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WHS-056  
Pages  
Copy      of       
13 August 1966

MANNED /AUTOMATIC

AND

AUTOMATIC

SYSTEMS ANALYSES

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RESULTS OF MAM/AM MISSION EFFECTIVENESS STUDIES

PROGRAM DIRECTION (SECRETARY OF DEFENSE, 24 AUGUST 1965)

1. DETERMINE MAN'S CONTRIBUTION TO EARLY SYSTEM MATURITY: BOTH MANNED/AUTOMATIC MODE AND AUTOMATIC MODE CONFIGURATIONS.
2. DETERMINE MAN'S CRITICAL CONTRIBUTION TO HIGH RESOLUTION PHOTO RECONNAISSANCE.

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MAN'S CONTRIBUTIONS TO EARLY  
SYSTEM DEVELOPMENT

- TROUBLE SHOOTING, MANUAL OVERRIDE,  
MAINTENANCE, REPLACEMENT, AND REPAIR
  
- BACKUP FAILED SUBSYSTEMS

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TROUBLE SHOOTING, MANUAL OVERRIDE,  
MAINTENANCE, REPLACEMENT, AND REPAIR

FLIGHT CREW ACTIVITIES

- ① DETECT ANOMALY IN REAL TIME FROM MONITOR-ALARM OR ABNORMAL RESPONSE
- ② OBSERVATIONS, SWITCHING, SELECT AVAILABLE ALTERNATE OPERATING MODE
- ③ REPORT TO GROUND AT STATION- CONTACT: VERIFY MALFUNCTION, GIVE STATUS
- ④ LOCALIZE FAULT AT COMPONENT LEVEL (VOLTMETER, CIRCUIT DIAGRAM, TEST POINTS)
- ⑤ ASSESS PROBABILITIES OF FIX, AVAILABLE SPARE, DEGREE OF RISK
- ⑥ CONFER WITH GROUND AT STATION- CONTACT, REPORT DETAIL DATA AND PROPOSED ACTION
- ⑦ INSTITUTE FIX
- ⑧ MONITOR TO ASSURE TROUBLE CORRECTED

GROUND SYSTEM ACTIVITIES

- ① VERIFY ANOMALY FROM TELEMETRY, IF FUNCTION INSTRUMENTED
- ② INITIATE ANALYSIS OF PROBABLE CAUSE
- ③ COMPARE T/M DATA WITH CREW REPORT- MAKE INITIAL RECOMMENDATIONS FOR ACTION
- ④ CONTINUE ANALYSIS UTILIZING SPECIALIZED MANPOWER. DEFINE PRIORITY ORDER OF CORRECTIVE ACTIONS ASSESSING RISK AND EXPEDIENCY.
- ⑤ CONCUR WITH CREW DIAGNOSIS AND FIX, OR ADVISE OF BETTER ALTERNATIVE, OR REQUEST ADDITIONAL MEASUREMENTS
- ⑥ REVIEW PROGRAM FOR ALTERNATE OPERATIONS MODE
- ⑦ MONITOR BY T/M

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ACCESSIBILITY FOR MAINTENANCE/REPLACEMENT/REPAIR

LABORATORY MODULE

<u>SUBSYSTEM</u>	<u>LOCATION</u>	<u>ACCESSIBILITY</u>	<u>I. V.</u>
<b>EPS:</b>			
FUEL CELL	UNPRESS. COMP.	INACCESSIBLE, REDUNDANT	
CRYO TANK/LINES	"	" "	
ELECT. CONTR. POWR UNIT	PRESS. COMP.	75%, COMMONALITY EMPHASIZED	✓
DISTRIBUTION	"	80%, SWING OUT PANELS	✓
<b>EC/LS:</b>			
FLUID LOOP/VALVING	UNPRESS. COMP.	INACCESSIBLE, REDUNDANT	
FREON PUMP/MTR, H. E.	"	" "	
MOLECULAR SIEVE	PRESS. COMP.	100%, HAS REGEN. CAPAB.	✓
	"	100%, REMOVAL EASY	✓
GAS REGULATOR	"	100%, THOUGH REDUNDANT	✓
<b>ACTS:</b>			
HORIZ. SEN. HDS.	EXTERN. VEH.	INACCESSIBLE, REDUNDANT	
TCA'S	"	" "	
PROP. TANK/LINES VALVES	UNPRESS. COMP.	" "	
CRYOS	PRESS. COMP.	100%, REMOVAL EASY	✓
ELECTRONIC CIRC. CARDS	"	100%, COMMONALITY EMPHASIZED	✓
<b>COMM/DATA MGMNT:</b>			
TRANSM/RECVRS	PRESS. COMP.	INACCESSIBLE, REDUNDANT	✓
VOICE COMPONENTS	"	" "	✓
COMPUTER	"	" "	✓
RECORD/TELEPR. HEADS	"	100%, CLEAN/REPLACE	✓
TAPES	"	100%, REPLACE	✓
<b>INSTR.</b>			
SIGNAL COND	PRESS. COMP.	100%, CHANNEL SWAPPING	✓
SENSORS/DISPLAYS	PRESS. & UNPRESS.	50%, REDUND/REPL	✓
<b>STRUCTURE:</b>			
DOOR/SEALS, LATCH	EXTR, WALL	100%, REPLACE	
RADIATOR	EXTERN. VEH.	INACCESSIBLE, REDUND PATHS	

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ACCESSIBILITY FOR MAINTENANCE/REPLACEMENT/REPAIR

MISSION PAYLOAD

<u>SUBSYSTEM</u>	<u>LOCATION</u>	<u>ACCESSIBILITY</u>	<u>I. V.</u>
CAMERA & FILM HANDLING	PRES. COMP'T-AFT BULKHEAD	100%	✓
RECONN CONSOLES	PRESS. COMPARTMENT	60%, SWING OUT PANELS	✓
ACQN/TRACKING SCOPE PICKUP HEADS	PRES. COMP'T-CONSOLE EXT. BOTTOM SKIN	25%, SWING OUT PANELS INACCESSIBLE, REDUNDANT	✓
COMPUTER SUBSYSTEM	PRES. COMP'T-CONSOLE	50%, SWING OUT PANELS	✓
DATA READOUT SUBSYSTEM PROCESSING SCANNER	PRES. COMP'T-CONSOLE PRES. COMP'T-CONSOLE	100% 50%, SWING OUT PANELS	✓ ✓
DATA RE-ENTRY VEHICLE LAUNCHER	PRES. COMP'T-BRACKET PRES. COMP'T BOTTOM	25%, BUCKET LOAD ACCESS 50% DRV LOAD HATCH	✓ ✓
OPTICAL SENSOR MIRRORS DRIVES	MISSION MODULE MISSION MODULE	INACCESSIBLE INACCESSIBLE, REDUNDANT	
THERMAL CONTROL HEATER BLANKETS THERMAL DOOR	MISSION MODULE MISSION MODULE	INACCESSIBLE, REDUNDANT 50%, IN OPEN POSITION	
OPS. REF. & CONTROL STAR TRACKER	MISSION MODULE UPPER SKIN	INACCESSIBLE, REDUNDANT	

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BACKUP FAILED SYSTEMS  
(MANNED FUNCTIONS)

