C05137291

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~~TOP SECRET~~

HANDLE VIA
BYEMAN
CONTROL SYSTEM

~~(S)~~ NATIONAL RECONNAISSANCE OFFICE

WASHINGTON, D.C.

14 00064440

THE NRO STAFF

3 February 1975

MEMORANDUM FOR COLONEL WHEELER

SUBJECT: DMA Request for Improvements to the Current HEXAGON Mapping Camera

BACKGROUND

As the result of the ExCom decision to fund the mapping program outside the NRP, we notified SAFSP that we would not support mapping camera changes which they had proposed (TABs A and B). We further stated the policy that any Mapping Camera System (MCS) improvements would have to be funded by DMA (TAB C). DMA then asked for cost, schedule and go-ahead dates for three MCS modifications: a 20% increase in film load through modification of the film supplies and take-ups, an increase of mission life film 60 to 90 days and an increase in the film load (30%) by use of ultrathin base (UTB) instead of standard thin base (STB) film. This is a separate subject from the follow-on mapping capability question.

DISCUSSION

SAFSP's reply at TAB D gives the cost, schedule and go-ahead data requested. [redacted] of the SOC analyzed the improvement in mission accomplishment for each of the proposed changes. These cost and performance data are given below.

A. Cost and schedule.

(1) Increase film supply by 20% effective SV-15. Go-ahead required by 1 March 1975. Cost ($ Millions).

FY-75	FY-76	FY-77T	FY-77	FY-78
0.2	0.65	0.125	0.325	0.1

Total: $1.4M (14% of a MCS)

HEXAGON

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CLASSIFIED BY BYEMAN - 1. EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652 EXEMPTION CATEGORY 5B2 DECLASSIFY ON IMP DET.

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PAGE 1 OF ____ PAGES

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(2) Increase mission life from 60 to 90 days effective SV-12. Go-ahead is required now for SV-12 effectivity. For a later effectivity, with the costs correspondingly rephased, go-ahead is required 15 months before the first 90-day mission.

FY-75	FY-76
0.4	0.6

Total: $1.0M (10% of a MCS)

(3) Increase film load by 30% through use of UTB instead of STB film, effective SV-13. Go-ahead is required by 15 February 1975. Cost ($ Millions).

FY-75	FY-76
0.125	0.225

Total: $0.350M (4% of a MCS)

B. Mission accomplishment.

Increase in Performance as % of an Average MCS Mission		Cost as % of Cost of One MCS
(1) 20% increase alone	30%	(14%)
(2) 90-day mission alone	16%	(10%)
(3) UTB alone	90%	(4%)
(4) 20% increase and 90-day mission	46%	(24%)
(5) 20% increase and UTB	120%	(18%)
(6) UTB and 90-day mission	110%	(14%)
(7) 20% increase, UTB and 90-day mission	140%	(28%)

DMA has been provided the cost data by message (TAB E) and the performance data through the SOC. In assessing the possible actions, one of DMA's major concerns will be the suitability of UTB for mapping from the metric stability standpoint. They have been evaluating UTB test data provided by SAFSP and conducting analyses on their own for the past three months. To date, their results indicate that UTB will not be suitable.

C05137291

Approved for Release: 2025/06/18 C05137291

As an added consideration, the costs for increasing mission life to 90 days are for requalification testing alone, as no requirement for redesign has been identified. Should the tests fail, additional funds for redesign would be required, and the schedule might be delayed.

It is now up to DMA to review the cost/benefit trades and to propose a course of action to us.

