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BERG FROM EVANS. ARMED FORCES COURIER UNABLE TO HAND CARRY DOCUMENTS YOU REQUESTED TO YOU PRIOR TO NEXT WEEK. THEREFORE, THEY ARE QUOTED BELOW FOR YOUR INFORMATION, IN FOUR PARTS. PART ONE. DRAFT MEMO BY D. S. STEININGER DATED 24 JUNE 1965 SECURITY CLASSIFICATION SECRET/BYEMAN/DORIAN.

BASED ON PRIOR DISCUSSIONS WITH DR. HORNIG AND DR. LAND, DR. BROWN OFFEDED A DRAFT MEMORANDUM TO THE PRESIDENT ON MOL REVISED TO REFLECT DR. HORNIG'S VIEWS. THIS DRAFT WAS CONCURRED IN BY DR. HORNIG.

AS REFLECTED IN THE DRAFT, IT WAS AGREED THAT AN UNMANNED CAPABILITY SHOULD BE DEVELOPED CONCURRENTLY WITH THE MOL, IF POSSIBLE BY USING A CAMERA SYSTEM FOR MOL THAT CAN OPERATE WITHOUT A MAN, AND THAT IS THE BEST POSSIBLE AUTOMATIC SYSTEMS FOR NAVIGATION, CAMERA POINTING, FOCUSING AND IMAGE MOTION CONTROL SHOULD BE DEVELOPED AND INCORPORATED IN THE MANNED AS WELL AS IN THE UNMANNED SYSTEM.

IT WAS FURTHER AGREED THAT TO IMPLEMENT THE PROGRAM PROPOSED BY THE MEMORANDUM, THE DOD WOULD TAKE THE FOLLOWING ACTIONS:

1. IMMEDIATELY AFTER PROGRAM APPROVAL CHOOSE A CONTRACTOR TO DEVELOP THE MOL WITH A [REDACTED] RESOLUTION CAPABILITY AND IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
  - A. THE CAMERA-OPTICAL SYSTEM WILL HAVE THE OBJECTIVE OF OPERATING EITHER MANNED OR UNMANNED WITH UP TO [REDACTED] RESOLUTION.
  - B. WHEN IN THE UNMANNED MODE, NECESSARY OPTICAL ALIGNMENT WILL BE ACHIEVED BY PROVIDING A CAPABILITY FOR ADJUSTING ALIGNMENT REMOTELY OR AUTOMATICALLY WHILE IN ORBIT RATHER THAN BY STRENGTHENING THE STRUCTURE OVER THAT REQUIRED FOR MANNED OPERATION.
  - C. A FLIGHT DEMONSTRATION OF THE UNMANNED MODE AT THE BEST FEASIBLE RESOLUTION WILL BE CONDUCTED WITHIN MONTHS AFTER THE FIRST MANNED FLIGHT.
2. INITIATE CONCURRENT STUDIES WITH OTHER CONTRACTOR(S) ON ALTERNATE OPTICAL SYSTEMS WITH THE PURPOSE OF ESTABLISHING AS SOON AS POSSIBLE WETHER THERE IS ANY OTHER OPTICAL SYSTEM WHICH

~~TOP SECRET~~  
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Control System

1 of 3

35  
212

... WOULD BE PREFERABLE TO THAT BEING PURSUED BY THE PRIME CONTRACTOR IN (1) ABOVE, PARTICULARLY WITH REGARD TO REDUCING THE POSSIBILITY OF RESOLUTION DEGRADATION IN EITHER THE MANNED OR UNMANNED MODES.

IT WAS RECOGNIZED THAT IF THE STUDIES PERFORMED UNDER (2) ABOVE PRODUCED A PREFERABLE SYSTEM, IT WOULD BE NECESSARY TO DETERMINE AT THAT TIME WHETHER A PROGRAM REORIENTATION WAS NECESSARY OR DESIRABLE.