<u>SUBSYSTEMS, FUNCTIONS INOPERATIVE</u>	<u>BACKUP ACTIVITY</u>	<u>% MISSION COMPLETION WITH EARLY FAILURE</u>
<u>V/R SENSORS, ACROSS FORMAT IMC, STAR TRACKERS</u>	MAN USES ATS	100
<u>ABOVE, PLUS: 1 SGLS COMMAND &amp; TRACK LINK, 2 FUEL CELLS, 1 CRYO TANK, 25% OF STABILIZATION SYSTEM, AUTO MODE ΔV, LAB ATTITUDE REFERENCE</u>	AS ABOVE, PLUS: MAN INITIATES POWER-DOWN MODE, MANUAL ΔV CONTROL, MANUAL STABILIZATION CONTROL WITH VISUAL REFERENCE	85
<u>ABOVE, PLUS: DRV/LAUNCHERS, WIDE-BAND DATA READOUT (SCANNER)</u>	AS ABOVE, PLUS: MAN INFORMS GROUND OF TAKE	75
<u>ABOVE, PLUS: ALL COMMUNICATIONS EXCEPT SINGLE UP/DOWN VOICE LINK</u>	MANUAL COMPUTER UPDATE WITH VOICE RECEIVED DATA	50
<u>ABOVE, PLUS: LOSS OF ALL PROPELLANT, OR LOSS OF ALL POWER, OR LOSS OF ALL CRYO, OR LOSS OF ALL STABILIZATION AND CONTROL, OR LOSS OF OPTICS</u>	CREW RETURNS WITH TAKE IN GEMINI B	0*

\* DEPENDENT ON TIME OF FAILURE

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VEHICLE RELIABILITY COMPARISONS

<u>SUBSYSTEM</u>	<u>AM</u> <u>R</u>	<u>M/AM</u> <u>R</u>
EPS	.998	.999
EC/LS	.999	.994
CRYO	.999	.999
ACTS - P	.996	.996
ACTS - E	.995	.999
COMMUNICATIONS	.960	.999
COMPUTER	.985	.985
MALFUNCTION CORRECTION/CONTROL	.940	.992
STRUCT/RADIATOR	.999	.999
LABORATORY VEHICLE SEGMENT	.880	.970
MISSION MODULE	} .830/.869 <sup>(1)</sup>	.920
SUPPORT MODULE		----
GEMINI B	----	.990
TOTAL	<u>.730/.765<sup>(1)</sup></u>	<u>.883</u>

(1) REDUNDANT V/R SENSORS

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MAN'S CRITICAL CONTRIBUTIONS TO HIGH  
RESOLUTION PHOTO RECONNAISSANCE

- ① EXAMINATION OF TARGETS FOR ACTIVE INDICATORS
- ② WEATHER AVOIDANCE
- ③ WEATHER VERIFICATION

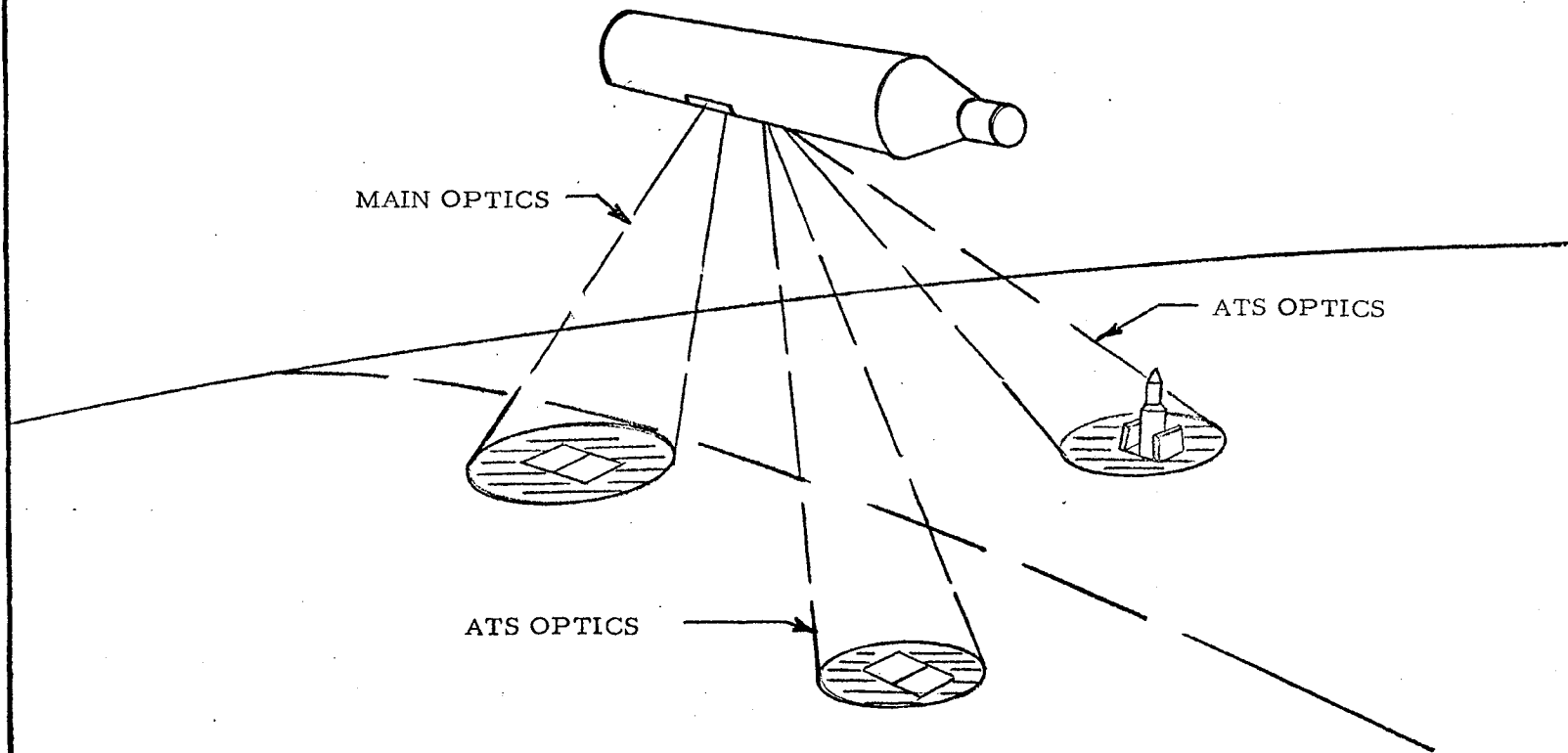
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CONCEPT OF MANNED EXAMINATION FOR ACTIVE INDICATORS



