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OXG - 0261-60

26 January 1960

MEMORANDUM FOR: Deputy Director (Plans)  
THROUGH : Chief, Development Branch, DPD  
THROUGH : Acting Chief, DPD  
SUBJECT : Review of Proposed Photographic System for OXCART  
REFERENCE : Evaluation of Reconnaissance Proposals for GUSTO  
GUS-0188, dated 19 March 1959

1. It has been ten (10) months, and we have spend [ ] since Perkin-Elmer was selected as the contractor to furnish the photographic equipment for this program. In view of the progress reported, the comments made in Washington and Boston last week, and the apparent floundering of P & E in trying to find a satisfactory approach to the problem, I would feel derelict in my duty if I did not express my deep concern over the progress being made. 25X1

2. At the time P & E was selected as the contractor to furnish this equipment, they did seem to have the best approach to the problem, and I quote from the reference:

"The P & E proposal is extremely well done and represents the product of a great amount of advanced thinking as well as a considerable amount of engineering effort in order to come up with a system that is sophisticated and well planned. This system, without a doubt, has the greatest <sup>capability</sup> potential and can be scaled up or down to allow maximum utilization of the air frame selected."

These comments at the present time are not considered true ones. P & E seems to be on a Schmidt or reflecting optical system "jag" that tends to ignore other requirements for a good reliable photographic system. The

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higher resolution advantages of the reflecting system are understood, but it seems doubtful that it can be made to operate satisfactorily when it ignores simplicity, reliability, weight, desired focal length, and stereo coverage requirements to get it in the vehicle. In short, it can only be said that after ten (10) months of effort, P & E can only propose a very complex system of minimum focal length that weighs over 500 pounds and does not give stereo coverage for the minimum photographic flight line distance. In view of the above facts and the proposal for a photographic system submitted by EK on 21 January 1960 for OXCART, it is felt that the 24-inch system now being studied by P & E must be carefully evaluated before they are instructed to proceed.

3. Because of my deep concern for the progress presently being made, I have reviewed all of the original proposals, including the excellent proposal received from EK, which shows they have a fine understanding of the problem. To show the soundness and feasibility of the EK system a comparison of major characteristics of this system and the one that Rod Scott indicated he had in his hip pocket and that he could proceed with are as follows:

<u>ITEM</u>	<u>EK</u>	<u>P &amp; E</u>
Camera Type	Panoramic	Panoramic
Installation Type	Split-vertical	Split-vertical
Lens Type	Refracting	Catadioptric
Lens Speed	f4	f4
Focal Length	21"	18"
Ground Resolution	Approx 1½ ft	Approx 1½ ft
Shutter Speed	1/200 sec	1/50 sec
Format Size	7.4" x 34"	4.4" x 28"
Film Width	8"	5"
Flight Line Photo Distance	2500	2500
Lateral Coverage	126°	135°
Forward Overlap	60% for 2500 mi	75% for 1,000 mi 50% for 1,500 mi
Stereo	for complete flight line distance	1,000 miles and 5 miles each side of nadir for additional 1500 miles
Convergence Coverage	30° each side of nadir	None
Weight (Complete System)	500 lbs.	570 lbs.
Window	1	2
Window Size	23" x 24"	Approx 20" x 24" ea.

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Items such as simplicity and reliability, of course, cannot be tabulated and can only be determined by review of the system layout. It can be readily seen by the attached photo that the film path in the proposed EK system is much simpler than that of Rod Scott's, which requires four 90° turns in the film path, thus insuring better equipment reliability. Also of great importance and not shown above is vibration. Due to the greater distances between large glass elements and the rotating 10-inch mirrors, P & E's system will be more susceptible to internal vibration.

4. It should also be pointed out that EK is proposing to use only one window, approximately one (1") inch thick, with no attempt to cool it. The equipment bay is purged with helium allowing excellent transmission of the light rays from the window to the focal plane. Only the film compartment (supply, take up spools and focal plane) will be pressurized and cooled to about 120° F.

5. The above is not an attempt to indicate that EK has a trouble-free system, but I do feel they are proposing a simpler, more reliable, and a better system than any of those of Rod Scott's. Without an improvement in effort, or progress at P & E, I can see us going down the "C" Configuration road.

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6. [Redacted]

I heartily recommend that the photographic equipment be given a complete review with serious consideration being given to the EK Proposal.

[Redacted]  
Major USAF  
Development Officer

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DPD-DD/E [Redacted]

ATTACHMENT:  
Photograph

Distribution:  
O&I-Addressee w/att  
1-A/CH/DPD wo/att  
1-CH/DB/DPD wo/att  
1-Mr. Kiefer, wo/att  
1-DB/DPD/LEW, wo/att  
1-OXC Chrono