TOP SECRET [redacted]

NO. _____

[redacted]

LAUNCH REQUIREMENTS- J21 VEHICLE 1615

11 MAY 1965

ATTACHED IS THE LAUNCH REQUIREMENTS AND LIMITATIONS FOR PAYLOAD J21 VEHICLE 1615.

[redacted] CHIEF
PAYLOAD INTERATION

DISTRIBUTION

[redacted]

LOGGED 18 May 65 FILED _____

TOP SECRET [redacted]

NO. [redacted]

1.0 SCOPE

1.1 GENERAL.

THE FOLLOWING REQUIREMENTS GOVERN THE CONDITIONS UNDER WHICH THE VEHICLE WILL BE LAUNCHED WITH THE A/P PAYLOAD SYSTEM. ANY DEVIATION FROM THE PRESCRIBED LIMITS SHALL BE CAUSE FOR HOLD. ANY STATUS CHANGES MUST BE REPORTED TO PAYLOAD INTREGRATION IMMEDIATELY AFTER OCCURRENCE FOR EVALUATION. ALL DISCREPANCIES AND DEVIATIONS MUST BE CORRECTED PRIOR TO RESUMPTION OF VEHICLE LAUNCH COUNT-DOWN.

1.2 DESIRED OBJECTIVE

ALL CAMERA OPERATIONS AFTER MATING SHALL BE CALLED 'ALPHA CHECKS' AND SHALL BE MICROWAVED TO STC. VAFB-AP SHALL BE RESPONSIBLE FOR IMPLEMENTING THIS OBJECTIVE.

2.0 PAYLOAD INTERNAL TEMPERATURE.

65 +/- 10 DEG. F. FROM MATING TO T-4 HOURS.
65 +/- 5 DEG. F. FROM T-4 THROUGH LAUNCH.

TEMPERATURE OF PAYLOAD SYSTEM SHALL BE MONITORED AND LOGGED EVERY ONE-HALF HOUR FROM MATING TO LAUNCH

3.0 RELATIVE HUMIDITY.

50 PERCENT OR LESS AT ALL TIMES.

4.0 N2 PRESSURE.

THE N2 MUST BE CONNECTED AND FLOWING WHEN THE SYSTEM IS ON THE LAUNCH PAD. MAXIMUM OFF TIME IS ONE-HALF HOUR PER DAY.

5.0 SRV TRANSMISSION FREQUENCY

RECOVERY TLM	228.2 +/- 0.1 MC
RECOVERY BEACON	235.0 +/- 0.1 MC

6.0 POWER.

POWER MUST BE APPLIED TO THE PAYLOAD INTERFACE WHENEVER THE PAYLOAD IS RAISED OR LOWERED.

7.0 THERMAL BLANKET

THERMAL BLANKET MUST REMAIN ON THE PAYLOAD FROM MATING UNTIL LAUNCH.

8.0 PRIMARY TELEMETRY READOUTS.

PAYLOAD CHECKOUT (MUST BE VERIFIED THROUGH VEHICLE TELEMETRY)

8.1 LENS ROTATION, HORIZON IDLER, AND CENTER OF FORMAT INSTRUMENT 1 CHANNEL 09, LINK I. NO BACK UP CHANNEL IS AVAILABLE.

8.2 LENS ROTATION, HORIZON IDLER, AND CENTER OF FORMAT INSTRUMENT 2 CHANNEL 10, LINK I. NO BACK UP CHANNEL IS AVAILABLE.

8.3 RING A CUMMUTATOR (.4 X 60) CHANNEL 13, LINK I AND POINTS LISTED BELOW. THE PRIMARY COMMUTATED POINTS MUST BE VERIFIED DURING PAYLOAD CONFIDENCE AFTER MATING AND CHECKOUT TASKS RUNS.