- IF EITHER ALTERNATE HAS ACTIVE INDICATORS, TAKE IT

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New 8/11

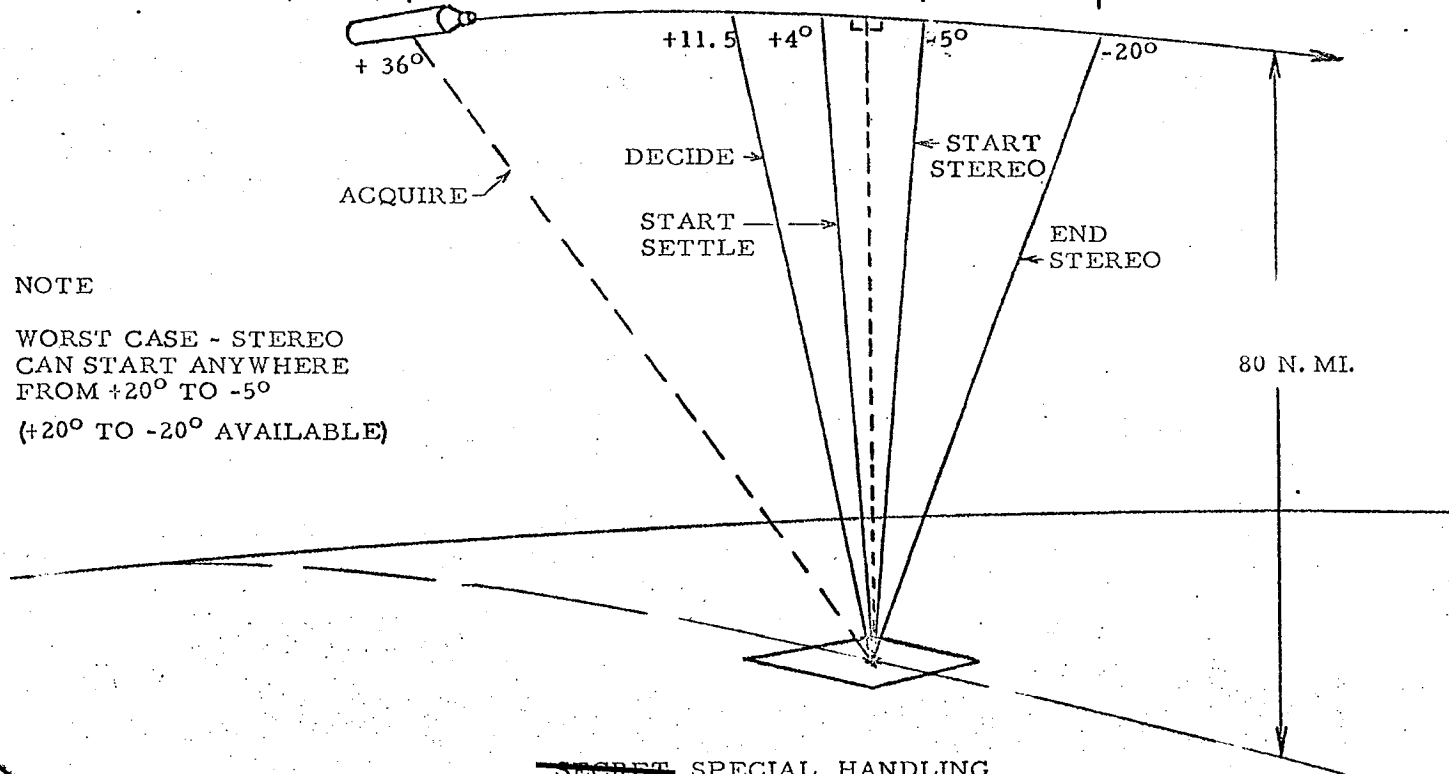
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ACTIVE INDICATOR EXAMINATION AND SPECIAL PHOTOGRAPHY SEQUENCE

TIMES (SEC.)	10	2.5	3	5.2
DISTANCE (N. MI.)	42	10.5	12.5	22



NOTE

WORST CASE - STEREO  
CAN START ANYWHERE  
FROM +20° TO -5°  
(+20° TO -20° AVAILABLE)

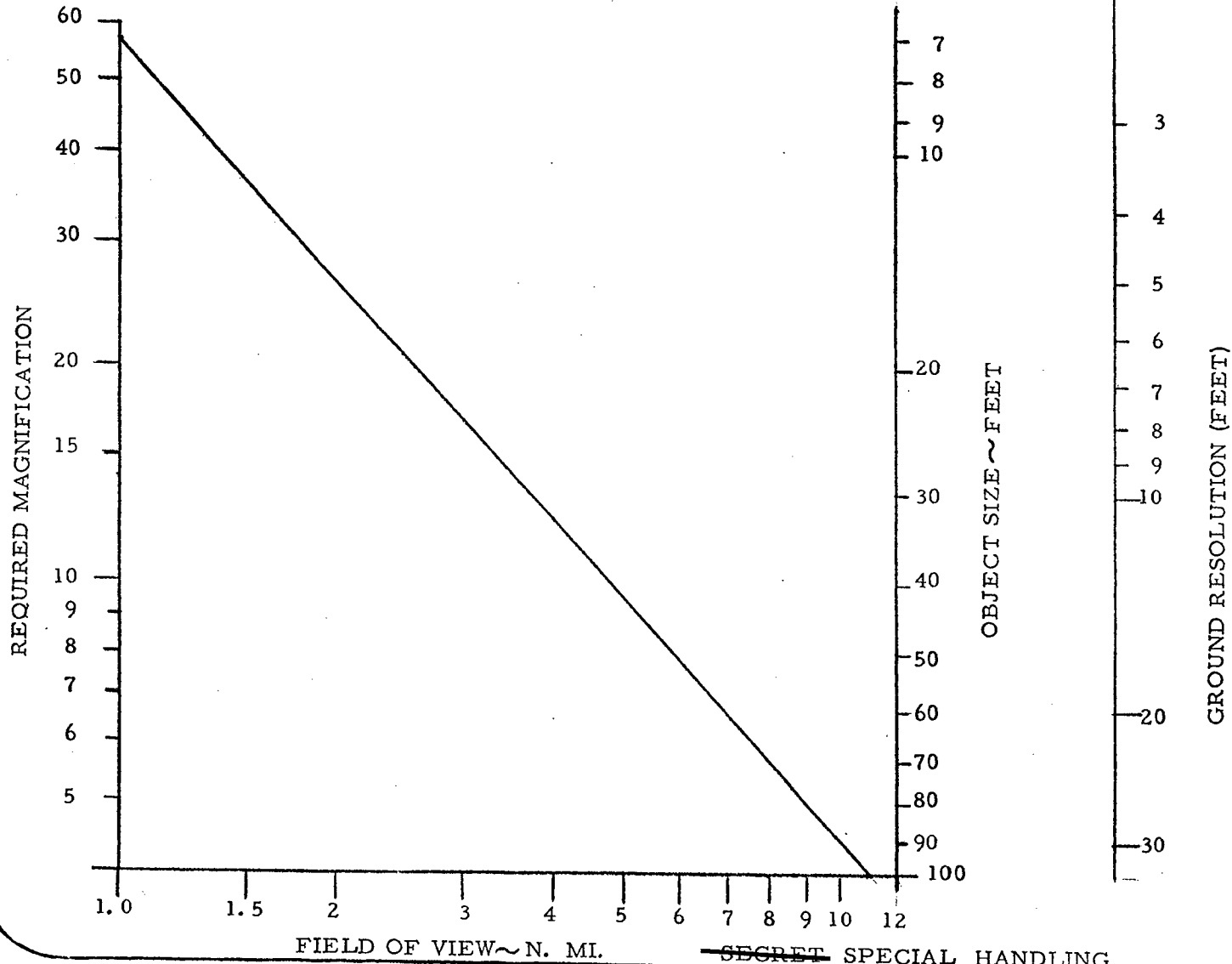
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ACQUISITION/TRACKING TELESCOPE  
CAPABILITIES



