30 July 1965

MEMORANDUM FOR DR. MCMILLAN

SUBJECT: Selection of DORIAN Payload Contractor

1. Forwarded herewith is a management resources survey of EKC conducted by SAFSP in order to provide a factual basis for pending decisions concerning the DORIAN effort.

2. On the basis of this survey, and consideration of related factors, I have reached the following conclusions:

a. EKC cannot handle both DORIAN and S-2. Even if the requirement for a parallel unmanned backup version were dropped, their estimated requirement for additional experienced manpower is completely beyond all reasonable expectation. Furthermore, DORIAN manpower estimates are based upon a planned sub-contract effort of 50%, which, on the basis of G-3 experience at EKC, I am convinced would result in an appreciable slip in the schedules presently contemplated.

b. Even if they are allowed to drop S-2, I have serious doubt as to the EKC ability to handle DORIAN alone, without the unmanned backup. It seems clear that they cannot do it with a parallel unmanned version.

c. The consortium proposed by EKC would not solve the basic problem in a satisfactory manner, and would introduce other serious problems. It would result in EKC doing considerably less than half the DORIAN work, and add a complicated and cumbersome management structure with the following undesirable characteristics:

(1) It would be an inherently weaker management structure than a straight, prime-sub-contractor structure, more diffuse and larger, with each consortium member also having sub-contractors, some possibly in common, within this limited specialized area of industry.

(2) It would add, to the total manpower directly involved, a large consortium committee. Injecting any committee into the direct management of this already complicated program would be most undesirable. The best of the apparently realizable program management structures will involve complex Air Force and Aerospace relationships. The injection of a payload consortium committee into this structure would invoke all of the worst characteristics of committee management with no actual gain to the overall program. In fact, due to the manpower required on the committee (estimated as 200 by EKC), this approach would require more, rather than less, total manpower.

(3) I cannot see any appreciable difference in the proportion of the DORIAN work which EKC could do if the consortium approach is used. They would gain by not having to supervise so much subcontract effort, but they would lose by having to supply experienced personnel to the consortium committee. They evidently conclude that there is a net EKC advantage in this approach. I conclude that there is a net program disadvantage.

(4) The consortium approach would require ad hoc improvisation to work out detailed procedures between all participants. This would be difficult enough due to the lack of complete program definition at the time the consortium would have to be established. It would be further complicated by the necessity of working within the special security provisions which would have to apply to most if not all participants, and by the necessity of careful and timely legal review as each step of the improvisation proceeds. (Although a consortium, per se, can be legal, this one seems loaded with possibilities for legal problems, such as anti-trust, etc.,) Because of these considerations, I believe that appreciable program delays would be inevitable in the initial and early phases of the program effort.

3. After full consideration of the attached report, and the factors mentioned above, and some points noted below, I recommend:

a. EKC should not be allowed to drop S-2 to work on DORIAN. In support of this recommendation, I note the following significant facts:

(1) The justification of both programs is intelligence data collection. The intelligence community is on positive, written record

that the requirement against which the S-2 program is designed is both valid and urgent. In contrast, they are not similarly on record that the requirement against which the DORIAN program is designed even exists, and some senior intelligence officials have openly and emphatically stated that it does not. Any change which favors DORIAN over S-2 would tend to justify separate and unilateral S-2 action by the CIA, and would impair efforts to obtain intelligence community support for the DORIAN program.

(2) The DNRO has made unequivocal commitments to the SecDef, the DCI, the FIAB and the PSAC that the EKC S-2 design is the best of the competing proposals, and that it has the greatest chance of meeting the stated requirements with the least risk, and that it should be developed as now scheduled.

(3) Substantial funds have been obligated on the EKC S-2 program. From August 1964 through August 1965, the NRO has obligated [redacted] for S-2 work with EKC, Itek, FCIC, LMSC and GE. Of this total, the EKC share was [redacted] For comparison, the nearest camera contractor was Itek, with [redacted]

(4) The heavy EKC funding has protected our capability to fly the S-2 system in April 1967. Any change in EKC's S-2 role will unquestionably cause a major slip in this schedule. I estimate that a change to Itek (for the Itek S-2 design) would involve, at the very least, a six to nine month slippage. Even if the EKC design were transferred to Itek, the slippage would be at least this much, very probably more.

b. The consortium approach to DORIAN should not be used. Instead, a single prime payload contractor should have complete responsibility for both manned and unmanned versions of DORIAN, using sub-contractors as necessary.

c. I recommend that Itek be selected as this prime payload contractor on the grounds that, with EKC eliminated due to conflict of other high priority effort, Itek is uniquely qualified for sole source selection by virtue of their extensive experience with unmanned satellite reconnaissance and their current knowledge and capability in the design and fabrication of reflective optics.

d. I recommend that the EKC DORIAN design be transferred to Itek and be retained as the initial DORIAN concept. The entire MOL program justification has been based upon this particular design approach. It has been under intensive study much longer than Itek's DORIAN design, and has been formulated to greater depth of detail. Yet, since it is at present only a design, without associated fabrication of special facilities, tooling, or procurement, it could be transferred at this time with minimum attendant program slippage, if any at all. Furthermore, such a transfer would be perfectly ethical, and EKC, although they undoubtedly would not like it, would have no legitimate basis for complaint. EKC did not win any DORIAN competition, or on their own initiative propose anything which has resulted in their present DORIAN contract effort. We originated (and funded) the entire effort by issuing specific direction to them (by amendment to our advanced technology contract) to study the possible design of manned system. In view of their inability to proceed without dropping existing work, I can see no reason why we cannot transfer the present design in its entirety .

e. I recommend that this selection be implemented as follows:

(1) SAFSP will give Itek a written RFP defining the DORIAN manned and unmanned versions, and schedules, and concurrently direct EKC to deliver to SAFSP complete information concerning the EKC DORIAN design for turnover to Itek. The RFP will require proposal for the entire task, with Itek to make their own arrangements for necessary manpower and resource support from the other areas of the industry having applicable competence and capability. It also will require proposal in detail of the sub-contractor arrangements that Itek feels necessary and workable to do the entire job, including management arrangements, identification of major sub-contractors, and including the type and proportion of the total planned effort to be undertaken by each.

(2) After receipt of this proposal, SAFSP will conduct a special management resources evaluation of the proposed arrangements to verify the adequacy of present and planned capability. This evaluation will be conducted along the same lines as the evaluation just concluded at EKC, but with added emphasis on the management relationships between the proposed sub-contractors.

(3) Upon conclusion of this evaluation, SAFSP will inform Itek of any unsatisfactory aspects and allow them the opportunity to make corrective arrangements and revise their proposal. Upon receipt of a satisfactory proposal, and authorization (and funds) from you, SAFSP will take necessary administrative and security steps, and award the contract. As the work progresses and the program is further definitized, the contract will be amended as necessary by CCN - Supplemental Agreement procedures.

JOHN L. MARTIN, JR
Brigadier General, USAF
Director

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30 July 1965

Subject: Report of Survey Committee

TO: SP-1 (Gen Martin)

BACKGROUND

1. The Committee was appointed by Gen Martin in letters to Col G T Smith, dated 13 and 15 July 1965 (Tab 1). On 16 July Gen Martin substituted Col F. N. Hand for Mr J Bender as a committee member.

2. During July EKC officials had discussed with Dr McMillan the company's capacity to perform all work contemplated on G, G-3, S-2, D, U, and V. The general consensus of these discussions was that EKC did not have the capacity to do all this work on the time schedules contemplated.

3. Two alternatives were discussed in these preliminary talks:

a. One possibility suggested by EKC was a consortium arrangement, under which several firms in the optical field would manufacture portions of the DORIAN payload. A central consortium would be responsible for design, planning, scheduling, interfacing, etc. The consortium's responsibilities would be limited to such functions, and Air Force and Aerospace Corporation personnel would assist in the over-all management, so as to ease the workload on the optical

industry. The consortium would be manned by 100 to 200 people drawn from the participating hardware contractors, and would be directed by either a contractor employee or an Air Force Officer. Tab 2 is a memorandum concerning Eastman's study of this arrangement. The Committee understands that this scheme was not well received by Secretary McNamara when first explained to him.

b. Another possibility was suggested by Dr McMillan, who asked EKC whether they could do all the projects except S-2, if S-2 work were transferred to Itek. On 16 July and again on 19 July, EKC advised Dr McMillan that under certain conditions their answer would be in the affirmative. These conditions were:

(1) First DORIAN flight would not be before April 1969, and it may not be possible on the first payload to obtain optimum performance.

(2) Authority to proceed would be forthcoming immediately, and would include go-ahead on facilities, long lead items and unlimited overtime.

(3) There must be capability for quick decisions on the part of the Government.

(4) Secretaries McNamara, Vance or [redacted] would verbally indicate to EKC an assurance that DORIAN was planned to be carried out through a flight schedule, and that the project was not to be terminated soon.

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(5) G, G-3, U, V and Lunar Orbiter would not be transferred from EKC, and in future years similar levels of effort would be maintained at EKC, in order that the company might have such relatively less difficult work on which to train personnel for more advanced effort such as D.

4. Dr McMillan advised Gen Martin that no decision in this matter would be reached for several weeks, and stated that in the interim he was interested in seeing this Committee report on EK's capability vs. requirements.

5. The Committee visited Rochester on 19-22 July and met with EKC officials, principally Messrs Waggershauser, Simmons, Oder, Stevens, Spoelhof, Soebbing, Stein and Brown, The Committee's approach was to lay out a master schedule chart (Tab 3) showing milestones for all the projects and then to examine EKC requirements and capacities in three areas: manpower, facilities, and make or buy.

a. The Manned Dorian project used as the basis for this survey was the concept currently under study at EKC and on which they have briefed SAFUS and PSAC. This concept contemplates a six flight program with a first flight date in the second quarter of Calendar Year 1969. Subsequent flights are scheduled at four month intervals. Delivery of the flight articles occur four months prior to launch. The optical system is the Ross Corrector type with the

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two axis gimballed tracking mirror and equivalent 60" aperture. Studies are still in progress to determine sizing trade offs between the primary mirror and tracking mirror. Initial results from this investigation indicate that a 70 inch diameter circular tracking mirror together with a 70" primary will provide performance equivalent to a system with a 60 inch primary and an 84" elliptical tracking mirror. The 70-70 system would simplify certain of the problems associated with the tracking mirror. However, the overall manpower estimates remain essentially the same for either the 60"-84" or 70"-70" approach.

b. During the team's visit, Dr McMillan reminded Mr Simmons that PSAC had insisted on an unmanned effort in parallel with Manned Dorian. Solely for the purpose of estimating the workload involved in such a project, referred to herein as Unmanned Dorian, EKC proposed to use an unmanned system previously proposed to PSAC as a departure point, and arrive by factoring at the required manpower, facilities and sub-contracting. Mr Simmons explained these ground rules to Dr McMillan by telephone on 22 July. The Committee chose to treat Unmanned Dorian as a separate subject, and its evaluation appears in paragraphs 24, below. All other evaluations in this report(paragraphs 6 through 23) are without regard to Unmanned Dorian.

c. The S-2 project considered during the Committee's visit to Rochester was the original schedule of first launch in January 1967, 8 launches in FY 67 and one per month thereafter, and the

original EKC work statement. Upon the Committee's return to El Segundo, we found that two decisions had been made altering this concept. First, DNRO had amended the flight schedule to first launch in April 1967, 2 launches in FY 67 and 8 per year thereafter. Second, at an interface meeting with EKC and GE, Col Heran had decided to transfer work on the recovery system, the shell for the payload and all systems integration work from EKC to GE. This leaves EKC with the optical work and the film transport. The net effect of both the schedule reduction and the work transfer was to reduce EKC's manpower requirements on S-2. On 30 July EKC telephoned their estimate that the reduction would be about 10% initially, changing to a 10% increase in late 1966 because of fabrication and assembly work. On the other hand, Col Heran estimated the reduction at approximately 15% across the board. Both estimates are ROM. The Committee concluded that the reduction could be as much as 15% across the board. The discussion of manpower in paragraphs 6 through 11, below, and the manpower figures shown in Tabs 4 and 5 accordingly are based on a 15% reduction in S-2 workload at EKC.

d. The NASA Lunar Orbiter Program workload at EKC was taken into consideration by the Committee in evaluating company capacity.

e. In accordance with its instructions, the Committee evaluated whether EKC was on schedule in connection with current contracts on G, G-3, U, S-2 and D.

MANPOWER

6. Basic to a discussion of manpower capability is EKC's personnel management philosophy and practices. The Company has produced quality satellite reconnaissance payloads by using highly skilled personnel working under a team concept in which all members of the team know each other's skills and/or shortcomings. The concept is a projectized approach, modified in certain cases along functional lines. The concept enables work to be done by people with the right skills, management to be effected with a minimum of documentation and cost, and high quality to be maintained. Moreover, the company has a conservative personnel policy under which people are hired selectively for the "long haul", trained carefully for initial assignments, and then moved up in career progression only after they have been well assimilated into the team concept and the overall company methods. This means that expansion of manpower cannot be done as rapidly as can be done, say, by a large airframe contractor such as North American, where employment peaks and valleys result from fluctuating workloads. Another contributing factor is the small Rochester labor market and the reluctance of potential employees to relocate from other areas to Rochester.

7. This is not to say that expansion of EKC manpower is not possible. In 1962 Dr Oder's Special Projects Organization, together with supporting assembly people, numbered about 850 people, working on 698 BJ and GAMBIT. Growth was slow until the G-3 project began.

By August 1964 the strength was about 1000 people and currently (one year later) it is about 1500. Current planning calls for some 1800 to 1900 by 1966. The significant points are that such expansion is a slow process, it is attended by some risk of dilution of the team concept capability, and expansion cannot be maintained indefinitely, because of the company policy of retaining employees for long periods and the uncertainty that government reconnaissance business will continue to expand. In summary, one doesn't expand the capacity to produce high quality reconnaissance payloads by rapid mass hiring of people off the street.

8. From the facts available to the Committee, it appears that the EKC manpower shortage will exist from the time of go-ahead on the full DORIAN effort, reach a maximum deficit in calendar year 1966 and disappear by calendar year 1967.

9. The total EKC manpower required to prosecute SAFSP projects includes people in various shops and other organizations not under direct control of Dr Oder's Special Projects Organization (SPO). The Committee felt, however, that the most critical manpower was in the SPO and the related assembly people, and accordingly the Committee studied that group. Tab 4 contains a series of manpower tables showing estimated requirements for this group through 1966 for each of the following projects: G, G-3, S-2, D, U, V and LOP. These requirements are firm for G, G-3, V and LOP, less firm for S-2 and U, and very rough order of magnitude (on the high side of probability) for D. Tab 5 is a graphic presentation of the project totals from

the tables in Tab 4. Also plotted on the graph are three cumulative curves showing (1) total manpower requirements for all the projects, (2) total manpower requirements for all the projects except S-2, and (3) EKC's best estimate of manpower availability. The chart shows that in the second quarter of calendar 1966 the manpower availability falls some 690 people short of meeting total requirements and some 170 people short of meeting all requirements except S-2. Since the DORIAN requirements are on the high side of probability, more refined figures should reduce these shortages.