VERIFICATION

MONITOR FUNCTION	PRIMARY CH-LK-PT	VOLTS	TOL.	ALTERNATE CH-LK-PT	VOLTS	TOL.
INSTR. 1 DOOR EJECT	13-1-10	1.3	+/-.2	NONE	---	---
INSTR. 2 DOOR EJECT	13-1-16	1.3	+/-.2	NONE	---	---
FAIRING SEPARATION	13-1-19	1.3	+/-.2	NONE	---	---
INSTR.1 CYCLE COUNT 1	13-1-22	0.55 STEP	+/-.15	13-1-25	4.05 OR GREATER	4.05 OR GREATER
INSTR.1 CYCLE COUNT 10	13-1-23	0.55 STEP	+/-.15	13-1-25	4.05 OR GREATER	4.05 OR GREATER
INSTR.1 CYCLE COUNT 100	13-1-24	0.55 STEP	+/-.15	13-1-25	4.05 OR GREATER	4.05 OR GREATER
FOOTAGE POT INSTR. 1	13-1-25	4.05 OR GREATER	4.05 OR GREATER	8-2-56	4.05 OR GREATER	4.05 OR GREATER
INSTR.2 CYCLE COUNT 1	13-1-27	0.55 STEP	+/-.15	13-1-31	0.9 OR LESS	0.9 OR LESS
INSTR.2 CYCLE COUNT 10	13-1-28	0.55 STEP	+/-.15	13-1-31	0.9 OR LESS	0.9 OR LESS
INSTR.2 CYCLE COUNT 100	13-1-29	0.55 STEP	+0-.15	13-1-31	0.9 OR LESS	0.9 OR LESS
CALIBRATE PLUS	13-1-30	5.0	--	13-1-07	5.0	---
CALIBRATE PLUS	13-1-30	5.0	--	13-1-14	5.0	---

FOOTAGE POT INSTR. 2	13-1-31	0.9 OR LESS	0.9 OR LESS	8-2-47	0.9 OR LESS	0.9 OR LESS
MODE MONITOR REC1/REC2	13-1-36	1.0	+/-.2	NONE	---	---
N2 BOTTLE PRESSURE	13-1-37	3.0 OR GREATER	---	11-1-11	3.0 OR GREATER	---
SEPARATION MON. SRV 2	13-1-46	1.3	+/-.2	NONE	---	---
FILM DOOR CLOSURE	13-1-47	4.7	+/-.2	NONE	---	---
CONTINUITY LOOP SRV-1	13-1-51	5.38	+/-.2	NONE	---	---
SEPARATION MON. SRV 1	13-1-52	0.28	+/-.1	16-1-25	0.28	+/-.1
RECOVERY BATTERY SRV-1	13-1-53	0.0	+/-.2	NONE	---	---
CONTINUITY LOOP SRV-2	13-1-54	5.38	+/-.2	NONE	---	---
RECOVERY BATTERY SRV-2	13-1-55	0.0	+/-.2	NONE	---	---
CALIBRATE ZERO	13-1-57	0.0	---	13-1-04	0.0	---
SYC. PULSE	13-1-58	5.5	+/-.2	13-1-59	5.5	+/-.2
SYC. PULSE	13-1-58	5.5	+/-.2	13-1-60	5.5	+/-.2

ALL COMMAND SELECTOR POINTS AS LISTED PER LAUNCH REQUIREMENTS LIST IN APPENDIX I.

9.0 HOMING OF CAMERA SCAN ARMS.

9.1 BOTH CAMERA SCAN ARMS MUST BE PROPERLY HOMED PRIOR TO TERMINAL COUNT.

10.0 LAUNCH REQUIREMENTS COMMAND SETTINGS.

10.1 ALL STEPPING SWITCHES MUST BE POSITIONED IN ACCORDANCE WITH THE COMMAND SETTINGS LIST IN APPENDIX I PRIOR TO TERMINAL COUNT.

11.0 FILM CONSUMPTION PRIOR TO LAUNCH.

11.1 MINIMUM FILM CONSUMPTION PRIOR TO LAUNCH SHALL BE 100 CYCLES ON EACH INSTRUMENT.

11.2 SHOULD THE PAYLOAD SYSTEM STAY IN A LOADED CONDITION FOR AN EXTENDED PERIOD, THE SYSTEM SHALL BE OPERATED FOR 10 CYCLES EVERY FOUR DAYS.

12.0 RESPONSIBILITY.

12.1 IT SHALL BE THE RESPONSIBILITY OF THE SENIOR A/P PAYLOAD ENGINEER TO ENSURE THE IMPLEMENTATION OF THE RESTRICTIONS AND REQUIREMENTS LISTED HEREIN. IN ADDITION, HE IS CHARGED WITH THE RESPONSIBILITY OF SUPPLYING THE FOLLOWING SYSTEM INFORMATION IMMEDIATELY PRIOR TO LAUNCH TO FLIGHT OPERATIONS AND COMPUTER SERVICES BY TELEPHONE.