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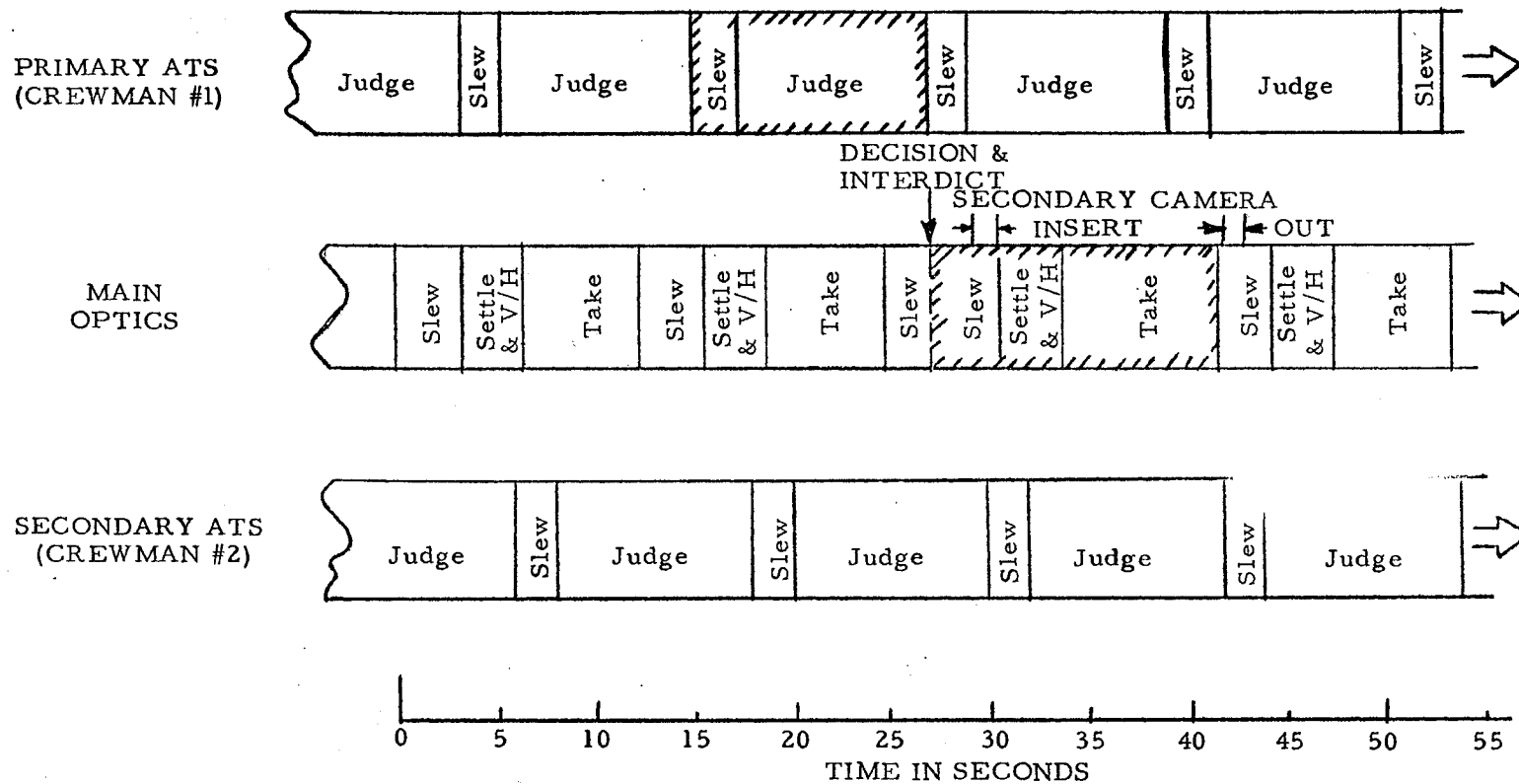
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MANNED ACTIVE INDICATOR EXAMINATION

TYPICAL TIMELINE



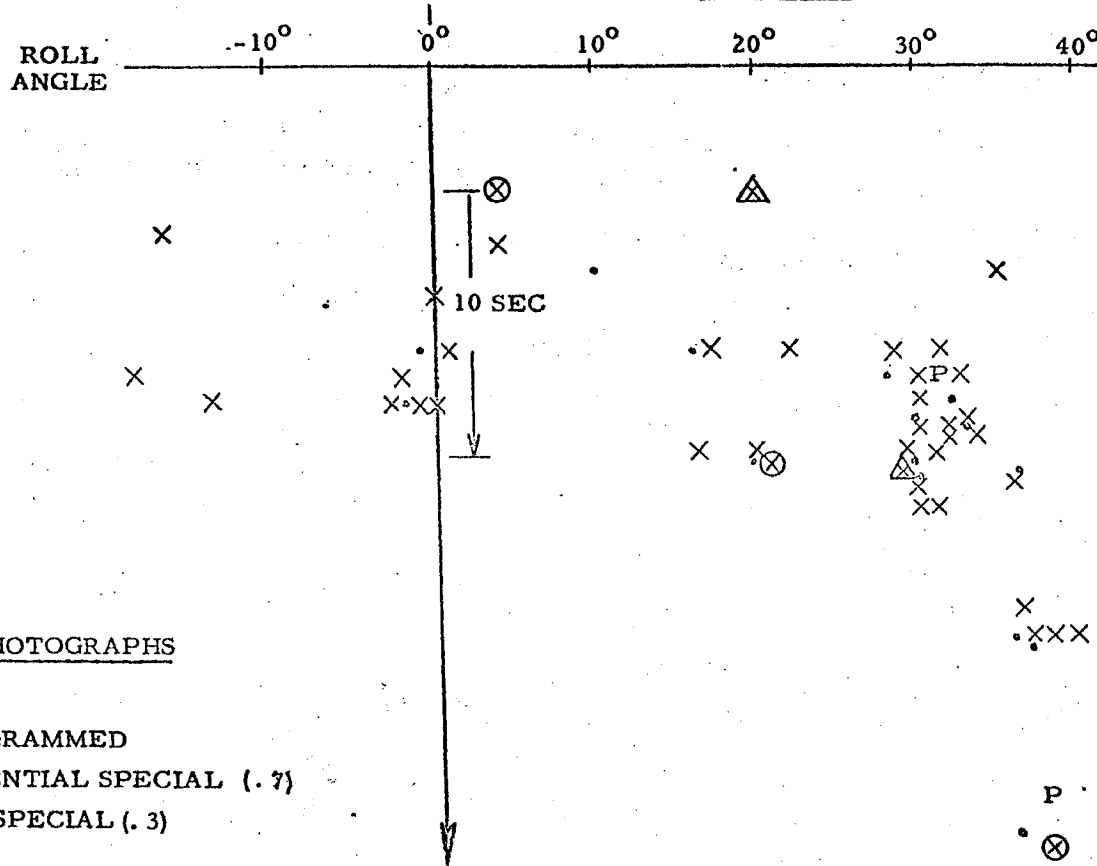
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SECTION OF TYPICAL SIMULATION RUN



KEY TO PHOTOGRAPHS

- P - PROGRAMMED
- X - POTENTIAL SPECIAL (.7)
- - NOT SPECIAL (.3)
- ⊗ - JUDGED BY CREWMAN #1
- ⊠ - JUDGED BY CREWMAN #2

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PROGRAMMED TARGETS PER DAY

o 3-DAY RUNS

	<u>EXAMINATION TIME, SECS.</u>		
	<u>10</u>	<u>6</u>	<u>4</u>
PRIMARY OPTICS	156	156	156
ACQUISITION SCOPE #1	67		113
ACQUISITION SCOPE #2	51		84
ACQUISITION SCOPES #1 and #2	118	160	197

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SPECIAL PHOTOGRAPH TAKE ANALYSIS