PART TWO, MEMO FROM DR. HORNIG TO SECDEF DATED 30 JUNE 1965, WITH ATTACHMENT, SECURITY CLASSIFICATION TOP SECRET/BYEMAN/DORIAN  
QUOTE:

HERE IS THE MEMORANDUM ON MOL WHICH COVERS THE POINTS THAT DIN LAND AND I COVERED VERBALLY WITH YOU LAST WEEK. I HAVE ALSO ATTACHED A COPY OF A MEMORANDUM TO THE PRESIDENT WHICH I HOPE TO GET TO HIM TOMORROW MORNING, AND I WOULD BE HAPPY TO HAVE YOUR COMMENTS ABOUT IT. THE REASON FOR MY HASTE IS THE IMMINENCY OF MY TRIP TO KOREA WHICH WILL KEEP ME AWAY UNTIL LATE JULY.

MEMORANDUM FOR  
THE SECRETARY OF DEFENSE

I SHOULD LIKE TO PASS ON TO YOU MY CURRENT THINKING IN CONNECTION WITH THE MOL PROGRAM, BASED ON THE WORK OF MY SPECIAL MOL PANEL UNDER THE CHAIRMANSHIP OF DR. EDWARD M. PURCELL AND ON DISCUSSIONS WITH DR. EDWIN H. LAND.

SINCE THE MOL PROPOSAL WOULD BUILD A FULL SCALE PROTOTYPE OF A MANNED HIGH RESOLUTION PHOTOGRAPHIC SYSTEM, I SHOULD FIRST ADDRESS MYSELF BRIEFLY TO THE QUESTION OF THE VALUE THAT SHOULD BE ASSIGNED TO HIGH RESOLUTION PHOTOGRAPHY IN GENERAL. I KNOW OF NO WAY TO MAKE A QUANTITATIVE ASSESSMENT IN THIS AREA. HOWEVER, IT SEEMS TO ME THAT OUR EXPERIENCE IN OCCASIONS OF NATIONAL CRISIS AND AT OTHER TIMES WHEN CERTAIN CRITICAL QUESTIONS COULD NOT BE FULLY ANSWERED (EXCEPT WITH A HIGHER RESOLUTION THAN WE HAVE AVAILABLE) ARE SUFFICIENT TO PUT VERY GREAT VALUE ON THE HIGHEST POSSIBLE RESOLUTION. THUS, I WOULD BE WILLING TO PAY A GREAT DEAL FOR A SYSTEM WHICH HAD THIS CAPABILITY. AT THE SAME TIME, HOWEVER, I MUST ALSO NOTE THAT

THERE ARE OTHER, PERHAPS EQUALLY URGENT, INTELLIGENCE REQUIREMENTS FOR QUICK RESPONSE AT TIMES OF CRISIS AND LOW VULNERABILITY FOR ACTIVE WAR SITUATIONS. THESE WILL NOT BE SATISFIED BY MOL. IF THERE WERE A SYSTEM FILLING THESE NEEDS IN COMPETITION WITH MOL, A CHOICE BETWEEN THE TWO WOULD BE VERY DIFFICULT INDEED. ALTHOUGH THERE IS NOT NOW SUCH A SYSTEM, ANY EXPENDITURES THAT WE MAY MAKE ON MOL SHOULD NOT BE ALLOWED TO REDUCE THE INTENSITY OF OUR FUTURE EFFORTS TO SATISFY THE STILL OUTSTANDING REQUIREMENTS.

WITH REGARD TO THE MOL PROPOSAL ITSELF, THE AIR FORCE HAS DONE

AN EXCEEDINGLY THOROUGH ANALYSIS OF BOTH THE MANNED AND UNMANNED SYSTEM ALTERNATIVES FOR A HIGH RESOLUTION OPTICAL RECONNAISSANCE SYSTEM. IT HAS, IN MY OPINION, DOCUMENTED A PERSUASIVE ARGUMENT THAT, FOR EQUAL TOTAL WEIGHTS AND TOTAL VOLUMES, THE MANNED SYSTEM DOES HAVE AN ADVANTAGE OVER THE UNMANNED SYSTEM AND CAN BE EXPECTED TO PROVIDE A HIGHER AVERAGE RESOLUTION AT AN EARLIER TIME THAN THE UNMANNED SYSTEM. I, THEREFORE, WOULD SUPPORT APPROVAL OF THE MOL PROGRAM. I WOULD POINT OUT THAT WE SHOULD EXPECT DIFFICULT TECHNICAL PROBLEMS IN BUILDING THE MIRRORS NECESSARY FOR SUCH SYSTEM, A CAPABILITY YET TO BE DEMONSTRATED. HOWEVER, I BELIEVE THAT THIS RISK IS ACCEPTABLE.

