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DEPARTMENT OF THE AIR FORCE
WASHINGTON

OFFICE OF THE UNDER SECRETARY

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MEMORANDUM FOR RECORD

SUBJECT: MOL Sensor Development

Activities at Issue

The MOL sensor development competes with other current and projected projects in the NRP involving large optics. The relevant contractors are Eastman Kodak (EK), ITEK, and Perkin-Elmer (PE). The activities at issue are listed below.

Current:

At EK: G, G3, Lunar read-out (NASA contract), APOLLO pointing camera (SAFSP contract for NASA), VALLEY (technology studies), S2 studies, DORIAN studies;

At ITEK: CORONA, CORONA improvement, S2 studies, technology of large optics, DORIAN studies, balloon camera for atmospheric studies;

At PE: FULCRUM studies, DORIAN studies.

Projected, non MOL: only S2 is considered.

MOL: The MOL program is defined as the development of a manned system having 60" to 70" aperture, and a parallel effort permitting conversion to an unmanned system. To convert would require the termination of the manned effort, transfer of its resources to the unmanned, and might entail a six month's delay in launch. It is considered that these parallel efforts will be with one contractor. Follow-on larger systems are not included. An independently developed unmanned system is not considered.

Data now available

In connection with a management survey at Eastman, EK has provided estimates of total manpower required for current projects at EK, for S2 if awarded to EK, and for the MOL (DORIAN) without unmanned backup.

EK has stated that MOL will take four times as many professional man-years as G3 - i.e., about 1000 professional man-years.

Estimates of ITEK and PE manpower now available are based on EK's estimate of S2 requirements, and upon the fact that ITEK and PE each have stated their readiness to undertake S2 at once. More data will be provided by ITEK soon.

Some judgements

EK hires cautiously and with standards appropriate to permanent retention of all new employees. The company is concerned about maintaining high standards of performance, and expands slowly. The labor market in Rochester is showing the effects of current expansion at EK.

EK does not wish to become a program-manager contractor - wishes to retain full control of all major program elements and to minimize management of subcontractors, subcontracting mostly fabrication of components or subassemblies.

EK is now larger than ITEK or PE, has larger resources on which to draw, and a larger base on which to build.

It seems to me likely that each of ITEK and PE will be less conservative than EK in undertaking a high rate of expansion. They can each draw from new sources.

It seems likely also, but perhaps less so, that ITEK and PE would be more willing to become managers of subcontractors.

ITEK has not had the full experience of developing and flying a system of the size of GAMBIT, but they came close to this with LANYARD. They have, of course, had extensive development and flight experience with the smaller and less demanding CORONA camera. They have also been working closely and intensively on design and planning of large systems for the last 18 months. PE is much less experienced and is a less promising candidate for a prime position on DORIAN.

EK's estimates on DORIAN include all optics, camera and film handling, alignment gear, on-board film handling for read-out and for recovery, on-board control and display consoles, tracking telescopes, tracking system, AGE, and optical test facilities to support development and fabrication. They call for 50% subcontracting according to the EK philosophy - that of breaking out a large number of relatively small subcontracts. It is not clear that the prime contractor needs to follow this philosophy. Breakout of a large subcontract seems entirely possible to me.

Facilities are troublesome, but manpower is the controlling factor, and it is probably professional manpower, rather than total, that counts.

With respect to professional manpower, there is little question that EK is now spread thinner than either ITEK or PE. Hence, ITEK and PE each has, relative to EK, a possibility of a higher proportionate rate of expansion of total manpower. Each also has, proportionately, probably a little better basis for managing a major subcontract.

Manpower Estimates

The following table estimates total manpower commitments and requirements, and projected manpower available.

Starred estimates are based on Eastman data. All other estimates are my own. The DORIAN requirements are based on EK's plan to subcontract 50%, mostly drafting and fabrication of subassemblies. They include also an arbitrary requirement of 100 for the unmanned backup.

Estimates of Total Manpower

	July 1965	July 1966	July 1967
Required for current projects			
EK	1500*	1200*	900
ITEK	200	100	100
PE	100	0	0
Subtotal	<u>1800</u>	<u>1300</u>	<u>1000</u>
Required for:			
S2	100*	500*	400
DORIAN	<u>100*</u>	<u>1000*</u>	<u>1300*</u>
Total Requirements	2000	2800	2700
Potentially available if required			
EK	1500*	1900*	2000*
ITEK	500	800	1100
PE	400	700	1000
	<u>2400</u>	<u>3400</u>	<u>4100</u>

The estimates of those potentially available now at ITEK and PE may be low.

Conclusions

Assignment of DORIAN and of S2 must be considered together.

If S2 does not go to EK, EK's estimates show that they will have to modify their estimates or their subcontracting philosophy in order to handle DORIAN with unmanned backup. In connection with our management survey, EK stated that they could undertake DORIAN in the absence of S2.

If S2 does go to EK:

- (1) There is no possibility to handle DORIAN at EK;
- (2) ITEK could probably handle DORIAN without breaking out a major subcontract;

- (3) ITEK and PE together could handle DORIAN with one as prime and the other a major subcontractor.

Possible Actions

There is no doubt that, from the point of view of the MOL, a clear award now of both S2 and DORIAN is desirable. Either of two contractors could be prime on DORIAN, and perhaps all three should be examined; all three are already in competition for S2. Award of both tasks to one contractor is of course excluded. There are other possibilities which, I believe, must also be excluded.

The interfering factors arise because of the present situation on S2. I have the following judgments in this regard:

1. There exists today a completely valid and justifiable basis for an award of S2 to Eastman;

2. There exists today no comparable basis for an award of S2 to either of the other contractors, and indeed both of the latter are pursuing designs having elements of risk not present in the EK design;

3. It will be several months before either ITEK or PE can establish a basis for award to them that is comparable to Eastman's;

4. I doubt that, considering all factors of risk, reliability, and performance, ITEK or PE will ever show clear superiority over EK on S2; in any case ITEK would be several months behind EK in schedule, and PE many months behind that.


On the basis of these judgments, I cannot recommend an action now that would prejudice an award of S2 to Eastman. The possible courses of action that remain are therefore:

1. Continue present DORIAN studies at EK, ITEK, and PE, initiating purchase of large DORIAN blanks as each contractor reaches that stage of design. Await the award of S2 before final award of DORIAN.

2. Award S2 now to EK. Take the EK work to date on DORIAN and make it available to ITEK and PE. Continue these latter in paid competition on DORIAN for two months, on the following terms: they are competing for prime, but each is to propose a breakout of major subcontracts, and each is to indicate subcontracting areas in which it can serve best. The flight program is to begin with the EK DORIAN design unless the bidder can demonstrate that he has a better design that will meet the schedule.

3. Combine (1) and (2) by competing all three contractors under the terms of (2), while awaiting award of S2.

If it is considered that DORIAN has greater overall importance than S2 and should get the most experienced contractor, and therefore denies the premise that a way must be kept open for EK to undertake S2, then a fourth option is available: (a) to assign DORIAN to EK at once, (b) to select ITEK as the S2 contractor. In this case I would take the whole of the EK work on S2 and turn it over to ITEK, obliging them to pursue it as an alternate to their own concept, with a selection of design to be made later. This would preserve something of the safety I feel in having this design available, but would certainly delay the best schedule by several months.


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