● 50% AVERAGE VISIBILITY

● PHOTOGRAPHS ARE STEREO PAIRS

● 1.5 PROGRAMMED PHOTOGRAPH REDUCTION FACTOR FOR INTERDICTION OF PROGRAM  
AUTOMATIC MODE

● 156 PROGRAMMED PHOTOGRAPHS/DAY

●  $156 \times 0.50 = 78$  CLEAR PROGRAMMED PHOTOGRAPHS/DAY

●  $78 \times 0.70 = 54.6$  POTENTIALLY SPECIAL CLEAR PROGRAMMED PHOTOGRAPHS/DAY

●  $54.6 \times 0.06 = 3.3$  CLEAR SPECIAL PROGRAMMED PHOTOGRAPHS PER DAY

● 70% OF PROGRAMMED PHOTOGRAPHS ARE POTENTIALLY SPECIAL

● 6% OF POTENTIALLY SPECIAL ARE IN FACT SPECIAL

MANNED ACTIVE INDICATOR MODE

● 160 POTENTIALLY SPECIAL PHOTOGRAPHS/DAY HANDLED BY CREW

●  $160 \times 0.50 = 80$  POTENTIALLY SPECIAL PHOTOGRAPHS JUDGED CLEAR

●  $80 \times .06 = 4.8$  CLEAR SPECIAL PHOTOGRAPHS PER DAY HANDLED BY CREW

●  $4.8 \times 1.5 = 7.2$  PROGRAMMED PHOTOGRAPHS LOST DUE TO INTERDICTION

●  $156 - 7.2 = 148.8$  RETAINED PROGRAMMED PHOTOGRAPHS/DAY

●  $\frac{148.8}{156.0} \times 3.3 = 3.2$  CLEAR SPECIAL PROGRAMMED PHOTOGRAPHS PER DAY

● CLEAR PHOTOGRAPHS/DAY WITH CREW PARTICIPATION =  $0.50 (156 - 7.2) + 4.8 = 79.2$

● SPECIAL PHOTOGRAPH OCCURRENCES

4.8	HANDLED BY CREW
3.2	RETAINED PROGRAMMED
<u>8.0</u>	TOTAL MANNED

● MANNED IMPROVEMENT FACTOR

<u>8.0</u>	= 2.4
3.3	

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TECHNICAL INTELLIGENCE COMPARISON FOR HIGH DENSITY TARGET AREAS

● 30% CLOUD COVER

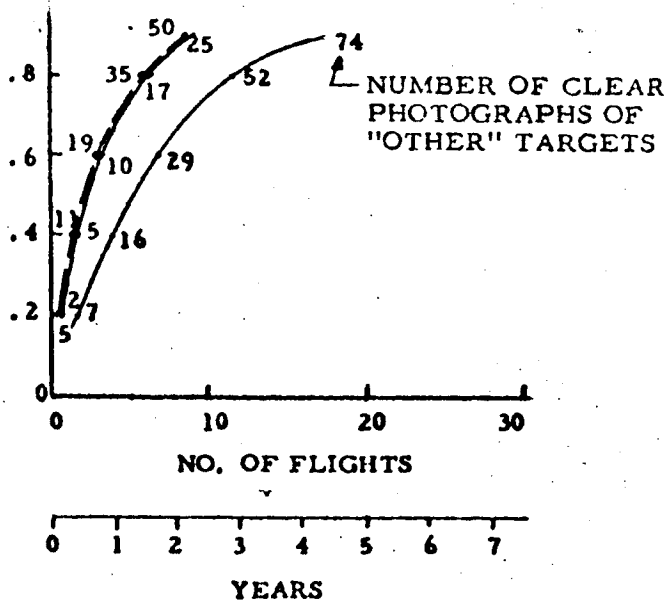
● 0.09 INCIDENCE OF ACTIVE INDICATOR

PROBABILITY OF SPECIAL PHOTOGRAPH

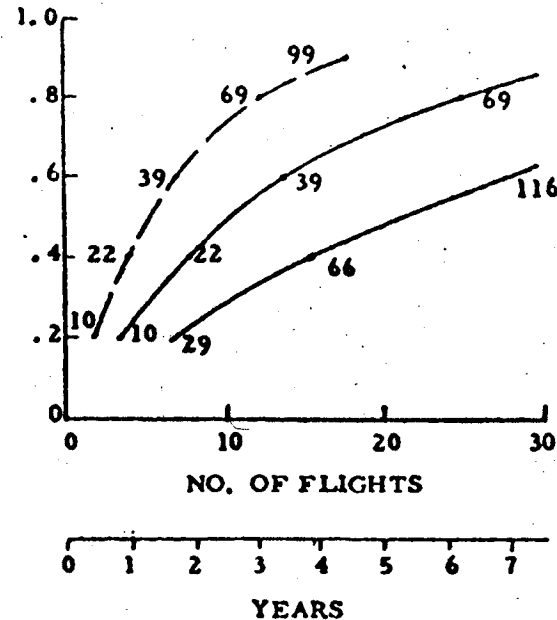
1 ACTIVE INDICATOR TARGET

4 ACTIVE INDICATOR TARGETS

--- MANNED  
— UNMANNED



PROBABILITY OF SPECIAL PHOTOGRAPH/INDICATOR TARGET



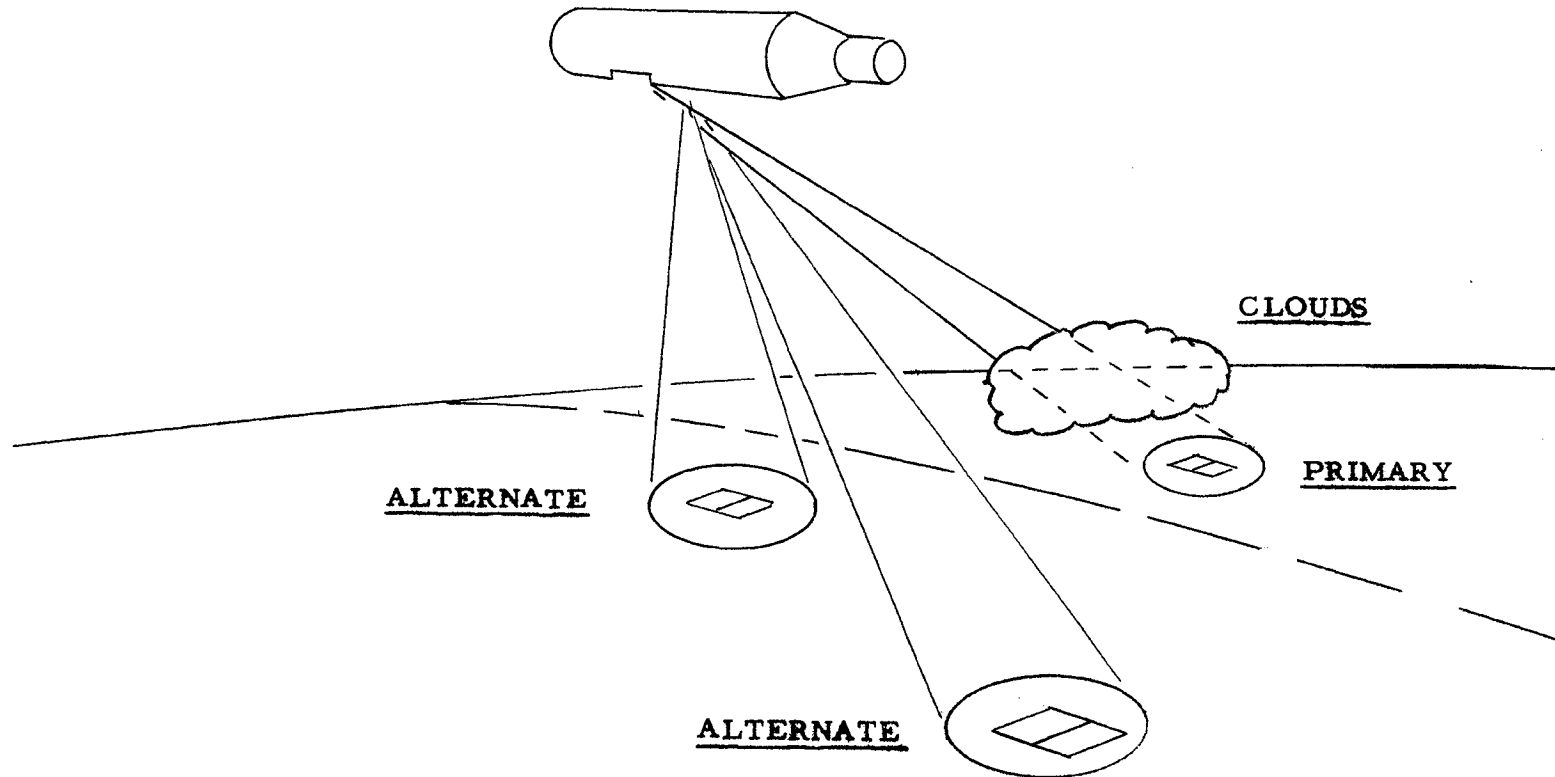
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WEATHER AVOIDANCE