10. The Committee asked EKC to identify which manpower skills were the most critical, i.e., most difficult to hire and assimilate into the team concept. EKC was initially reluctant to attempt such identification, since any expansion always involves shifting people, i.e., moving people with some experience into more responsible positions. EKC then agreed that if they forsee an over-all manpower shortage, they should be able to identify at least some examples of critical skills only and the probable shortages in these skills. The following examples were furnished the Committee:

a. Photo Systems Engineering people - 7 more are required immediately over and above planned availability. This increases to 12 by the end of 1965 and 14 by the end of 1966.

b. Optical Test Development Engineers - 6 more are required immediately, increasing to 14 by the end of 1965 and remaining at this level through mid 1966.

c. Mirror Sub-strate Engineers (optical/mechanical) - The shortage is 4 immediately, remaining at that level through mid 1966.

d. Optical Theorists - The shortage is 3 immediately, remaining at that level through mid 1966.

e. Thermal-optical Engineers - The shortage is 3 immediately, remaining at that level through early 1966.

f. Optical Technicians - The shortage is 2 immediately, increasing to 7 in 1966.

11. In summary, the Committee's opinion was that manpower is the most critical shortage and that under EKC policy and procedures this shortage prevents the company from prosecuting all the SAFSP projects on the time schedules indicated.

FACILITIES

12. At the present time the Contractor is utilizing or in the process of readying for utilization (i.e., building 601 for S-2) approximately 307,000 square feet of floor space. This figure includes only the space utilized by the Contractor's Special Projects Organization and does not include space used on an intermittent and variable basis by other contractor departments that provide support to Special Projects Operations. This space utilization is allocated

as follows:

G	39,000 sq ft
G-3	97,000 "
V	8,000 "
UPWARD	35,000 "
S-2	91,000 "
LOP	28,000 "
D	9,000 "
	307,000 "

13. To continue on with D, and do S-2 also, would require an additional 100,000 sq ft of floor space which will require a new building. This building will be needed within 12 months of program go-ahead and is not regarded as a pacing item.

14. In any event (either with or in lieu of S-2) D will require, but may not be limited to, the following special test facilities and equipment, none of which are regarded as pacing items:

Vertical Test Chamber (Optional) *
Horizontal Test Chamber (Optional)*
Payload Test Chamber
Thermal Test Chamber
Weight and Balance Machine
Vibration Test Equipment.

*NOTE: Optional means that EKC thought it might be possible to combine the Vertical and Horizontal Chambers.

The above are required because of the greater size of D over predecessor systems. (The Committee discussed the question of whether, in providing facilities for Dorian-1, SAFSP should provide for the larger sizes of a possible follow-on Dorian-II. It was concluded

that the uncertainties of D-II and the probable substantial cost involved would argue against this course of action.). Because of the vibration problem, the vibration test equipment needs to be housed in a building separate from the building where assembling and other testing is accomplished. It is estimated that this building will have to be about 15,000 sq ft and is not included in the gross estimates for total program requirements.

15. Should the Contractor do D in lieu of S-2 he would use building 601, presently under modification for S-2. The Contractor would build adjacent to building 601 the vertical test facility (optional) which would be a tower about a hundred fee high and 25 to 30 feet square. He would also have to build the separate building (noted above) as housing for the vibration test equipment. This would be somewhat less than the total of 100,000 plus 9,000 estimated by the Contractor as his rough estimate for total space requirements to accomplish DORIAN in sizes up to 70 inches, but Contractor feels that he could fit the operation into building 601 and other available space although there would be inconveniences that would tend to degrade efficiency.

16. In our opinion, the schedule for providing necessary facilities is very tight, but probably can be met. Therefore, facilities do not constitute a pacing item nor will they, by themselves, prevent EKC from performing successfully on all the programs considered in connection with this problem.

17. The substance of the above comments was discussed with Mr Simmons. He indicated that there might be some unanticipated delays in the availability of the special test facilities and equipment, but the problems he mentioned were problems inherent in accomplishing D on the contemplated schedule and were not problems traceable to a facility shortage caused by a combination of S-2 and D.

18. When questioned whether 100,000 sq ft in building 601 could be made available to accomplish D in lieu of the new building mentioned above, he stated that such might be possible and that management had been considering it. Of interest is that building 601 is nearly completed and that there appears to be ample space to not only meet the needs of S-2 (occupancy scheduled for 15 August 1965) but also the needs of D. Indicative of the depth of management consideration was a statement Mr Simmons made that the cafeteria, medical facilities, and other support requirements would be too small to handle the greater population density.

MAKE OR BUY (Comparison of in-house effort on present and future programs)

19. A comparison was made of the percentage of effort subcontracted on current programs with planned percentages on future work. Comments are pertinent in the following areas:

20. Sub-Contracting

a. G (-16%) - This included majority of test equipment and

handling equipment as well as the following airborne components -- camera, regulated power supply, servos, signal gating modules, lens assembly, glass blanks. It should be noted that pacing items in early stages of G program were subcontracted items. The Rixon Motor Speed Drive and the EMI Camera would have delayed the entire program if the associated contractor had not been several months late. In the case of the MSD the solution was to assume the task in-house.

b. G-3 (31%) - This also included the majority of the test equipment and handling equipment. In addition, the following airborne components are on sub-contract: SRV, external structure, servos, oscillators, power conversion units, focus electronics, film drive electronics, cables, mirror blanks, cutter sealer assembly, weight & balance equipment, etc. It should be noted that it appears some of the major schedule problems on this program are the result of the large subcontracted effort.

c. S-2 (40%) - No breakdown of type of items was obtained, but we assume at least the same type of items as on G, with the addition of some of the more simple components. In addition, EKC is giving consideration to subcontracting some of the mirror polishing. This task has been one of the most critical on G, so Mr Simmons indicated it was very unlikely it would be subcontracted on S-2.

d. D(50%) - Includes nearly all test and handling equipment, plus such items as:

(1) MOL Module - Readout equipment, pointing and tracking telescope (and its related tracking mirror) which will be slaved to the optics module, TV camera, zoom lens, pointing and tracking display and controls, automatic check.

(2) Camera/Optics Module - Movie camera, frame camera, mirror blanks, servos.

e. U(40%) - Same comment as S-2.

f. In general it appears that the increase in subcontracting on planned programs is a direct result of the manpower problem at EKC and manpower projections are based on this allocation. It would also appear that to subcontract this amount of effort on programs like DORIAN and S-2 would definitely increase the already high risk involved. This conclusion is supported by the results to date of the increased sub-contracting for G-3, in comparison with G, and the attendant internal G-3 schedule slippages at EKC.

21. DRAFTING. Following are the actual and/or planned percentages of subcontracted drafting effort:

G	22%
G-3	60%
S	50%
D	50%
U	40%

It should be noted that the Contractor has exceeded the original

SAFSP ceiling on subcontracted drafting effort for G-3 by over 100%. In addition, the man-hours and cost for drafting effort are exceeding the original effort proposed by a considerable amount. Thus it appears that subcontracting drafting effort results in some inefficiency and would probably cause schedule delay on planned projects.

22. FABRICATION & ASSEMBLY - Following are actuals and/or planned percentages of this effort to be done out of house:

G	16%
G-3	25%
S	45%
D	45-50%
U	30-35%

From the above figures it is apparent that SAFSP requirements are exceeding EKC capacity in the fab and assembly area. However, in the past EKC has sub-contracted only the simpler, routine tasks in order to save their own capability for more critical tasks. With the higher percentages of sub-contracting shown above, the Committee could not be sure this practice would be continued, although Mr Simmons stated it was his goal. The chief impact of this increased sub-contracting would be a sharp increase in EKC production control workload, with the possibilities of some loss of tight control and some lesser capability to react quickly to production emergencies.

CONTRACT SCHEDULE STATUS

23. In its terms of reference the Committee was charged with determining whether current contract work for G, G-3, U, S-2 and D is on schedule. The Committee queried both EKC officials and

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SAFSP project and procurement personnel. The current status and explanatory remarks for each of the projects is shown below.

a. GAMBIT. Essentially on schedule and no slippages are forecast.

b. G-3. The following items are behind schedule as indicated, however EKC maintains that the launch schedule can still be met:

(1) Formula sample lens: The 90% design release was due 15 Dec 64 but not completed until 7 April 65, a 12 week slip. The lens was to be available for test 15 May 65 but was not available until 7 June, a slippage of 3 weeks.

(2) Thermal model. The 90% design release was due 15 January 65 but was not completed until 7 April, an 8 week slip. The model was to be available for test without external structure on 5 April 65 and with external structure on 15 August 65. These availabilities are now forecast to be 30 July and 30 September, respectively, which are slippages of 15 and 6 weeks.

(3) Engineering model. The 90% design release was due 15 January 65 but was not completed until 1 June, an 18 week slip. The first need lens was due to be available for test 15 August 65 but is forecast to be available 8 September, a 3 week slip. The camera optical assembly #1 was due to be available for test 1 Sept 65 but is forecast to be available 24 September, a 3 week slip. The camera optical assembly #2 was due to be available for test on 10 September but is forecast to be available 10 October, a 4 week slip.

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(4) Reliability model. The 90% design release was due 15 January 65 but was not completed until 1 June, an 18 week slip. The first need optics were due to be available for test on 15 October 65. The availability is now forecast as 24 December, a 9 week slip. The camera optical assembly #2 was due to be available for test 20 January 66 but is now forecast to be available 28 January, a one week slip. The retrofitted reliability model was due to be available for test 15 April 66 but is now forecast to be available 29 April, a 2 week slip.

(5) The above G-3 slippages were discussed with Col King, the project officer. He made the point that there had been no pacing schedule problems on GAMBIT payloads, primarily because during most of the design and fabrication period there had been no other programs at EKC competing for manpower and facilities. With G-3, however, the slippages noted above arise from such competition. Col King is generally pessimistic about meeting G-3 launch schedules and has under consideration several remedial steps to ease EKC's workload. Among these are changing the GE recovery vehicle from CFE (EKC has a sub contract with GE) to GFE (direct SAFSP contract with GE), eliminating the requirement for certain preliminary models which will not be available for test prior to first flight, and providing SAFSP assistance to EKC in management of sub-contracts. In Col King's opinion placing additional effort such as DORIAN at EKC would result in severe complication of the current G-3 difficulties.

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c. UPWARD. Current contract work is on schedule; however, SAFSP desires to begin a new contract immediately and EKC cannot begin for 1 to 2 weeks.

d. VALLEY. No slippage from current contract schedule, however, the contract schedule had to be readjusted because VALLEY manpower was diverted to S-2.

e. S-2. During the Committee's visit to Rochester, all discussions were based on the original S-2 schedule (first flight January 1967, 8 launches FY 67, 12 per year thereafter) and on the original EKC work statement. On this basis the Committee found S-2 was behind schedule on the following items:

(1) Thermal Model, Engineering Model and Dynamic Simulator are 2 weeks behind schedule. There is a problem in getting the outer shell from GE.

(2) Electronic breadboarding and breadboard testing are 2 weeks behind schedule.

(3) The large thermal chamber (sub-contracted to Chicago Bridge & Iron) is three months behind schedule.

(4) The Formula Sample Lens Assembly is 3-1/2 months behind schedule because of late delivery of meniscus glass blanks from Schott.

Upon the Committee's return to El Segundo, we were advised of a reduction in flight schedule and a reduction in the EKC work statement as discussed in par 5c, above. The Committee's final assessment, concurred in by Col Heran, is that S-2 work at EKC is now on schedule.

f. DORIAN. No slippage from current contract schedule. LtCol Knolle concurs.

UNMANNED DORIAN

24. On 27 July 65, after the Committee had returned from Rochester to El Segundo, EKC telephoned to the chairman their estimated requirements for manpower, facilities and sub-contracting if an Unmanned Dorian project were to be undertaken roughly in parallel (not more than 6 months lag) with Manned Dorian. The estimates are rough order of magnitude, computed under the ground rules discussed in paragraph 5b, above.

a. Manpower. Estimated requirements are shown in Tab 6. The numbers shown in that tab represent a manpower requirement over and above the requirements shown in Tabs 4 and 5 and discussed in paragraphs 6 through 11. Thus it is clear that EKC does not have the manpower capacity to pursue an Unmanned Dorian effort in addition to the G, G-3, U, V, LOP and one of either S-2 or D.

b. Facilities. EKC estimates that if Manned and Unmanned Dorian were running approximately concurrently, both could not be accommodated in building 601 without substantial modifications and relocations of company commercial business. In the event both of these versions of Dorian were undertaken in lieu of S-2, the company would have to decide whether to alter building 601 or build a new building. Preliminary thinking points toward the latter course. In any event, facilities are not the pacing item in accomplishing either or both versions of Dorian.

c. Sub-Contracting. The company estimates 50% or more of the Unmanned Dorian effort would have to be sub-contracted. This involves the same risks discussed in paragraphs 19 through 22, above.

d. General. The rough order of magnitude measure of workload described above is a far different matter from actual workload which would result from a precise work statement and program plan. The above measure, however, served to convince the Committee that Unmanned Dorian on the time schedule contemplated is not possible at EKC.

CONCLUSIONS:

26. The Committee concluded that:

a. EKC can perform G, G-3, U, V, S-2 and LOP on the time schedules currently contemplated.

b. If Manned Dorian is added, S-2 would have to be dropped.

c. With respect to EKC capacity under b, above:

(1) The number of skilled people required exceeds the number required for a, above, so that a (reduced) shortage will still exist.

(2) There would undoubtedly be some reduction in EKC's efficiency level, schedules and costs, across the total spectrum of SAFSP projects. EKC has stated they would devote close management attention to this matter and would insist on not compromising quality, even if schedules slipped or costs rose.

(3) There would be a very tight time schedule for providing facilities for D. Any delayed decisions, changes in concept, or construction problems would cause slippage in the D flight schedule.

(4) There would be a high percentage of sub-contracting on U (40%) and D (50% or higher). This requires extra EKC management effort and increases the cost to the Government through costs and fees to both EKC and the subs. Of special import is the G and G-3 history, wherein most of the principal problems encountered were related to effort bought on subcontract.

d. EKC could not perform the Unmanned Dorian project in addition to the workloads in either a or b, above, if the time schedule for Unmanned Dorian is roughly parallel to Manned Dorian (6 month lag).

e. EKC is essentially on schedule under current contracts for G, U, D, and S-2 but is from 3 to 18 weeks behind contract schedule on elements of G-3. Although EKC maintains that this schedule slippage will not affect planned flight dates, the Committee concluded that all the slack has been used up and any new problems encountered from now on will probably result in launch schedule slippages.

