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~~T O P S E C R E T~~ 271515Z JUN 77 CITE CHARGE 6039
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HANDLE VIA BYEMAN CHANNELS ONLY
GAMBIT/HEXAGON
WHIG FOR DR COOK FROM: J. E. KULPA, JR
SUBJECT: DUAL MODE GAMBIT
1. OUR PREVIOUS MESSAGE, CHARGE 4696, GAVE A PRELIMINARY ASSESSMENT OF THE GAMBIT DUAL MODE VEHICLES CAPABILITIES FOR REDUCED CALL-UP TIME AND VULNERABILITY/SURVIVABILITY. WE INDICATED A REFINED ASSESSMENT, INCLUDING COST AND TECHNICAL TRADEOFFS, WOULD BE \VAILABLE BY 20 JUNE 77. THIS MESSAGE PROVIDES THE RESULTS OF OUR EVALUATION.
2. THE REDUCED CALL-UP ALTERNATIVES EVALUATED ARE:
ALTERNATIVE 1: MAINTAINING A CONTINUOUS L-30 TO L-45 DAY RESPONSE AT ALL TIMES.
ALTERNATIVE 2: MAINTAINING AN -30 TO L-45 DAY RESPONSE ONLY TO BACKUP HEXAGON FROM 60 DAYS PRIOR TO UNTIL 30 DAYS AFTER THEIR SCHEDULED LAUNCH DATES.
ALTERNATIVE 3: MAINTAINING A CONTINOUS L-14 DAY RESPONSE AT ALL TIMES.

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ALTERNATIVE 4: THE ABILITY TO MOVE FROM THE L-14 STATUS (ALTERNATIVE 3) TO AN L-7 STATUS AND HOLD FOR 30 TO 60 DAYS.
3. THE GAMBIT DUAL MODE HAS THE CAPABILITY TO ACHIEVE ANY OF THESE RESPONSE ALTERNATIVES. COSTS RANGE FROM [redacted] FOR A HEXAGON BACKUP (ALTERNATIVE 2) TO [redacted] FOR THE L-7 HOLD CAPABILITY (ALTERNATIVE 4). THESE ARE DELTA COSTS TO THE DUAL MODE ALTERNATIVE OF THE MAY 77 BUDGET SUBMITTAL AND COVER EFFORTS THROUGH FY84. ALL FOUR ALTERNATIVES WOULD BE AVAILABLE AFTER THE COMPLETION OF THE VEHICLE 52 MISSION.
4. THE COSTS COVER REQUIREMENTS FOR TEST TAPE CONFIGURATION, ADDITIONAL TEST TEAM SUPPORT FOR BOTH FACTORY AND PAD TESTS, AND ADDITIONAL SYSTEMS TESTS. EACH OF THE ALTERNATIVES REQUIRES PERIODIC RETEST/SYSTEMS CHECKOUT TO MAINTAIN THE READINESS POSTURE. HOWEVER, THE PROCEDURE FOR ACHIEVING THIS DIFFER

)R THE SATELLITE CONTROL SECTION AND PHOTOGRAPHIC PAYLOAD
>ECTION:
SATELLITE CONTROL SECTION: REQUIRES CONSIDERABLE TIME FOR RETEST; A LEAP FROG APPROACH OF VEHICLE SCHEDULING IS USED TO MAINTAIN A STANDBY VEHICLE.
PHOTOGRAPHIC PAYLOAD SECTION: RETEST IS LIMITED SUCH THAT THE NEXT NORMALLY SCHEDULED VEHICLE IS USED AS THE STANDBY; IF

CALL-UP OCCURS DURING A RETEST, THE TESTING WILL BE INTERRUPTED AND FINAL CHECKOUT ACCOMPLISHED AT THE PAD.
TO MAINTAIN A RESPONSE OF LESS THAN L-42 REQUIRES THE GENERATION OF SEASONAL FILM LOADS WHICH CAN BE INSTALLED UPON NOTICE. THE L-14 RESPONSE (ALTERNATIVE 3) REQUIRES THE PRIME FILM LOAD TO BE INSTALLED IN THE VEHICLE UPON COMPLETION OF ITS FIRST SYSTEMS TEST. FILM CONSUMED DURING A RETEST WOULD NOT BE REPLACEABLE. THIS CONSTRAINT CAN BE ALLEVIATED BY BACKING OFF TO AN L-20 DAY STANDBY CAPABILITY. INCREASING THE L-14 RESPONSE TIME (ALTERNATIVE 3) TO L-20 ALSO ELIMINATES THE REQUIREMENT TO PERIODICALLY RECYCLE THE SATELLITE CONTROL SECTION TO REPLACE PYROS WHICH HAVE LIMITIED SHELF LIFE.
5. THERE ARE NO KNOWN RELIABILITY OR PERFORMANCE CONCERNS FOR LTERNATIVES 1, 2 OR 3 (PARTICULARLY IF ALTERNATIVE 3 IS INCREASED rROM L-14 TO L-20). ALTERNATIVE 4, TO HOLD AT L-7 FOR 30 0 60 DAYS, DOES PRESENT SOME CONCERNS, NONE OF WHICH ARE INSURMOUNTABLE. THE WETSTAND LIFE OF THE BATTERIES MAY LIMIT THE LENGTH OF MISSION AFTER A LONG PAD HOLD PERIOD. THE LONGER WETSTAND LIFE EXPECTED OF THE 1903A BATTERY TO BE FLOWN BEGINNING AT VEHICLE 50 SHOULD ALLOW FOR A 120 DAY MISSION AFTER A 60 DAY HOLD. EFFECTS OF THE VERTICAL STORAGE IN THE PAD