- IF PRIMARY COVERED AND ALTERNATE CLEAR, SWITCH TO ALTERNATE

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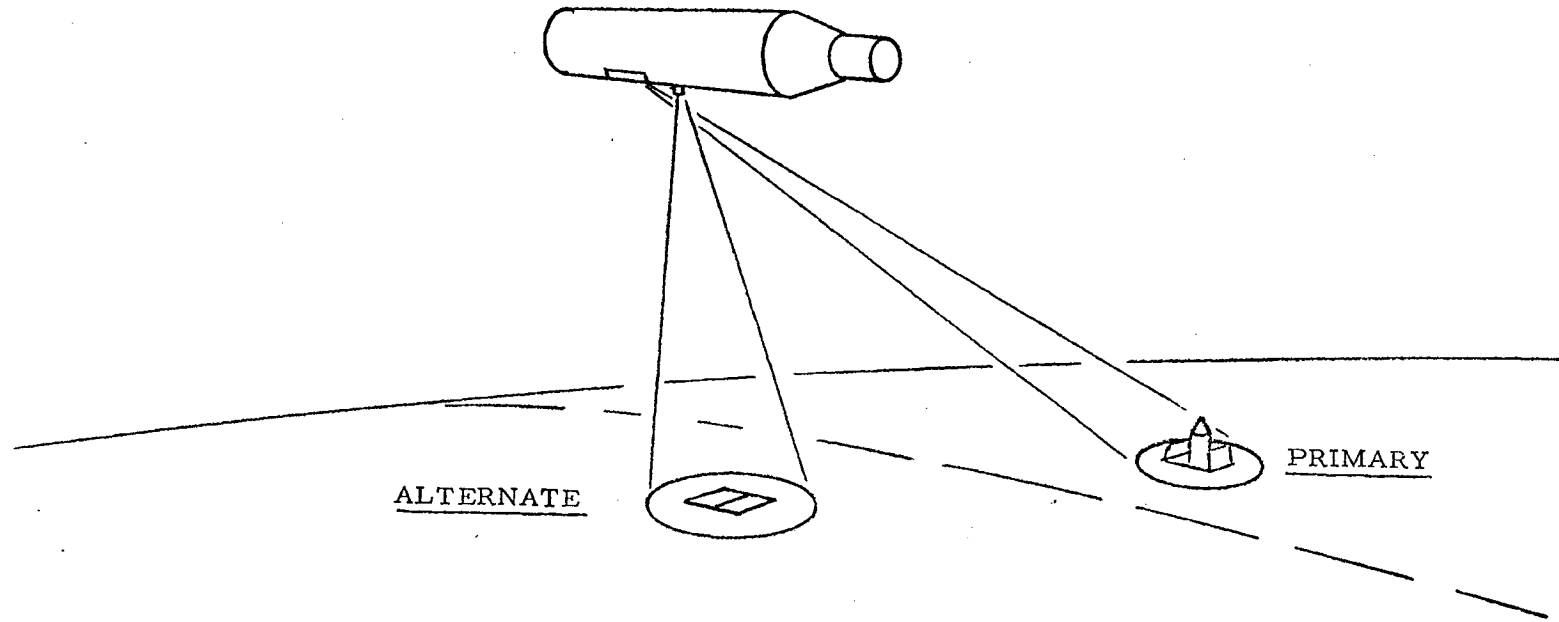
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WEATHER AVOIDANCE



- IF PRIMARY COVERED AND ALTERNATE CLEAR, SWITCH TO ALTERNATE

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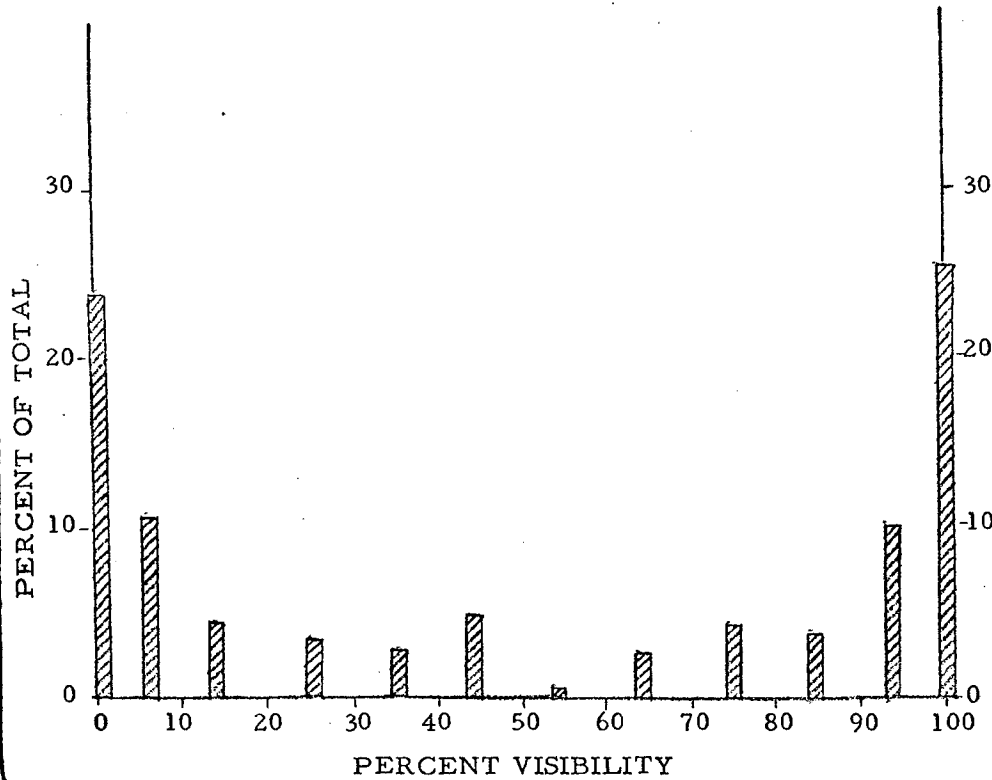
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WEATHER DISTRIBUTION