SECRET

BYE-40252-65

G T SMITH
Colonel, USAF
Chairman

6 Tabs
1 - Letter Orders
2 - Memo on Consortium
3 - Master Schedule
4 - Manpower Tables
5 - Manpower Chart
6 - Manpower Table, Unmanned Dorian

F NED HAND
Colonel, USAF

RALPH GEORGE
Major, USAF

ROY SMITH
LtCol, USAF

JOHN J KEENAN
Major, USAF

JOHN WALLACE
Major, USAF

ORRIN V PARDUN
Major, USAF

SECRET

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SPECIAL HANDLING

SECRET

BYE-40252-65

3 JUL 1965

SP-1

MEMORANDUM FOR COLONEL GERALD T. SMITH

SUBJECT: Management Resources Survey of Eastman Kodak Company

1. You are hereby appointed Chairman of a committee to conduct subject survey. Members of the committee will be:

Lt Colonel Roy Smith, [redacted]
Major John J. Keenan,
Major Orrin Pardun, [redacted]
Major John Wallace,
Major Ralph George, SP-3
Mr. Jack Bender, SSJ

2. Your committee will review existing and contemplated workloads at Eastman represented by the following projects:

GAMBIT
GAMBIT-3
UPWARD
S-2
DORIAN

You will assess Eastman's present capabilities with regard to both personnel and resources to accomplish the above projects on the schedules now contemplated, and further assess probable interactions between these projects.

3. I desire your verbal report not later than Friday, 30 July 1965, to be followed as soon as possible by a written report.

JOHN L. MARTIN, JR.
Brigadier General, USAF
Director of Special Projects

P-13674

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BYE-40252-65

SP-1

15 July 1965

MEMORANDUM FOR COLONEL GERALD T. SMITH

SUBJECT: Management Resources Survey of Eastman Kodak Company

Reference my 13 July 1965 memorandum to you, subject as above, P-13674. Please add the following to the list of projects in paragraph 2:

VALLEY - Advanced Studies

JOHN L. MARTIN, JR.
Brigadier General, USAF
Director of Special Projects

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P-13674.a

BYE-40252-65

~~SECRET~~

SUBJECT: Proposed Consortium for DORIAN

1. On 19 July 1965 Dr Oder of EK briefed Col Smith's group on the consortium proposal of EK for the accomplishment of the DORIAN program. Copies of his charts are attached. On 21 July Dr Oder made available for Col Hand's perusal the staff study prepared by EK on this matter, copy of which had been furnished to Dr McMillan and presumably passed on to Mr McNamara. The mentioned charts are the inclosures to this staff study. Dr Oder did not want a copy to be made of the staff study but permitted Col Hand to take notes. The following comments are made on the basis of these notes and concurrent conversation with Dr Oder.

2. In brief, the consortium contemplates a close working relationship between Contractors having photographic satellite reconnaissance experience through a joint committee working closely with the Government in parceling out the work, establishing specifications and making interface decisions so that no one Contractor is given the total responsibility and the available resources of all are utilized to the maximum extent. The staff study makes the comment that precedence exists for this type of arrangement and Dr Oder explained that Dr McMillan commented that a similar consortium was worked out between ITT, Bell Labs and RCA while Dr McMillan was at Bell.

3. The study points out that even with a factor of 50% subcontracting, the in-house effort to do DORIAN would require 1,000 man years of professional engineering and would require over 500 professional people. One of the alternate considerations was the possibility that DORIAN could be turned over to a large aerospace company, however it was concluded that the resulting recruitment of qualified technical people would probably disrupt the present satellite reconnaissance program. The study proposed as a feasible solution, the consortium of qualified members of the photo reconnaissance industry to be perhaps augmented with a non-photographic company that had experience and capability in satellite reconnaissance.

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4. The consortium is planned to operate at two levels: the higher level in the area dealing in area of program coordination and subsystem engineering which they refer to in their charts as the PC & SE group; and the lower level to operate in the area of hardware engineering, manufacturing and design. A qualifying note was included that while higher level members of the consortium would participate, only one of the members would be responsible for pre-launch integration and test of the overall subsystem.

5. The PC & SE group would work as an organized group regardless of company affiliation and would be composed of people from the various companies. The members would keep their respective companies advised of the actions of PC & SE group and identify the potential impact of PC & SE actions on the part of the hardware consortium being played by their company. The PC & SE group would suggest the extent to which their respective companies could, with authority by the Air Force, assist in a problem.

6. Functionally, the PC & SE group will:

a. Represent the consortium in dealing with the aerospace corp.

b. Prepare program plans and schedules for the integration of DORIAN photo subsystem.

c. Take the broad MOL/DORIAN requirements and specifications and derive specific component requirements.

d. Develop subsystem design approaches for the guidance of the hardware organizations.

e. Negotiate documents and reach decisions to accomplish needed interfaces.

f. The individual in charge of PC & SE group would, in addition to organizing and supervising the activities of the group, have the responsibility and authority to make the final decisions for the group.

g. The PC & SE group is not to be the directive agency for out-of-scope work upon the hardware organization, but will render its output of out-of-scope work to the Air Force which after review by the Aerospace Corporation will provide contractual direction to the members of the consortium.

h. In the case of in-scope work, the PC & SE group deals directly with the hardware organizations.

i. The hardware portion of the consortium would be less tightly managed and integrated than the PC & SE group. It presumes that the Air Force would assign hardware tasks after PC & SE definition. There would also be close cooperation between the companies concerned to assure the continued coordination of the integration test planning and detailed interface.

7. The purpose of the consortium approach would be to relieve a number of the companies of manpower demands that they would face if they had the entire DORIAN responsibility. Under the consortium concept Air Force/Aerospace would have to assume responsibility for such things as reliability analysis and design review of the integrated subsystems, establishing of uniform manufacturing and quality control procedures and surveillance thereof, review and approval of integration test plans and results, etc.

8. The study indicated that a capable senior Government individual would be assigned to direct the total activities of the consortium with power to act for DORIAN in resolving DORIAN matters arising within and without the consortium.

9. The conclusions of the study were:

Conclusion 1 - Only the consortium would be capable and strong enough to accomplish DORIAN.

Conclusion 2 - That the consortium be established at two levels:

a. PC & SE staffed from members of the consortium would:

(1) Perform overall subsystem and technical planning and scheduling and interface management.

(2) Conduct, coordinate, and render decisions on the following: subsystem engineering, conceptual design and prepare specifications and work statements.

(3) Accomplish liaison with AF/Aerospace and members of the consortium and associate subsystem contractors.

b. An interrelated and coordinated group of companies performing hardware engineering, manufacture, and test functions as well as the subsystem engineering and conceptual design functions as required and controlled by the PC & SE group.

Conclusion 3 - Will require enthusiasm, constructive and cooperative participation of the individual members; that the Government insure fair treatment of all companies.

