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~~(S)~~ NATIONAL RECONNAISSANCE OFFICE
WASHINGTON, D.C.

THE NRO STAFF

23 AUG 1974

Approved By The
Under Secretary of the Air Force
26 Aug 74

MEMORANDUM FOR MR. PLUMMER

SUBJECT: HEXAGON Pallet Implementation

REFERENCE: A. CHARGE 3934, 15 May 74

B. CHARGE 6024, 6 Aug 74

C. WHIG 0706, 30 May 74

D. DMA Memo, 30 Apr 74, BYE-47542-74

E. CHARGE 6254, 14 Aug 74

BACKGROUND

The HEXAGON Pallet is a proposed general purpose interface station for carrying a variety of secondary payloads or experiments. It will preclude the necessity for changing the HEXAGON interface design for each piggy-back payload. This reduces the cost for integration and operations of flying secondary payloads and also reduces the lead time required for payload integration. The pallet design was initiated in FY-74 at a cost of $.5M.

TAB A indicates that potential non-NRP users will be charged a pro-rata share of the costs for use of the pallet. TAB B establishes the total cost at $2.5M for FY-75-FY-77 and requests go-ahead of 16 Aug 74, if effectivity is to be achieved for Vehicle 13. The pallet change was not flagged as an appropriate ExCom review item, however, fund protection was included in the recommended/approved program. TAB C delayed a decision until after the July ExCom to enable better visibility on the funded situation.

WORKING PAPERS

DISCUSSION

Addressing the requirement, one Air Force (SAMSO) and three SAFSP experiments have been identified as pallet users, starting with Vehicle 13. In addition, the DMA Geodetic Package would be a pallet user for three or four flights (and more, if a mapping capability is provided beyond Vehicle 16). Full use of all 12 pallets on the six applicable HEXAGON vehicles is highly probable, based on the current number of identified SAMSO and SAFSP experiments needing a host launch/orbital vehicle.

The main benefit of the pallet for the NRP would be in the area of flying experimental or exploratory SIGINT payloads (in lieu of full P-11 payloads) and in space flight qualification of new hardware. In both cases, the advantages of the pallet are the reduced integration and operating costs and shorter leadtimes. Hence, an experiment can be conceived much later and can be traded much closer to scheduled HEXAGON launch dates.

The cost savings for the pallet amount to about $.5M per experiment and leadtime reductions are three to six months. Another advantage is the reduced workload of managing the HEXAGON/Experiment interface with the attendant reduction in risk to the HEXAGON mission.

The proposed SAFSP SIGINT experiments include those for which a separate P-11 package would not be justified or timely. For Example:

A. Low altitude HF intercept, to verify the model which indicates a future viable collection capability.

B. 18-42 GHz experiment to sample the frequency band in response to SORS concern that this presently uncovered frequency range may contain valuable intelligence.

C. Spread spectrum receiver, to search for the presence of otherwise undetectable very wide band low power sources.

A SAMSO experiment of mutual interest to SAFSP is flight testing for a new design Nickel-Hydrogen battery.

As reported in Reference E, the cost saving for the Geodetic Package effort (which calibrates the HEXAGON Mapping Camera to follow-on missile accuracies) is $.5M in integration cost to be funded by AF/RDS (Space Test Program). More importantly, go-ahead on the pallet now will allow incorporation of the Geodetic Package on Vehicle 13, one vehicle earlier than previously planned, allowing for an extra mapping mission at the increased acquisition accuracies.

The total NRP funding for the pallet is:

	FY-75	FY-76	FY-77	FY-78	TOTAL
Cost ($Millions)	.7	1.3	.5	0	2.5

While we did have NRP fund protection for the pallet, DMA was queried as to their ability to provide the entire $1.1M required for Geodetic Package integration now, thus saving them the possible additional $.5M in integration costs and allowing for incorporation of the package on Vehicle 13. Provision of these funds in FY-75 would allow us to proceed with the pallet and at the same time apply the protected funds to other proposed NRP efforts of high priority. In response to our query, DMA obtained DDR&E support in obtaining $.950M from the Minuteman program for Geodetic Package integration.

