)	MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY ANY 2 OF 4 MANDATORY, OTHERS HIGHLY DESIRABLE MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY	USED FOR VERIFICATION OF PROPER SCS OPERATION USED TO VERIFY +X TRANSLATION USED FOR VERIFICATION OF PROPER SPACECRAFT ATTITUDE FOR SPS ENGINE BURNS		
	11-2					
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	STABILIZATION AND CONTROL SYSTEM	PRELAUNCH/LAUNCH/COAST/ENTRY	11-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
	11-2	CONT'D		AT T+10 MIN (S4B CUTOFF): PITCHYAWROLL ROOT SUM SQ+4.3°+5.8°+4.3° WORST CASE+6.0°+8.5°+6.0° AT T+20 MIN (SPS BURN - 1 MIN): PITCHYAWROLL ROOT SUM SQ+4.8°+6.9°+4.8° WORST CASE+8.5°+11.2°+8.5° NOTE: DUE TO A NON-LINEAR ATTITUDE INSTRUMENTATION SYSTEM (i.e. SINE FUNCTION PRESENTATION) A FIXED INSTRUMENTATION ERROR CANNOT BE ASSIGNED, THE MAXIMUM IS 5°.		
	11-3	PCM HI LEVEL REFS (85 % OF 15 % OF LIMITS + 2 % VOLTS)	CHECK OTHER S/C PARAMETERS TO DETERMINE VALIDITY OF ARS MEASUREMENTS	CUE: PCM HI LEVEL REFS OTHER PCM PARAMETERS NOTE: ARS DATA CANNOT BE CORRECTED IN REAL TIME FOR THIS PROBLEM DUE TO NON-LINEAR CHARACTERISTIC		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		A	11/1/65	STABILIZATION AND CONTROL SYSTEM	PRELAUNCH/LAUNCH/COAST/ENTRY	11-2

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	11-4	THE FOLLOWING 5 RULES WILL BE USED IN THE CASE WHERE THE S/C HAS ASSUMED A NORMAL STABILIZED ATTITUDE PRIOR TO THE FIRST SPS BURN.		ARS ATTITUDES OUTSIDE FOLLOWING LIMITS: PITCH: ±40° PRIOR TO SPS BURN INITIATE + 1 MIN TO INSURE AERODYNAMIC CAPTURE DURING ENTRY. PITCH: OUTSIDE FIDO LIMITS (NOMINAL ±12°) AFTER SPS BURN INITIATE + 1 MIN. YAW B: ±45° AT ANY TIME YAW A: USED TO CONFIRM YAW B READINGS WHERE POSSIBLE ROLL: NO ACTION ON ROLL SCS ATTITUDE ERROR OF 2 1/2° OR GREATER (LESS THAN 2 1/2° WILL BE CONSIDERED INSTR ERROR) ANY DISCERNABLE RATE INDICATION (>0.2°/SEC WHICH IS THE RATE GYRO INSTR THRESHOLD) DECISION FOR FIRST BURN INHIBIT WILL BE BASED ON AT LEAST TWO OF THE ABOVE INDICATIONS.		
B	11-5	PITCH ATTITUDE GREATER THAN ±40° PRIOR TO SPS BURN INITIATE PLUS 1 MIN AS EVIDENCED BY THE ARS ATTITUDE GYROS AND CONFIRMED BY THE SCS ATTITUDE ERROR AND/OR THE SCS RATE GYRO.	RKV CAPCOM SEND <u>GC-17</u> <u>DIRECT THRUST OFF</u>	PITCH ATTITUDE MUST BE WITHIN FIDO ATTITUDE LIMITS AT SPS BURN INITIATE PLUS 1 MIN.		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	STABILIZATION AND CONTROL SYSTEM	COAST	11-3

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	11-6	PITCH ATTITUDE GREATER THAN FIDO ATTITUDE LIMITS (NOMINAL $\pm 12^\circ$) AFTER 1 MIN AND LESS THAN 2 MIN OF SPS BURN AS EVIDENCED BY THE ARS ATTITUDE GYROS AND CONFIRMED BY THE SCS ATTITUDE ERROR AND/OR THE SCS RATE GYRO.	RKV CAPCOM SEND <u>GC-17 DIRECT THRUST OFF</u>	PITCH ATTITUDE WILL BE USED AS PRIMARY CUE AFTER 1 MIN OF SPS BURN.		
B	11-6A	PITCH ATTITUDE GREATER THAN $\pm 40^\circ$ AFTER SPS BURN INITIATE PLUS 2 MIN AS EVIDENCED BY ARS ATTITUDE GYROS AND CONFIRMED BY THE SCS ATTITUDE ERROR AND/OR THE SCS RATE GYRO.	RKV CAPCOM SEND <u>GC-17 DIRECT THRUST OFF</u>			
B	11-7	YAW ATTITUDE GREATER THAN $\pm 45^\circ$ DURING THE SPS BURN AS EVIDENCED BY ARS ATTITUDE GYROS AND CONFIRMED BY THE SCS ATTITUDE ERRORS AND/OR SCS RATE GYRO.	RKV CAPCOM SEND <u>GC-17 DIRECT THRUST OFF</u>	ARS YAW B GYRO GIVES BEST INDICATION OF YAW ATTITUDE. YAW A GYRO WILL BE USED TO CONFIRM YAW B READING IF ATTITUDES IN PITCH AND YAW ARE RELATIVELY STABLE.		
B	11-8	ROLL ATTITUDE DEVIATION OF ANY MAGNITUDE PRIOR TO OR DURING THE SPS BURN AS EVIDENCED BY ARS ATTITUDES, SCS ATTITUDE ERROR, AND/OR SCS RATES.	NO ACTION			
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	STABILIZATION AND CONTROL SYSTEM	COAST	11-4