12.1.1 FINAL FLIGHT SYSTEM WEIGHTS

		A SRV S/N	B SRV S/N ....
12.1.1.1	TOTAL SYSTEM WEIGHT, IN POUNDS.		
12.1.1.2	TOTAL SRV OR NOSE CONE WEIGHT, LBS.	.....	.....
12.1.1.3	RECOVERY VEHICLE WEIGHT, LBS.	.....	.....
12.1.1.4	SUSPENDED CAPSULE WEIGHT, LBS.	.....	.....
12.1.1.5	DUMMY PAYLOAD WEIGHTS		
	A. NUMBER 1, LBS.	.....	.....
	B. NUMBER 2, LBS.	.....	.....
	C. NUMBER 3, LBS.	.....	.....
	D. NUMBER 4, LBS.	.....	.....
12.1.1.6	RETRO ROCKET WEIGHT, LBS.	.....	.....
12.1.1.7	PARACHUTE WEIGHT, LBS.	.....	.....

12.1.2 AT THE TIME THE FLIGHT FILM IS FIRST SPLICED TO THE SYSTEM, RECORD THE CYCLE COUNTER READINGS, CASSETTE FOOTAGE POT VOLTAGE AND LENGTH OF TAKE-UP CASSETTE LEADER ON EACH INSTRUMENT.

	MASTER	SLAVE
A. CYCLE COUNTERS, CYCLES	.....	.....
B. FOOTAGE POT VOLTAGE, VOLTS	.....	.....
C. TOTAL SYSTEM LEADER, FT.	.....	.....

[redacted]

12.1.3 IF ANY OFF-SPOOLING IS PERFORMED, THE FOLLOWING IS REQUIRED AT THE TIME THE FINAL SPLICE IS MADE BETWEEN THE FLIGHT FILM AND THE TAKE-UP LEADER. RECORD THE CYCLE COUNTER READINGS, CASSETTE FOOTAGE POT VOLTAGES, AND REMAINING LENGTH OF LEADER IN THE TAKE-UP CASSETTES.

	MASTER	SLAVE
A. CYCLE COUNTERS, CYCLES	.....	.....
B. FOOTAGE POT VOLTAGE, VOLTS	.....	.....
C. REMAINING TAKE-UP LEADER, FT.	.....	.....

12.1.4 CYCLE COUNTER AND FILM FOOTAGE POT READINGS FOR EACH INSTRUMENT, AT LAUNCH.

	MASTER	SLAVE
A. CYCLE COUNTERS, CYCLES	.....	.....
B. FOOTAGE POT VOLTAGE, VOLTS	.....	.....

12.1.5 CLOCK ERROR, STATIC RUN, IN MICROSECONDS .....

12.1.6 TOTAL LENGTH OF FLIGHT FILM OFF-SPOOLED FROM EACH SUPPLY SPOOL INCLUDING ALL CONTROL STRIPS AND SAMPLES.

A. MASTER ..... FT.

B. SLAVE ..... FT.

12.1.7 TOTAL LENGTH OF FILM OFF-SPOOLED FROM EACH S/I INSTRUMENT.

A. S/I A STELLAR ..... FT.

A INDEX ..... FT.

B. S/I B STELLAR ..... FT.

B INDEX ..... FT.

12.1.8 DOOR POSITION MONITORS.

		TLM VOLTAGE		
A. INSTR. 1 MAIN DOOR	ON		OFF	
B. INSTR. 2 MAIN DOOR	ON		OFF	
C. FILM LIGHT DOOR	OPEN		CLOSED	

12.1.9 SRV SEPARATION MONITORS

	CONDITIONS				TLM VOLTAGE
	SRV-1	SRV-2	P-29	SW-OVER	
A.	MATED	MATED	MATED	1ST. REC.	.....
B.	SEP.	MATED	MATED	1ST. REC.	.....
C.	SEP.	SEP.	MATED	1ST. REC.	.....
D.	MATED	SEP.	MATED	1ST. REC.	.....
E.	SEP.	MATED	SEP.	2ND. REC.	.....
F.	SEP.	SEP.	SEP.	2ND. REC.	.....