Daniel B. Hutchison

DANIEL B. HUTCHISON
Lt Colonel, USAF

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~~S E C R E T~~ 072230Z JUN 74 CITE CHARGE 4527.
WHIG.
HEXAGON
FOR [redacted]/KULPA/PEAKE. FROM ANDERSON/BRICKER
SUBJECT: MAPPING CAMERA MISSION DURATION AND FILM CAPACITY.
REFERENCE: THE FY 1975 BUDGET SUBMISSION FOR PROJECT
HEXAGON, PARA 38, HARDWARE OPTIONS FOR IMPROVEMENTS
TO ST CAMERA SYSTEMS ON SV 13 AND SUBSEQUENT.
1. ACORN AND TRACE WERE TASKED 1) TO INVESTIGATE THE
POSSIBILITY OF INCREASING THE MISSION LIFE AND EXTENDING
THEIR INCENTIVE RISK OF THEIR HARDWARE FROM 60 TO 90
DAYS, AND 2) TO COLLABORATE ON A METHOD OF INCREASING
OUR FILM TAKEUP CAPACITY. AS A RESULT, THEY HAVE
PROPOSED THE FOLLOWING TASKS:
TASK A. ACORN AND TRACE HAVE PROPOSED INDEPENDENT

DISTRIBUTION		
DIR/SS	A	
DIR/OS		
DD		
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SS-2		✓
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SS-7		
COMP		✓
SS-1 RF		✓
RF-11		
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PAGE 2 CHARGE 4527 ~~S E C R E T~~
TEST PROGRAMS TO EVALUATE THE EFFECTS OF AN EX-
TENDED VACUUM ENVIRONMENT ON SELECTED MATERIALS,
LUBRICANTS AND MECHANICAL DEVICES. AFTER SUCCESSFUL
COMPLETION OF THE TEST PROGRAMS, THEY WOULD CONCUR
IN EXTENSION OF MISSION LIFE TO 90 DAYS. ASSUMING COM-
PLETION OF THE PROGRAMS NLT JUN 75, SIX MAPPING CAMERA
PAYLOADS COULD BE FLOWN FOR UP TO 90 DAYS EACH BEGINNING
ON SV 14.
TASK B. TRACE WILL INCREASE THE AVAILABLE ENVELOPE
FOR THE TAKEUP ASSEMBLIES BY RELOCATING SOME COM-
PONENT PARTS INSIDE THE RV. THE FILM CAPACITY WILL BE
INCREASED BY APPROXIMATELY 20 PERCENT. A PARTIAL RE-
QUALIFICATION OF THE RV WILL BE REQUIRED. THE CHANGE
WOULD BE EFFECTIVE ON SV 14, 15 AND 16 ONLY.
TASK C. ACORN WILL MODIFY THE SUPPLY AND TAKEUP
ASSEMBLIES TO ACCOMODATE AN INCREASE OF 700 FT OF
TERRAIN FILM AND 490 FEET OF STELLAR FILM (APPROXIMATELY
20 PERCENT). CHANGE WOULD BE EFFECTIVE ON SV-14, 15,
AND 16 ONLY.

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ANY TECHNICAL PROBLEMS TO ACCOMMODATE THE 90 DAY MISSION LIFE AND THE INCREASED FILM LOAD.

3. TASK A IS ESSENTIALLY A TEST PROGRAM AND ANY HARDWARE MODIFICATIONS REQUIRED AS A RESULT OF THE TEST PROGRAM WOULD BE AT ADDITIONAL COST. PROVIDED THE HARDWARE PASSES THE TEST PROGRAM SUCCESSFULLY, THERE WOULD BE NO RECURRING COST ASSOCIATED WITH EXTENDING THE MISSION LIFE. THE CONTRACTOR HAS PROPOSED SOME INCENTIVE PROVISION CHANGES FOR EACH UNIT FLYING 90 DAYS BUT THAT DOES NOT INCREASE THE CONTRACT TARGET COST, OR TARGET FEE.

4. WE FEEL THE 90 DAY TEST PROGRAM FOR ACORN COULD BE NEGATED SIMPLY BY EXTENDING THE ORBITAL LIFE WITHOUT EXTENDING THE CONTRACTORS RISK. THIS IS THE SAME STRATEGY WE USED IN EXTENDING THE LIFE OF THE PAN CAMERA SYSTEM. SOME TESTING MAY HAVE TO BE ACCOMPLISHED ON THE TRACE HARDWARE. WE ARE IN THE PROCESS OF EVALUATING THIS POSSIBILITY.