ENVIRONMENTS ON SUCH ITEMS AS ALIGNMENTS, OPTICS, FILM LEADER, AND SPLICE TAPE HAVE NOT BEEN ASSESSED. AN EVALUATION OF THE PERFORMANCE ASPECTS OF THESE ITEMS WILL BE INCLUDED IF THIS ALTERNATIVE IS SELECTED.
6. THE ABILITY OF THE SATELLITE TEST CENTER TO SUPPORT THESE ALTERNATIVES HAS BEEN EVALUATED. OPERATIONAL PLANNING TO SUPPORT ALL CASES CAN BE ACCOMPLISHED. LAUNCH VEHICLE SUPPORT IS ALSO ACHIEVABLE FOR ALL CASES, IF SLC-4W DOES NOT HAVE ANOTHER PROGRAM VEHICLE BEING WORKED WHEN THE CALL-UP OCCURS. IF OCCUPIED, A 60 DAY RESPONSE IS ACHIEVABLE. THE PERIODS IN WHICH THIS OCCURS ARE LIMITED TO THE SCHEDULED PAD AND LAUNCH CYCLE OF THE OTHER PROGRAM TO BE LAUNCHED.
. [redacted] THREATS TO THE GAMBIT SYSTEM WERE EVALUATED FOR THE DUAL MODE MISSON: THE ASAT, [redacted] THE PRIMARY CONSIDERATIONS WERE THE DUAL MODE

.TITUDE PROFILE, MISSION LENGTH, AND PROPELLANTS VS MANEUVERABILITY.
8. THE ASAT THREAT WAS ANALYZED FOR A SOUTHERLY LAUNCH FROM TYURATAM (WORST CASE) WITH A ONE REVOLUATION INTERCEPT. THE GAMBIT SYSTEM COULD BE ATTACKED WITHIN AN ALTITUDE RANGE OF

65 NM TO 530 NM ALMOST ANY DAY DURING THE MISSION. AT LOW ALTITUDE, LIMITED EARLY OPPORTUNITIES EXIST TO [redacted] BUT THERE ARE NO SUCH OPPORTUNITIES AFTER U. S. [redacted] AT HIGH ALTITUDE, BOTH EARLY AND LATE COMMAND OPPORTUNITIES EXIST. WITH ALTERNATE ATTACK WARNING SOURCES, SUCH AS DSP, EVASIVE MANEUVERS COULD BE INITIATED SOONER. FURTHERMORE, ABOUT 80 PERCENT OF ALL HIGH ALTITUDE ATTACKS WOULD BE VISIBLE FROM FLYINGSDALE MOOR, ASSUMING THE POINT OF CLOSEST APPROACH WOULD BE NEAR 54.7 DEGREES NORTH LATITUDE. THIS COULD PROVIDE A MEANS OF ATTACK VERIFICATION.
9. BECUASE THE [redacted] BETWEEN THE LOW AND HIG ALTITUDES, GAMBIT SURVIVABILITY IS SIGNIFICANTLY IMPROVED WITH DUAL MODE. WITH THE HIGHER ALTITUDE AND INCLUSION OF VARIOUS [redacted] PROPOSED IN THE NSDM 333 REPORT, GAMBIT COULD MAINTAIN ITS [redacted] INTO THE FAR TERM. SHOULD A LOW ALTITUDE SATELLITE BE ATTACKED BY A [redacted] SUBSEQUENT DUAL MODE LAUNCHES INTO THE HIGHER ALTITUDES COULD PROVIDE ADEQUATE SURVIVABILITY WHILE PERFORMING A USEFUL MISSION.
10. [redacted] THE PROBABILITIES OF UPSET FROM [redacted] FOR THE LOW ALTITUDE

ARE LESS THAN 5 PERCENT AND LESS THAN 3 PERCENT FOR [redacted] FOR THE HIGH ALTITUDE CASE, THESE FIGURES ARE LESS THAN 6 PERCENT FOR [redacted] AND LESS THAN 3 PERCENT FOR [redacted]. THE [redacted] EFFECTS AT BOTH ALTITUDES WOULD BE WELL BELOW THE [redacted] THRESHOLD, EVEN FOR A 120 DAY MISSION.
11. THE DUAL MODE MISSION DOES NOT DIRECTLY AFFECT GAMBIT SYSTEM [redacted]. CERTAIN MODIFICATIONS, SUCH AS [redacted]
12. INSUMMARY, DUAL MODE ENHANCES THE GAMBIT SYSTEM SURVIVABILITY FROM [redacted], DUAL MODE GAMBIT SHOULD [redacted] IS NOT DIRECTLY AFFECTED BY DUAL MODE. ANY FUTURE TRANSITION TO THE STS/T34D WOULD PROVIDE [redacted] FOR [redacted] FUR[redacted]

VASIVE MANEUVERING, THUS, GREATLY INCREASING THE SURVIVABILITY OF THE GAMBIT VEHICLE.
13. OUR EVALUATION OF BOTH THE REDUCED CALL-UP AND SURVIVABILITY ASPECTS OF THE GAMBIT DUAL MODE VEHICLE INDICATES THAT THIS VEHICLE CAN SATISFY THE ROLE OF A HIGH RESOLUTION PHOTOGRAPHIC VEHICLE WHILE SIMULTANEOUSLY FURNISHING A SEARCH GAP-FILLER MODE. THE DUAL MODE CONCEPT ALSO FURNISHES INCREASED SURVIVABILITY WHILE ACHIEVING A VARIETY OF EARLY CALL-UP OPTIONS AS PRESENTED ABOVE.
E-2 IMPDET
~~T O P S E C R E T~~
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