SUMMARY

The HEXAGON pallet is a worthwhile addition to the NRP, giving us a flexible capability to fly experiments which would not be practical to integrate directly with the HEXAGON vehicle because of cost or schedule constraints.

A. It will allow incorporation of the Geodetic Package on Vehicle 13.

B. It will reduce the Geodetic Package integration cost by $.5M.

C. FY-75 Pallet and Geodetic Package integration costs will be provided outside the NRP.

D. It will permit flying a number of SIGINT experiments at lower cost and with improved timing.

E. It will allow testing of a number of space hardware items at lower cost and improved schedule.

RECOMMENDATION

Recommend approval and immediate implementation of the HEXAGON Pallet.

Daniel B. Hutchison

DANIEL B. HUTCHISON
Lt Colonel, USAF

Approved:
J. W. Plummer

J.E.K.

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XXXXX
QUARD 736
QUARD PASS WHIG

~~T O P S E C R E T~~ 152552Z MAY 74 CITE CHARGE 3934.
PRIORITY WHIG.
SECTION ONE OF TWO
HEXAGON
FOR [redacted] FROM COLONEL BRICKER
SUBJ: HEXAGON BUDGET SUBMISSION
REF: SYS-1663D-74 AND WHIG 0516 13 MAY 74
IN RESPONSE TO YOUR REQUEST, THE FOLLOWING INFORMATION IS PROVIDED CONCERNING THE HEXAGON PROGRAM:

A. THE STELLAR TERRAIN CAMERA PROGRAM FOR UNITS AFTER NO. 12 (HEXAGON NO. 16):

(1) OPTION 2, TWO SYSTEMS PER THREE LAUNCHES. THE COST OF THIS OPTION SHOULD BE CORRECTED AS SHOWN BELOW. THESE COSTS WILL PROVIDE FOR PROCUREMENT AND OPERATION SCHEDULE AS SHOWN IN REFERENCED DOCUMENT UNDER THIS OPTION. (FY 75 ALL DEFINED

→ GO TO YELLOW TAB

PAGE 2 CHARGE 3934 ~~T O P S E C R E T~~

	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	FY 1980
ST CAMERA	2.900	6.000	7.200	5.900	11.690	11.600
ST RV	0	.800	1.400	1.400	1.800	2.400
DOPPLER	0	.635	0	0	0	.700
TOTALS	2.900	8.230	8.600	7.300	13.490	14.700

(2) THE FOLLOWING COSTS PERTAIN TO A NEW OPTION 3 FOR THE ST SYSTEM INVOLVING A RATE OF ONE SYSTEM PER TWO LAUNCHES BUT WITH TWO HEXAGONS (NO. 17 & NO. 18) NOT EQUIPPED WITH THE ST SYSTEM AT THE CONCLUSION OF THE CURRENT APPROVED ST PROGRAM. FY 1975 COSTS ARE ZERO.

	FY 1976	FY 1977	FY 1978	FY 1979	FY 1980
ST CAMERA	6.350	6.920	4.800	5.600	11.200
ST RV	.500	1.300	1.400	1.400	1.640
DOPPLER	0	.660	0	0	0
TOTALS	6.850	8.880	6.200	7.000	12.840

(3) SHOULD IT BE DESIRED TO ADJUST OPTION 2 TO A POSITION WHERE NO FY 1975 COSTS WOULD BE INCURRED, IT WOULD REQUIRE ACCEPTANCE OF A TWO VEHICLE LAPSE, AS IN OPTION 3 SHOWN IN PARA A(2) ABOVE, AND WOULD ALSO REQUIRE INCORPORATION OF A NEW FUNDING PROFILE FOR THE ST CAMERA LINE IN OPTION 2 AS FOLLOWS:

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A

DE 3 CHARGE 3930 ~~T O P S E C R E T~~

	FY 1976	FY 1977	FY 1978	FY 1979	FY 1980
ST CAMERA	8,600	8,300	6,100	11,900	11,600
ST RV	,600	1,400	1,400	1,800	2,400
DOPPLER	,630	0	0	0	,700
TOTALS	10,030	9,700	7,500	13,700	14,700