JUNE 30 1965

CLASSICAL ORGANIZATION

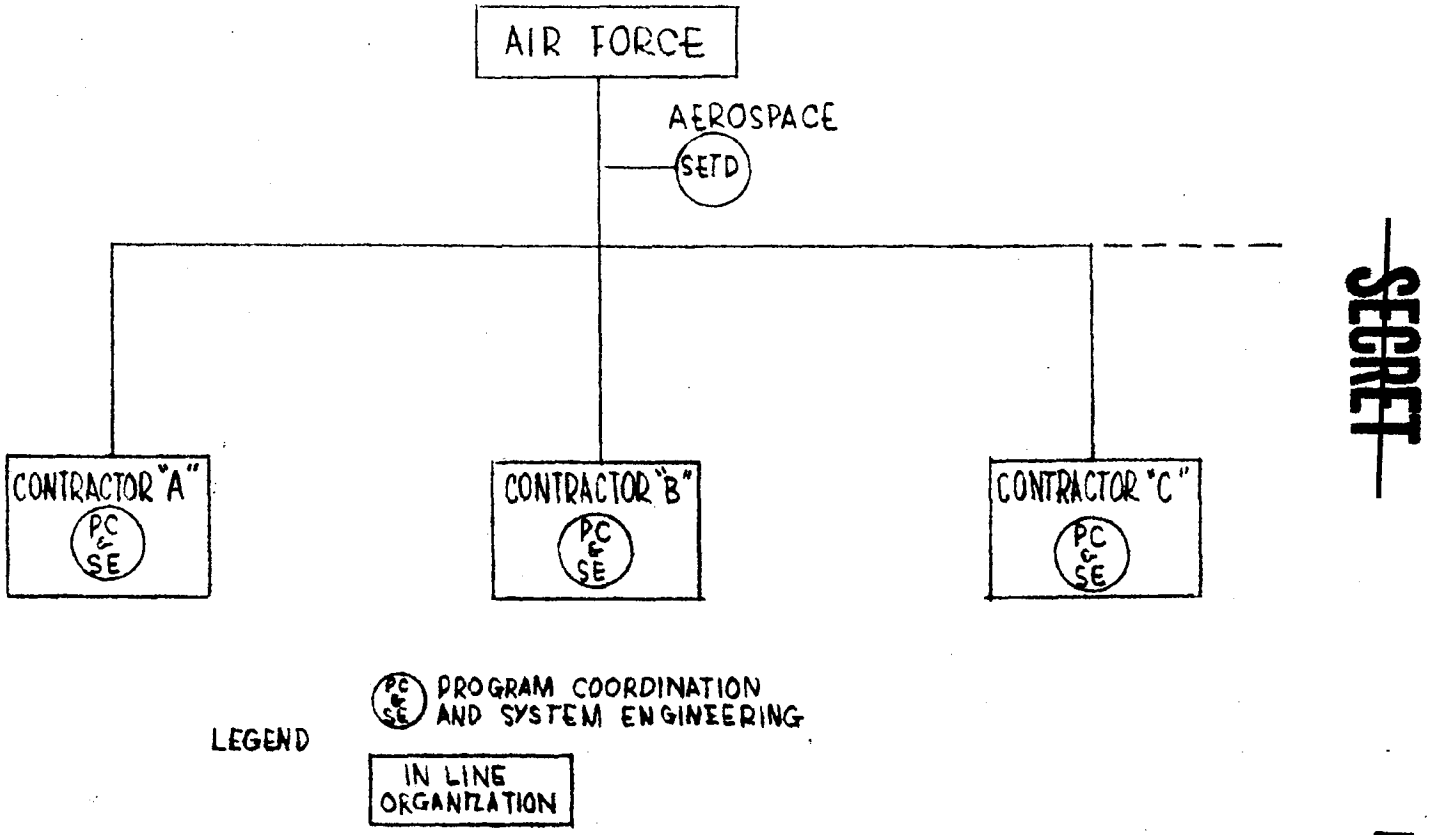

FIGURE 1

MODIFIED ORGANIZATION

TECHNICAL DIRECTION
FOR IN SCOPE
CHANGES

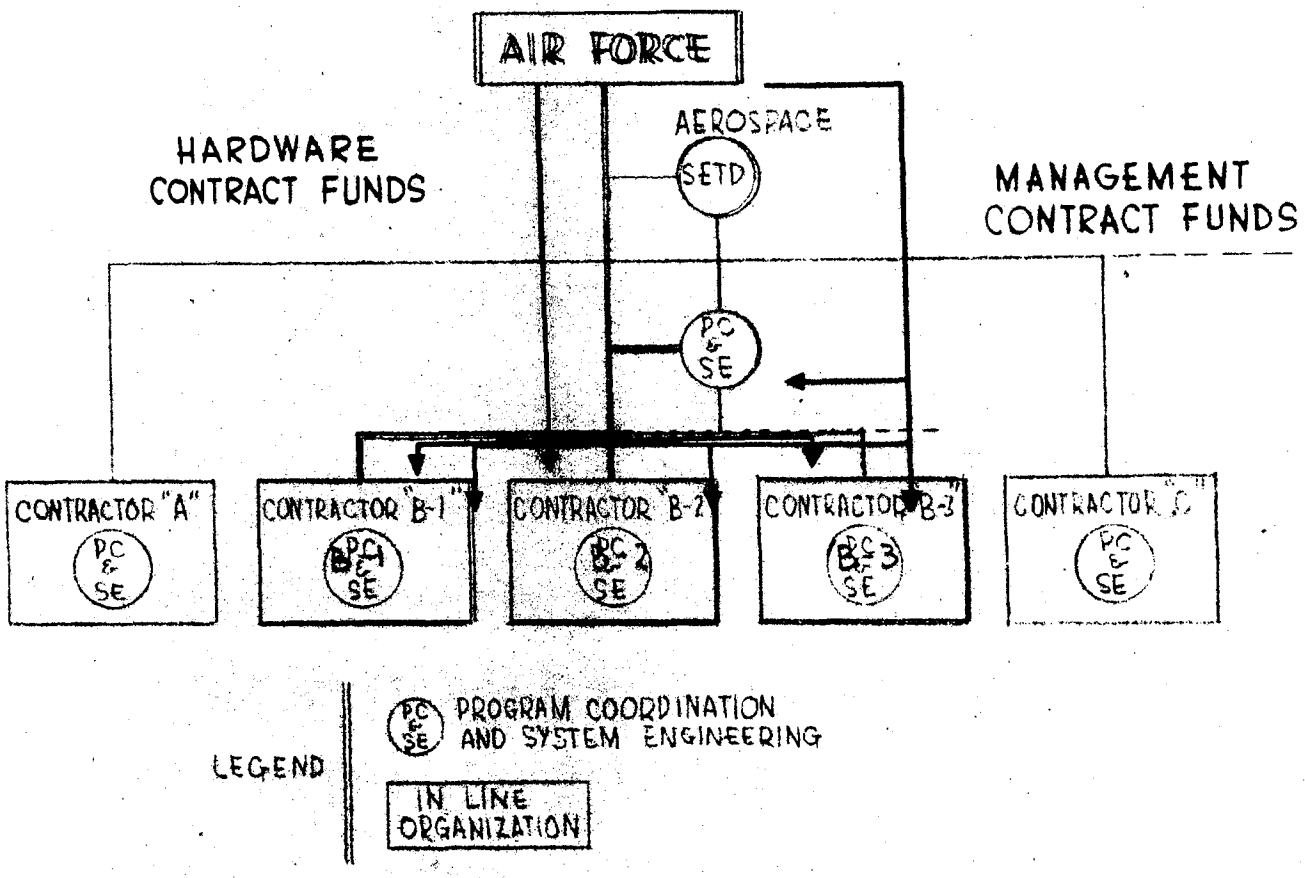

FIGURE 2

FIGURE 3

FIGURE 3A

JUNE 30 1965

MODIFIED ORGANIZATION

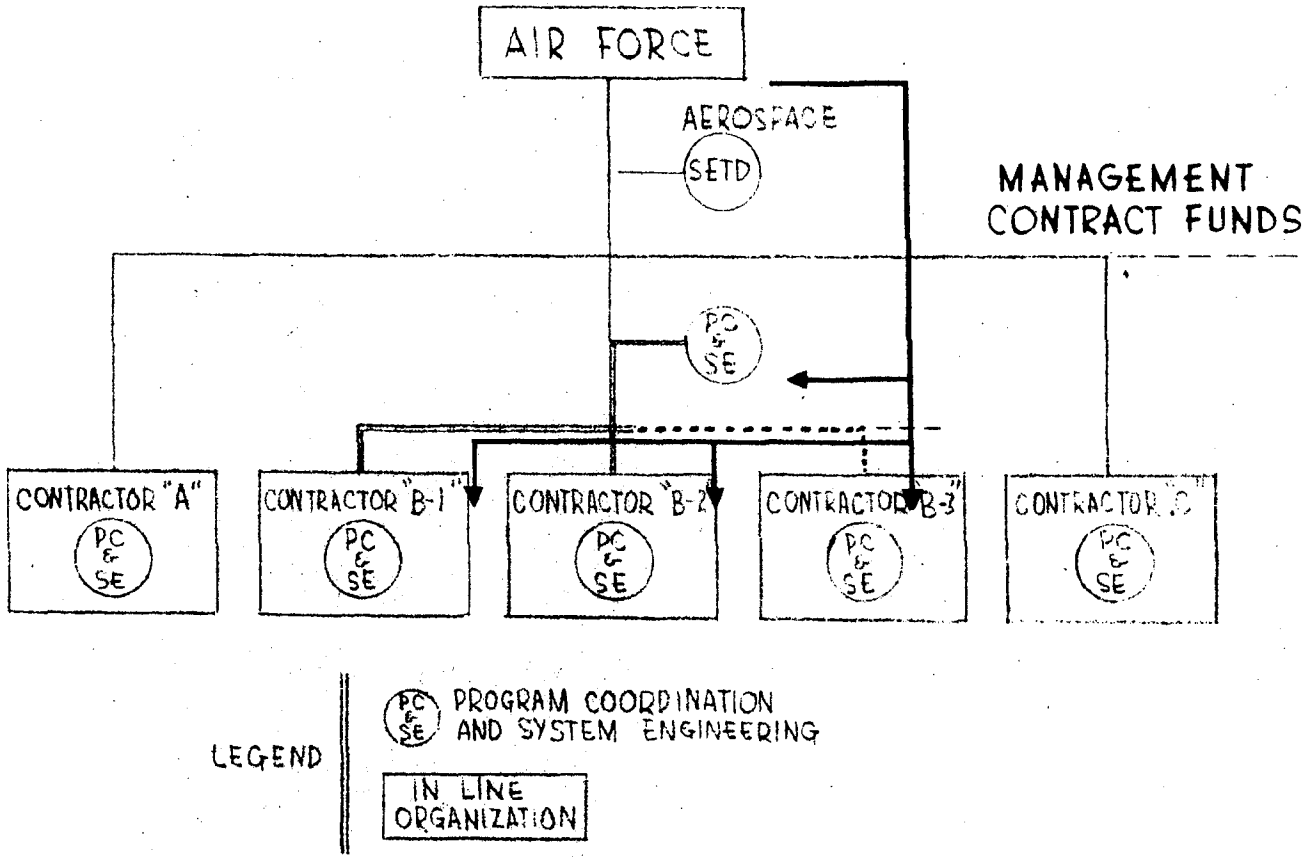

FIGURE 2

FIGURE 3A

ORGANIZATION CHART FOR PROGRAM COORDINATION AND SYSTEM ENGINEERING

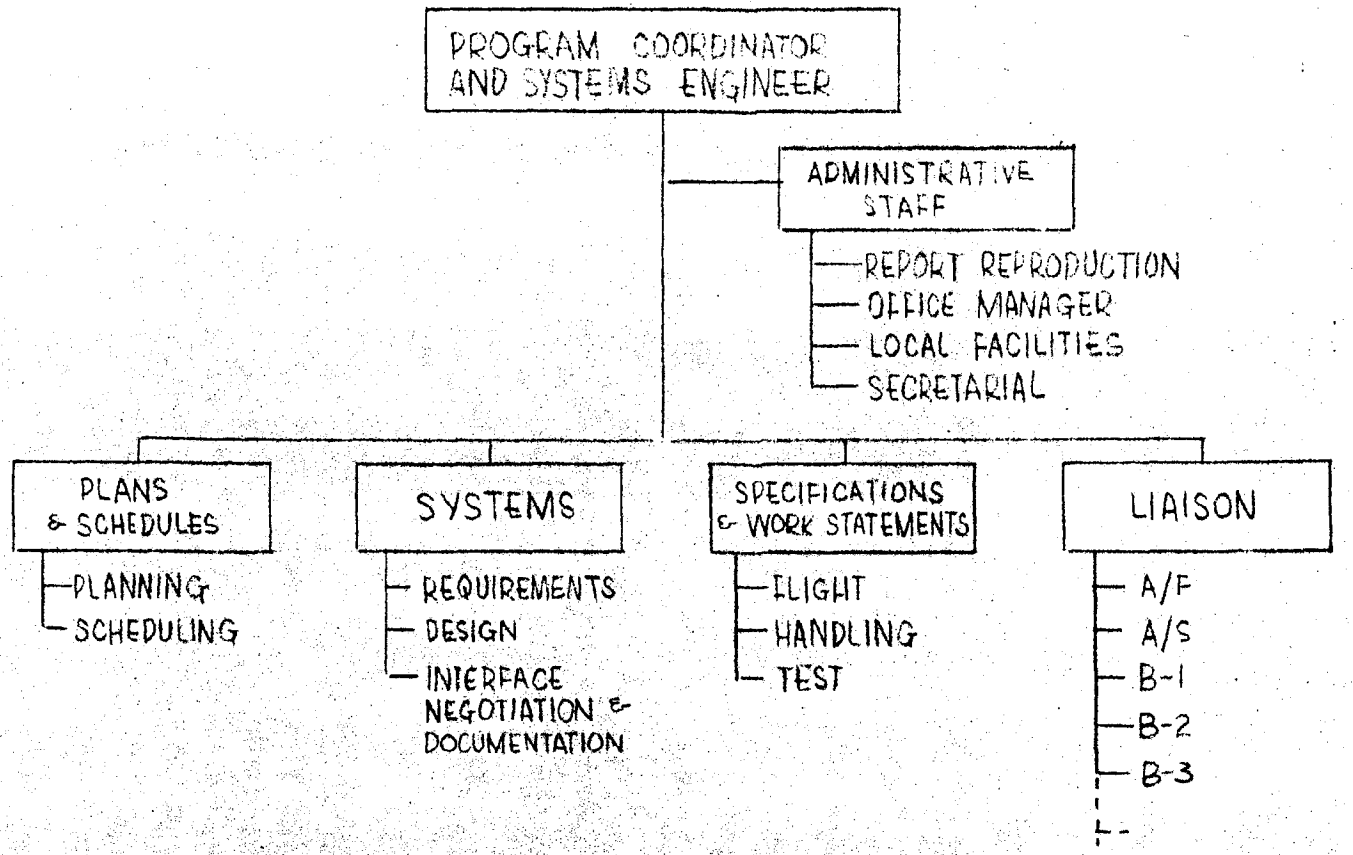

FIGURE 4

JUNE 30 1965

FLOW DIAGRAM FOR PROGRAM COORDINATION AND SYSTEM ENGINEERING

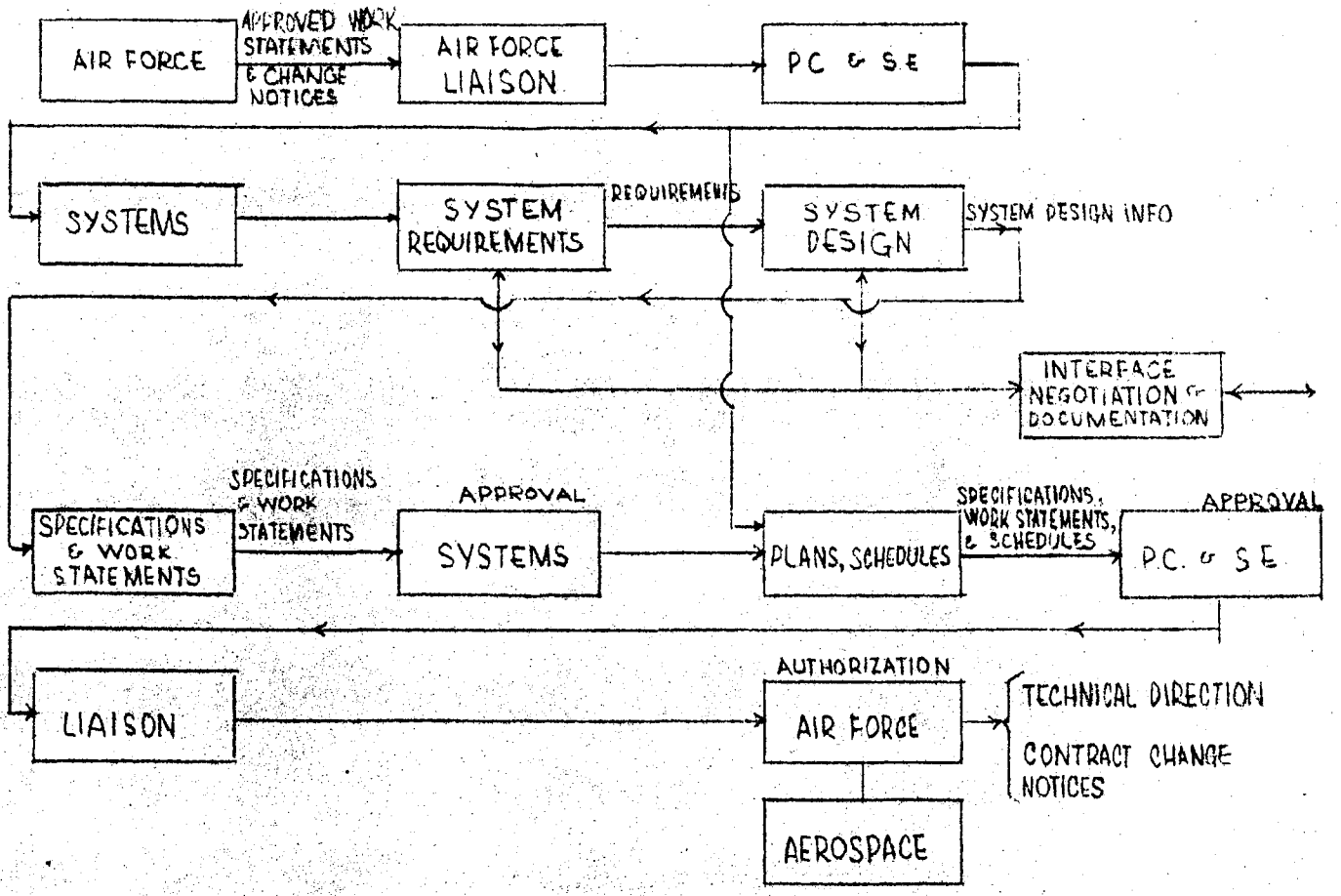

FIGURE 5

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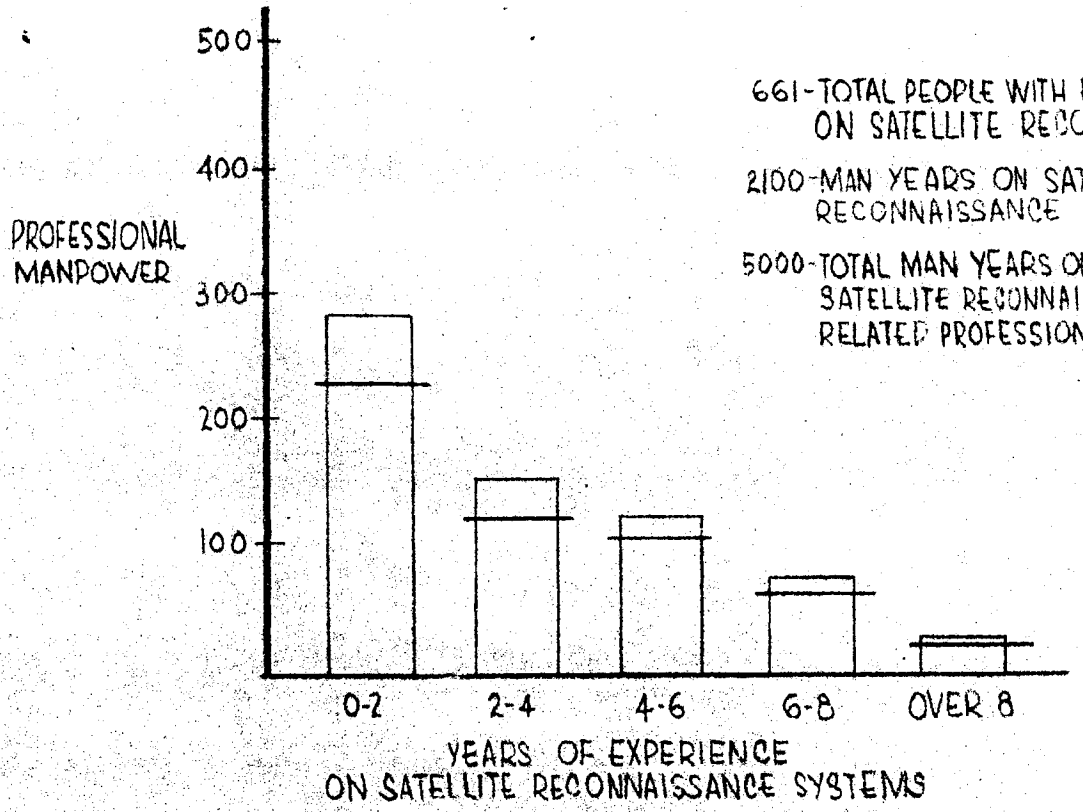
JUNE 30 1965

