



METRIC PAN
(copy sent to SS-6)

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HANDLE VIA BYEMAN CONTROL
CHANNELS ONLY

HEXAGON METRIC PAN ISSUE
STATUS BRIEFING TO THE
DEFENSE MAPPING AGENCY

17 OCTOBER 1974

Lt Col Daniel B. Hutchison
National Reconnaissance Office

HEXAGON

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HANDLE VIA BYEMAN CONTROL
SYSTEM ONLY

BACKGROUND

- 73-74: *74 74* REQUIREMENTS VS CAPABILITY BEYOND 12 HMC
- JAN ~~73~~-JUN ~~73~~: METRIC PAN OPTIONS
- JUL ~~73~~: *74* EXCOM REAFFIRMED NO NRP FUNDING FOR HMC PAST SV-16
- 26 AUG 74: NRO REQUIREMENT FOR METRIC PAN EVALUATION
- 13 SEP 74: SAFSP MESSAGE TO DMA, DNRO
- 27 SEP 74: SAFSP BRIEF DNRO
- 17 OCT 74: NRO BRIEF DMA

----- DEADLINE 15 DEC 1974 -----

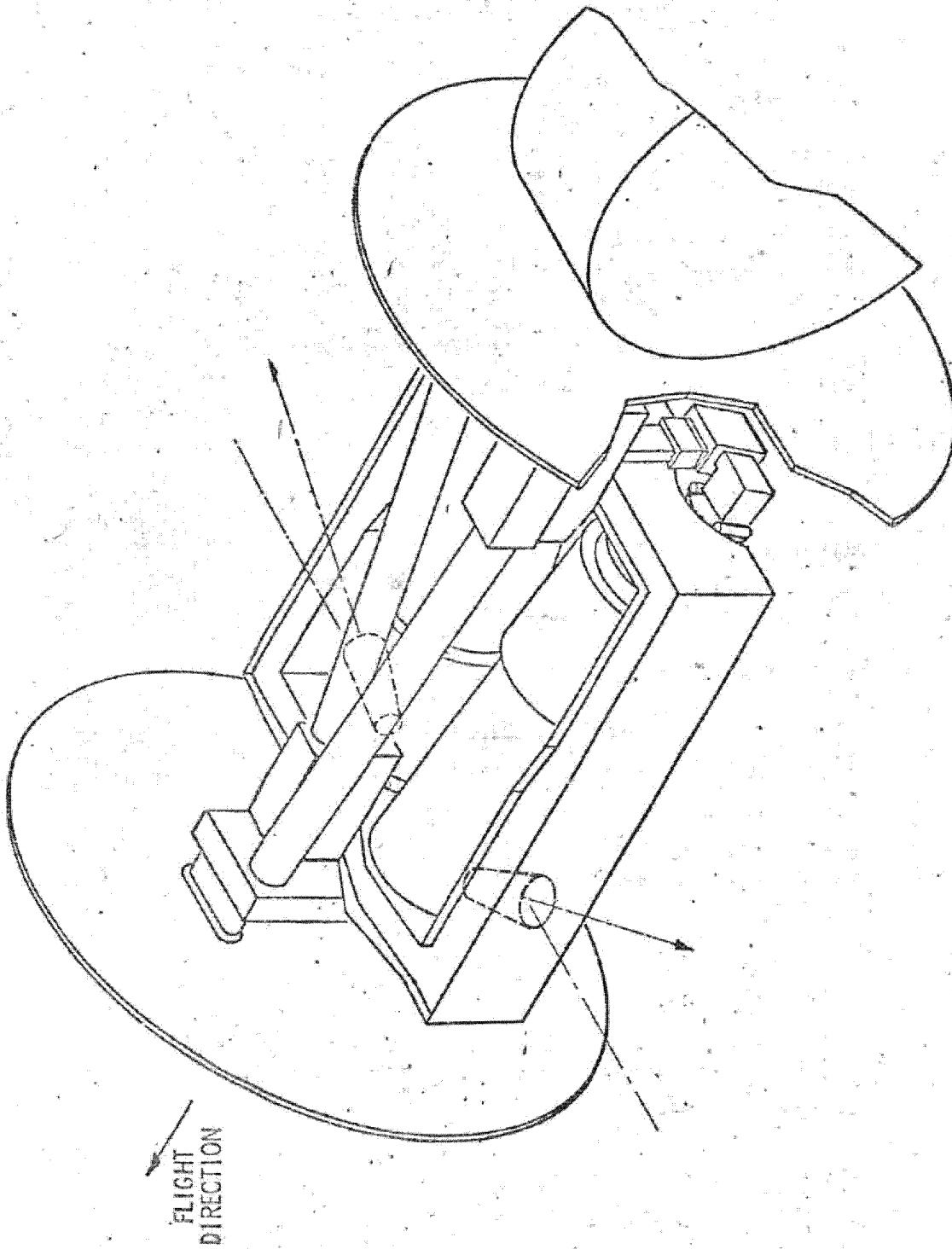
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METRIC - PAN PRELIMINARY INVESTIGATIONS