B. UNIT COST FOR STELLAR TERRAIN SYSTEMS AFTER NO. 12:

(1) OPTION 1:
- ST CAMERA 5,500
- ST RV ,919
- DOPPLER ,103
- TOTAL PER UNIT 6,475

(2) OPTION 2:
- ST CAMERA 6,990
- ST RV ,909
- DOPPLER ,130
- TOTAL PER UNIT 8,020

(3) OPTION 3:
- ST CAMERA 8,460
- ST RV 1,000
- DOPPLER ,165
- TOTAL PER UNIT 9,625

PAGE 4 CHARGE 3930 ~~T O P S E C R E T~~

C. HARDWARE OPTIONS FOR IMPROVEMENTS TO THE ST CAMERA SYSTEMS #13 AND SUBSEQUENT. THE FOLLOWING INFORMATION SHOWS AN ESTIMATE OF THE 3600/3020 STRUCTURE OF THESE COSTS, AS WELL AS THE MAXIMUM ACCEPTABLE DELAY IN GENERAL SYSTEMS IMPROVEMENTS UNDER THE THREE SCHEDULE OPTIONS.

	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	FY 1980
(1) ULTRA THIN BASE FILM ST CAMERA -	,300	,500	,800	0	0	0
(2) INCREASED FILM CAPACITY ST CAMERA -						
3020 BLACK	,900	,900	,700	0	0	0
(3) GEN SYS IMPROVEMENT (RELIABILITY/FLEXIBILITY). THESE IMPROVEMENTS REQUIRE GO AHEAD IN THE MONTH INDICATED						
OPT 1 (DEC Y4) ST CAMERA -						
3600 BLACK	1,000	,500	0	0	0	0
ST CAMERA -						
3020 BLACK	2,000	1,200	2,800	0	0	0
TOTAL	3,000	3,100	2,800	0	0	0

P

OPT 2 (MAR 79)						
ST CAMERA -						
3600 BLACK	.900	1.000	0	0	0	0
ST CAMERA -						
3020 BLACK	0	5.400	3.900	.500	0	0
TOTAL	.500	6.400	3.500	.500	0	0
OPT 3 (JUL 79)						
ST CAMERA -						
3600 BLACK	0	1.900	0	0	0	0
ST CAMERA -						
3020 BLACK	0	3.500	5.000	.500	0	0
TOTAL	0	5.000	5.000	.500	0	0

D. USE OF THE IBM 370 COMPUTER IN LMSC BUILDING 196 BY HEXAGON:

	HOURS
HOURS AVAILABLE PER MONTH	347
(2 SHIFTS, 5 DAYS)	
ALLOWANCE FOR MAINTENANCE &	
ADMIN (10 PERCENT)	39
DEDICATION TO HEXAGON PS SENSOR	
(NOT TIME SHARED)	40

LMSC HEXAGON USAGE		
(TIME SHARED)	70	
TOTAL HEXAGON		148
AVAILABLE TO OTHER SYSTEMS		
(TIME SHARED)		202

NOTE: CURRENT SOFTWARE PROGRAMS HAVE BEEN TAILORED TO THIS MACHINE. MEASURES WHICH REDUCE OR ELIMINATE ITS AVAILABILITY TO HEXAGON WILL RESULT IN SIGNIFICANT COSTS TO RECONSTRUCT THE COMPUTER PROGRAMS FOR USE WITH OTHER EQUIPMENT.