EK PROFESSIONAL MANPOWER

YEARS OF EXPERIENCE



661-TOTAL PEOPLE WITH EXPERIENCE ON SATELLITE RECONNAISSANCE

2100-MAN YEARS ON SATELLITE RECONNAISSANCE

5000-TOTAL MAN YEARS OF EXPERIENCE ON SATELLITE RECONNAISSANCE AND OTHER RELATED PROFESSIONAL EXPERIENCE

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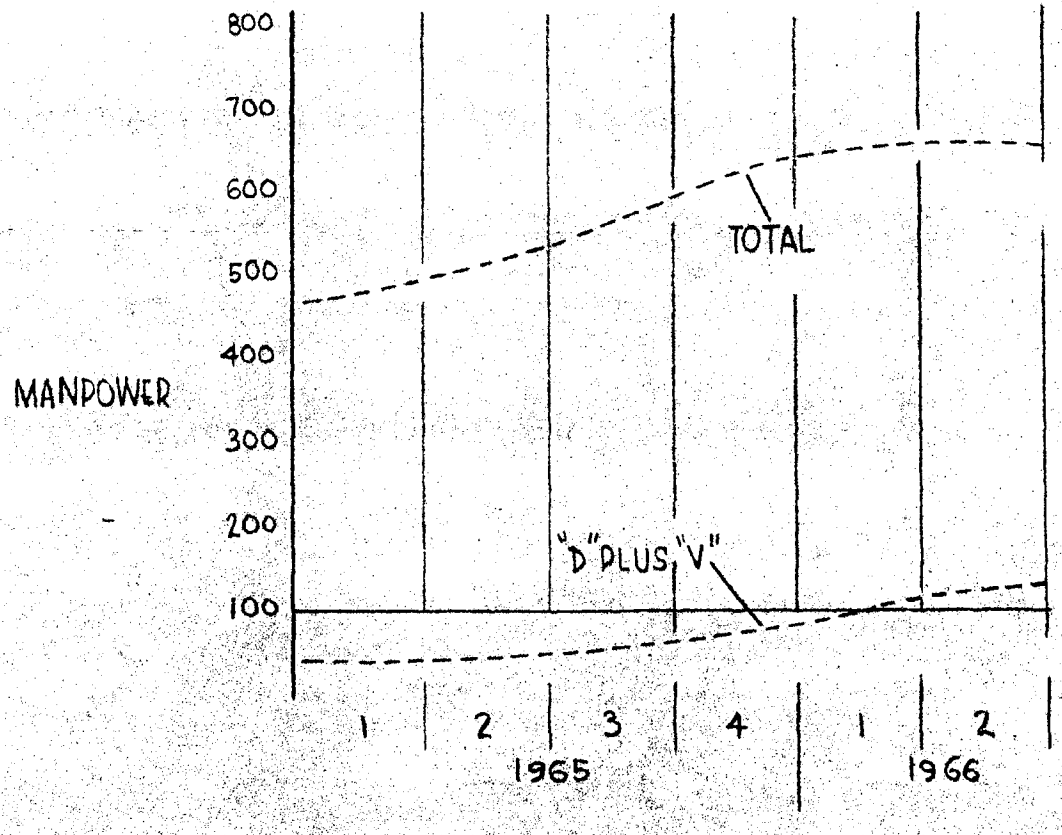
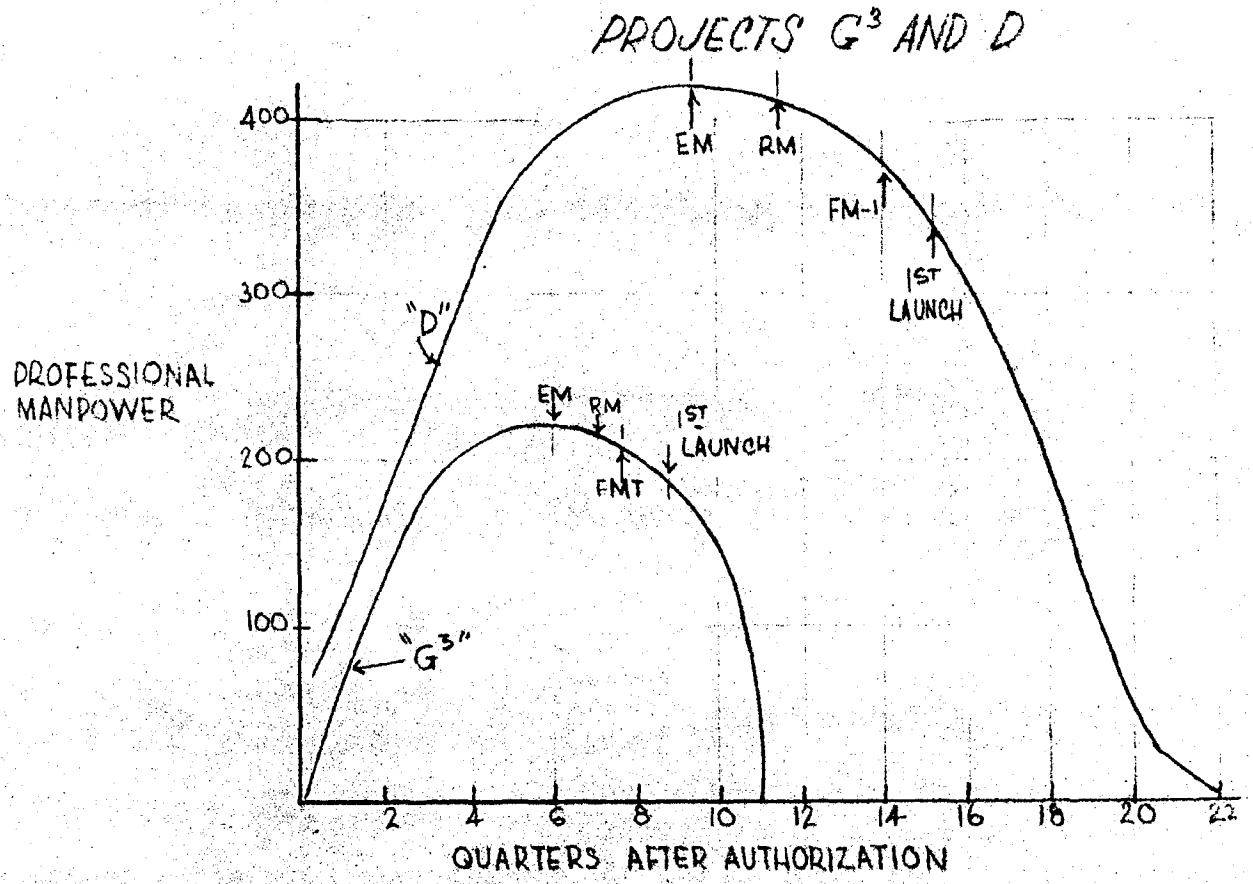
PROFESSIONAL MANPOWER



JUNE 30 1965

PROFESSIONAL MANPOWER ESTIMATE



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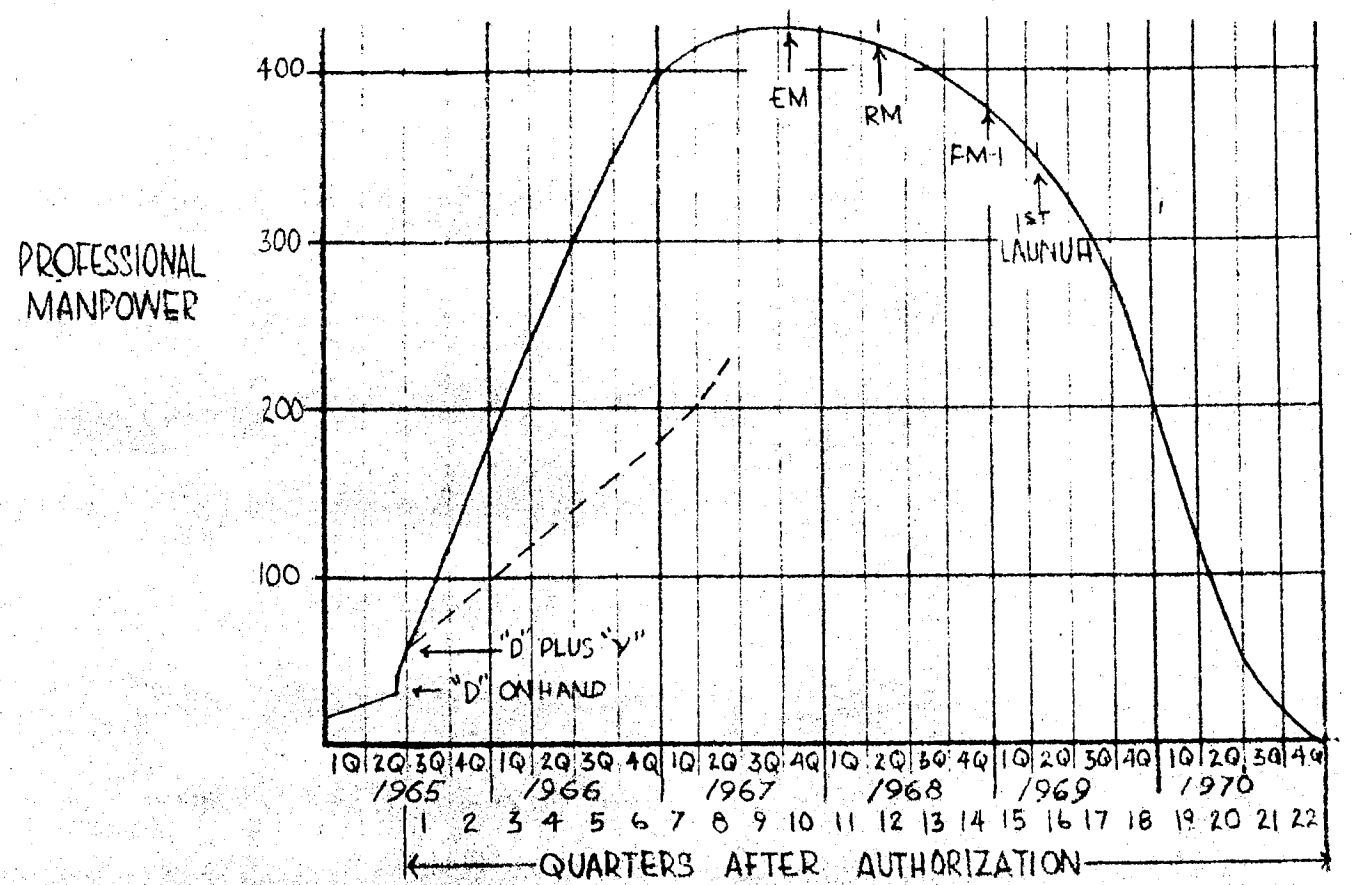
PROFESSIONAL MANPOWER

PROJECT D



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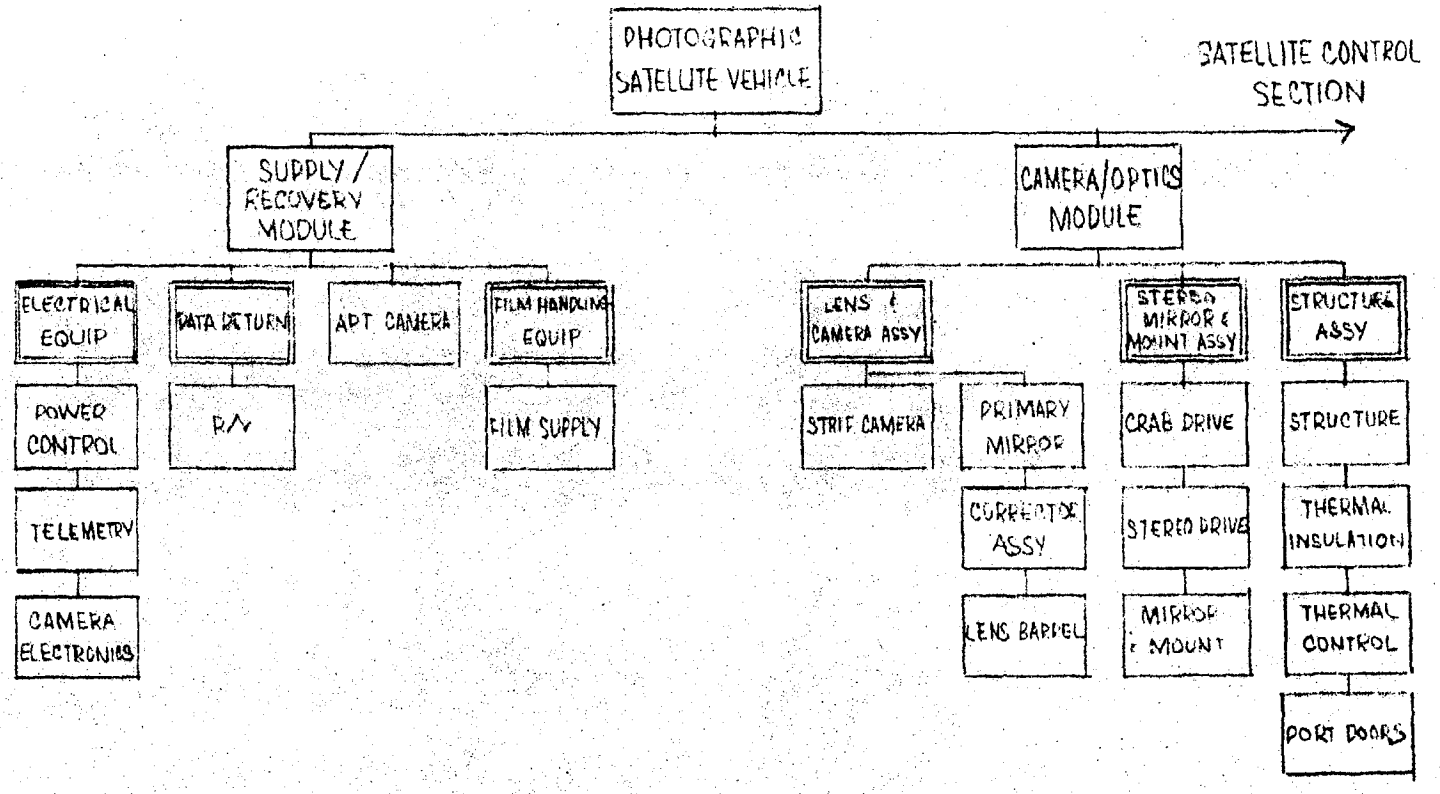
G³ AIRBORNE COMPONENTS



JUNE 30 1965

ON-ORBIT FUNCTIONS

	SUSTENANCE	COMMUNICATION DATA RETURN	TARGET RECONNAISSANCE	OPERATIONAL ADJUSTMENT
MOL & DORIAN	LIFE SUPPORT POWER ATTITUDE CONTROL ORBIT ADJUST	TELEMETRY COMMANDS VOICE FILM READOUT DATA CAPSULE RECOV GEMINI RECOVERY	BRIEFING ACQUISITION TRACKING VISUAL INSPECT PHOTOGRAPHY PROCESSING FILM INSPECTION	EXTENSION ALIGNMENT FOCUS CONTROL EXPOSURE CONTROL THERMAL CONTROL FILM HANDLING TEST & REPAIR
G^3	POWER ATTITUDE CONTROL ORBIT ADJUST	TELEMETRY COMMANDS DATA CAPSULE RECOV.	TARGET AIMING IMC PHOTOGRAPHY	FOCUS CONTROL EXPOSURE CONTROL THERMAL CONTROL FILM HANDLING