12.1.10 FAIRING SEPARATION MONITORS

	CONDITION	TLM VOLTAGE
A.	MATED	.....
B.	SEPARATED	.....

12.1.11 CONITUNITY LOOP MONITOR CALIBRATIONS

	CONDITIONS			TLM VOLTAGE		
	CONTINUITY LOOP	S/I SEAL	MAIN SEAL	NOMINAL +/-5PCT	SRV-A	SRV-B
A.	CLOSED	CLOSED	CLOSED	1.84	.....	.....
B.	CLOSED	CLOSED	OPEN	4.30	.....	.....
C.	CLOSED	OPEN	OPEN	5.38	.....	.....
D.	OPEN	OPEN	OPEN	4.57	.....	.....
E.	OPEN	OPEN	CLOSED	2.16	.....	.....
F.	OPEN	CLOSED	CLOSED	0.75	.....	.....
G.	OPEN	CLOSED	OPEN	3.42	.....	.....
H.	CLOSED	OPEN	CLOSED	3.12	.....	.....

[redacted]

APPENDIX I PAYLOAD LAUNCH REQUIREMENT LETTER

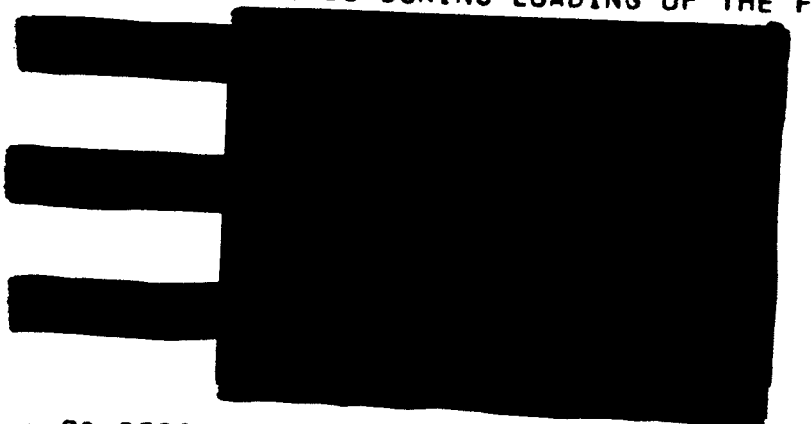
LAUNCH REQUIREMENT- COMMAND SETTINGS

THE FOLLOWING COMMAND SETTINGS ARE SPECIFIED FOR J21 PAYLOAD 1615 VEHICLE. DATE OF ISSUE .....

NO.	FUNCTION	COMMAND SELECTOR POSITION	VERIFICATION PRIMARY CH-LK-PT	PRIMARY VOLTS TOL	SECONDARY CH-LK-PT	SECONDARY VOLTS TOL
6	V/H RAMP LEVEL	7	13-1-02	2.0 ±.10	8-2-24	2.0 ± .10
			13-1-03	3.0 ±.15	8-2-26	3.0± .15
8	V/H RAMP AMPLITUDE	6	13-1-05	2.0 ± .10	8-2-28	2.0 ± .10
			13-1-06	2.0 ± .10	8-2-30	2.0 ± .10
9	PROGRAM	4	13-1-08	1.0 ± .05	8-2-32	1.0 ± .05
			13-1-09	4.0 ± .20	8-2-34	4.0 ± .20
10	V/H RAMP DELAY	6	13-1-11	2.0 ± .10	8-2-44	2.0± .10
			13-1-12	2.0 ± .10	8-2-45	2.0 ± .10
11	INSTR. MODE	1	13-1-14	1.0 ± .05	8-2-48	1.0 ± .05
			13-1-15	1.0 ± .05	8-2-50	1.0 ± .05
12	INTERMIX POSITION	11	13-1-17	4.0 ± .20	8-2-52	4.0 ± .20
			13-1-18	4.0 ± .20	8-2-53	4.0 ± .20
15	INTERMIX MODE	4	13-1-20	4.0 ± .20	8-2-55	4.0 ± .20

LAUNCH REQUIREMENTS- CAMERA SYSTEM

LOADING MONITORS- THE FOLLOWING REPRESENTATIVES HAVE BEEN DESIGNATED RESPONSIBLE DURING LOADING OF THE FLIGHT SYSTEM



• OR DESIGNATED REPRESENTATIVE.