- 6 ARRAY SILICON DETECTOR
- SOLID STATE STELLAR DETECTOR - CCD
- IMAGE DISSECTOR
- PHOTOMULTIPLIER PAIR
- INDEPENDENT FILM PATH STELLAR CAMERA
- INTER-OP IMAGING STELLAR CAMERA

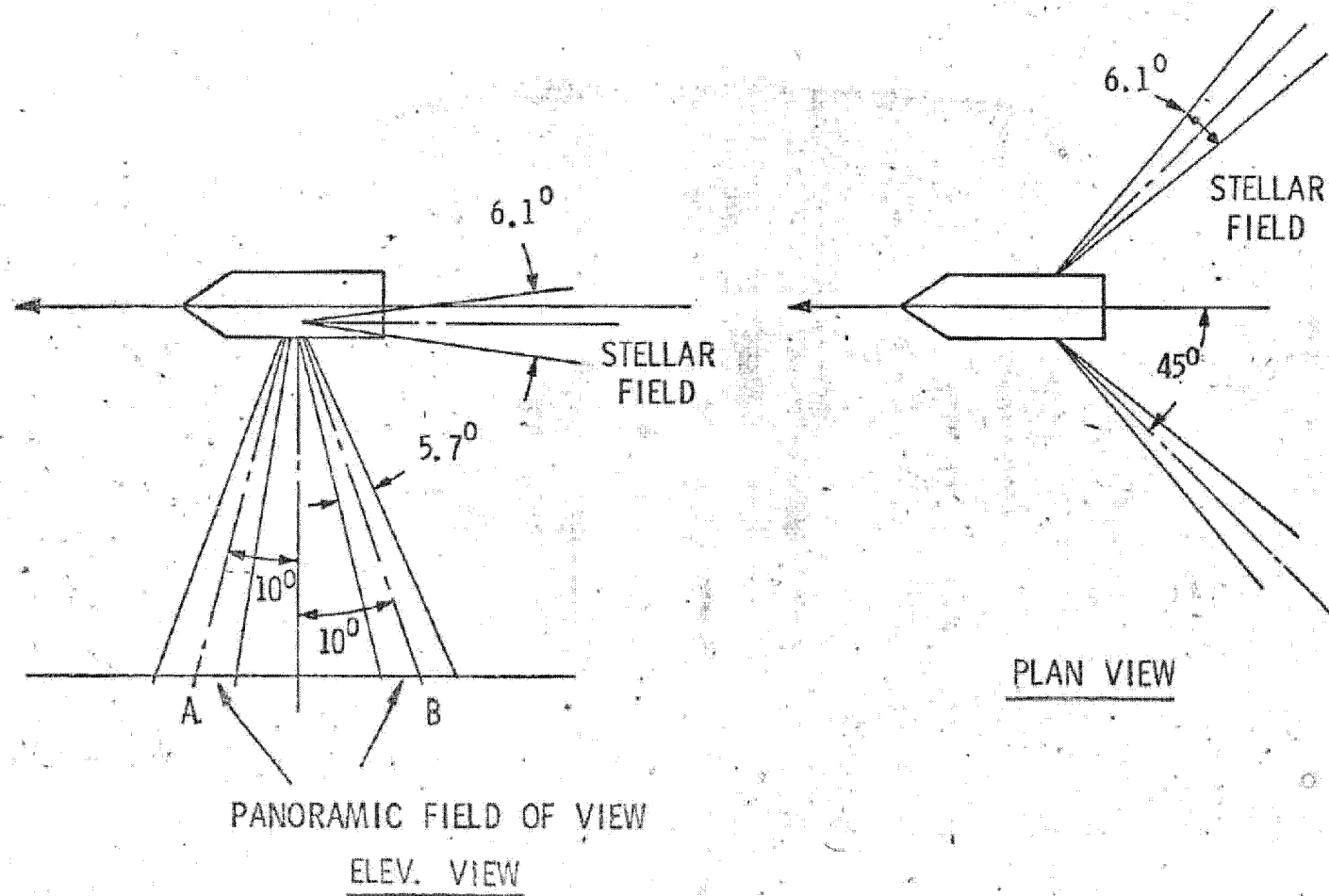
S³ ATTITUDE CAMERA ARRANGEMENT

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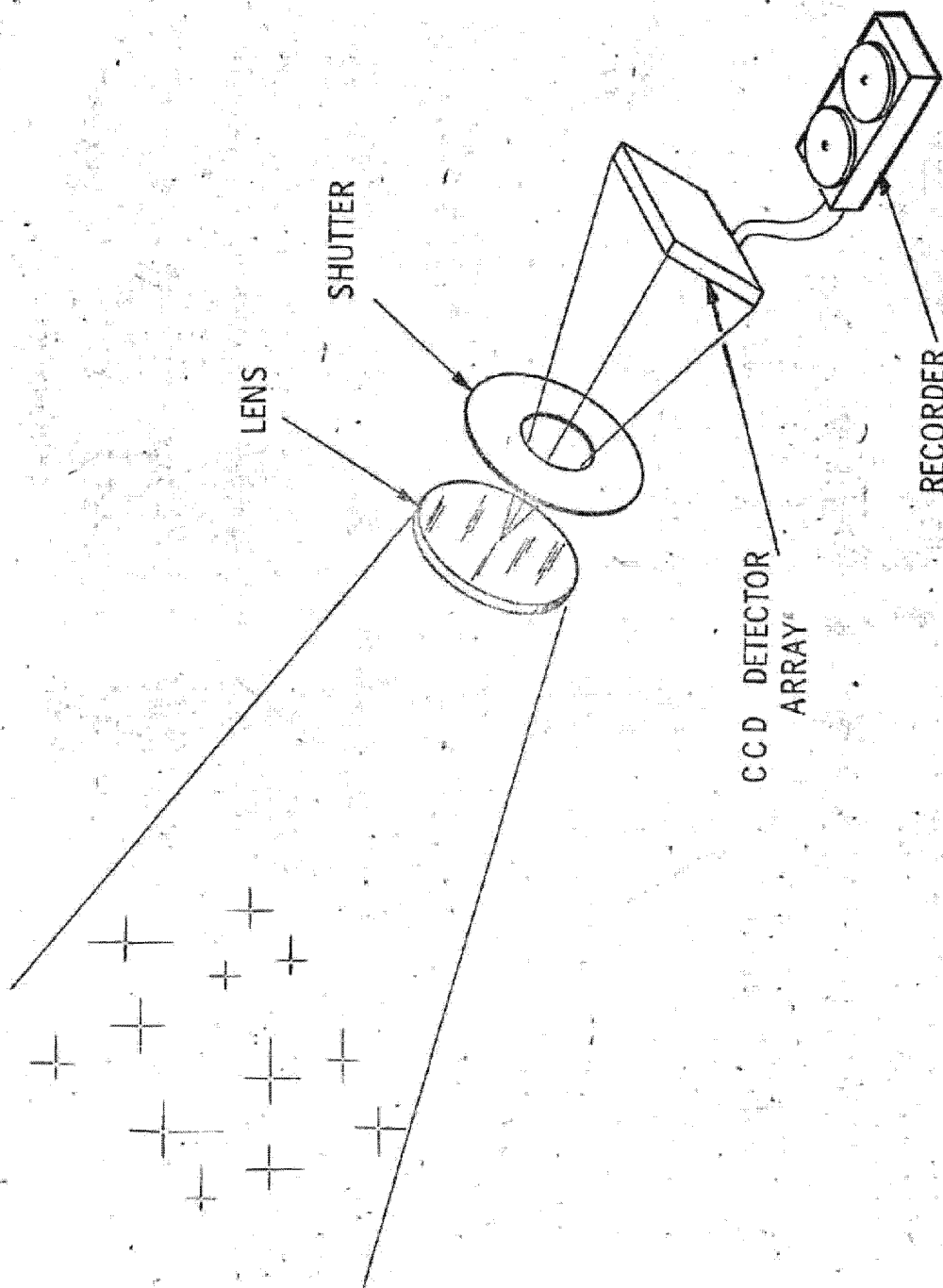