5. THE FOLLOWING HARDWARE/COST OPTIONS OFFERED BY THE CONTRACTORS ARE PRESENTED FOR YOUR CONSIDERATION:

OPTION 1: INCREASE THE SUPPLY AND TAKEUP CAPACITY EFFECTIVE WITH SV 14 BY AUTHORIZING THE WORK OUTLINED IN TASKS B AND C. THE ESTIMATED COST IS $1.900M (ACORN $1.450M AND TRACE - $.450M). THIS OPTION CORRESPONDS TO THE INCREASED FILM CAPACITY COSTS PRESENTED IN THE REFERENCED BUDGET SUBMISSION AS FOLLOWS:

ST CAMERA - 3020 BLACK,	FY 75	FY 76	FY 77
	.900	.900	.100

OPTION 2: EXTEND THE MISSION LIFE FROM 60 TO 90 DAYS ON SV 11 THRU SV 16 MAPPING CAMERA SYSTEM BY AUTHORIZING THE WORK IN TASK A. THE ESTIMATED COST FOR A 90 DAY QUALIFIED SYSTEM IS $1.000M (ACORN - $.425M AND TRACE - $.575M).

	FY 75	FY 76
ST CAMERA - 3020 BLACK	.800	.200

OPTION 3: COMBINE THE 90 DAY MISSION (EFFECTIVE WITH SV 11) WITH THE INCREASED FILM CAPACITY EFFECTIVE WITH SV 14. ESTIMATED COST IS $2.900M (ACORN - $1.675M AND TRACE - $1.025M). THIS EXCEEDS THE COSTS PRESENTED IN THE BUDGET SUBMISSION AND WOULD NECESSITATE A REQUEST FOR ADDITIONAL FUNDS.

	FY 75	FY 76	FY 77
ST CAMERA - 3020 BLACK	1.700	1.100	.100

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~~S E C R E T~~ 121851Z JUN 74 CITE WHIG 6768.
CHARGE
EYEMAN BUDGET
FOR ANDERSON/BRICKER FROM [redacted] PEAKE
REFERENCE CHARGE 4527 RE MAPPING CAMERA MISSION DURATION AND FILM CAPACITY. AT THIS TIME, IT IS EVIDENT THAT FOLLOW-ON MAPPING CAMERAS WILL BE BUDGETED AND FUNDED OUTSIDE THE NRP. THAT FUNDING WILL NOT START UNTIL FY 1976 EVEN THOUGH A GAP MIGHT RESULT, AND THAT IT WILL BE UP TO THE RESPONSIBLE OFFICE TO DETERMINE WHETHER IMPROVEMENTS IN MISSION DURATION AND FILM CAPACITY SHOULD BE BUDGETED. ACCORDINGLY, NONE OF THE THREE PROPOSED OPTIONS, INVOLVING FY 1975 FUNDING, CAN BE PURSUED NOR IS THE NRP INTERESTED IN FUNDING ANY IMPROVEMENTS TO EXISTING OR FOLLOW-ON MAPPING CAMERAS. E-2 IMPDET
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CONTROL SYSTEM

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CATCH 825, ANGLO 133
CATCH PASS CHARGE
ANGLO PASS ETHER

SUB 560-R
AA 8036

~~S E C R E T~~ 261340Z AUG 74 CITE WHIG 1121.
PRIORITY CHARGE INFO PRIORITY ETHER.
HEXAGON
FOR GENERAL BRADBURN/COL ANDERSON/LT COL POWELL/LT COL HOFFMAN
INFO: DR. M. ROCUMBEN/J. WEBB
FROM GENERAL SCHAFER.
SUBJECT: HEXAGON MAPPING CAMERA
REFERENCE A. TELECON LT COLS POWELL AND HUTCHISON,
9 AUG 74
B. CHARGE 5816, 2317227Z JUL 74
C. CHARGE 3934, 152255Z MAY 74
D. WHIG 1762, 121951Z JUN 74
E.
1. BASED ON YOUR PREVIOUS INPUTS AND THE JULY EXCOM