<u>PERCENT VISIBILITY</u>	<u>NO. OF CASES</u>	<u>EFFECTIVE VISIBILITY</u>
0	760	0
1-10	348	19
11-20	156	24
21-30	114	29
31-40	92	33
41-50	161	73
51-59	20	11
60-69	90	50
70-79		
80-89	118	100
90-99	324	310
100	794	794
	<hr/>	<hr/>
	3,113	1,555

$$\frac{1555}{3113} = 50\% \text{ AVERAGE AREA VISIBILITY}$$

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ALTERNATE TARGET DISTRIBUTIONS

NUMBER  
OF  
ALTERNATES

FREQUENCY OF OCCURRENCE

0	30.4%
1	16.0%
2	33.8%
3	13.0%
4	6.8%

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EFFECTS OF WEATHER AVOIDANCE

NUMBER OF ALTERNATES	UNMANNED SYSTEM	AREA TAKE (SAME NUMBER OF ALTERNATES EVERYWHERE)	MANNED SYSTEM
0	100%	58%	30.4%
1	0	54%	16.0%
2	0	58%	33.8%
3	0	61%	12.0%
4	0	62.5%	6.8%
TOTAL AREA TAKE	48%		55.0%

MANNED IMPROVEMENT  
RATIO

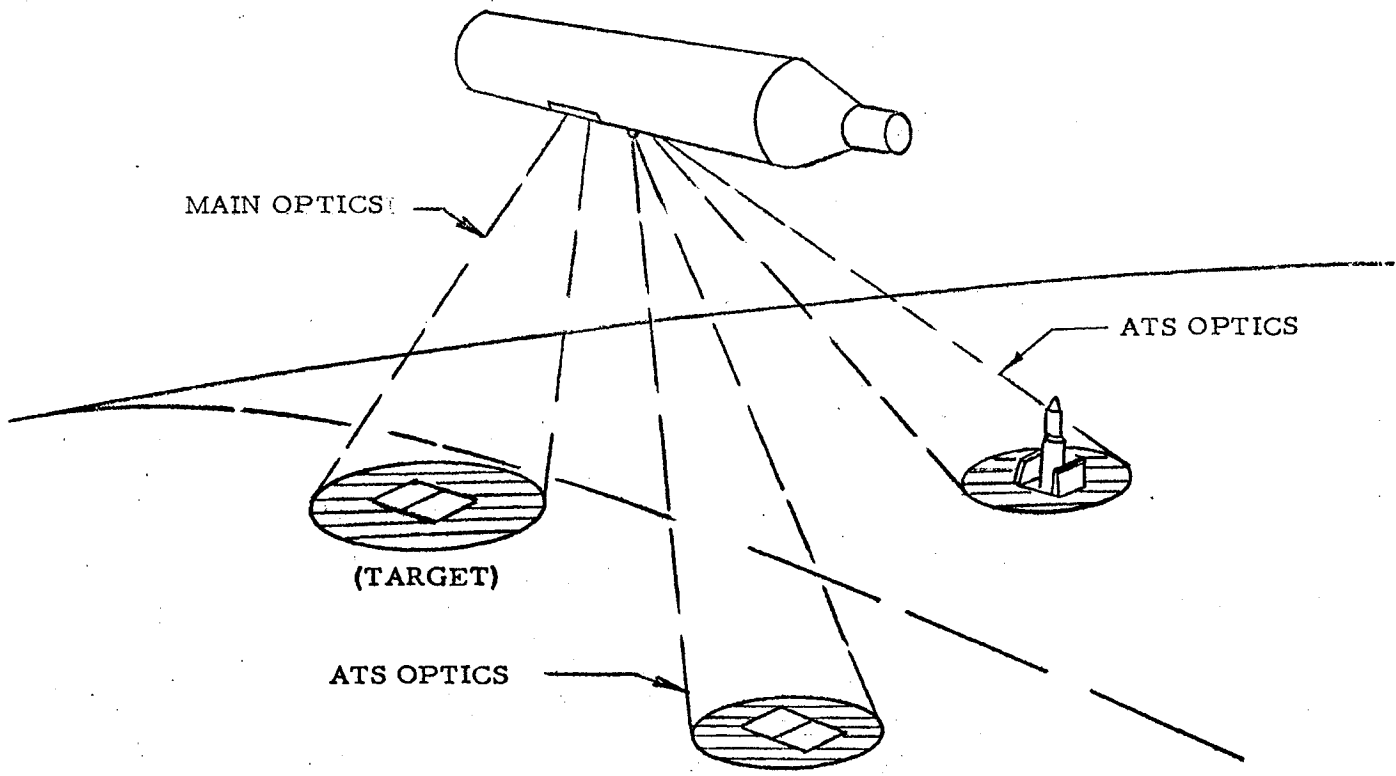
$$\frac{.55}{.48} = 1.15$$

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WEATHER VERIFICATION



● IF TARGET IS CLEAR AT TIME OF PHOTOGRAPH, COUNT IT DOWN.

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WEATHER VERIFICATION CONCEPT

OPERATING CONCEPT

TARGET PRIORITY

• MUST TAKE  
0-2  
(IMMEDIATE COVERAGE)

• HIGH PRIORITY  
3-7  
(IMMEDIATE COVERAGE)

• LOW PRIORITY  
8 & 9  
(6-MONTH TO YEAR  
COVERAGE)

MANNED

REPROGRAM EVERY  
ACCESS, ELIMINATING  
VERIFIED TARGETS

UNMANNED

PROGRAM UNTIL GROUND  
VERIFIED, COUNT DOWN  
PRIORITY BY 1/2

1st Closure	2nd Closure	3rd Closure	4th Closure
N	N'	N'-n <sub>1c</sub>	N'-n <sub>1c</sub> -n <sub>2c</sub>

PROGRAM DIFFERENT TARGETS FOR  
EACH ACCESS  
(GROUND VERIFICATION)

1st Closure	2nd Closure	3rd Closure	4th Closure
N	N'-n <sub>1c</sub>	N'-n <sub>1c</sub> -n <sub>2c</sub>	N'-n <sub>1c</sub> -n <sub>2c</sub> -n <sub>3c</sub>

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IMPROVEMENT BY WEATHER VERIFICATION

<u>TARGET PRIORITY</u>	<u>"6000" DECK</u>	<u>UNMANNED TAKE*</u>	<u>MANNED TAKE*</u>	<u>% IMPROVEMENT</u>
0	0	--	--	--
1	0	--	--	--
2	59	4	4	0
3	113	6	6	0
4	0	--	--	--
5	313	26	26	0
6	615	1	2	100
7	34	2	2	0
8	4098	88	98	11.4
9	1030	27	29	7.4

TOTAL IMPROVEMENT 8.5%

\*TAKE ON REV'S 5, 21 & 37  
REPEATED EACH WEEK  
FOR FOUR WEEKS

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COMBINED FUNCTION CONSIDERATIONS

<u>NUMBER OF TARGETS</u>	<u>WEATHER CONDITIONS</u>	<u>FUNCTIONS</u>
• PRIMARY	ALL	VERIFICATION (PO)
• PRIMARY AND 1 ALT.	ALL	WEATHER AVOIDANCE ACTIVE INDICATORS VERIFICATION (ATS)
• PRIMARY AND 2 ALT.	CLEAR	ACTIVE INDICATORS
	CLOUDY	ACTIVE INDICATORS WEATHER AVOIDANCE VERIFICATION (ATS)

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MANNED SYSTEM MISSION FLEXIBILITY

MOL BASELINE

- \* EDIT AND READ OUT 15 TO 150 HIGH RESOLUTION STEREO PAIRS PER DAY
- \* ADJUST ORBIT FOR RAPID ACQUISITION AND READOUT IN CRISIS RECONNAISSANCE SITUATIONS
- \* [REDACTED]