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
B	11-9	THE FOLLOWING 2 RULES WILL BE USED IN THE CASE WHERE THE S/C IS UNSTABLE (RATE AND/OR ATTITUDE DEVIATIONS) PRIOR TO THE FIRST SPS BURN.		NOTE: THIS CASE IS BASED ON THE FACT THAT THE S/C WILL NOT BE STABILIZED IN THE PROPER ATTITUDE AT ENTRY. THIS IS BASED ON OBSERVED SCS RATES, ARS ATTITUDES AND SCS ATTITUDE ERRORS.
B	11-10	THE CSM IS UNSTABLE OR AT A NON-NOMINAL ATTITUDE IN PITCH AND/OR YAW PRIOR TO THE FIRST SPS BURN.	RKV CAPCOM SEND <u>GC-17 DIRECT THRUST OFF</u> AFTER 20 SEC OF BURN.	NOTE: SINCE THE CSM WILL NOT ACHIEVE A STABILIZED ENTRY ATTITUDE, A SHORT BURN WILL BE DONE TO SATISFY A MAJOR S/C TEST OBJECTIVE. A SHORT BURN WAS SELECTED TO PREVENT EXCEEDING FIDO LIMIT LINES.
B	11-11	THE CSM IS UNSTABLE IN ROLL PRIOR TO THE FIRST SPS BURN.	NO ACTION	NOTE: NON-NOMINAL ATTITUDE IS DEFINED AS BEING OUTSIDE THE GROSS LIMITS.

MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	B	2/9/66	STABILIZATION AND CONTROL SYSTEM	COAST	11-5

B	12-3	CO. GC NO.	16 17 18 25 26 30 31 37 38	DIRECT DIRECT ABORT ELS ACTIVA CM-SM SEPARATE LET JETTISON NORMAL TIMER START SLV-CSM SEPARATE	
B	12-4	LOSS OF CSM TM DATA		A. GC2 GC31 GC37 NOR B. RKV CAPCOM WIL DIRECT THRUST OF MESSAGE TIME IS LES NOMINAL.	
MISSION		REV	DATE	SECTION	GROUP
AS-201		B	2/9/66	COMMUNICATIONS AND INSTRUMENTATION	PRELAUNCH/L

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION		RULING	NOTES/COMMENTS/SOP'S																				
	12-1	THE ENTIRE COMMUNICATION AND INSTRUMENTATION SYSTEM (EXCEPT SENSORS WHICH ARE CONSIDERED WITH THEIR RESPECTIVE OPERATING SYSTEM) AS CONFIGURED FOR AS-201 IS MANDATORY.																							
B	12-2	PCM HI-LEVEL REFS (85% OR 15%) OUT OF LIMITS ±2% VOLTS		CHECK OTHER S/C PARAMETERS TO DETERMINE VALIDITY OF ARS MEASUREMENTS.	CUE: PCM HI-LEVEL REFS OTHER PCM PARAMETERS NOTE: ARS DATA CANNOT BE CORRECTED IN REAL TIME FOR THIS PROBLEM DUE TO NON-LINEAR CHARACTERISTICS.																				
B	12-3	COMMAND REQUIREMENTS <table><tr><th>GC NO.</th><th>GC TITLE</th></tr><tr><td>16</td><td>DIRECT THRUST ON</td></tr><tr><td>17</td><td>DIRECT THRUST OFF</td></tr><tr><td>18</td><td>DIRECT ULLAGE</td></tr><tr><td>25</td><td>ABORT</td></tr><tr><td>26</td><td>ELS ACTIVATE</td></tr><tr><td>30</td><td>CM-SM SEPARATE</td></tr><tr><td>31</td><td>LET JETTISON</td></tr><tr><td>37</td><td>NORMAL TIMER START</td></tr><tr><td>38</td><td>SLV-CSM SEPARATE</td></tr></table>		GC NO.	GC TITLE	16	DIRECT THRUST ON	17	DIRECT THRUST OFF	18	DIRECT ULLAGE	25	ABORT	26	ELS ACTIVATE	30	CM-SM SEPARATE	31	LET JETTISON	37	NORMAL TIMER START	38	SLV-CSM SEPARATE	MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY MANDATORY	MAPS 1 AND 2 MAPS 1 AND 2 MAPS 1 AND 2 MAP 2 MAP 2 MAP 1 AND 2 MAP 1 AND 2 MAP 1 AND 2 MAP 1 AND 2
GC NO.	GC TITLE																								
16	DIRECT THRUST ON																								
17	DIRECT THRUST OFF																								
18	DIRECT ULLAGE																								
25	ABORT																								
26	ELS ACTIVATE																								
30	CM-SM SEPARATE																								
31	LET JETTISON																								
37	NORMAL TIMER START																								
38	SLV-CSM SEPARATE																								
B	12-4	LOSS OF CSM TM DATA		A. NO CMDS WILL BE SENT FROM MCC-H OTHER THAN: <u>GC25 ABORT</u> <u>GC31 LET JETTISON</u> <u>GC37 NORMAL TIMER START</u> B. RKV CAPCOM WILL SEND <u>GC-17 DIRECT THRUST OFF</u> IF MANEUVER MESSAGE TIME IS LESS THAN NOMINAL.	A. THESE CMDS ARE SENT FOR REASONS BASED ON BOOSTER DATA AND REQUIRE NO CSM TM DATA FOR INITIATION. LET JETT AND N/T START COMMANDS WILL BE SENT BY EECOM ON COUNT FROM AFD. B. SENDING DIRECT THRUST OFF CMD IS BASED ON PREVIOUS TRAJECTORY DATA AND WOULD BE SENT TO PREVENT LOSS OF TEST CONDITIONS AND/OR THE VEHICLE.																				
MISSION		REV	DATE	SECTION	GROUP	PAGE																			
AS-201		B	2/9/66	COMMUNICATIONS AND INSTRUMENTATION	PRELAUNCH/LAUNCH/COAST/ENTRY	12-1																			