THE FOLLOWING SETTINGS/REQUIREMENTS ARE SPECIFIED FOR THE J21 PAYLOAD 1615 VEHICLE.

PANORAMIC LENS SETTINGS-

	INSTRUMENT 1 (MASTER)	INSTRUMENT 2 (SLAVE)
SLIT DIMENSIONS	.175	.250
FILTER TYPE	WRATTEN 21	WRATTEN 25

NOTE- SLIT DIMENSIONS MUST BE MEASURED PRIOR TO INSTALLATION.

MEASURED BY .....

VERIFIED BY .....

HORIZON OPTICS SETTINGS -

	INSTRUMENT 1 (MASTER)	INSTRUMENT 2 (SLAVE)
SUPPLY HORIZONS-		
APERTURE	F 6.8	F 8.0
SPEED	1/100 SEC	1/100 SEC
FILTER	WRATTEN 25	WRATTEN 25
TAKE-UP HORIZONS-		
APERTURE	F 8.0	F 6.8
SPEED	1/100 SEC	1/100 SEC
FILTER	WRATTEN 25	WRATTEN 25

STELLAR INDEX OPTICS SETTINGS-

	STELLAR INDEX A	STELLAR INDEX B
STELLAR LENS-		
APERTURE	F 1.8	F 1.8
SPEED	2.0 SEC	2.0 SEC
FILTER	NONE	NONE

[redacted]

INDEX LENS-		
APERTURE	F4.5	F4.5
SPEED	1/500 SEC	1/500 SEC
FILTER	WRATTEN 21	WRATTEN 21

FILM NOMENCLATURE-

PANORAMIC INSTRUMENTS

	INSTRUMENT 1 (MASTER)	INSTRUMENT 2 (SLAVE)
PRIMARY		
TYPE	7J-40-16000	7J-40-16000
EMUL. DATA	95-10-3-4-1-5	95-4-1-5
WT. AND SPCOL NO.	89.0-78.7-48-11T	88.2-78.9-55-80B
BOX NO.	46	46
SECONDARY		
TYPE	7J-40-16000	7J-40-16000
EMUL. DATA	81-2-1-5	81-2-7-1-5
WT. AND SPCCL NO.	87.4-77.9-55-135T	88.0-78.5-55-134B
BOX NO.	13	13

STELLAR INDEX-

	STELLAR INDEX A		STELLAR INDEX B	
	STELLAR	INDEX	STELLAR	INDEX
PRIMARY-				
TYPE	3J-34	7J-33	3J-34	7J-33
EMUL. DATA	51-10-12-4	37-1-12-4	51-10-12-4	37-1-12-4
SECONDARY				
TYPE. DATE	3J-34	7J-33	3J-34	7J-33
EMUL. DATA	51-10-12-4	37-1-12-4	51-10-12-4	37-1-12-4

PANORAMIC OFFSPOOLING REQUIREMENTS-

	MASTER	SLAVE
ORINGINAL LENGTH-FT.	16000	16000
LENGTH OF OFF SPOOL-FT.	0 +/-10	0 +/-10
LENGTH TO LOAD-FT.	16000	16000

STELLAR INDEX FILM OFFSPOOLING REQUIREMENTS

	STELLAR INDEX A		STELLAR INDEX B	
	STELLAR	INDEX	STELLAR	INDEX
ORGINAL LENGTH-FT.	7.5	13.5	7.5	13.5
LENGTH TO OFF SPOOL-FT.	30 +1 -0	45 +1 -0	30 +1 -0	45 +1 -0
LENGTH TO LOAD-FT.	45	90	45	90

CYCLE RATIO STELLAR INDEX TO PANORAMIC 1 TO 7

STELLAR BAFFLE TYPE-

STELLAR A	STELLAR B
5.000	5.000

LAUNCH WINDOW 1800 TO 1900 Z

APPROVED BY [redacted]

LAST PAGE

LAST PAGE

[redacted]

[redacted]