DISTRIBUTION		
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SS-6		
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COMP		
SS-1/RF		
RF-11		
FILE		

PAGE 2 WHIG 1121 ~~S E C R E T~~
DECISIONS, THE CURRENT FISCAL PLANNING FOR THE HEXAGON
MAPPING CAMERA (HMC) IS:

	$ MILLIONS					
	FY-75	FY-76	FY-77	FY-78	FY-79	FY-80
NRO FUNDING, THRU VEH 16	5.8	5.8	2.6	1.6	.3	0
DNA CONTROLLED FUNDING, VEH 17 & 18	-	9.7	9.7	2.0	2.0	2.0

THE DNA CONTROLLED LINE ITEM IS IN A POM FOR APPROVAL, BUT HAS NOT BEEN ACTED ON BY OMB. BEFORE YOU CAN PROCEED WITH THE PROCUREMENT OF HMC'S OR OTHER MAPPING CAPABILITIES FOR VEHICLES 17 AND 18, CONGRESS MUST APPROVE THE ENTIRE LINE, PROBABLY BY SEPTEMBER 1975.
2. AS THE RESULT OF THE EXCOM DECISION, THE FOLLOWING GROUND RULES APPLY.
A. THE NRO WILL NOT FUND ANY MAPPING RELATED IMPROVEMENTS OR HMC ADDITIONAL UNITS BEYOND THE ORIGINAL 12.
B. DNA MAY FUND IMPROVEMENTS/HMC FOLLOW-ONS WHICH WILL BE SUPPORTED BY THE NRO.

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PAGE 3 WHIG 1121 ~~S E C R E T~~
FOLLOWING POLICIES SHOULD BE OBSERVED.
A. CHARGE WILL NOT INTERFACE DIRECTLY ON FISCAL MATTERS WITH DMA OR ASD(I). IF ACTION IS TO BE TAKEN UNDER 2.B. ABOVE, THEN CHARGE WILL SUBMIT BUDGETARY ESTIMATES TO WHIC, WHO WILL FORWARD THEM TO DMA AND ASD(I).
B. IF CHARGE HAS PROPOSALS FOR CHANGES/IMPROVEMENTS ON THE M/C, THOSE SHOULD BE COORDINATED WITH WHIC, AND THEN WHIC CAN SET UP MEETINGS WITH DMA PERSONNEL AS REQUIRED FOR PRESENTATION OF THESE PROPOSALS BY CHARGE.
C. APPROVED FUNDS FOR M/C ACTIONS UNDER 2.B. ABOVE WILL BE PASSED TO THE WHIC COMPTROLLER WHO WILL ALLOCATE THEM TO CHARGE IN THE NORMAL MANNER.
D. THE FACT OF DMA/ASD(I) FUNDING OF M/C IMPROVEMENTS OR FOLLOW-ONS DOES NOT TRANSFER PROGRAM MANAGEMENT WHICH SHALL REMAIN CHARGE'S RESPONSIBILITY.
4. STINT IS VERY INTERESTED IN THE METRIC PAN AS AN ALTERNATIVE TO THE ADDITIONAL M/C BUY. THE FISCAL PLANNING IN PARA 1. ABOVE COULD APPLY TO EITHER APPROACH. REQUEST YOU PROVIDE THE FOLLOWING INFORMATION BY

PAGE 4 WHIG 1121 ~~S E C R E T~~
6 SEPTEMBER 1974 TO AID IN THIS DECISION.
A. WHAT WOULD BE CHARGE'S RECOMMENDED APPROACH TO THE METRIC PAN? WHAT ACCURACIES IN ORBIT, ALTITUDE, CALIBRATION AND TIME WOULD THIS OFFER?
B. WHAT VEHICLE COULD BE EQUIPPED WITH THE RECOMMENDED METRIC PAN OPTION BASED ON 1 OCTOBER 1974 GO-AHEAD? BASED ON 1 OCTOBER 1975 GO-AHEAD?
C. WHAT WOULD THE PHASED COSTS BE FOR EACH OPTION IN B. ABOVE?
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ZNY XXXXX KKK ZNM
R 272150Z
BT
XXXXX
GUARD 736
GUARD PASS WHIG