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	12-5	<u>TOTAL FLIGHT CONTROL INSTRUMENTATION REQUIREMENTS</u>				
		CSM				
		BS0030X	ENGINE NO 1 OUT A	HIGHLY DESIRABLE	USED TO VERIFY LV-S/C SEPARATION	
		CD0101X	TOWER MTR FIRE A	HIGHLY DESIRABLE		
		CD0102X	TOWER MTR FIRE B	HIGHLY DESIRABLE		
		CS0100X	CM-SM SEPARATION ACTUAL	HIGHLY DESIRABLE	ONLY ACTUAL CM SEP INDICATION	
		CH0024V	PITCH RATE	MANDATORY	USED FOR VERIFICATION OF PROPER	
		CH1024V	YAW RATE	MANDATORY	SCS OPERATION	
		CH2024V	ROLL RATE	MANDATORY	" "	
		CH0075V	PITCH SCS ATT ERROR	MANDATORY	" "	
		CH1075V	YAW SCS ATT ERROR	MANDATORY	" "	
		CH2075V	ROLL SCS ATT ERROR	MANDATORY	" "	
		CH0087X	PITCH +X SOL DR OUT	ANY 2 OF 4	USED TO VERIFY +X TRANSLATION	
		CH0088X	PITCH +X SOL DR OUT	MANDATORY		
		CH1087X	YAW +X SOL DR OUT	OTHERS HIGHLY		
		CH1088	YAW +X SOL DR OUT	DESIRABLE		
		CH8020V	ROLL ATTITUDE REF 1 (ARS)	MANDATORY	USED FOR VERIFICATION OF PROPER	
		CH8021V	ROLL ATTITUDE REF 2 (ARS)	MANDATORY	SPACECRAFT ATTITUDE FOR SPS	
		CH8022V	PITCH ATTITUDE REF 1 (ARS)	MANDATORY	ENGINE BURNS	
		CH8023V	PITCH ATTITUDE REF 2 (ARS)	MANDATORY	" "	
		CH8024V	R-YAW ATTITUDE REF 1 (ARS)	MANDATORY	" "	
		CH8025V	R-YAW ATTITUDE REF 2 (ARS)	MANDATORY	" "	
		CH8026V	P-YAW ATTITUDE REF 1 (ARS)	MANDATORY	" "	
		CH8027V	P-YAW ATTITUDE REF 2 (ARS)	MANDATORY	" "	
		CH8031X	NORM TIMER BRAKE	HIGHLY DESIRABLE	USED TO VERIFY NORMAL TIMER START	
		CH8032X	ABORT TIMER BRAKE	HIGHLY DESIRABLE	USED TO VERIFY ABORT TIMER START	
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	COMMUNICATIONS AND INSTRUMENTATION	PRELAUNCH	12-2

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S			
B	12-5 (CONT'D)	TOTAL CSM INSTRUMENTATION REQUIREMENTS (CONT'D)					
		CH8061 CAGE PITCH BMAG CH8062 CAGE ROLL BMAG CH8063 CAGE YAW BMAG SC0219C DC CUR BATT 1 } SC0221C DC CUR BATT 2 } SC0226C DC CUR BATT 3 } CH0034V PITCH POS F/B IN } CH1034V YAW POS F/B IN } CT0125V PCM HI-LEVEL 85% REF CT0126V PCM HI-LEVEL 15% REF CT0281 MAP 1 CT0282 MAP 2 SP0661P PRESSURE ENGINE CHAMBER } SP0022H F/O VALVE #1 POS } SP0023H F/O VALVE #2 POS } SP0024H F/O VALVE #3 POS } SP0025H F/O VALVE #4 POS }	HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE 1 OF 3 MANDATORY OTHERS HIGHLY DESIRABLE 1 OF 2 MANDATORY OTHER HIGHLY DESIRABLE HIGHLY DESIRABLE HIGHLY DESIRABLE MANDATORY MANDATORY 1 OF 5 MANDATORY OTHERS HIGHLY DESIRABLE	USED FOR VERIFICATION OF ANALOG TELEMETRY ACCURACY (ATTITUDES, RATES AND GIMBAL POSITIONS) USED TO VERIFY SPS ENGINE FIRING			
	12-6	SLV (INSTRUMENTATION UNIT) C57-900 Q-BALL TEMP	MANDATORY	ONLY ACTUAL TOWER JETTISON INDICA- TION			
	MISSION		REV	DATE	SECTION	GROUP	PAGE
	AS-201		B	2/9/66	COMM/INST	PREL AUNCH	12-3