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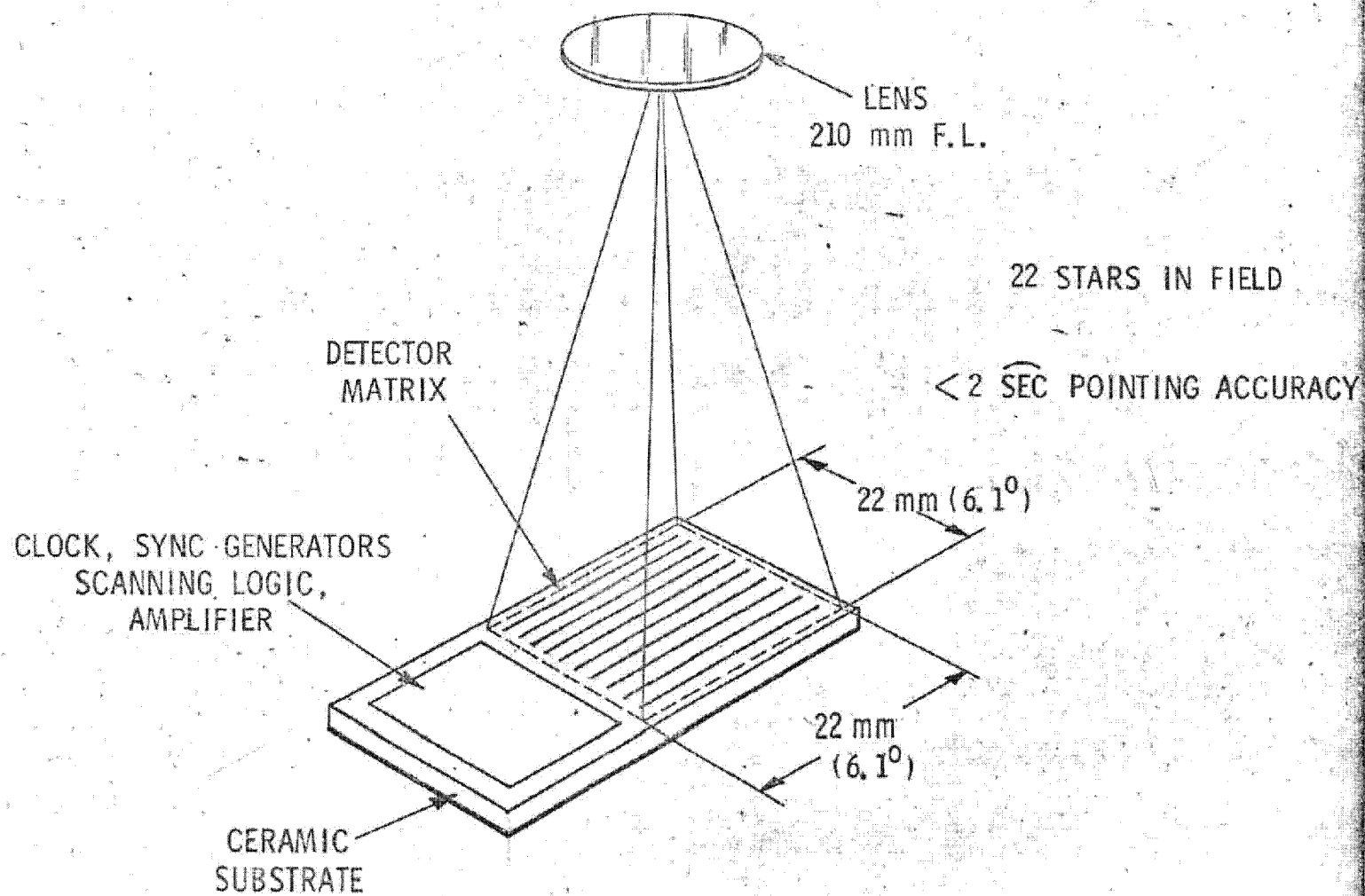
P-E SOLID STATE STELLAR ATTITUDE SYSTEM