INDEX LENS-		
APERTURE	F4.5	F4.5
SPEED	1/500 SEC	1/500 SEC
FILTER	WRATTEN 21	WRATTEN 21
FILM NOMENCLATURE-		
PANORAMIC INSTRUMENTS		
	INSTRUMENT 1 (MASTER)	INSTRUMENT 2 (SLAVE)
PRIMARY		
TYPE	7J-40-16000	7J-40-16000
EMUL. DATA	81-2-1-5	81-2-7-1-5
WT. AND SPCCL NO.	87.4-77.9-55-135T	88.0-78.5-51-13[redacted]
BOX NO.	[redacted]	
SECONDARY		
TYPE	7J-40-16000	7J-40-16000
EMUL. DATA	85-52-1-5	85-52-1-5
WT. AND SPCCL NO.	88.8-79.0-25-113T	88.2-78.8-45-88
BOX NO.	10	10

STELLAR INDEX-	STELLAR INDEX A		STELLAR INDEX B	
	STELLAR	INDEX	STELLAR	INDEX
PRIMARY-				
TYPE	3J-34	7J-33	3J-34	7J-33
EMUL. DATA	51-10-12-4	37-1-12-4	51-10-12-4	37-1-12-
SECONDARY				
TYPE. DATE	3J-34	7J-33	3J-34	7J-33
EMUL. DATA	51-10-12-4	37-1-12-4	51-10-12-4	37-1-12-4

[redacted]

TOP SECRET [redacted]

NO. [redacted]

LAUNCH REQUIREMENTS- J21 VEHICLE 1615

12 MAY 1965

ATTACHED IS THE LAUNCH REQUIREMENTS AND LIMITATIONS FOR PAYLOAD J21 VEHICLE 1615.

REVISION A: PAGE 9 CHANGED

[redacted]

CHIEF
PAYLOAD INTERATION

DISTRIBUTION

[redacted]

TOP SECRET [redacted]

NO. [redacted]

[redacted]

12 May 1965

TO: [redacted]

FROM: [redacted]

SUBJECT: J-20 AND J-21 RESOLUTION AND THEODOLITE TESTS

INTRODUCTION

The final resolution and theodolite tests for J-20 and J-21 systems were completed at A/P on 13 February and 24 March 1965 respectively. Test results are summarized as follows:

DATA SUMMARY

J-20 System Instruments 136 and 137

1. Theodolite test material was evaluated and found to be acceptable for both instruments.

2. Thru focus resolution tests were completed, graphically plotted and evaluated. The collimator position of peak focus and the peak resolution is shown in the table below:

MASTER INSTRUMENT #136

Max Hi Con 184 Li/MM
Max Lo Con 107 Li/MM Peak focus at -.001"

SLAVE INSTRUMENT #137

Max Hi Con 194 Li/MM
Max Lo Con 102 Li/MM Peak focus at -.001"

All aspects of the resolution data for both instruments appear normal.

Instruments 136 and 137 have demonstrated a resolution performance at A/P and Boston that meet test and flight requirements.

[redacted]

[redacted]

J-21 System Instruments 166 and 167

1. Theodolite tests for both instruments were completed without incidence. A/P processed theodolite film was rated acceptable for distribution to Boston.

2. The final resolution tests for instruments 166 and 167 meet J program requirements for peak resolution. Resolution results are shown as follows for your convenience.

MASTER INSTRUMENT #166 (Cell I-85)

Max Hi Con 208 Li/MM
Max Lo Con 107 Li/MM Peak focus -.001"

SLAVE INSTRUMENT #167

Max Hi Con 187 Li/MM
Max Lo Con 116 Li/MM Peak focus -.002"

The peak focus of -.002" is considered normal peak position for A/P because the Boston peak was at -.001". This was the first time theodolite test material was sent directly to [redacted] group in Washington for calibration from A/P.

J-21 system will fly backwards in flight, that is nose first. A/P resolution tests were performed before IMC and field flattener changes were made. Evaluation of the changes made to the IMC and field flattener indicate that further resolution tests are not warranted.

Instrument 166 was previously resolution tested and results reported 3 March 1965. At that time the Max Low Contrast peak was unacceptably low at 89 Li/MM. Instrument #166 was returned to Boston and corrected to a flight acceptable performance level by replacing lens cell I-86 with I-85.

APPROVED:

[redacted]

for [redacted] Manager
Operations & Analysis

[redacted]

[redacted]

Performance Evaluation

[redacted]

[redacted]