B	13-4			
B	13-5	LATEST LAUNCH TIME (ASPECTS)		
		<u>PLANNED LANDING AREA GUIDELINES</u>		
	13-6	A SHIP ACCESS TIME OF 3 HOURS AND IS PLANNED IN THE PLANNED LANDING AREA		
MISSION		REV	DATE	SECTION
AS-201		B	2/9/66	RECOVERY
				GROUP
				LAUNCH AREA

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B		<u>LAUNCH AREA GUIDELINES FOR RECOVERY OPERATIONS</u>		A SHIP ACCESS TIME OF 12 TO 18 HOURS IS DESIRED IN THE LAUNCH ABORT AREA. THIS AREA EXTENDS FROM 41 N.M. DOWNRANGE FROM THE PAD TO THE PRIMARY LANDING AREA AND EXTENDS 50 N.M. TO EITHER SIDE OF THE GROUND TRACK. PARARESCUE PERSONNEL ACCESS TIME IS 3 HOURS. TO ALLOW 3 HOURS REMAINING DAY-LIGHT IN THE RECOVERY AREA.		
	13-1	CEILING	2000 FEET MINIMUM			
	13-2	VISIBILITY	3 NAUTICAL MILES MINIMUM			
	13-3	WAVE HEIGHT	5 FEET MAXIMUM			
	13-4	SCHEDULED LAUNCH TIME	A.M. EST			
B	13- 5	LATEST LAUNCH TIME (FROM RECOVERY ASPECTS)	10:00 A.M. EST			
		<u>PLANNED LANDING AREA GUIDELINES FOR RECOVERY OPERATIONS</u>				
	13-6	A SHIP ACCESS TIME OF 3 HOURS AND A PARARESCUE TEAM (TO ATTACH FLOTATION DEVICES) ACCESS TIME OF 1 HOUR IS PLANNED IN THE PLANNED LANDING AREA.				
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	RECOVERY	LAUNCH AREA & PLA	13-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B	13-7	RECOVERY CAPABILITY WILL BE BASED	PRIMARILY UPON THE LOCAL RECOVERY TASK UNIT COMMANDER'S RECOMMENDATION	TO THE RECOVERY TASK FORCE COMMANDER AT MCC ON HIS ABILITY TO PERFORM THE RECOVERY OPERATION.		
	13-8	A WEATHER CONDITION WHICH RESULTS	IN AN UNSATISFACTORY RECOVERY CONDITION	IN THE PLANNED LANDING AREA		
	13-9	SURFACE WINDS	20 KNOTS MAXIMUM	THE CENTER OF THE PLA IS 10.25° WEST AND 8.67° SOUTH WHICH IS APPROXIMATELY 4752 N.M. DOWNRANGE. THE PRIME PLA IS 282 N.M. LONG BY 40 N.M. WIDE.		
	13-10	CEILING	1500 FEET MINIMUM			
	13-11	VISIBILITY	5 N.M. MINIMUM			
	13-12	WAVE HEIGHT	8 FEET MAXIMUM			
		<u>PARARESCUE OPERATIONS</u>				
	13-13	THE DECISION TO USE PARARESCUE PERSONNEL IS DEPENDENT UPON WEATHER,	SURFACE VESSEL LOCATION, AND ABILITY	TO PROVIDE AIR DROPPED SUPPLIES UNTIL ARRIVAL OF A SURFACE VESSEL. WEATHER MINIMA FOR PARARESCUE OPERATIONS ARE:		
		WAVE HEIGHT	6' TO 8' SWELLS 10' TO 11'			
		SURFACE WINDS	15 KNOTS			
	CEILING	1,000 FEET				
	VISIBILITY	TARGET VISIBLE				
		NOTE FINAL DECISION TO JUMP IS LEFT TO THE JUMP MASTER.				
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	RECOVERY	LAUNCH AREA & PLA	13-2

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		<u>SPACECRAFT WATER IMPACT STRUCTURAL LIMITS</u>				
	13-14	A WEATHER CONDITION WHICH EXCEEDS SPACECRAFT WATER IMPACT STRUCTURAL LIMITS IN THE PLANNED LANDING AREA WILL BE CONSIDERED AS THE BASIS FOR A HOLD OR SCRUB.				
B	13-15	SURFACE WINDS	<u>20</u> KNOTS MAXIMUM			
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	RECOVERY	LAUNCH AREA & PLA	13-3

	GROUP	PAGE
MISSION RULES ANNEX	ACQ AND LOS	14-1

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION			RULING	NOTES/COMMENTS/SOP'S	
	14-1	ACQ AND LOS TIMES (0° ELEVATION ANGLE)					
		<u>SITE</u>	<u>ACQ</u>	<u>LOS</u>			
		KDY	00:00	11:04			
		GBI	01:04	12:14			
		GTI	03:08	15:32			
		BDA	04:28	15:22			
		ANT	07:32	18:30			
		RKV	17:30	26:00	POSTION - 00 DEG 00 MIN 25 DEG 00 MIN W.		
		ASC	22.21	31:14			
MISSION		REV	DATE	SECTION		GROUP	PAGE
AS-201		A	11/1/65	MISSION RULES ANNEX		ACQ AND LOS	14-1