IT IS IMPORTANT TO EMPHASIZE THAT THE CONCLUSIONS ABOUT THE RELATIVE MERITS OF MANNED AND UNMANNED SYSTEMS ASSUME THE USE OF A TECHNOLOGY ABOUT WHICH WE ARE REASONABLY CONFIDENT. ALTHOUGH THIS IS AN APPROPRIATE ASSUMPTION TO MAKE, WE SHOULD RECOGNIZE THE POSSIBILITY THAT THE UNMANNED SYSTEM FALLS SHORT IN THIS COMPARISON BECAUSE, FOR THE VERY SOPHISTICATED TYPE OF SYSTEM THAT WE ARE DISCUSSING HERE, RELATIVELY LITTLE EFFORT HAS BEEN DEVOTED TO SOLVING THE PROBLEMS INHERENT IN AUTOMATIC PATTERN RECOGNITION, IMAGE MOTION COMPENSATION AND PRECISE POINTING TO THE ACCURACY REQUIRED FOR THIS PURPOSE. I AM PERSONALLY CONVINCED THAT IF SUFFICIENT COMPETENCE, IMAGINATION AND EFFORT WERE DEVOTED TO THE DEVELOPMENT OF THE NECESSARY AUTOMATIC SUBSYSTEMS, THE MARGIN THAT NOW EXISTS IN FAVOR OF THE MANNED SYSTEM COULD IN TIME BE LARGELY ELIMINATED.

I WOULD ALSO LIKE TO MENTION SEVERAL ADDITIONAL FACTORS WHICH ARE PERTINENT TO A DISCUSSION OF MANNED VS. UNMANNED SYSTEMS. FIRST, ALTHOUGH AVAILABLE EVIDENCE MAKES US REASONABLY CONFIDENT THAT MAN IS PHYSIOLOGICALLY AND PSYCHOLOGICALLY CAPABLE OF PERFORMING AS REQUIRED BY MOL, THIS CAPABILITY IS STILL TO BE DEMONSTRATED, AND IT IS POSSIBLE THAT THE FLIGHT TESTS WILL SHOW THAT THE MANNED SYSTEM DOES NOT PERFORM AS WELL AS PREDICTED. SECOND, IT SEEMS REASONABLE TO ANTICIPATE THE POSSIBILITIES THAT EITHER PUBLIC REACTION AGAINST MOL AS AN INVASION OF PRIVACY OR INTERNATIONAL OPPOSITION TO MANNED OVERFLIGHTS MAY PREVENT THE USE OF A MANNED SYSTEM. ALTHOUGH BOTH THESE RISKS SEEM ACCEPTABLE FROM THE FINANCIAL STANDPOINT AND SHOULD NOT THEREFORE PREVENT INITIATION OF THE DEVELOPMENT OF THE MOL, THEY ARE SERIOUS ENOUGH POLITICALLY TO WARRANT OUR TAKING ACTION TO PROVIDE FOR THE EVENTUALITY THAT AN UNMANNED, RATHER THAN MANNED, SYSTEM WILL BE REQUIRED. IN ADDITION, IT SEEMS QUITE POSSIBLE THAT FROM AN OPERATIONAL STANDPOINT, AN UNMANNED SYSTEM WILL EVENTUALLY BE DESIRED TO COMPLEMENT THE MANNED SYSTEM BY PERFORMING THE MORE ROUTINE RECONNAISSANCE MISSIONS OR BE AVAILABLE IN SPECIAL CIRCUMSTANCES, SUCH AS, FOR EXAMPLE, IN CASE OF THREATS AGAINST THE SYSTEM BY THE OTHER SIDE.

