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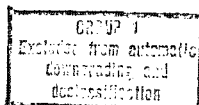
3 June 1965

MEMORANDUM FOR: Deputy Director for Science and Technology

SUBJECT: Refractive Panoramic Cameras as Candidates
for the New Search System

1. Early in the FULCRUM program the class of refractive panoramic cameras of the CORONA type was examined against the then current new search system specifications. At that time refractive systems were rejected as too heavy, large, and difficult given the desire to exceed three foot resolution a significant fraction of the time. However, in the light of the recent tendency to view the original FULCRUM performance specifications as a guide but not a firm specification, SPS has conducted a re-examination of refractive systems, and has concluded that a camera development based on the CORONA technology may well have acceptable performance coupled with many advantages in the areas of cost, schedule, and development risk. In short, such a system is the ultimate embodiment of "evolution" rather than "revolution" and, therefore, SPS recommends that immediate steps be taken to prepare a CORONA type proposal for presentation to the Land Panel.

2. The above recommendation was arrived at after a detailed review of the Itek M-2 proposal. This review included not only an assessment of the reasonableness of the Itek performance claims but also a consideration of how far beyond the M-2 system the CORONA technology might be pushed. The following is a summary of the M-2 characteristics, all of which are clearly realizable and credible:

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Focal Length:	40"
F/No.:	3.5
T/No.:	4.0
Scan Angle:	70 deg.
Format:	5"
Camera System Weight:	900 lb.
Three Sigma Performance:	
h = 100 nm.	4.8 ft.
h = 80 nm.	3.8 ft.
Area Coverage (440 lb of film/camera):	
h = 100 nm.	16.7 million nm. ²
h = 80 nm.	10.7 million nm. ²

The performance numbers are based on a three sigma camera performance of 125 l/nm. which seems most reasonable given that the system is F/3.5 with no mirrors and no central obscuration. Furthermore, all of the coverage at 100 nm. is better than six ft. and at 80 nm. better than 4.8 ft. The camera system weight is 600 lb. lighter than the current M system weight and 900 lb. lighter than F¹.

3. The M-2 film transport system has been breadboarded, and it is our understanding that a set of prototype optics has been fabricated and tested. The system design was constrained by the requirement to fly on TAT with a maximum diameter of 80 inches. A relaxation of both the weight and diameter restrictions would permit a number of camera design improvements and some increase in focal length (perhaps to 44 inches). However, the 70 deg. scan angle is a limitation which is probably fundamental to the basic camera design. This narrow scan angle implies mission lengths at least twice as long as FULCRUM for comparable coverage effectiveness and will undoubtedly result in reliability penalties.

4. In summary, it is our judgement that a scaled up CORONA-like system is sufficiently interesting in the current context to warrant a serious and detailed consideration of such a system as a candidate for the new search system.

J. Maxey
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 C/SPS/DDS&T

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