WITH CHANGES TO BASELINE

- \* USE ELINT SYSTEM, TO DF SIGNALS, PROVIDE INDICATIONS OF SITE ACTIVITY JUSTIFYING HIGH RESOLUTION PHOTOGRAPHY, AND TECHNICAL INTELLIGENCE ON EXOTIC SIGNALS
- \* REDUCE DEVELOPMENT RISK AND ACCELERATE SYSTEM MATURITY OF AN ADVANCED OPTICAL SENSOR [REDACTED]
- \* IMPROVE COST EFFECTIVENESS

NON-MILITARY

- \* ACQUIRE ASTRONOMICAL PHOTOGRAPHS OF THE PLANETS AND 15 MAGNITUDE STARS AT 0.1 TO 0.2 SECONDS RESOLUTION
- \* WITH CHANGE IN BASELINE, DETECT AND PHOTOGRAPH ASTRONOMICAL SOURCES OF ULTRA VIOLET

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MOL (M/AM, AM) COMPARISON WITH UNMANNED SYSTEM

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TECHNICAL INTELLIGENCE TAKE PER FLIGHT  
(EXAMINATION FOR ACTIVE INDICATORS FUNCTION)

	<u>M/AM</u> <u>MANNED</u>	<u>AM</u> <u>UNMANNED</u>	<u>WHOLLY</u> <u>UNMANNED</u>
MISSION DESIGN LIFE	30	65	35
MEAN MISSION DURATION	28	45	27
CLEAR PHOTOGRAPHS	2,218	3,510	2,110
CLEAR SPECIAL PHOTOGRAPHS	224	149	90
ADDITIONAL TARGETS EXAMINED BUT NOT PHOTOGRAPHED	2,106	--	--
TOTAL TARGETS EXAMINED AND PHOTOGRAPHED	4,324	3,510	2,110

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EARLY TECHNICAL INTELLIGENCE TAKE  
(EXAMINATION FOR ACTIVE INDICATOR FUNCTION)

	<u>MOL BASELINE PROGRAM*</u> (3 M/AM & 2 AM**)	<u>WHOLLY UNMANNED</u>	
NO. OF FLIGHTS	5	10	13
SUCCESSFUL DAYS ON ORBIT	174	162	243
CLEAR PHOTOGRAPHS	13,640	12,660	18,990
SPECIAL PHOTOGRAPHS	840	540	810
ADDITIONAL TARGETS EXAMINED BUT NOT PHOTOGRAPHED	4,210	---	---
TOTAL TARGETS PHOTOGRAPHED AND EXAMINED	17,850	12,660	18,990

\* ASSUMES EQUIPMENT FAILURES ON ONE MANNED FLIGHT MAKING TAKE EQUIVALENT TO A 28 DAY AM.

\*\* AM FLIGHTS ARE ASSUMED TO BE 65 DAY MDL WITH 45 DAY MMD.

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COMPARISON OF EARLY DEVELOPMENT PROGRAMS

SCHEDULE - LAUNCHES

COSTS - MILLIONS

CALENDAR YEAR	1969	1970	1971	1972	
MOL BASELINE PROGRAM	△ △ ▲	▲ ▲ △ △	△		\$1,784
WHOLLY UNMANNED PROGRAM		× × × × × × × ×	× × × × × × × ×		\$1,120 - \$1,255

MANNED AUTOMATIC      ▲  
 UNMANNED AUTOMATIC    △  
 WHOLLY UNMANNED        ×

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COST SUMMARY

	<u>MOL BASELINE PROGRAM</u>	<u>WHOLLY UNMANNED</u>
EARLY DEVELOPMENT COST (BILLIONS)	\$1.784	\$1.12 (10 LAUNCHES)
FOLLOW-ON RECURRING COST PER FLIGHT (MILLIONS)	<u>M/AM</u> <u>AM</u> \$86.8      \$67.0	\$45.0

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CLEAR PHOTOGRAPH TAKE PER YEAR - MATURE SYSTEMS

	<u>AM</u>	<u>WHOLLY UNMANNED</u>
NUMBER OF FLIGHTS	4	7
SUCCESSFUL DAYS ON ORBIT	180	189
CLEAR PHOTOGRAPHS	14,040	14,770
CLEAR SPECIAL PHOTOGRAPHS	594	624
COSTS PER YEAR (MILLIONS)	\$268	\$315
-----		
TOTAL COST		
DEVELOPMENT	1,784	1,120
4 YEARS OPERATION	<u>1,072</u>	<u>1,260</u>
	2,856	2,380

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CLEAR SPECIAL PHOTOGRAPH TAKE PER YEAR - MATURE SYSTEMS  
(EXAMINATION FOR ACTIVE INDICATOR FUNCTION)

	<u>M/AM</u>	<u>WHOLLY UNMANNED</u>
NUMBER OF FLIGHTS	4	10
SUCCESSFUL DAYS ON ORBIT	112	270
CLEAR PHOTOGRAPHS	8,872	21,100
CLEAR SPECIAL PHOTOGRAPHS	896	900
ADDITIONAL TARGETS EXAMINED BUT NOT PHOTOGRAPHED	8,424	-----
TOTAL TARGETS EXAMINED AND PHOTOGRAPHED	17,296	21,100
COST PER YEAR (MILLIONS)	\$348	\$450
-----		
TOTAL COST		
DEVELOPMENT	1,784	1,255
4 YEARS OPERATION	<u>1,392</u>	<u>1,800</u>
	3,176	3,055

~~SECRET~~ - SPECIAL HANDLING

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CLEAR SPECIAL PHOTOGRAPH TAKE PER YEAR - MATURE SYSTEMS

(EXAMINATION FOR ACTIVE INDICATOR AND WEATHER FUNCTIONS)

	<u>M/AM</u>	<u>WHOLLY UNMANNED</u>
NUMBER OF FLIGHTS	4	11
SUCCESSFUL DAYS ON ORBIT	112	297
CLEAR PHOTOGRAPHS	10,960	23,210
CLEAR SPECIAL PHOTOGRAPHS	996	990
ADDITIONAL TARGETS EXAMINED BUT NOT PHOTOGRAPHED	8,424	-----
TOTAL TARGETS EXAMINED AND PHOTOGRAPHED	19,384	23,210
COSTS PER YEAR (MILLIONS)	\$348	\$495
-----		
TOTAL COST (\$M)		
DEVELOPMENT	1,784	1,255
4 YEARS OPERATION	<u>1,392</u>	<u>1,980</u>
	3,176	3,235

~~SECRET~~ - SPECIAL HANDLING

~~SECRET~~ SPECIAL HANDLING

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SUMMARY

WHOLLY UNMANNED DEVELOPMENT FEASIBLE

THE MOL PROGRAM PROVIDES EARLIEST:

- LOW RISK DEVELOPMENT OF MATURE AUTOMATIC AND MANNED/AUTOMATIC CONFIGURATIONS
- QUANTITY RETURN OF [REDACTED] TECHNICAL INTELLIGENCE

FOLLOW-ON FLIGHTS BASED ON MOL DEVELOPMENT:

- PROVIDE OPTIONS FOR ANY DESIRED MIX OF M/AM - AM CONFIGURATIONS
  - . . . AUTOMATIC -- MOST CLEAR PHOTOS
  - . . . MANNED/AUTOMATIC -- HIGHEST INTELLIGENCE VALUE
- RESULT IN COST EFFECTIVE OPERATIONS

~~SECRET~~ SPECIAL HANDLING