FOR THESE REASONS, I URGE THAT YOU INCLUDE AS AN INTEGRAL PART OF THE MOL PROGRAM A MAJOR EFFORT TO DEVELOP THOSE SUBSYSTEMS WHICH WOULD BE NECESSARY FOR A HIGH RESOLUTION UNMANNED SYSTEM, SO THAT IF THE MANNED VEHICLE TURNS OUT TO BE UNUSEABLE, AN UNMANNED SYSTEM CAN BE PUT INTO OPERATION REASONABLY SOON THEREAFTER. I SEE NO REASON WHY AN IMMEDIATE EFFORT ON THE CRITICAL

..... AUTOMATIC SUBSYSTEMS SHOULD PERTURB THE PROGRESS OF THE MOL DEVELOPMENT PROGRAM IN ITS INITIAL PHASES. HOWEVER, A DECISION WOULD HAVE TO BE MADE RATHER EARLY IN THE PROGRAM ABOUT HOW THE CAPABILITY FOR THE UNMANNED ALTERNATIVE WOULD BE CARRIED FORWARD. I RECOMMEND THAT THIS BE DONE BY BUILDING THE MOL TELESCOPE-CAMERA SO THAT IT CAN BE OPERATED IN EITHER THE MANNED OR THE UNMANNED MODE, USING THE SAME ESSENTIAL COMPONENTS OF THE OPTICAL SYSTEM FOR EACH MODE. NATURALLY, THE CONSEQUENCES OF THIS RECOMMENDATION MUST BE WORKED OUT IN DETAIL TO DETERMINE WHETHER IT WOULD ENTAIL AN UNREASONABLE INCREASE IN COST OR A SERIOUS DEGRADATION OF PERFORMANCE AS COMPARED TO THE OTHER ALTERNATIVES. I ALSO RECOMMEND A STUDY INTO THE POSSIBILITY OF BUILDING AN ALTERNATE MODULE FOR THAT PORTION OF THE PAYLOAD OCCUPIED BY THE GEMINI-LIVING MODULE WHICH WOULD PROVIDE ADDITIONAL FILM, RECOVERY CAPSULES OR PROPULSION FOR THE SYSTEM WHEN USED IN THE UNMANNED MODE.

TURNING NOW TO THE IMPACT OF MOL ON OUR PROGRAMS AND POLICIES, THERE IS AN IMPORTANT QUESTION REGARDING THE RELATIONSHIP OF MOL TO NASA PROGRAMS. THE AIR FORCE HAS SUGGESTED, AND IT IS CERTAINLY QUITE TRUE, THAT IN THE LIVING COMPARTMENT TO BE DEVELOPED FOR MOL CERTAIN NASA EXPERIMENTS COULD BE CONDUCTED. HOWEVER, I REGARD THESE EXPERIMENTS AS RELATIVELY TRIVIAL WHEN COMPARED TO THE OVER-ALL NASA PROGRAMS AND TO THE MAJOR JUSTIFICATION OF THE MOL ITSELF. IT SEEMS TO ME, THEREFORE, THAT IT WOULD BE IN THE BEST INTERESTS OF THE MILITARY PROGRAM, THE PEACEFUL IMAGE OF THE NASA PROGRAMS, AND GOOD RELATIONSHIPS BETWEEN DOD AND NASA IF THE MOL CAPABILITY FOR NON-MILITARY EXPERIMENTS WERE EXCLUDED FROM THE INITIAL PROGRAM OBJECTIVES AND FROM SUCH MINIMUM PUBLIC ANNOUNCEMENTS ABOUT THE PROGRAM AS MAY BE NECESSARY. NATURALLY, I DO NOT MEAN THIS TO PRECLUDE THE EVENTUAL USE OF AVAILABLE SPACE TO THE ADVANTAGE OF THE OVER-ALL PROGRAM, OR TO FUTURE USE BY NASA OF SUBSYSTEMS OR MODULES DEVELOPED BY MOL AS MAY BE APPROPRIATE TO NASA'S PROGRAM AND AS AVAILABLE FROM MOL.

FINALLY, I BELIEVE THAT VERY SERIOUS POLITICAL QUESTIONS ARISE FROM THE MOL PROGRAM. ONE IS THE CONCERN, ALREADY MENTIONED ABOVE THAT MOL AS A MANNED MILITARY VEHICLE WITH POTENTIAL OBSERVATION CAPABILITY MAY BE OBJECTED TO, AND PERHAPS THREATENED, BY THE USSR. ON THE OTHER HAND IF ACCEPTANCE IS ACHIEVED, MOL COULD CONTRIBUTE TO THE RECOGNITION OF MANNED OBSERVATION AND SURVEILLANCE AS A NORMAL MODE OF INTERNATIONAL BEHAVIOR.