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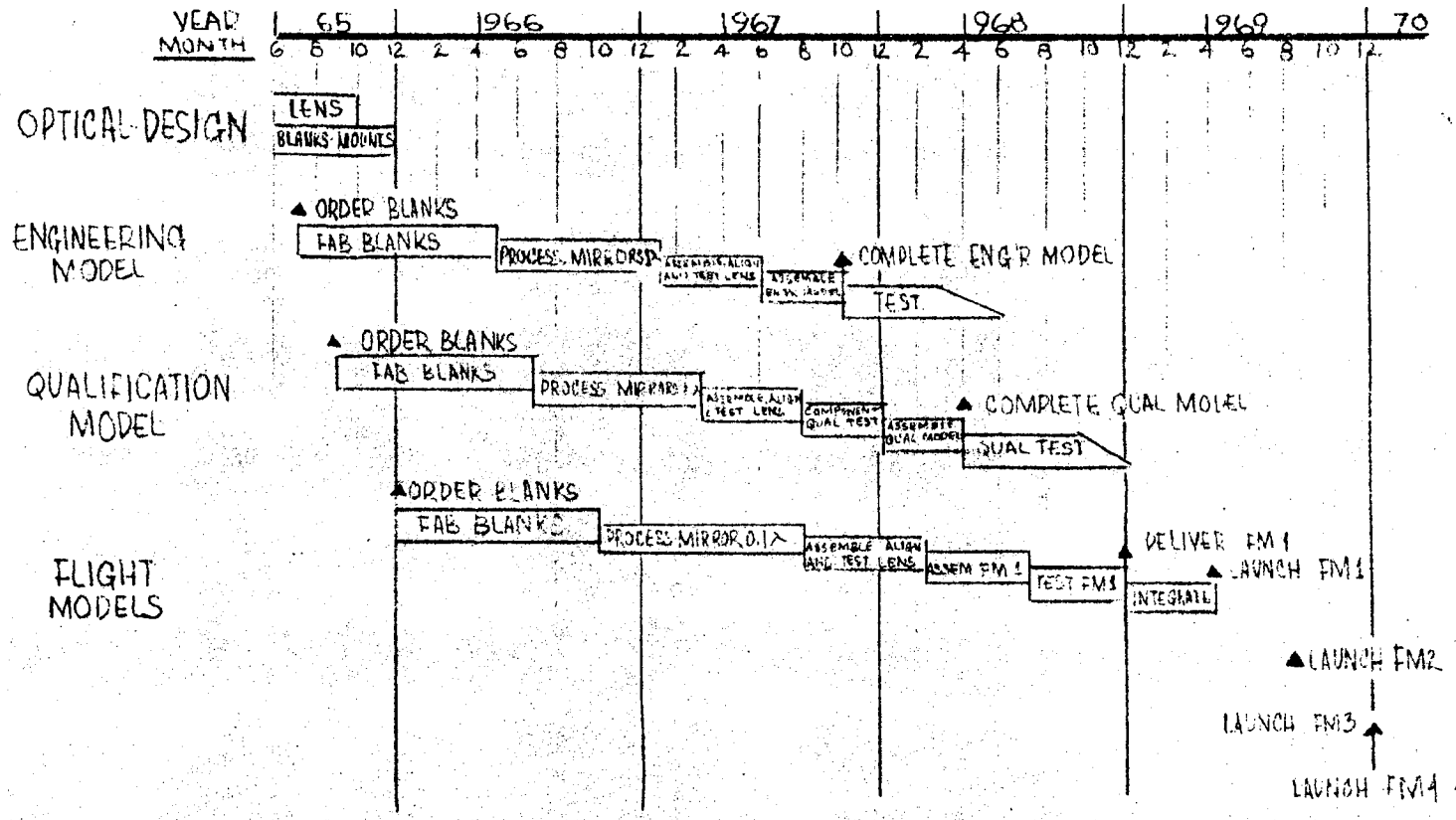
CRITICAL PATH SCHEDULE

FOR CAMERA OPTICS



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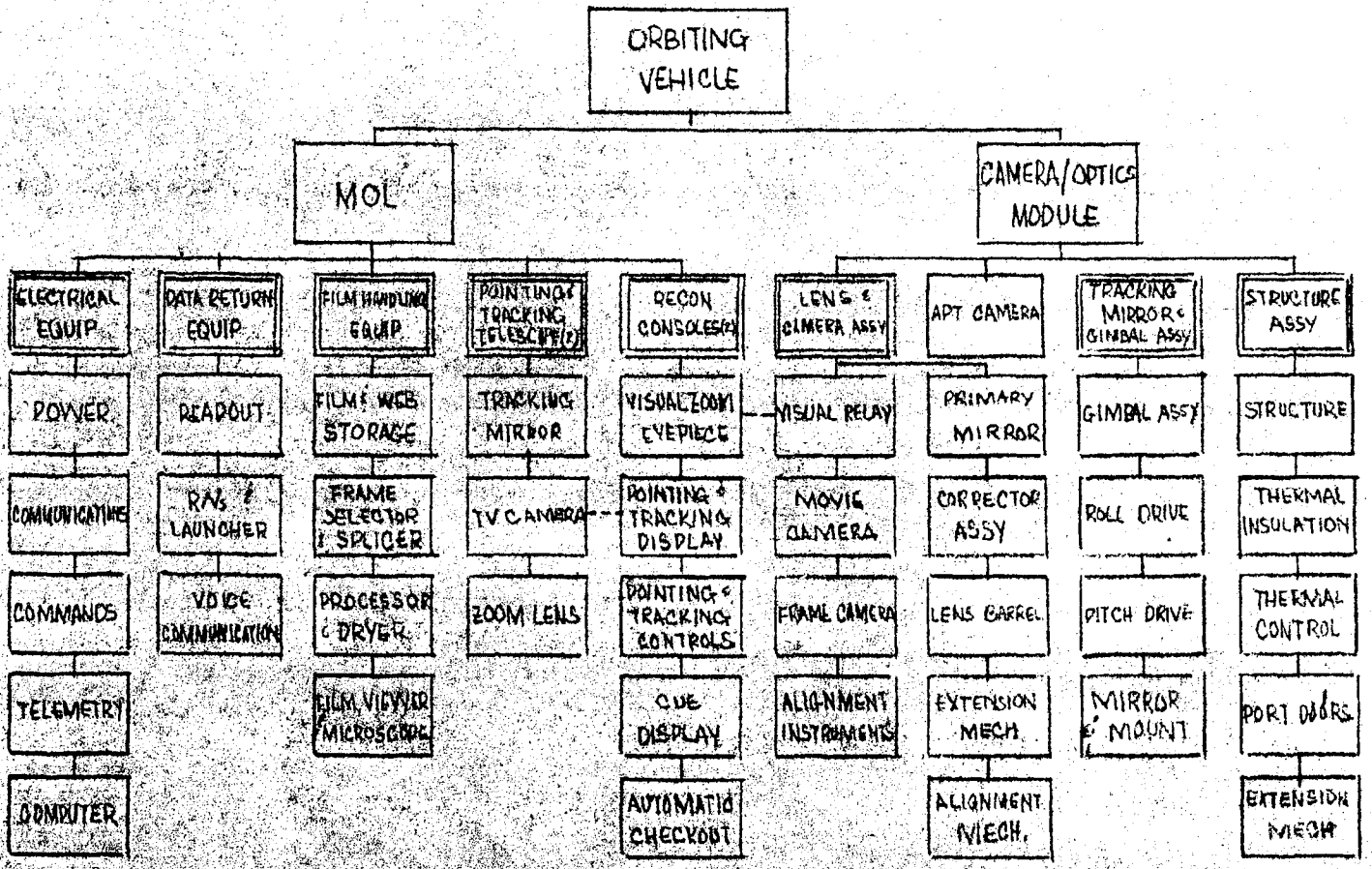
JUNE 30 1965

Dorian AIRBORNE COMPONENTS



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JUNE 30 1965

CONCLUSION

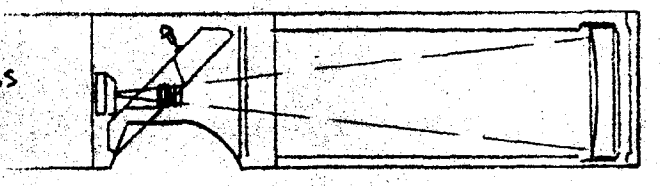
1 OUR ESTIMATES OF THE MANPOWER REQUIRED ASSUME A MATURE ORGANIZATION, FULLY EXPERIENCED IN SPACE RECONNAISSANCE

2 ALTHOUGH EXTENSIVE CAPACITY HAS BEEN ACHIEVED WE ARE UNABLE TO ACCOMPLISH OUR CONCEPT OF THE PROGRAM IN THE DESIRED TIME INTERVAL

JUNE 30 1965

CAMERA/OPTICS MODULE COMPARISON

G

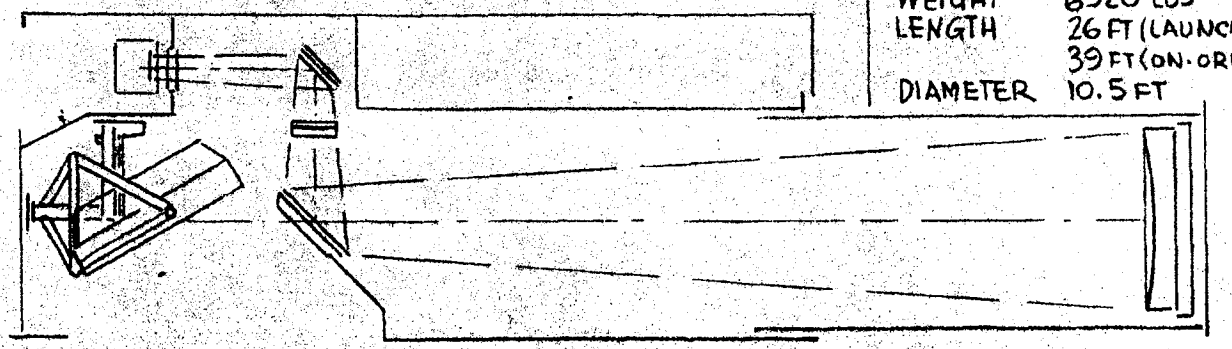


G3

	160 INCH	EF
	43.5 INCH D	f/3.68
	WEIGHT	2234 LBS
	LENGTH	17.5 FT
	DIAMETER	5 FT

DORIAN

[redacted]		EF
	60 INCH D	f/8.3
	WEIGHT	6520 LBS
	LENGTH	26 FT (LAUNCH)
		39 FT (ON-ORBIT)
	DIAMETER	10.5 FT



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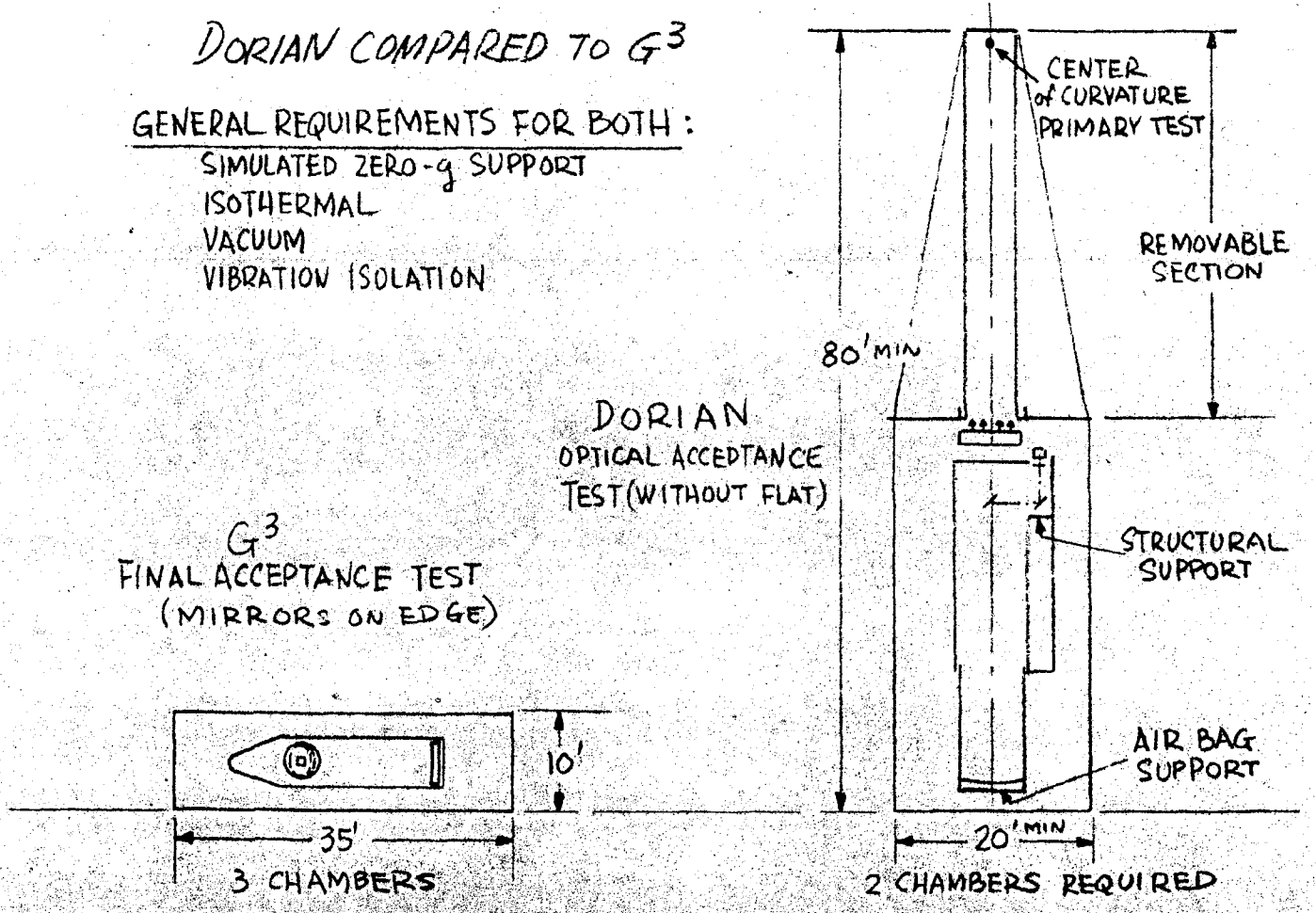
JUNE 30 1965

SAMPLE OF OPTICAL TEST FACILITY

DORIAN COMPARED TO G^3

GENERAL REQUIREMENTS FOR BOTH:

- SIMULATED ZERO-g SUPPORT
- ISOTHERMAL
- VACUUM
- VIBRATION ISOLATION



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OVERALL DELIVERY SCHEDULE
(WITH LAUNCH SCHEDULE INDICATED BY △)

CY 65 | CY 66 | CY 67 | CY 68 | CY 69 | CY 70

S O N D | J F M A M J J A S O N D | J F M A M J J A S O N D | J F M A M J J A S O N D | J F M A M J J A S O N D | J F M A

PROGRAM

G — 24 25/26 27 28 29 30 31/32 33 34 35 36 37 38 39 40 41 42 — DELIVERY — LAUNCH

G' — TM / EM — FMT — RM — 1 2 3 4 5 6 — Deliveries Continue → — LAUNCH

U — TM DS — EM — RM — FMT — 1 2 3 4 5 — DELIVERY — LAUNCH

LOP — DS — EM / RM — TM FMT — 1 2/3 4 5 — Delivery — LAUNCH

S-2 — TM DS — EM — RM FMT — 1 2 3 4 5 6 — Deliveries Continue 6/YR → — LAUNCH

D — DS — TM — EM / TS — FMT — RM — 1 2 3 — 6 → — LAUNCH

~ LEGEND ~

DS - Dynamic Simulator
TM - Thermal Model
EM - Engineering Model
RM - Reliability Model
FMT - Flight Model Test
TS - Trainer Simulator
FLIGHT MODELS - 1 & 2 etc.