E. FILM COSTS. FILM COSTS FOR THE VARIOUS OPTIONS ARE DISCUSSED BELOW. IN ANY INDIVIDUAL SITUATION, THESE COSTS CAN VARY CONSIDERABLY DEPENDING ON THE PORTION OF THE LOAD DEVOTED TO COLOR, INFRA-RED AND/OR OTHER SPECIAL LOADS, AS WELL AS THE TIMING OF THE PROCESSING (HOLIDAYS, URGENCY, ETC.). HOWEVER, THE NOMINAL LOAD FOR THE BASELINE MAIN HEXAGON CAMERA WILL COST APPROXIMATELY $.110M FULLY PROCESSED. THE USE OF UTB FILM WILL DOUBLE THIS COST BECAUSE OF THE COMBINED EFFECT OF INCREASED PRODUCTION COSTS PER FOOT AND INCREASED FOOTAGE. A 25 PER CENT INCREASE IN FILM CAPACITY WILL RESULT IN APPROXIMATELY 25 TO 30 PERCENT INCREASE IN THESE COSTS OR ABOUT $.140M FOR THE NOMINAL LOAD AND $.280M

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~~T O P S E C R E T~~ 192255Z MAY 74 CITE CHARGE 3934.
PRIORITY WHIG.
FINAL SECTION OF TWO
HEXAGON
FOR [redacted] FROM COLONEL BRICKER
SUBJ: HEXAGON BUDGET SUBMISSION

FOR UTB. WITH RESPECT TO THE STELLAR TERRAIN CAMERA, THE FILM LOAD IS MUCH SMALLER, WITH A NOMINAL COST OF APPROXIMATELY $.007M FOR THE BASELINE MATERIAL. RATIOS SUCH AS DISCUSSED FOR THE MAIN CAMERA APPLY TO THIS FIGURE ALSO.

F. PALLET AND GEODETIC PACKAGE:

(1) PALLET: A SPECIFIC SCHEDULE OF PALLET RIDERS HAS NOT BEEN ESTABLISHED. HOWEVER, BASED ON PREVIOUS EXPERIENCE WITH STP AND OTHERS, WE BELIEVE THAT WE CAN PLAN ON FULL UTILIZATION

PAGE 2 CHARGE 3934 ~~T O P S E C R E T~~

OF THIS SYSTEM. THE COSTS SHOWN IN THE BUDGET ARE ONLY THOSE TO DESIGN THE SYSTEM, MODIFY THE HEXAGON VEHICLE TO ACCEPT THE PALLET AND CONSTRUCT THE PALLET HARDWARE. THE COSTS OF AUXILIARY PAYLOADS AND ANY PECULARIZATION REQUIRED ARE NOT INCLUDED AND ARE TO BE PAID BY THE PAYLOAD SPONSORS. SP-6 IS NOW CONSIDERING VARIOUS PAYLOADS WHICH WOULD USE THIS SYSTEM. SHOULD IT BE DESIRED, AN ALLOCATION OF THE COST OF ESTABLISHING THIS CAPABILITY CAN BE CHARGED TO USERS AS THEY APPEAR.

(2) THE COSTS OF THE GEODETIC PACKAGE FOR BLOCK 3 (HEXAGONS 13, 14 AND 15) TOTAL $1.970M, AS REFLECTED IN THE BUDGET SUBMISSION. THIS IS SOMEWHAT IN EXCESS OF THE $1.000M DISCUSSED IN WHIG 0616, 13 MAY 74. THE $1.97O WAS CALCULATED SO AS TO PROVIDE PROTECTION AGAINST UNFAVORABLE CONFIGURATION OF THE DMA PROVIDED EQUIPMENT AND/OR POSSIBLE DISAPPROVAL OF THE PALLET. DISAPPROVAL OF THE PALLET WILL RAISE THE ACTUAL COST OF INTEGRATION OF THE DMA EQUIPMENT BY APPROXIMATELY $.400M.