MISSION RULES

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING		NOTES/COMMENTS/SOP'S	
		TIME MIN:SEC		EVENT		
		✕ 02:26	S-IB OBCO			
		02:27	S-IVB ULLAGE ROCKETS FIRE MCC BEGIN RF BLACKOUT S-IB SEP S-IB RETRO-ROCKETS FIRE S-IVB CONTROL SYSTEM ON			
		02:28	S-IVB FUEL CHILLDOWN PUMP OFF S-IVB LOX CHILLDOWN PUMP OFF S-IVB CHILLDOWN PUMPS DISCHG VALVES CLOSE S-IVB ENGINE READY BYPASS			
		✕ 02:29	S-IVB ENGINE START COMMAND ON S-IVB ENGINE START COMMAND OFF			
		02:30	S-IVB ULLAGE ROCKETS BURNOUT MCC END RF BLACKOUT			
		02:31	S-IVB LOX TANK FLT PRESS SYSTEM ON S-IVB FIRST BURN RELAY SET			
		02:32	S-IVB J-2 ENGINE AT 90% THRUST			
		02:34	S-IVB P.U. ACTIVATE			
		02:40	IU COOLANT VALVE OPEN			
		02:42	S-IVB ULLAGE ROCKETS JETTISON			
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	MISSION RULES ANNEX	MISSION TIMELINE	14-3

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S			
		TIME MIN:SEC	EVENT				
		X 02:52 2:53	CSM TOWER JETTISON CSM SPS ABORT MODE ENABLE CSM ECS GLYCOL EVAP START	No Hsu data, Feb 718 has good track data C-band is being 4:40 intermittent data RDO.			
		07:29	S-IVB FIRST BURN RELAY RESET				
		X 09:53	S-IVB ENGINE C/O COMMAND ON S-IVB ENGINE C/O COMMAND OFF S-IVB PITCH AND YAW CONTROL ACTIVATE				
		5.2.CO 10:05 X 10:03	10:02 Predicted 10:10 now 10:14 S-IVB START PITCHDOWN MANEUVER AT 1°/SEC	10° drift in pitch - slow in 6 min. rate			
B		X 10:53	CSM CONTROL PROGRAMER START	5° Yaw. A.			
		10:55	CSM TAPE RECORDER OFF				
		X 11:56	11:03 TV good. S-IVB TERMINATE PITCHDOWN MANEUVER	1/2°/min drift in pitch.			
		13:53	CSM COMMAND SIVB SEP ON CSM SCS GYROS UNCAGE CSM DIRECT ULLAGE ON				
B		X 13:55	14:08 ✓ S-IVB SEP Good.				
		X 13:56	CSM SCS/RCS ENABLE CSM DIRECT ULLAGE OFF				
B			✓ CSM +X TRANSLATION ON				
B							
MISSION		REV	DATE	SECTION	GROUP	PAGE	
AS-201		B	2/9/66	MISSION RULES ANNEX		MISSION TIMELINE	14-4

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION		RULING		NOTES/COMMENTS/SOP'S		
		<u>TIME</u> <u>MIN:SEC</u>		<u>EVENT</u>				
		x	14:14	CSM	+X TRANSLATION OFF	No drift in zero g states		
			17:30	RKV	HAS 0° ELEVATION ANGLE	170° +12 -14 regd.		
			17:52	CSM	APOGEE	9 R, 7 354 Y. } 0 P, }		
			18:30	ANT	HAS 0° ELEVATION ANGLE			
B		+	19:30	19:44	CSM +X TRANSLATION ON CSM SPS GIMBAL SET ARMED	Gimbal posit. 17130 35% P 18% Y. to RKV.		
B		+	19:45		CSM SPS GIMBAL MOTORS ON			
		x	20:00	20:11	CSM SPS THRUST ON CSM +X TRANSLATION OFF	TM intermitt Sm No rates P 170 R 9 Y 354.		
B			21:51		CSM TAPE RECORDER ON	2 min ΔV 3200 slight fluct in chamber pres. - dropped 10 psi. to 93-94		
		+	23:00		CSM SPS THRUST OFF (ΔV)	2 min 2° drift		
		x	23:05		CSM +X TRANSLATION ON CSM SPS GIMBAL SET CSM SPS THRUST OFF (CP)	TM intermitt dropped 10 psi. to 93-94		
		+	23:20	23:05	CSM SPS THRUST ON CSM +X TRANSLATION OFF	SPS inlet pres. 4° drift in T. 1.5 ΔV.		
MISSION		REV	DATE	SECTION		GROUP		PAGE
AS-201		B	2/9/66	MISSION RULES ANNEX		MISSION TIMELINE		14-5