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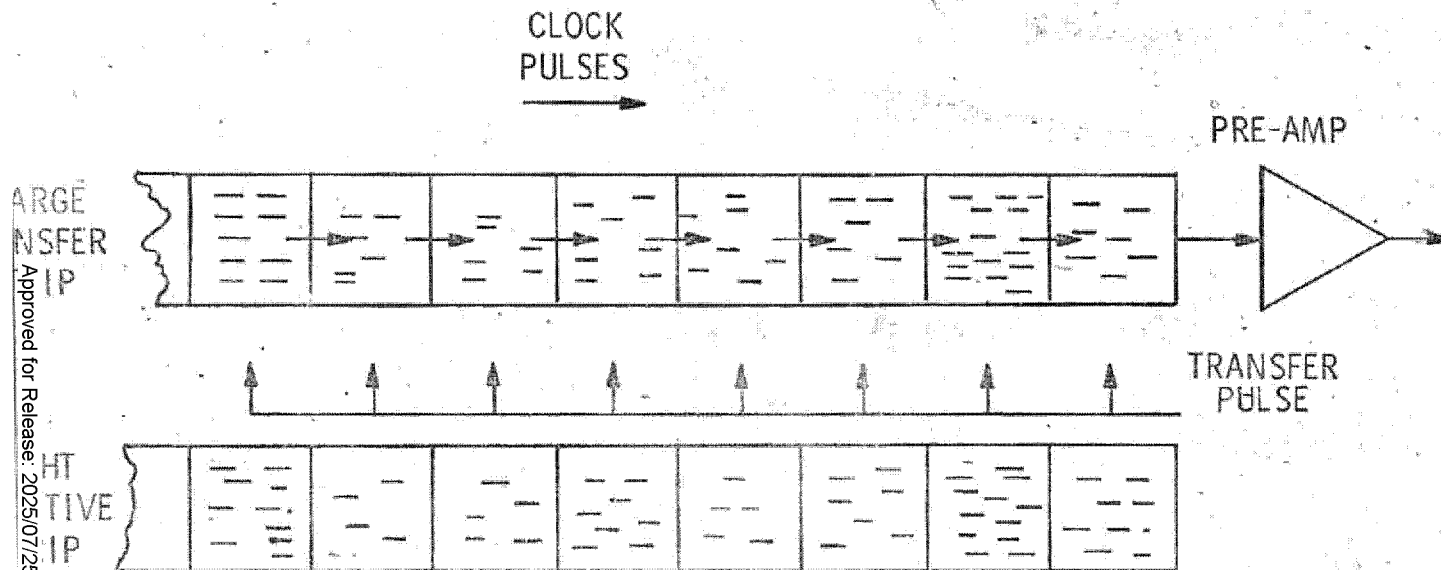
S³ ATTITUDE SYSTEM

SOLID STATE CAMERA SCHEMATIC



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CHARGE COUPLED DEVICE (CCD)



CHARACTERISTICS

ELEMENT SIZE 13 x 16 μm (1 x 1728)

SENSITIVITY 1.2×10^{-14} W/ELEMENT @ S/N 10:1
IN 0.5 TO 1 μ BAND FOR
INTEGRATION TIME OF 50 MSEC

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RISK AREAS

CHIP DEV/QUAL/PROD

SIGNAL TO NOISE RATIO

CALIBRATION/STABILITY

TCA QUAL & VIB MODES

SUMMARY - RISK ASSESSMENT				
	COST	SCHEDULE	PERFORMANCE	SYSTEM IMPACT
	TOTAL	RISK		
PRESENT SYSTEM	\$19.4M	LOW	NONE	NONE
	(6.0M)			
METRIC-PAN	22.1M	MODERATE TO HIGH	HIGH	LOW