G. 5TH RECOVERY VEHICLE OPTION: IF GO AHEAD ON THE FIFTH RECOVERY VEHICLE IS DELAYED UNTIL JUN 75, THE EFFECTIVITY OF THIS CHANGE WILL SLIP FROM [illegible]

PAGE 3 CHARGE 393% ~~T O P S E C R E T~~
THE FOLLOWING FUNDING PROFILE REFLECTS SUCH A REVISION%

	FY 1976	FY 1977	FY 1978	FY 1979	FY 1980
SPACECRAFT					
3020	1.500	2.000	1.000	1.200	.800
3600	.300	0	0	0	0
RECOVERY VEHS					
3020	2.800	3.000	4.000	4.000	3.000
3600	.600	0	0	0	0
SENSOR					
3020	.700	.600	.200	.200	.200
TOTAL	9.900	5.600	5.200	6.000	4.000

N. 25 PER CENT INCREASE IN FILM CAPACITY% IF GO AHEAD ON THIS OPTION IS DELAYED UNTIL JUL 75. THE OPTION WILL REMAIN EFFECTIVE WITH VEH 19. BUT THE FOLLOWING FUNDING PROFILE WILL APPLY%

SPACECRAFT					
3020	1.900	1.900	.500	.100	.100
3600	.300	0	0	0	0
RECOVERY VEH					
3020	1.600	1.250	.500	.500	.500
SENSOR SUBSYS					
3020	5.000	3.000	2.000	2.300	2.400
3600	.600	.700	0	0	0
TOTAL	9.000	6.850	3.000	2.900	3.000

E-2 IMPDET
~~T O P S E C R E T~~
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GUARD PASS WHIG

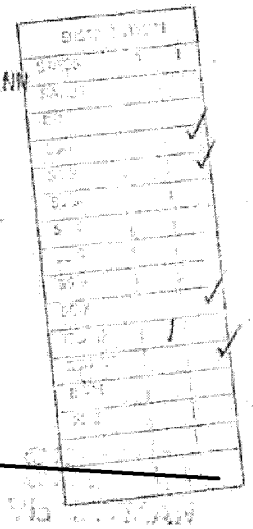
AA 7262

RECEIVED 6 AUG

~~TOP SECRET~~ 062330Z AUG 74 CITE CHARGE 6024.
PRIORITY WHIG.
HEXAGON/10170
FOR GEN KULPA/[redacted] FROM COL PARRISH/COL ANDERSON/LT COL HOFMANN
SUBJECT: HEXAGON PALLET
REF: WHIG 0706 MAY 74

1. WE UNDERSTAND BY INFORMAL CONVERSATIONS THAT FUNDS ARE BEING PROTECTED FOR THE HEXAGON EXPERIMENT PALLET. ACCORDINGLY, WE REQUEST AN IMMEDIATE "GO AHEAD" DECISION FOR THE PALLET OPTION AND FUNDING APPROVAL AS SET FORTH IN PARAGRAPH 4.

2. THE FORWARD SECTION OF VEHICLE 13 IS IN FABRICATION AND LOCKHEED IS DOING ALL THAT IS POSSIBLE TO READJUST FACTORY FLOW TO ENSURE PALLET AVAILABILITY ON THIS VEHICLE. HOWEVER, AFTER 16 AUGUST THE EXPERIMENT PALLET MODIFICATION ON VEHICLE 13 COULD NOT BE ACCOMMODATED WITHOUT A SCHEDULE SLIP. THERE ARE SEVERAL CANDIDATE EXPERIMENTS WHICH CAN TAKE ADVANTAGE OF THE PALLET ON



THIS VEHICLE, INCLUDING A FLIGHT TEST OF A NICKEL-HYDROGEN BATTERY. THIS IS A SAMSO SPACE COMMUNICATION TECHNOLOGY ITEM WHICH HAS DIRECT APPLICATION TO BOTH THE HEXAGON PROGRAM OFFICE AND THE IMAGING RADAR SATELLITE PROGRAM. AS SUCH, IT WILL BE FUNDED BY SAMSO IF, AND ONLY IF, IT CAN BE FLOWN NO LATER THAN VEHICLE 13.