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION		RULING	NOTES/COMMENTS/SOP'S	
B		<u>TIME</u> <u>MIN:SEC</u>		<u>EVENT</u>	SPS Press ↓	
		* 23:30	23:30	CSM SPS THRUST OFF		
		+ 23:34	✓	CSM START MINUS 5°/SEC PITCH		
		+ 23:52	23:40/24:08	CSM TERMINATE MINUS 5°/SEC PITCH		
		24:03		CSM CONNECT ENTRY BATT BUS TO MAIN DC BUS		
				CSM TRANSFER JET LOGIC TO CM-RCS		
				CSM CONNECT ENTRY BATTS TO PL BUS		
				CSM SM-RCS FFT ON		
				CSM PRESSURIZE CM-RCS		
				CSM DEADFACE SQUIBS FIRE		
B				CSM UMBILICAL GUILLOTINE		
				CSM TENSION TIES DESTRUCT		
				CSM SCS ENTRY MODE ENABLE		
		* 24:04	24:18	CM-SM SEP COMPLETE		
		* 24:12	✓	CM START MINUE 5°/SEC PITCH		
		* 24:29	✓	CM TERMINATE MINUS 5°/SEC PITCH		
			✓	CM START + 5°/SEC ROLL		
	* 25:04	25:18	✓	CM TERMINATE +5°/SEC ROLL-		
			CM	ARM .05G BACKUP SWITCH		
			CM	ELS ACTIVATE		
			RKV	SEND ELS ACTIVATE COMMAND		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	MISSION RULES ANNEX	MISSION TIMELINE	14-6

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION		RULING	NOTES/COMMENTS/SOP'S	
		TIME MIN:SEC		EVENT		
		25:28		CM ENTRY INTERFACE (400 K')		
		26:00	26:20	CM ENTER BLACKOUT RKV NOMINAL LOS	15° off nom roll during beam. (after 9° handover)	
		26:10		CM NOMINAL .05G		
		28:00		CM END BLACKOUT		
		32:32	16:43:00 GMT. ↓ 31:05 Air Boss 1 has vis.	CM 25 K BARO SWITCH CLOSE CM ELS LOGIC BUS ARM CM SCS/RCS DEACTIVATE CM APEX COVER JETTISON CM ELS PYRO BUS ARM	confirmed by R same direction as No alt. error seen.	
		32:34		CM DROGUE CHUTES DEPLOY		
		33:15	A.B.Z- 320°	CM 12K BARO SWITCH CLOSED CM MAIN CHUTES DEPLOY CM DROGUE CHUTES RELEASE CM ACTIVATE MAIN CHUTE DISC BACKUP CKT	Track 1 & AFI visual con	
B		33:23		CM MAIN CHUTES DISREEFED CM DEPLOY VHF RECOVERY ANTENNA CM DEPLOY VHF SURVIVAL ANTENNA CM DEPLOY FLASHING LIGHT		
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	MISSION RULES ANNEX	MISSION TIMELINE	14-7

MISSION RULES

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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S	
B	B	<u>TIME</u> <u>MIN:SEC</u>	<u>EVENT</u>		
		00:00	CSM ABORT TIMER START CSM SCS GYROS UNCAGE CSM COMMAND S-IVB SEP ON S-IVB ENGINE CUTOFF CSM DIRECT ULLAGE ON CSM SPS GIMBAL MOTORS ON	8° 28' S 11° 01' W 37 nm from Baker #3	
		<i>Final DV</i> <i>1,100 fps</i>			
		00:02	S-IVB SEP		
		00:03	CSM SCS/RCS ENABLE CSM SPS GIMBAL SET CSM SPS THRUST SOLENOIDS ARM CSM SPS THRUST ON	Swimmers in water by 17:24:00.	
		00:04	CSM DIRECT ULLAGE OFF		
		00:13	CSM SPS THRUST OFF		
		00:20	CSM START MINUS 5°/SEC PITCH		
		00:24	CSM TERMINATE MINUS 5°/SEC PITCH		
		00:54	CSM CONNECT ENTRY BATT BUS TO MAIN DC BUS CSM CONNECT ENTRY BATTS TO PL BUS CSM TRANSFER JET LOGIC TO CM-RCS CSM PRESSURIZE CM-RCS CSM SM-RCS FFT ON CSM SCS ENTRY MODE ENABLE		
MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	B	2/9/66	MISSION RULES ANNEX	SPS ABORT TIMELINE	14-9