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EKC MANPOWER REQUIREMENTS SUMMARY

	On Hand & Hired	CY 1965		CY 1966			
		3 Qtr	4 Qtr	1 Qtr	2 Qtr	3 Qtr	4 Qtr
PROJECT	347	551	619	668	678	653	612
QUALITY CONTROL	200	223	253	261	282	259	244
TECHNICAL OPERATIONS	113	134	159	159	175	190	195
OPTICAL OPERATIONS	24	38	45	54	55	62	62
FIELD OPERATIONS	33	39	62	61	59	57	55
SUB-CONTR LIAISON	13	15	21	30	42	50	48
ENGR SERVICES	192	297	344	385	411	385	384
MATERIEL OPERATIONS	127	149	178	193	215	204	206
PLANNING & SCHEDULING	34	47	49	55	52	58	55
SERVICES	276	346	379	384	401	401	411
PRODUCTION	168	249	245	259	272	269	289
ORIGINAL TOTAL	1527	2088	2354	2509	2642	2588	2561
ADJUSTMENT FOR RECENT REDUCTION IN S-2 WORKLOAD (PAR 5c OF REPORT)	~~32~~	-59	-80	-91	-92	-82	-67
REVISED TOTAL	1495	2029	2274	2418	2553	2510	2498

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(GAMBIT)

PROJECT R MANPOWER REQUIREMENT

DATE 7-1-65

GROUP	HIRED NOT AT WORK	ON HAND	TOTAL ON HAND + HIRED	1965 3Q	1965 4Q	1966 1Q	1966 2Q	1966 3Q	1966 4Q	REMARKS
PROJECT										
SUPERVISION		3	3	3	3	3	3	1	1	
ENGINEERS		14	14	16	16	16	16	8	8	
ADMINISTRATION		3	3	3	3	3	3	1	1	
SECURITY & DOC CONTROL		2	2	2	2	2	2	1	1	
QUALITY CONTROL										
SUPERVISION		1	1	1	1	1	1	1	1	
ENGINEERS		12	12	12	12	12	12	6	6	
TECHNICIANS		17	17	17	17	17	17	8	8	
INSPECTORS		17	17	17	17	17	17	8	8	
TECHNICAL OPERATIONS										
RELIABILITY ENGRS		2	2	2	2	2	2	1	1	
MATH SCIENCE ENGRS		2	2	2	2	2	2	1	1	
PHOTO SCIENCE ENGRS		2	2	2	2	2	2	1	1	
SPECS & STDS ENGRS										
PHOTO SCIENCE TECHS		1	1	1	1	1	1	1	1	
MATH SCIENCE TECHS		1	1	1	1	1	1	1	1	
SPECS & STDS TECHS										
OPTICAL OPERATIONS										
ENGINEERS		1	1	1	1	1	1	1	1	
TECHNICIANS										
FIELD OPERATIONS										
ENGINEERS		8	8	8	8	8	8	4	4	
TECHNICIANS		12	12	12	12	12	12	6	6	
ROCHESTER REPS		1	1	1	1	1	1	1	1	
CLERICAL		3	3	3	3	3	3	2	2	
S/C LIAISON										
ENGINEERS										
COMPUTER OPERATS.										
ENGINEERS										
TECHNICIANS										
CLERICAL										
ENG'R'G SERVICES										
SUPERVISION		1	1	1	1	1	1	1	1	
DRAFTSMAN		3	3	3	3	3	3	2	2	
TECHNICIANS	1	7	8	7	7	7	7	3	3	
DWG DIST & LIAISON		1	1	1	1	1	1			
LIBRARIAN										
MATERIAL OPERATIONS										
SUPERVISION		4	4	4	4	4	4	2	2	
PRODUCT CONTROL		12	12	14	14	14	14	7	7	
STOCK CONTROL		18	18	18	18	18	18	9	9	
TOOL CRIB & STOCK										
PLANNING & SCHEDULING										
SUPERVISION		1	1	1	1	1	1	1	1	
SCHEDULERS		2	2	2	2	2	2	1	1	
BRIEFING AIDS		1	1	1	1	1	1	1	1	
PHOTO SERVICES		1	1	1	1	1	1	1	1	
SERVICES										
FINANCIAL		4	4	4	4	4	4	2	2	
CLERICAL		37	37	38	38	38	38	19	19	
S/C PLACEMENT		1	1	1	1	1	1	1	1	
REPORTS & REPROD		1	1	1	1	1	1	1	1	
CONTRACT ADMIN		1	1	1	1	1	1	1	1	
REPRODUCTION		5	5	5	5	5	5	2	2	
PRODUCTION										
SUPERVISION		4	4	4	4	4	4	2	2	
PROCESS ENGINEERS		5	5	5	5	5	5	3	3	
HANDS										
ASSEMBLERS & TECHS		25	25	25	25	25	25	12	12	
FABRICATORS										
CLERICAL										
TOTAL	1	237	238	241	241	241	241	124	124	

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PROJECT K (6-3) MANPOWER REQUIREMENT DATE 7-19-65

GROUP	HIRED NOT AT WORK	ON HAND	TOTAL ON HAND + HIRED	1965 3Q	1965 4Q	1966 1Q	1966 2Q	1966 3Q	1966 4Q	REMARKS
PROJECT										
SUPERVISION		8	8	8	8	5	5	5	5	BYE-40252-65
ENGINEERS	1	114	115	114	103	94	94	84	74	
ADMINISTRATION		5	5	5	5	5	5	5	5	SECRET
SECURITY & DOC CONTROL		2	2	2	2	2	2	2	2	
QUALITY CONTROL										
SUPERVISION		4	4	4	4	4	4	4	4	
ENGINEERS	1	28	29	28	28	28	28	28	28	
TECHNICIANS		12	12	14	15	15	15	15	15	
INSPECTORS		22	22	23	25	22	22	22	22	
TECHNICAL OPERATIONS										
RELIABILITY ENGRS	3	15	18	15	15	15	15	10	10	
MATH SCIENCE ENGRS	1	10	11	10	10	10	10	10	10	
PHOTO SCIENCE ENGRS		3	3	3	3	3	3	3	3	
SPECS & STDS ENGRS		5	5	5	5	5	5	5	5	
PHOTO SCIENCE TECHS		3	3	3	3	3	3	3	3	
MATH SCIENCE TECHS		4	4	4	4	4	4	4	4	
SPECS & STDS TECHS		2	2	2	2	2	2	2	2	
OPTICAL OPERATIONS										
ENGINEERS		13	13	10	6	6	6	6	6	
TECHNICIANS										
FIELD OPERATIONS										
ENGINEERS				4	14	14	10	10	10	
TECHNICIANS				1	4	4	4	4	4	
ROCHESTER REPS			1	1	1	1	1	1	1	
CLERICAL					3	3	3	3	3	
S/C LIAISON										
ENGINEERS	1	7	8	7	7	7	7	7	7	
COMPUTER OPERATS.										
ENGINEERS										
TECHNICIANS										
CLERICAL										
ENG'R'G SERVICES										
SUPERVISION		7	7	7	7	7	7	7	7	
DRAFTSMAN		46	46	42	35	30	30	25	25	
TECHNICIANS	1	39	40	36	38	38	38	38	38	
DWG DIST & LIAISON		4	4	4	4	3	3	3	3	
LIBRARIAN										
MATERIAL OPERATIONS										
SUPERVISION		4	4	4	4	4	4	4	4	
PRODUCT CONTROL		15	15	17	18	18	18	18	18	
STOCK CONTROL		26	26	31	32	30	30	30	30	
TOOL CRIB & STOCK										
PLANNING & SCHEDULING										
SUPERVISION		2	2	2	2	2	2	2	2	
SCHEDULERS		5	5	5	5	5	5	5	5	
BRIEFING AIDS				1	1	1	1	1	1	
PHOTO SERVICES				1	1	1	1	1	1	
SERVICES										
FINANCIAL		7	7	7	7	7	7	7	7	
CLERICAL		75	75	77	74	74	74	74	64	
S/C PLACEMENT				4	4	4	4	4	4	
REPORTS & REPROD				4	4	4	4	4	4	
CONTRACT ADMIN		1	1	1	1	1	1	1	1	
REPRODUCTION		12	12	12	12	12	12	12	12	
PRODUCTION										
SUPERVISION		4	4	8	7	7	7	7	7	SECRET
PROCESS ENGINEERS	1	16	17	14	14	14	14	14	14	
HANDS										
ASSEMBLERS & TECHS		30	30	62	46	46	46	46	46	
FABRICATORS										
CLERICAL										Handle via BYEMAN Control System
							556	536	516	
TOTAL	9	550	559	602	583	560	[redacted]	[redacted]	[redacted]	

(LUNAR ORBITER)

PROJECT L MANPOWER REQUIREMENT

DATE 7-1-65

GROUP	HIRED NOT AT WORK	ON HAND	TOTAL ON HAND + HIRED	1965 3Q	1965 4Q	1966 1Q	1966 2Q	1966 3Q	1966 4Q	REMARKS
PROJECT										
SUPERVISION		4	4	3	2	2	1	1		
ENGINEERS		23	23	21	17	15	8	2		
ADMINISTRATION		7	7	7	7	6	1	1		
SECURITY & DOC CONTROL										
QUALITY CONTROL										
SUPERVISION		3	3	3	3	3	1	1		
ENGINEERS	1	26	27	25	24	14	6	1		
TECHNICIANS		13	13	13	13	9	4			
INSPECTORS		31	31	31	29	15	5			
TECHNICAL OPERATIONS										
RELIABILITY ENGRS		10	10	11	12	4	2	-		
MATH SCIENCE ENGRS										
PHOTO SCIENCE ENGRS		4	4	4	4	4	2	2		
SPECS & STDS ENGRS		1	1	1	1	1				
PHOTO SCIENCE TECHS		3	3	3	3	1	1	1		
MATH SCIENCE TECHS										
SPECS & STDS TECHS		1	1	1	1					
OPTICAL OPERATIONS										
ENGINEERS										
TECHNICIANS										
FIELD OPERATIONS										
ENGINEERS		4	4	4	7	5	2	2		
TECHNICIANS		1	1	1	3	3	2	2		
ROCHESTER REPS		1	1	1	1	1	1	1		
CLERICAL										
S/C LIAISON										
ENGINEERS		3	3	3	1	-	-	-		
COMPUTER OPERATS.										
ENGINEERS										
TECHNICIANS										
CLERICAL										
ENG'R'G SERVICES										
SUPERVISION		3	3	3	3	3	2	1		
DRAFTSMAN		8	8	6	5	5	4	1		
TECHNICIANS	2	21	23	34	24	16	10			
DWG DIST & LIAISON		1	1	1	1	1				
LIBRARIAN										
MATERIAL OPERATIONS										
SUPERVISION		4	4	4	2	1	1			
PRODUCT CONTROL		16	16	16	10	10	5			
STOCK CONTROL		10	10	10	10	10	5	-		
TOOL CRIB & STOCK										
PLANNING & SCHEDULING										
SUPERVISION		2	2	2	2	2	1			
SCHEDULERS		5	5	5	4	3	1			
BRIEFING AIDS		2	2	2	1	1	1			
PHOTO SERVICES		1	1	1	1	1	1			
SERVICES										
FINANCIAL		4	4	4	4	2	1			
CLERICAL		55	55	55	50	24	2			
S/C PLACEMENT		3	3	3	3	1				
REPORTS & REPROD		8	8	8	5	1				
CONTRACT ADMIN		1	1	1	1	1	1	1		
REPRODUCTION										
PRODUCTION										
SUPERVISION		6	6	6	4	2	1			
PROCESS ENGINEERS		9	9	6	5	3	1			
HANDS										
ASSEMBLERS & TECHS		46	46	50	35	20	3			
FABRICATORS										
CLERICAL										
TOTAL	3	340	343	349	298	190	~~77~~ 76	17		

BYE-40252-65

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Handle via BYEMAN Control System

PROJECT (DORIAN) P MANPOWER REQUIREMENT (ESTIMATED) DATE 7/19/65

GROUP	HIRED NOT AT WORK	ON HAND	TOTAL ON HAND + HIRED	1965 3Q	4Q	1966 1Q	2Q	3Q	4Q	REMARKS
PROJECT		20		165	200	250	275	305	315	
SUPERVISION										BYE 40252-65
ENGINEERS										
ADMINISTRATION										
SECURITY & DOC CONTROL										SECRET
QUALITY CONTROL		0		11	21	31	51	66	71	
SUPERVISION										
ENGINEERS										
TECHNICIANS										
INSPECTORS										
TECHNICAL OPERATIONS		8		24	34	45	65	95	105	
RELIABILITY ENGRS										
MATH SCIENCE ENGRS										
PHOTO SCIENCE ENGRS										
SPECS & STDS ENGRS										
PHOTO SCIENCE TECHS										
MATH SCIENCE TECHS										
SPECS & STDS TECHS										
OPTICAL OPERATIONS		1		10	12	17	22	30	32	
ENGINEERS										
TECHNICIANS										
FIELD OPERATIONS		1		2	2	2	7	14	17	
ENGINEERS										
TECHNICIANS										
ROCHESTER REPS										
CLERICAL										
S/C LIAISON				1	5	10	20	30	30	
ENGINEERS										
COMPUTER OPERATS.										
ENGINEERS										
TECHNICIANS										
CLERICAL										
ENG'R'G SERVICES		3		62	92	130	165	190	210	
SUPERVISION										
DRAFTSMAN										
TECHNICIANS										
DWG DIST & LIAISON										
LIBRARIAN										
MATERIAL OPERATIONS				10	30	40	65	85	90	
SUPERVISION										
PRODUCT CONTROL										
STOCK CONTROL										
TOOL CRIB & STOCK										
PLANNING & SCHEDULING				9	9	14	14	24	24	
SUPERVISION										
SCHEDULERS										
BRIEFING AIDS										
PHOTO SERVICES										
SERVICES		13		46	65	90	124	160	190	
FINANCIAL										
CLERICAL										
S/C PLACEMENT										
REPORTS & REPROD										
CONTRACT ADMIN										
REPRODUCTION										
PRODUCTION		4		20	25	31	62	81	101	
SUPERVISION										
PROCESS ENGINEERS										SECRET
HANDS										
ASSEMBLERS & TECHS										
FABRICATORS										
CLERICAL										Handle via BYEMAN
TOTAL		50		360	495	660	870	1080	1185	

(upward)