3. THE CONTRACTOR'S CURRENT COST ESTIMATE FOR THIS EFFORT ON BLOCK III IS $2.5M WHICH WE HAD REQUESTED FOR FY 75 THROUGH FY 77 IN OUR APRIL BUDGET SUBMISSION. THERE IS NO CHANGE IN FY 1975, HOWEVER, OUR APRIL SUBMISSION SHOULD BE UPDATED TO REFLECT THE SHIFT IN FUND REQUIREMENTS FROM FY 1977 TO 1976 CAUSED BY A CHANGE IN THE CONTRACTOR'S WORK PLANNING SCHEDULE, AND ALSO TO IDENTIFY THE FUND REQUIREMENTS IN THE SHORT PERIOD JULY-SEPT 1976. IN ADDITION, COSTS FOR THE BLOCK IV PALLET EFFORT IN THE FY 78 THROUGH FY 80 TI

4. FUND APPROVAL IS REQUESTED AS FOLLOWS:

	WHITE FY 75	BLACK FY 75	TOTAL FY 75
SPACECRAFT 3020	.300	.200	.500

SPACECRAFT 3600	.200	0	.200
	.500	.200	.700

[redacted]

	FY 76	SHORT PERIOD JUL-SEP 76	FY 77	FY 78	FY 79	FY 80	TOTAL
SPACECRAFT 3020	1.300	.400	.100	0	0	0	
SPACECRAFT 3600	0	0	0	0	0	0	
	1.300	.400	.100	0	0	0	2.500

NNNN 070036

[redacted]

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IE RUXQAA 101 1501630
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CATOR 486
CATOR PASS CHARGE

~~S E C R E T~~ 301849Z MAY 74 CITE WHIG 0786.
NEXAGON
FOR ANDERSON, [redacted] BRICKER, CHARGE FROM [redacted] AND PEAKE
REFERENCE YOUR CHARGE. ARIG RE NEXAGON PALLET. INASMUCH AS THIS IS AN UNBUDGETED ADDENDA ITEM, AND THERE IS NO PRESENTLY-IDENTIFIED SOURCE OF FUNDS, THIS ITEM WILL BE DEFERRED FROM INITIAL FY 75 APPROVALS. IT MAY LATER BE ESTABLISHED, ALTHO WE ARE EXAMINING POSSIBILITIES OF CUSTOMER FUNDING, PARTICULARLY DMA. ACCORDINGLY, NO ACTION IS TO BE TAKEN ANTICIPATING APPROVAL, SUCH AS INITIATING LONG LEAD PORTIONS IN JUNE 74.
E-2 IMFDEI
~~S E C R E T~~
BT

FY-75 Sept 1st slated

WORKING COPY

~~TOP SECRET~~

DEFENSE MAPPING AGENCY
BUILDING 56, U.S. NAVAL OBSERVATORY
WASHINGTON, D.C. 20305

30 APR 1974

MEMORANDUM FOR DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

ATTN: [redacted] and LTC Peake

1. References:

a. NRO Secret Message 192106Z April 1974.

b. Director, DMA letter, 29 January 1974, BYE-47511-74.

2. In response to the referenced message, 1.a., DMA will fund for and provide, as Government Furnished Equipment (GFE), the developed DMA geodetic package to NRO by December 1975 for integration on KH-9 Mission 1214. Two subsequent geodetic packages will be provided at six-month intervals for incorporation on Missions 1215 and 1216.

3. Further, the funding of the integration costs (approximately $1100K), as outlined in your referenced message, will be provided by AF/RDS (Space Test Program). This decision was reached by mutual agreement with General Stelling and [redacted] on 26 April 1974. The principal DMA point of contact for this effort is [redacted] HQ DMA/PRA.

4. DMA is very appreciative of NRO's timely response to Director, DMA's letter of 29 January 1974 and stands ready to assist in the implementation of this effort as you deem essential.

FOR THE DIRECTOR:

R. H. CARNAHAN
Rear Admiral, USN
Deputy Director
Plans, Requirements
and Technology

BYE-47542-74

Classified by BYE-1
EXEMPT FROM GENERAL DECLASSIFICATION
SCHEDULE OF EXECUTIVE ORDER 11652
EXEMPTION CATEGORY para 5B (2) (3)
DECLASSIFY ON Impossible to determine

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HANDLE VIA
BYEMAN-TALENT-KEYHOLE
CONTROL SYSTEMS JOINTLY

~~TOP SECRET~~