ANOTHER, MORE SERIOUS, CONCERN ARISES FROM THE POSSIBILITY THAT THE MODE OF DATA RECOVERY FROM THE MOL, IF DETECTED BY THE INTELLIGENCE OF THE OTHER SIDE AND COMBINED WITH INFERENCES ABOUT OBSERVATION DEVICES, MIGHT BE CONSTRUED AS DEMONSTRATING AN ACTIVE WEAPONS SYSTEM CAPABILITY FOR THE SPACECRAFT. I THEREFORE RECOMMEND THAT CONSIDERATION AT THE HIGHEST LEVEL BE GIVEN TO QUESTIONS SUCH AS THESE SO THAT (A) OUR PUBLIC STATEMENTS..... ABOUT THE MOL ARE CAREFULLY DEVISED TO MAXIMIZE THE LIKELIHOOD OF ULTIMATE

ACCEPTANCE OF THE PROGRAM, AND (B) WHEN THE FIRST MANNED FLIGHTS ARE IMMINENT WE HAVE, TO THE BEST OF OUR ABILITY, ASSESSED THE POLITICAL RISKS INVOLVED AND DEvised DETAILED RESPONSES FOR THE VARIOUS CONTINGENCIES WHICH MAY OCCUR.

IN SUMMARY, I WOULD SUPPORT THE APPROVAL OF THE MOL PROVIDED PLANS ARE MADE TO CONCURRENTLY DEVELOP AN UNMANNED OPERATIONAL CAPABILITY FOR THE SYSTEM, AND RECOMMEND THE FOLLOWING ACTIONS: SIMULTANEOUS INITIATION OF A WELL SUPPORTED PROGRAM TO DEVELOP THE AUTOMATIC SUBSYSTEMS NECESSARY FOR UNMANNED OPERATIONS, AND A REDESIGN OF THE MOL TELESCOPE-CAMERA FOR DUAL MODE OPERATION. AT THE SAME TIME, I WOULD URGE YOU TO CONTINUE TO SEEK FURTHER SYSTEMS WHICH CAN SATISFY THE INTELLIGENCE NEEDS NOT MET BY MOL. I WILL BE HAPPY TO GIVE WHATEVER ASSISTANCE I CAN TO YOU AND TO THE DIRECTOR OF THE NRO IN FORMING PLANS FOR THE MOL DEVELOPMENT AND PARTICULARLY FOR THE AUTOMATIC SUBSYSTEM DEVELOPMENT.  
SIGNED DONALD F. HORNIG UNQUOTE. PART THREE. MEMO FROM EDWIN H. LAND TO DONALD F. HORNIG DATED 18 AUGUST 1965, SECURITY CLASSIFICATION SECRET/BYEMAN/DORIAN QUOTE:

STUDIES ON THE MOL SYSTEM HAVE BEEN CONDUCTED BY THE AIR FORCE WHICH INDICATE THAT A TELESCOPE WHICH IS POINTED BY A MAN AND CONTROLLED IN TRACKING BY A MAN CAN LEAD TO ABOUT [REDACTED] RESOLUTION ON THE GROUND. ON THE BASIS OF THESE STUDIES, IF IT IS AGREED THAT [REDACTED] RESOLUTION IS A DESIRABLE OBJECTIVE, ONE CAN CONCLUDE THAT A LARGE TELESCOPE IN A SATELLITE SHOULD BE DESIGNED AND BUILT. THE PANEL FEELS FIRST THAT THESE STUDIES, ALTHOUGH VERY COMPETENT FOR THE TIME CONCERNED, SERVED MAINLY TO PROVE THAT A DESIRABLE OBJECTIVE COULD BE ACHIEVED; AND SECOND THAT THERE WAS NOT TIME ENOUGH FOR THE STUDIES TO EXPLORE A VARIETY OF OPTICAL SYSTEMS THAT MIGHT BE USED, NOR TO EXPLORE OR INVENT MECHANISMS FOR MARKING THE IMAGE SHARP ALL OVER THE AREA OF THE FILM, NOR TIME TO EXPLORE INTENSIVELY ALTERNATIVES TO THE USE OF A MAN.