RECOMMENDATIONS

- * BUY TWO ADDITIONAL MCS FOR I7 & I8
UNLESS CURRENT PERFORMANCE IS CONSIDERED INADEQUATE - THEN
- * DEFINE REQUIREMENTS
- * PERFORM 6 MONTH CONFIGURATION STUDY FOR METRIC PAN SYSTEM

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HEXAGON MAPPING MISSION

HEXAGON SV-	9	10	11	12	13	14	15	16	17	18
1/YR '78	OCT'74	APR'75	OCT'75	APR'76	OCT'76	APR'77	OCT'77	OCT'78	OCT'79	OCT'80
1/YR '76	OCT'74	APR'75	OCT'75	OCT'76	OCT'77	OCT'78	OCT'79	OCT'80	OCT'81	OCT'82
			75	76	77	78	79	80	81	82
MAPPING CAMERAS	*	*	*	*	*	*	*	*		
101/205' H ⁽¹⁾										
95' V										

GEODETIC PACKAGE
MX⁽²⁾ 85' H
75' V

OPTION A: 2 MORE MAPPING CAMERAS \$20M
OPTION B: METRIC PAN CAPABILITY \$24M

NOTE:

- (1) VALUES ARE 90% CEP FOR HORIZONTAL; 90% LINEAR FOR VERTICAL.
(2) GEODETIC PACKAGE REDUCES ORBIT ERRORS TO 30' INTRACK, 30' ACROSSTRACK
AND 30' VERTICAL (1σ) VS CURRENT 90, 60, 30 WITH DOPPLER BEACON SYSTEM



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HEXAGON

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OPTIONS

1. NO MORE MAPPING CAPABILITY *after SV-16*
SATISFY 97% CAT I TARGETS AT 205'
50% CAT I TARGETS AT 85'
70% AREA REQUIREMENT (PRI 1-4)
49% AREA REQUIREMENT (PRI 1-5)
2. TWO MORE MAPPING CAMERAS *(17 and 18)*
SATISFY 97% CAT I TARGETS AT 205'
65% CAT I TARGETS AT 85'
76% AREA REQUIREMENT (PRI 1-4)
60% AREA REQUIREMENT (PRI 1-5)
3. METRIC PAN *(17 and 18)*
SATISFY 100% CAT I TARGETS AT 205'
100% CAT I TARGETS AT 85'
APPROACH 98% AREA REQUIREMENT (PRI 1-5)
4. MAPPING-DEDICATED SATELLITE
5. MAPPING CAMERAS
HIGH (\$10M/FLIGHT) RECURRING COST
6. METRIC PAN
RELATIVELY LOW RECURRING COST; BECOMES PART
OF BASELINE PAN CAMERA

CANCEL HEXAGON

AFTER SV-18

CONTINUE HEXAGON

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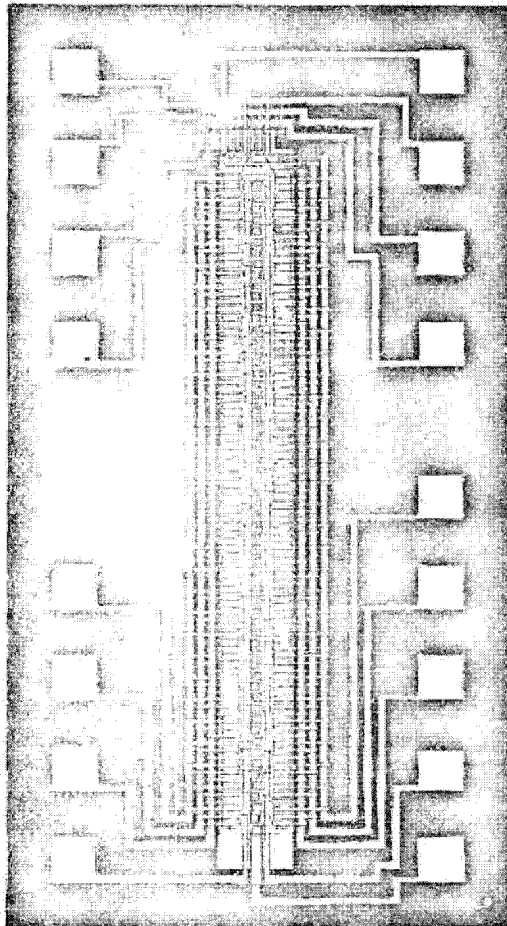
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CONCLUSION