AA 0805

~~S E C R E T~~ 272150Z JAN 75 CITE CHARGE 0733.
WHIG.
HANDLE VIA BYEMAN CONTROL SYSTEM
HEXAGON
FOR HUTCHISON, [redacted] FROM POWELL/HOFMANN
SUBJ: MAPPING CAMERA MISSION DURATION AND FILM CAPACITY.
REF: A. WHIG 1687, DEC 74.
B. CHARGE 4527, JUN 74.
1. TO OPTIMIZE EFFECTIVE USE, THE INCREASE IN FILM CAPACITY MUST BE UTILIZED ON A LONGER DURACTION MISSION TO OBTAIN ADDITIONAL USEFUL PHOTOGRAPHY ON EACH MISSION. THEREFORE THE COSTS AND EFFECTIVITY FOR BOTH INCREASED LIFE AND CAPACITY ARE UPDATED IN THIS MSG.
2. INCREASING THE CAPACITY BY ENLARGING THE TAKEUP AND SUPPLY CAN BE EFFECTIVE ON SV-15 AND SV-16 ASSUMING A 1 MARCH 75 NOTIFICATION TO PROCEED. THE PACING

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SS-6	✓	
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COMP		✓
SS-TSP		
NPIC		
P/E		

PAGE 2 CHARGE 0733 ~~S E C R E T~~
ITEM IS THE RECOVERY VEHICLE MODIFICATION. THE COST HAS DECREASED BY 500K COMPARED TO THOSE QUOTED IN CHARGE 4527 SINCE SOME OF ACORN'S WORK CAN BE PERFORMED BY PERSONNEL SUSTAINED UNDER THE RECENT DELIVERY SCHEDULE EXTENSION.

	FY 75	FY 76	FY 7T	FY 77	FY 78
OPTION 1 (UPDATE)	200K	650K	125K	325K	100K

3. MISSION DURATION RATIONALE WAS COVERED IN CHARGE RTWU AS OPTION 2. THE EFFECTIVITY NOW COULD POSSIBLY BE AS EARLY AS SV-12 BUT THIS IS VERY MUCH DEPENDENT ON WHEN GO AHEAD IS RECEIVED. THE ROM COST OF ONE MISSION HAS NOT CHANGED.

	FY 75	FY 76
OPTION 2 (UPDATE)	400K	600K

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4. INCREASING THE CAPACITY BY UTILIZING UTB FILM CAN BE EFFECTIVE ON SV-13 ASSUMING A FIELD RETROFIT TO CHANGE ONLY THE FILM TENSION AND A NOTIFICATION TO PROCEED BY 15 FEB 75. THIS LEAD TIME IS REQUIRED TO ALLOW ACORN TO CONDUCT TESTS ON THE SV-14 SYSTEM IN THEIR FACTORY TO DEMONSTRATE THAT UTB WILL MEET

PAGE 3 CHARGE Ø733 ~~S E C R E T~~
ETHER'S REQUIREMENTS. WE ESTIMATE 250K TO PERFORM THIS ADDITIONAL TESTING. ANTICIPATING THAT ONLY THE FILM TENSION IS REQUIRED TO BE CHANGED, 100K WILL BE REQUIRED FOR HARDWARE MODIFICATIONS. IF THE RESULTS OF THE SYSTEM TEST DICTATE THAT ADDITIONAL HARDWARE MODIFICATIONS ARE NECESSARY, THEN THIS ESTIMATE WILL VARY ACCORDINGLY.

	FY 75	FY 76
°UTB (NEW OPTION)	.125	.225

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