IN THE MOL STUDY THE UNMANNED SYSTEM WAS CONCEIVED IN RATHER CONVENTIONAL TERMS. AS THUS CONCEIVED TWO PROBELMS SEEMS CRITICALLY LIMITING:

- (A) ADJUSTING THE IMC WITH SUFFICIENT ACCURACY; AND
- (B) POINTING THE CAMERA CLOSE ENOUGH TO A DESIRED TARGET.

THE LATTER PROBLEM WAS MADE ACUTE BY THE FACT

- (C) THAT IN THE ABSENCE OF MEANS FOR DIFFERENTIAL IMC COMPENSATION OVER THE ENTIRE FRAME, ONLY A SMALL REGION IN THE FORMAT IS RECORDED AT HIGHEST RESOLUTION.

IT WAS SHOWN THAT MAN CAN COPE WITH PROBLEMS(A) AND (B); THE UNSATISFACTORY CONSEQUENCES OF FACT (C) WERE TACITLY ACCEPTED AS UNAVOIDABLE. WE BELIEVE THAT THESE TECHNICAL PROBLEMS CAN BE SOLVED ALONG LINES NOT ADEQUATELY EXPLORED IN THE MOL STUDY. ELEMENTS IN THE SOLUTION WILL BE: IMPROVED NAVIGATION, POSSIBLY ACCOMPLISHED THROUGH PROPER USE OF EXISTING OR PLANNED GROUND SYSTEMS; APPROPRIATE ON-BOARD COMPUTER; AUTOMATIC INTRODUCTION OF DIFFERENTIAL IMC OVER THE FORMAT.

IT SEEMS TO HAVE BEEN ASSURED THAT A FAMILY OF INVENTIONS IS REQUIRED TO MAKE THE UNMANNED NAVIGATION OPERATE AND TO ELIMINATE IMAGE SMEAR AWAY FROM THE CENTER OF THE FIELD. THE COMMITTEE IS PUZZLED BY THESE ASSUMPTIONS BECAUSE IT SEES QUITE CLEARLY THE FEASIBILITY OF ADAPTING WHAT IS ALREADY KNOWN IN BOTH OF THESE DOMAINS FOR USE WITHIN A VEHICLE THAT IS DESIGNED AS A WHOLE TO PERMIT THE POSSIBILITY OF SOLUTION.

A SOLUTION TO THESE PROBLEMS WOULD PERMIT THE UNMANNED SYSTEM, OPERATING WITH ESSENTIALLY THE SAME CAMERA, TO ACHIEVE THE SAME GROUND RESOLUTION ON PRESCRIBED TARGETS AS THE MANNED SYSTEM. IT WOULD ALSO CONTRIBUTE SIGNIFICANTLY TO THE MANNED OPERATION BY RELIEVING THE OBSERVER OF MUCH OF THE ROUTINE TRACKING AND IDENTIFICATION TASK, AND MAKING THE POINTING AND SELECTION OF AREA OF INTEREST LESS CRITICAL.

THE CONCLUSION THAT AN UNMANNED VEHICLE WOULD RESULT IN A LOWER RESOLVING POWER SEEMS TO US, THEREFORE, UNWARRANTED; THE FURTHER IMPLIED CONCLUSION THAT THE SOLUTION OF THE PROBLEMS INVOLVED WHEN A MAN IS NOT EMPLOYED TO DIRECT THE TELESCOPE, WOULD SERIOUSLY DELAY THE PROGRAM ALSO SEEMS TO US UNWARRANTED. INDEED, IT APPEARS THAT THE LIMITING FACTOR IN THE SCHEDULE WILL PROBABLY BE LEARNING HOW TO DESIGN THE MECHANICS OF VERY LARGE MIRRORS SO THAT THEY WILL RETAIN THEIR SHAPE IN THEIR MOUNTS IN SPACE. WE, THEREFORE, RECOMMEND THAT IF THE MOL SYSTEM IS APPROVED, ITS CAMERA PAYLOAD BE DESIGNED AS A COMPLETELY AUTOMATIC SYSTEM. THIS DEVICE THEN COULD BE FLOWN WITH OR WITHOUT A MAN DEPENDING UPON A NATIONAL JUDGEMENT ON EACH OCCASION ABOUT THE NEED OR DESIRABILITY OF ADDING THE SPECIAL HUMAN CAPABILITIES FOR TARGET SELECTION, SELECTION OF DATA TO BE TRANSMITTED TO GROUND STATIONS AND VERBAL REPORTING.  
SIGNED EDWIN H. LAND

PART FOUR. MEMO FROM DONALD F. HORNING TO DR. ALEXANDER FLAX, WITH ATTACHMENT, DATED 22 NOVEMBER 1965, SECURITY CLASSIFICATION TOP SECRET/BEYMAN/DORIAN/TALENT-KEYHOLE, QUOTE.