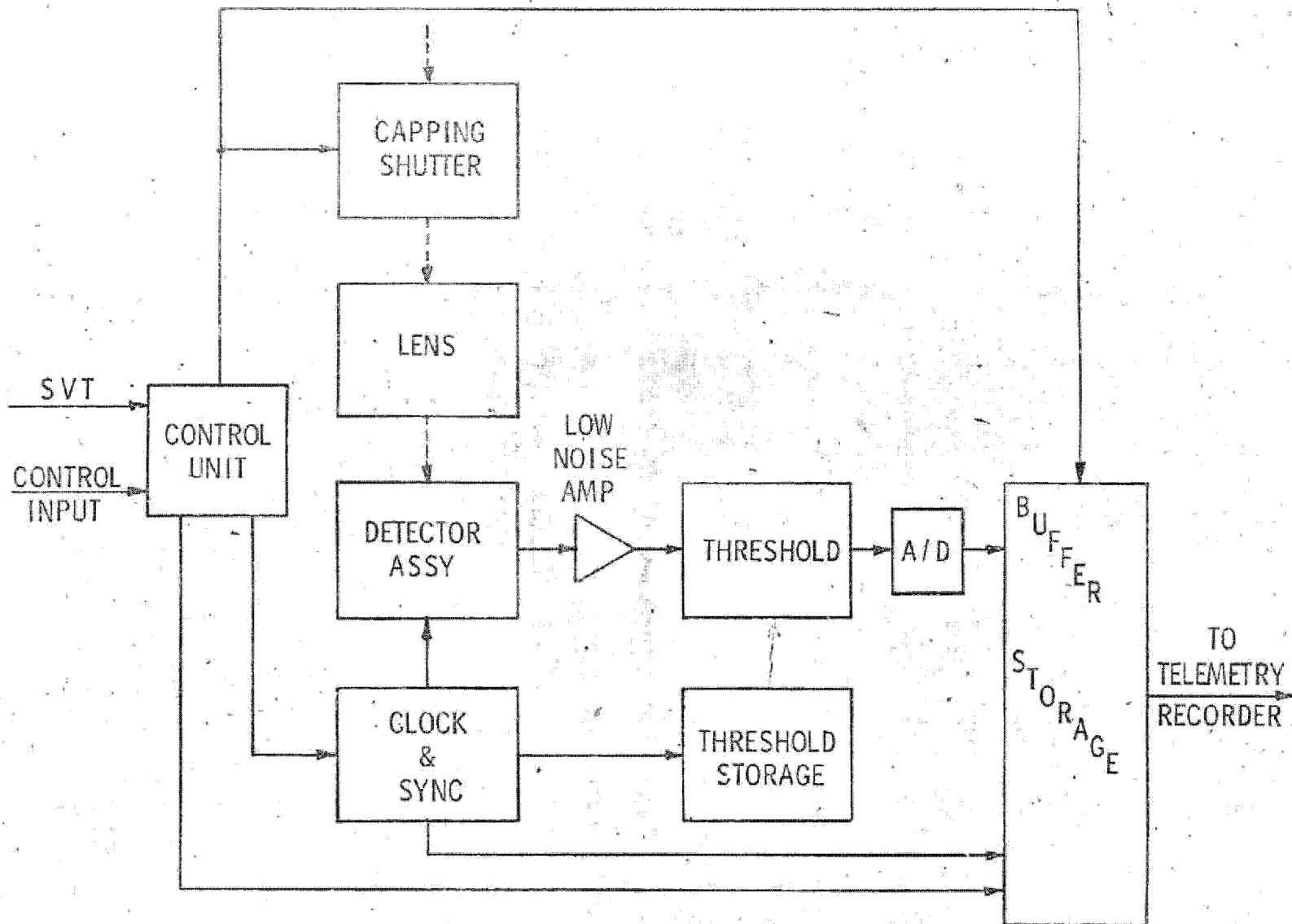
- DMA HAS OPTIONS UNTIL 15 DECEMBER 1974
- NRO STAFF IS AVAILABLE FOR ANY HELP REQUESTED
- (OPINION) REQUIREMENTS IS THE REAL ISSUE (ORIGINAL BUY OF
12 WAS WELL CONSIDERED)