PROJECT Y MANPOWER REQUIREMENT 1965 1966 DATE 7-19-65

GROUP	HIRED NOT AT WORK	ON HAND	TOTAL ON HAND + HIRED	3Q	4Q	1Q	2Q	3Q	4Q	REMARKS
PROJECT										
SUPERVISION		4	4	4	4	4	4	4	4	
ENGINEERS	5	15	20	28	41	48	56	56	56	
ADMINISTRATION		0	0	1	2	2	2	2	2	
SECURITY & DOC CONTROL		1	1	1	2	2	2	2	2	
QUALITY CONTROL										
SUPERVISION		1	1	1	1	1	1	1	1	
ENGINEERS		2	2	2	3	6	9	9	9	
TECHNICIANS						1	3	3	3	
INSPECTORS		1	1	1	2	4	7	7	7	
TECHNICAL OPERATIONS										
RELIABILITY ENGRS		1	1	2	2	2	2	2	2	
MATH SCIENCE ENGRS		2	2	2	3	3	3	3	3	
PHOTO SCIENCE ENGRS		2	2	2	2	2	2	2	2	
SPECS & STDS ENGRS		1	1	1	3	3	3	3	3	
PHOTO SCIENCE TECHS		1	1	2	2	2	2	2	2	
MATH SCIENCE TECHS					1	1	2	2	2	
SPECS & STDS TECHS					1	1	2	2	2	
OPTICAL OPERATIONS										
ENGINEERS						2	2	2	2	
TECHNICIANS						1	1	1	1	
FIELD OPERATIONS										
ENGINEERS					1	1	1	1	1	
TECHNICIANS										
ROCHESTER REPS					1	1	1	1	1	
CLERICAL										
S/C LIAISON										
ENGINEERS		1	1	1	1	2	3	3	3	
COMPUTER OPERATS.										
ENGINEERS										
TECHNICIANS										
CLERICAL										
ENG'R'G SERVICES										
SUPERVISION		1	1	1	1	1	1	1	1	
DRAFTSMAN		4	4	5	5	5	6	6	6	
TECHNICIANS		1	1	4	12	13	13	13	13	
DWG DIST & LIAISON										
LIBRARIAN										
MATERIAL OPERATIONS										
SUPERVISION		1	1	1	2	2	2	2	2	
PRODUCT CONTROL		3	3	3	6	10	16	16	16	
STOCK CONTROL					1	1	2	2	2	
TOOL CRIB & STOCK										
PLANNING & SCHEDULING										
SUPERVISION		1	1	1	1	1	1	1	1	
SCHEDULERS		1	1	1	1	2	2	3	3	
BRIEFING AIDS					1	1	1	1	1	
PHOTO SERVICES					1	1	1	1	1	
SERVICES										
FINANCIAL		1	1	1	1	2	2	2	2	
CLERICAL		8	8	8	14	17	20	20	20	
S/C PLACEMENT		1	1	1	1	1	1	1	1	
REPORTS & REPROD					1	1	1	1	1	
CONTRACT ADMIN		1	1	1	1	1	1	1	1	
REPRODUCTION		2	2	2	2	5	10	10	10	
PRODUCTION										
SUPERVISION		1	1	1	1	2	3	3	3	
PROCESS ENGINEERS		2	2	2	3	5	7	7	7	
HANDS										
ASSEMBLERS & TECHS		4	4	4	6	15	15	15	15	
FABRICATORS										
CLERICAL										
TOTAL	5	64	69	84	133	175	213	214	214	

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Handle via BYEMAN

(VALLEY)

PROJECT T MANPOWER REQUIREMENT DATE 7-19-65

GROUP	HIRED NOT AT WORK	ON HAND	TOTAL ON HAND + HIRED	1965 3Q	4Q	1966 1Q	2Q	3Q	4Q	REMARKS
PROJECT										
SUPERVISION		1	1	1	2	2	2	2	2	
ENGINEERS		12	12	12	14	18	18	18	18	
ADMINISTRATION		2	2	2	2	2	2	2	2	
SECURITY & DOC CONTROL		2	2	2	2	2	2	2	2	
QUALITY CONTROL										
SUPERVISION										
ENGINEERS										
TECHNICIANS										
INSPECTORS										
TECHNICAL OPERATIONS										
RELIABILITY ENGRS										
MATH SCIENCE ENGRS		4	4	4	4	4	4	4	4	
PHOTO SCIENCE ENGRS		1	1	1	1	1	1	1	1	
SPECS & STDS ENGRS										
PHOTO SCIENCE TECHS		2	2	2	2	2	2	2	2	
MATH SCIENCE TECHS										
SPECS & STDS TECHS										
OPTICAL OPERATIONS										
ENGINEERS										
TECHNICIANS										
FIELD OPERATIONS										
ENGINEERS										
TECHNICIANS										
ROCHESTER REPS										
CLERICAL										
S/C LIAISON										
ENGINEERS										
COMPUTER OPERATS.										
ENGINEERS										
TECHNICIANS										
CLERICAL										
ENG'R'G SERVICES										
SUPERVISION		1	1	1	1	1	1	1	1	
DRAFTSMAN		4	4	4	7	7	7	7	7	
TECHNICIANS		4	4	11	13	13	13	13	13	
DWG DIST & LIAISON										
LIBRARIAN										
MATERIAL OPERATIONS										
SUPERVISION										
PRODUCT CONTROL		1	1	1	1	1	1	1	1	
STOCK CONTROL		2	2	2	2	2	2	2	2	
TOOL CRIB & STOCK										
PLANNING & SCHEDULING										
SUPERVISION		1	1	1	1	1	1	1	1	
SCHEDULERS		1	1	1	1	1	1	1	1	
BRIEFING AIDS		1	1	1	1	1	1	1	1	
PHOTO SERVICES										
SERVICES										
FINANCIAL		2	2	2	2	2	2	2	2	
CLERICAL		7	7	7	7	7	7	7	7	
S/C PLACEMENT										
REPORTS & REPROD		1	1	1	1	1	1	1	1	
CONTRACT ADMIN										
REPRODUCTION		1	1	1	1	1	1	1	1	
PRODUCTION										
SUPERVISION		1	1	1	1	1	1	1	1	
PROCESS ENGINEERS		1	1	1	1	1	1	1	1	
HANDS										
ASSEMBLERS & TECHS		2	2	2	2	2	2	2	2	
FABRICATORS										
CLERICAL										
TOTAL		54	54	61	69	73	73	73	73	

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PROJECT S-2 MANPOWER REQUIREMENT Date: 7-30-65

The figures on the following page represent EKC's estimate as of 19 July, based on the original launch schedule and the original EKC work statement.

Between 19 and 30 July, changes in both the launch schedule and work statement (see par 5c, of report) have reduced EKC's manpower requirements. The Committee assessed this reduction at approximately 15%.

The EKC S-2 manpower requirements used by the Committee are therefore the following totals instead of the totals shown on the next page:

1965		1966			
3 Q	4 Q	1 Q	2 Q	3 Q	4 Q
332	455	519	521	462	382

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PROJECT S (X2) MANPOWER REQUIREMENT DATE 7-19-65

GROUP	HIRED NOT AT WORK	ON HAND	TOTAL ON HAND + HIRED	1965 3Q	4Q	1966 1Q	2Q	3Q	4Q	REMARKS
PROJECT										
SUPERVISION		6	6	6	6	6	6	6	6	
ENGINEERS	9	79	88	138	169	172	162	136	99	
ADMINISTRATION		2	2	3	3	3	3	3	3	
SECURITY & DOC CONTROL		3	3	4	4	4	4	4	4	
QUALITY CONTROL										
SUPERVISION		1	1	2	3	3	4	4	3	
ENGINEERS	2	4	6	10	17	25	31	31	25	
TECHNICIANS				2	3	8	14	14	8	
INSPECTORS		1	1	6	15	25	30	30	25	
TECHNICAL OPERATIONS										
RELIABILITY ENGRS	1	4	5	10	18	18	18	15	15	
MATH SCIENCE ENGRS	1	6	7	7	7	7	7	6	5	
PHOTO SCIENCE ENGRS		1	1	1	1	1	1	1	1	
SPECS & STDS ENGRS		1	1	2	3	3	2	2	1	
PHOTO SCIENCE TECHS		1	1	1	1	1	1	1	1	
MATH SCIENCE TECHS		1	1	1	1	1	1	1	1	
SPECS & STDS TECHS		2	2	2	2	2	2	1	1	
OPTICAL OPERATIONS										
ENGINEERS		1	1	3	4	5	5	4	4	
TECHNICIANS FAB		8	8	14	22	22	18	18	16	
FIELD OPERATIONS										
ENGINEERS						1	2	4	4	
TECHNICIANS										
ROCHESTER REPS		1	1	1	1	1	1	1	1	
CLERICAL										
S/C LIAISON										
ENGINEERS		1	1	3	7	12	12	10	8	
COMPUTER OPERATS										
ENGINEERS										
TECHNICIANS										
CLERICAL										
ENG'R'G SERVICES										
SUPERVISION		1	1	2	4	4	4	3	2	
DRAFTSMAN		12	12	37	50	55	55	40	30	
TECHNICIANS		10	10	19	24	34	34	25	18	
DWG DIST & LIAISON		6	6	6	6	6	6	5	4	
LIBRARIAN										
MATERIAL OPERATIONS										
SUPERVISION		4	4	4	4	4	4	4	4	
PRODUCT CONTROL	1	4	5	7	14	17	17	15	13	
STOCK CONTROL		2	2	3	6	7	7	7	6	
TOOL CRIB & STOCK										
PLANNING & SCHEDULING										
SUPERVISION		1	1	2	2	2	2	2	1	
SCHEDULERS		3	3	4	6	7	7	7	5	
BRIEFING AIDS		2	2	2	2	2	2	2	2	
PHOTO SERVICES		1	1	1	1	1	1	1	1	
SERVICES										
FINANCIAL		4	4	5	5	5	5	4	4	
CLERICAL		14	14	34	49	55	55	49	42	
S/C PLACEMENT		2	2	3	3	3	3	3	3	
~~REPORTS & REPROD~~		2	2	6	9	10	10	8	6	
CONTRACT ADMIN		1	1	1	1	1	1	1	1	
REPRODUCTION		1	1	1	1	1	1	1	1	
PRODUCTION										
SUPERVISION		1	1	4	6	6	6	6	6	
PROCESS ENGINEERS		3	3	14	15	15	14	14	14	
HANDS										
ASSEMBLERS & ~~TECHS~~		3	3	20	40	55	55	55	55	
FABRICATORS										
CLERICAL										
TOTAL	14	200	214	391	535	610	613	544	449	

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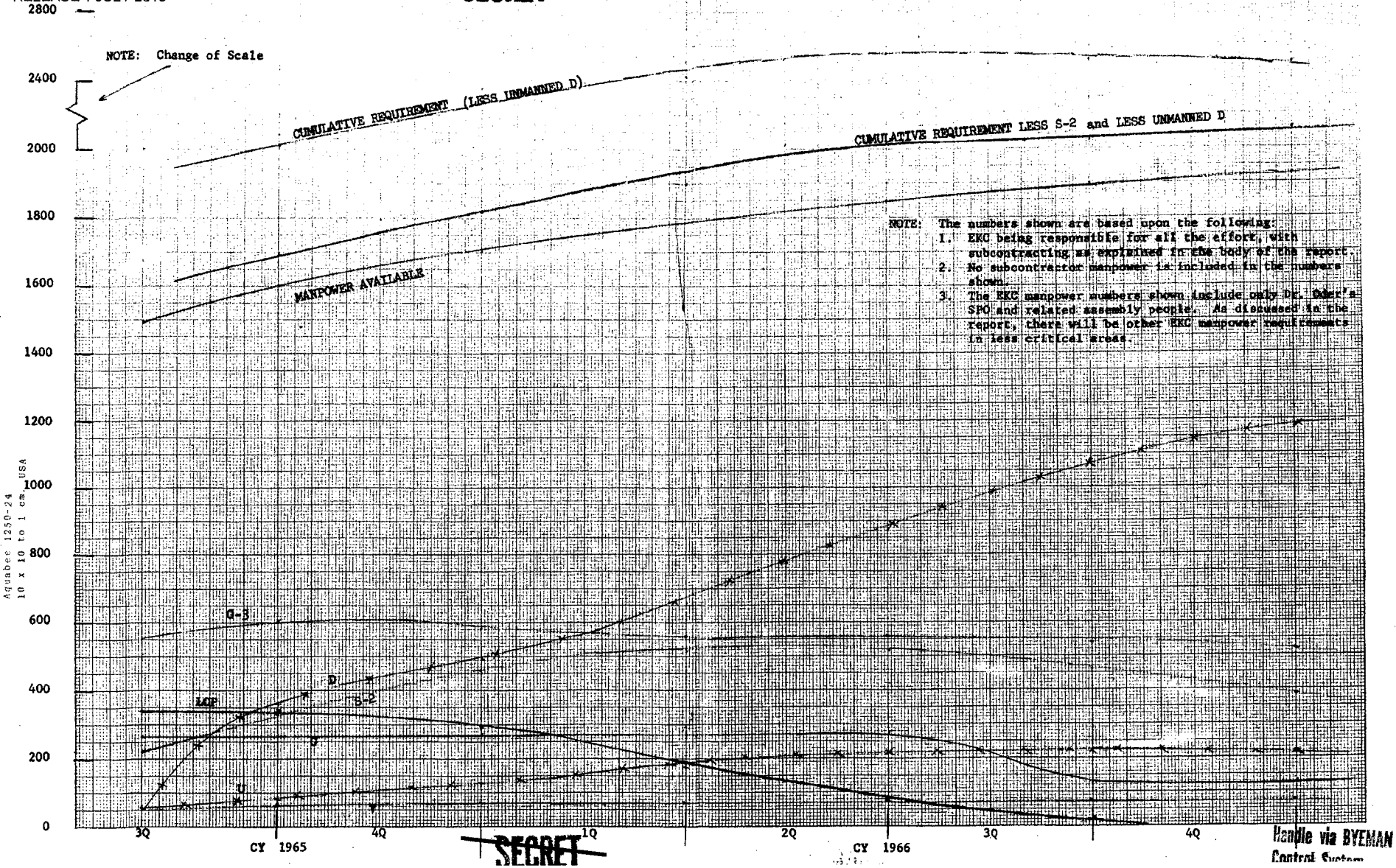
MANPOWER FORECAST
AVAILABILITY & REQUIREMENTS REVISED S-2



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BYE-40252-65

PROJECT (Unmanned Dorian) REQUIREMENT (Estimated)

DATE: 7/27/65

	1966				1967		McM "estimate"
	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	
PROJECT PEOPLE	144	175	218	240	266	275	150
QUALITY CONTROL	9	18	28	46	57	63	10
TECHNICAL OPERATIONS	21	28	39	56	84	91	10
OPTICAL OPERATIONS	7	10	14	19	26	28	5
FIELD OPERATIONS	2	2	2	6	12	14	0
SUBCONTRACT LIAISON	1	4	8	16	28	28	15
ENGINEERING SERVICES	55	81	112	146	166	182	100
MATERIAL OPERATIONS	8	27	35	56	74	78	10
PLANNING & SCHEDULING	7	7	12	12	21	21	5
SERVICES	36	56	78	106	140	165	65
PRODUCTION	17	21	28	56	70	88	25
TOTAL	307	429	574	759	944	1033	395

Based on an unmanned system differing from manned largely in camera and film transport area.

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Control System