I THINK THAT THE RECENT RECONNAISSANCE PANEL MEETING WITH YOU WAS A VERY PRODUCTIVE ONE, PARTICULARLY WITH RESPECT TO THE DISCUSSION ON MOL. I KNOW THAT IT WAS USEFUL FOR US TO KNOW THE QUESTIONS THAT HAD ARISEN ABOUT THE PANEL INTENT AND I HOPE YOU FOUND THE PANEL'S EXPLANATIONS EQUALLY HELPFUL. I REALIZE THAT THE WHOLE CHARACTER OF THE MOL DEVELOPMENT WILL BE DETERMINED BY THE PROGRAM DEFINITION STUDIES NOW UNDERWAY IN THE AIR FORCE, AND SO I AM ESPECIALLY INTERESTED THAT THEY ACCURATELY REFLECT THE PANEL'S OPINION.

IT OCCURS TO ME THAT IT WOULD BE USEFUL TO HAVE A SUMMARY OF THE POINTS MADE BY THE PANEL DURING THE MEETING WHICH YOU COULD SEND TO THE KEY PEOPLE ON THE DEFINITION PROGRAM. THE ATTACHED PAPER DOES, I BELIEVE, FAITHFULLY REPRESENT THE PANEL VIEWS AND I WOULD LIKE TO MAKE IT AVAILABLE TO YOU FOR SUCH USE AS YOU FEEL APPROPRIATE. SIGNED DONALD F. HORNING.



RECONNAISSANCE PANEL VIEWS ON THE  
MOL DEVELOPMENT PROGRAM

IT IS THE PROPOSE OF THIS PAPER TO SUMMARIZE VIEWS OF THE RECOMMAISSANCE PANEL ON THE MOL DEVELOPMENT PROGRAM AND, IN PARTICULAR, THE PANEL'S INTERPRETATION OF THE AGREEMENT REACHED BETWEEN DR. HORNING AND DR. BROWN ON AUGUST 23, 1965.

THE PANEL IS CONVINCED THAT A HIGH RESOLUTION ON THE MOL DEVELOPMENT [REDACTED] ORBITAL RECONNAISSANCE SYSTEM IS A HIGH PRIORITY NATIONAL GOAL. ALTHOUGH THE PANEL CONCURS THAT THE PROPOSED MANNED MOL CAN ATTAIN SUCH RESOLUTION AND THAT THE PRESENCE OF A MAN ON BOARD THE SPACECRAFT CAN ENHANCE CERTAIN ASPECTS OF THE MISSION, THE PANEL CONCLUDES THAT A PROPERLY DESIGNED UNMANNED SYSTEM CAN, IN AN EQUIVALENT TIME, ATTAIN THE SAME RESOLUTION WITH ACCEPTABLE MISSION RELIABILITY. IN ADDITION, BECAUSE OF THE GREAT SIGNIFICANCE OF THE DATA THAT MOL WILL OBTAIN, THE PANEL FORESEES A FUTURE REQUIREMENT FOR OPERATIONAL MISSIONS ON A CONTINUING BASIS AND CONSIDERS IT LIKELY THAT IN SUCH AN OPERATIONAL PROGRAM THE UNMANNED SYSTEM WILL SHOW ADVANTAGES FOR THE ROUTINE MISSIONS, AND MANNED SYSTEM FOR SITUATIONS WHICH REQUIRE SPECIAL CAPABILITIES. IT THEREFORE BELIEVES THAT THE MOL DEVELOPMENT PROGRAM CAN AND SHOULD SUPPORT AN OPERATIONAL PROGRAM WHICH COULD USE BOTH MANNED AND UNMANNED VERSIONS OF THE SYSTEM IN WHATEVER MANNER IS MOST CONSISTENT WITH THE INDIVIDUAL MISSION REQUIREMENTS, THE CONTINUING NEED FOR ECONOMIC OPERATIONS AND THE INTERNATIONAL SITUATION THAT MAY EXIST AT THE TIME.