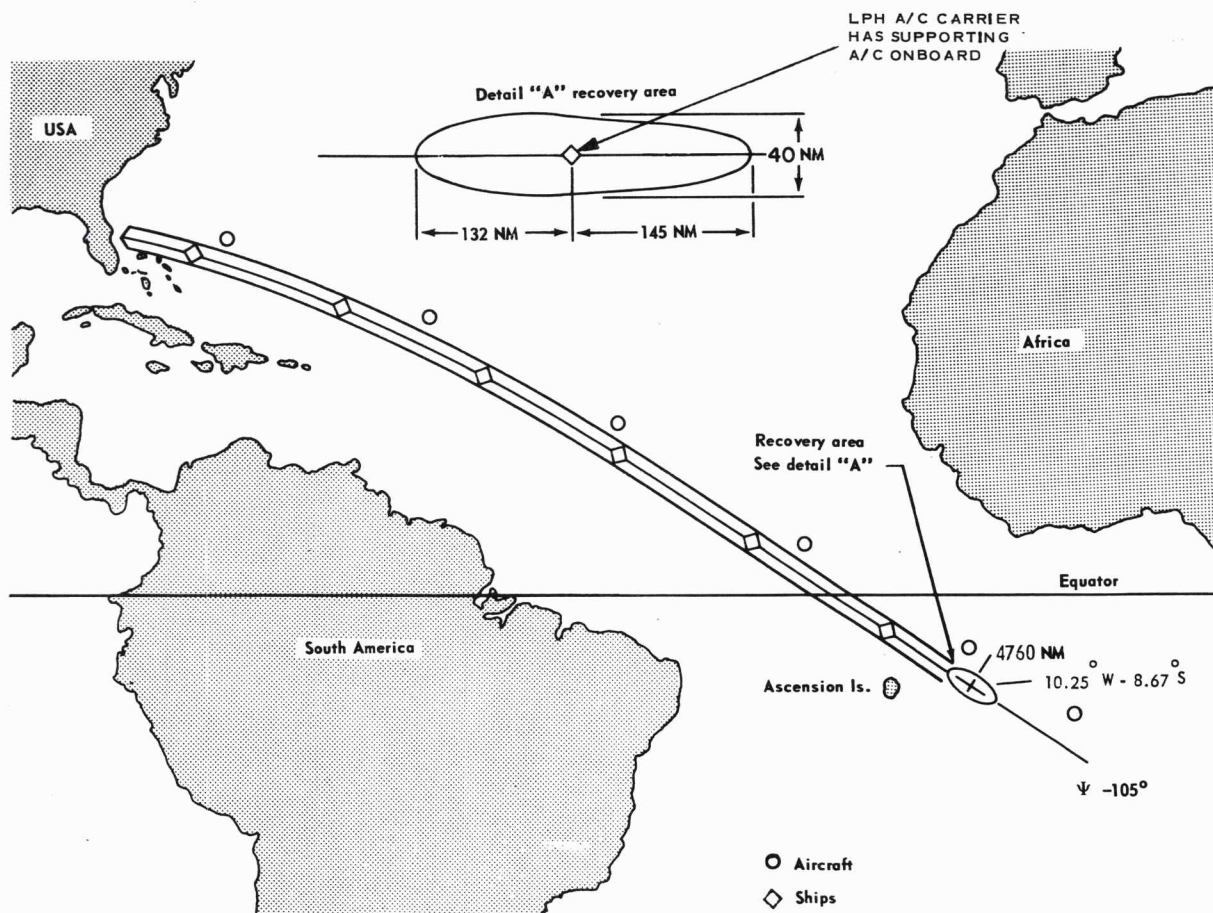
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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
		TIME MIN:SEC 00:54 (CONT'D) 00:55 01:07 01:18 01:54	EVENT CSM DEADFACE SQUIBS FIRE CSM UMBILICAL GUILLOTINE CSM TENSION TIES DESTRUCT CM-SM SEP COMPLETE CM START MINUS 5°/SEC PITCH CM TERMINATE MINUS 5°/SEC PITCH CM START +5°/SEC ROLL CM TERMINATE +5°/SEC ROLL CM ARM .05G BACKUP SWITCH CM ELS ACTIVATE			
MISSION		REV	DATE	SECTION	GROUP	PAGE
AS-201		B	2/9/66	MISSION RULES ANNEX	SPS ABORT TIMELINE	14-10

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
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MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	B	2/9/66	MISSION RULES ANNEX	RECOVERY AREA	14-11

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MISSION RULES

REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S
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KSC SIB SIVB IU CSM-WBD & RCD