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CCD ARRAY

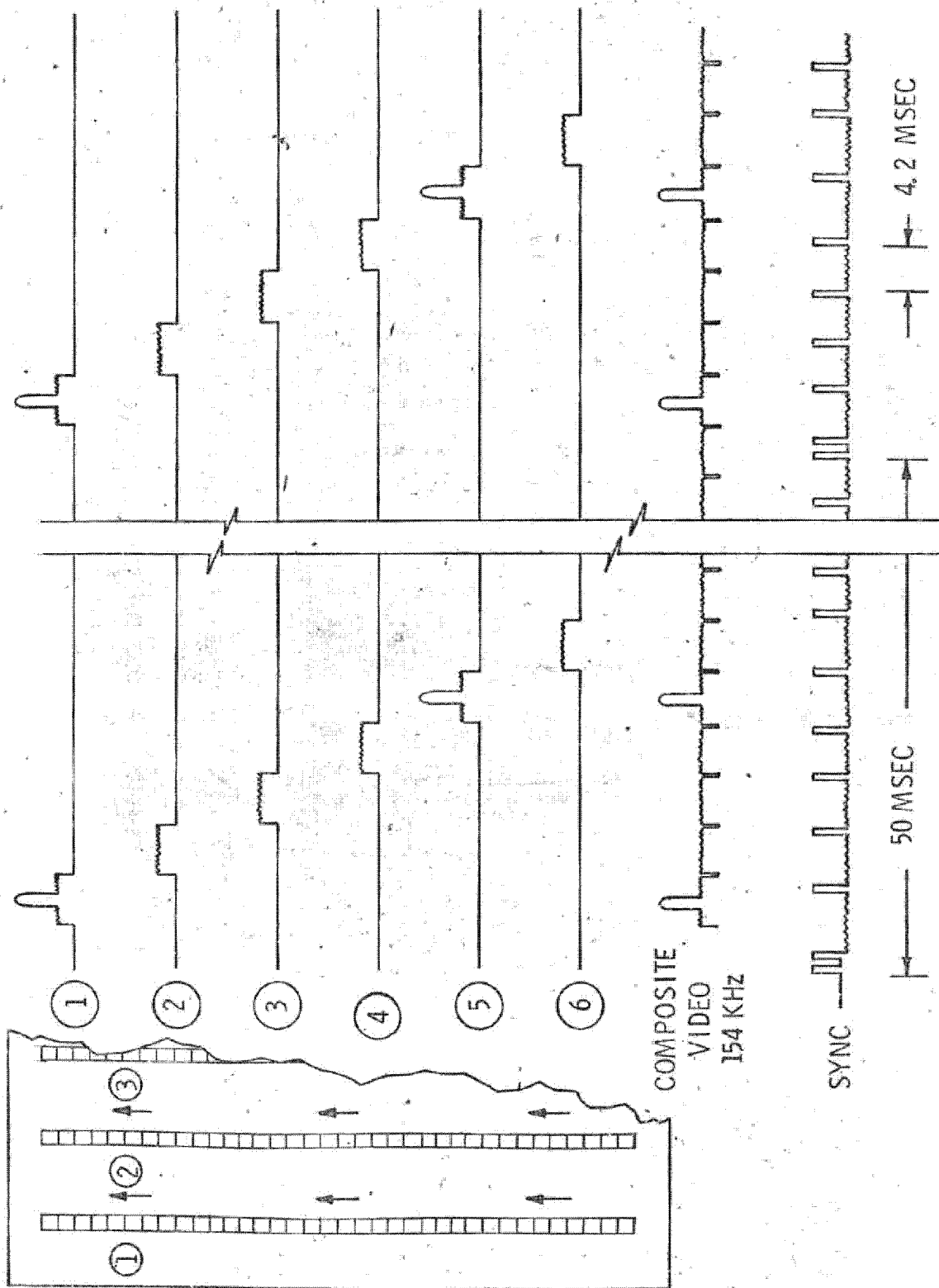


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S³ CAMERA BLOCK DIAGRAM

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SCANNING SEQUENCE AND WAVEFORMS



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