THE PANEL CONCLUDES THAT CERTAIN ELEMENTS OF THE MANNED AND UNMANNED SYSTEMS CAN BE COMMON. IN PARTICULAR, THE AUTOMATED SYSTEMS FOR NAVIGATION AND CONTROL, POINTING AND FOCUSING, DIFFERENTIAL IMC OVER THE FORMAT AND ON ORBIT ALIGNMENT OF THE OPTICS SHOULD BE DEVELOPED BOTH TO REALIZE THE FULL POTENTIAL OF THE OPTICS DURING UNMANNED OPERATIONS AND ALSO TO ENHANCE THE PERFORMANCE OF THE MANNED SYSTEM BY RELIEVING THE MAN OF ROUTINE, DEMANDING TASKS. THE PANEL OBSERVES THAT A PROPERLY PLANNED DEVELOPMENT PROGRAM CAN ACCOMMODATE IDENTICALITY BETWEEN MAJOR ELEMENTS OF THE SYSTEM (PRIMARILY THE OPTICS,

THE SUBSYSTEMS MENTIONED ABOVE, THE LABORATORY MODULE AND THE BOOSTER) IF THE REQUIREMENTS OF BOTH MANNED AND AUTOMATED MISSIONS ARE FULLY CONSIDERED IN THE INITIAL SYSTEMS DESIGN.

THE PANEL RECOGNIZED THAT THE AUTOMATIC FILM HANDLING AND RECOVERY SYSTEMS NECESSARY FOR AN UNMANNED MOL MIGHT NOT BE APPROPRIATE IN THE MANNED SYSTEM AND, CONVERSELY, THAT THE GEMINI SPACECRAFT WOULD NOT BE NEEDED DURING UNMANNED OPERATION. IT IS CONSIDERED LIKELY THEREFORE THAT A PACKAGE CONTAINING MULTIPLE FILM RECOVERY CAPSULES WILL HAVE TO BE DEVELOPED TO REPLACE THE GEMINI FOR PLANNED UNMANNED MISSIONS.

THE PANEL INTERPRETS THE HORNING-BROWN AGREEMENT TO MEAN THAT THE INITIAL SYSTEM DEFINITION WILL RESULT IN A DESIGN CONSISTENT WITH THE

ABOVE AND THAT THE SEPARATE MODULES AND CONVERSION EQUIPMENT NECESSARY FOR AUTOMATIC OPERATION WILL BE DEVELOPED AND BUILT CONCURRENTLY WITH THE MANNED MOL AND WITH A FINANCIAL AND MANAGEMENT PRIORITY EQUAL TO THAT GIVEN THE MANNED MODULES. IN CONNECTION WITH THE FLIGHT DEMONSTRATION OF THE UNMANNED SYSTEM REFERRED TO IN THE AGREEMENT, THE PANEL ASSUMES THAT A FLIGHT TEST OF THE COMPLETE AUTOMATIC SYSTEM, INCLUDING THE SEPARATELY DEVELOPED EQUIPMENT, WILL BE INCLUDED IN THE MOL TEST PROGRAM AS EARLY AS THE TEST PROGRAM WILL REASONABLY ALLOW. ALTHOUGH THE AGREEMENT SPECIFIED THIS AS 9 MONTHS AFTER THE FIRST MANNED TEST - (AT THE TIME OF THE AGREEMENT, THIS PERIOD REPRESENTED A COMPROMISE BETWEEN PANEL AND DOD OPINIONS ABOUT WHEN THE UNMANNED SYSTEM COULD BE READY) - IT IS EXPECTED THAT THE AIR FORCE PROGRAM DEFINITION STUDIES WILL DEFINE A MORE APPROPRIATE SCHEDULE WHICH INCLUDES BOTH MANNED AND UNMANNED TESTS IN A SEQUENCE WHICH TECHNICAL CONSIDERATIONS SHOW TO BE EQUALLY ADVANTAGEOUS TO BOTH SYSTEMS. UNQUOTE.

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