GBI SIVB IU CSM-WBD & RCD

GTI IU CSM - WBD SIVB-RCD

BDA SIVB-HSD IU CSM-RCD

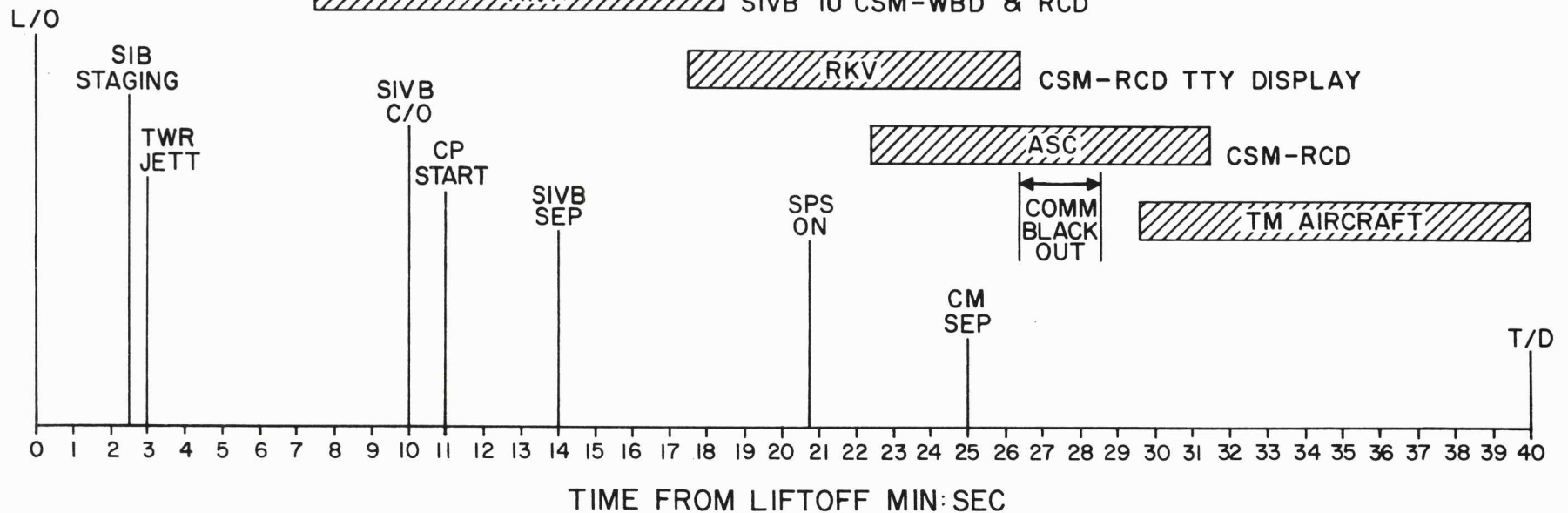
ANT SIVB IU CSM-WBD & RCD

RKV CSM-RCD TTY DISPLAY

ASC CSM-RCD

COMM
BLACK
OUT

TM AIRCRAFT



MISSION	REV	DATE	SECTION	GROUP	PAGE
AS-201	A	11/1/65	MISSION RULES ANNEX	GND STA COVERAGE FOR 0° ELEV ANGLES	14-12

MISSION RULES

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REV	ITEM	CONDITION/MALFUNCTION	RULING		NOTES/COMMENTS/SOP'S	
		<u>STATION/RADAR</u> BDA/FPS-16 ASC/TPQ-18 ASC/FPS-16 ASC/TTR	<u>TRACKING PLAN</u> T+620 SEC TO LOS AOS TO LOS AOS TO LOS SKIN TRACK SM AFTER CM/SM SEP.		PLAN IF ASSIGNED BEACON FAILS OR CANNOT BE TRACKED SWITCH TO IU BEACON SKIN TRACK CM SKIN TRACK SIVB	
MISSION	REV	DATE	SECTION		GROUP	PAGE
AS-201	B	2/9/66	MISSION RULES ANNEX		RADAR	14-14

B

B

S
MEM
PING
PRESE
AMOS,
BRIZZOLA
LOWE, MER
KEYSER, L.
HERVEY, B.
ROSENBLUTH, M
CANIN, L. S.

REMOTE SITE OPERA
LEWIS, CHARLES R.
FENDELL, EDWARD I.

R H.

C.
GORDON V.
HN A.
WILLIAM H.
ON, MILES R.
ROY E.

MISSION	REV	DATE	SEC	PAGE
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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
B		<u>MISSION RULES DISTRIBUTION</u> ASST. DIRECTOR FOR FLIGHT OPS KRAFT, CHRISTOPHER C. (2) SJOBERG, SIGURD A. ROSE, RODNEY G. FLIGHT CONTROL DIVISION HODGE, JOHN D. (1) OWENS, DAVID H. TOMBERLIN, JAMES L. FLIGHT CONTROL OPERATIONS BRANCH KRANZ, EUGENE F. (2) MISSION OPERATIONS SECTION HARLAN, CHARLES S. PLATT, WILLIAM E. SCHULTHEISS, RICHARD F. MERCIER, L. PINGATORE, GREGORY T. PRESENT, STUART M. AMOS, CARL E. BRIZZOLARA, FRANKLIN W. LOWE, MERRIL A. KEYSER, L. HERVEY, B. T. ROSENBLUTH, M. L. CANIN, L. S. REMOTE SITE OPERATIONS SECTION LEWIS, CHARLES R. FENDELL, EDWARD I.	KUNDEL, K. K. SCOTT, GARY B. EALICK, P. L. VICK, J. P. ROY, ARDA DAVIS, STUART A. DIAMOND, P. FUCCI, J. R. DRAUGHON, H. GARVIN, N. BUCHOLZ, W. CONTROL CENTER OPERATIONS SECTION ROACH, JONES W. MOLNAR, WILLIAM HOLKAN, DONALD E. ARMSTRONG, LARRY L. GOODWIN, HERMAN R. SUTTON, RICHARD H. TEMPLE, JOHN PORTER, H. E. BEATTY, E. B. GEMINI FLIGHT SYSTEMS BRANCH BROOKS, MELVIN F. APOLLO FLIGHT SYSTEMS BRANCH PENDLEY, DAVID B. DELUCA, LOUIS A. CSM SECTION MESZAROS, JOHN P. DUMIS, CHARLES L. LINDSEY, OTHO C.	SULMEISTERS, TALIVALDIS K. BURTON, WILLIAM C. FRANKLIN, MYLES E. KAMMAN, JOHN A. MOON, WILLIAM J. SANDERS, ALFRED P. WILLOUGHBY, BRIGGS N. LEM SECTION HANNIGAN, JAMES E. CRAVEN, JACKSON B. MCKINNON, CHARLES L. PUDDY, DONALD R. KNIGHT, JACK JR. LANGENFELD, EUGENE J. STRIMPLE, LARRY W. WATROS, GARY C. YOUNG, WILLIAM C. JOKI, JAMES A. SLV SYSTEMS SECTION CASEY, CHARLES W. DAGENAIS, FRANK E. BURDESHAW, DEXTER H. IBM HAYES, MYRON C. DOOLITTLE, GORDON V. SMITH, JOHN A. SHOOK, WILLIAM H. ROBINSON, MILES R. DAY, ROY E.		
	B					
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AS-201		B	2/9/66	DISTRIBUTION LIST		15-1

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REV	ITEM	CONDITION/MALFUNCTION	RULING	NOTES/COMMENTS/SOP'S		
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