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26 January 1965

MEMORANDUM FOR THE RECORD**SUBJECT: Meeting with Secretary McMillan
22 January 1965**

1. I met with Dr. McMillan on Friday, 22 January to discuss two topics. He had inquired earlier in the day about the level of funding that we would be seeking to support the FULCRUM contractors during February and March, and I gave him the figures contained in my memorandum of 20 January to Mr. McCone. In the same telephone conversation I inquired about the status of the Air Force programs which are competitive to FULCRUM, and he agreed to discuss them with me in a personal meeting at the Pentagon. These two topics formed the basis for our conversation.

2. When I arrived, McMillan showed me a letter which was then in final draft addressed to Mr. McCone (Reference BYE-36010-65) explaining the level of funding by General Greer directed specifically toward developing a search system competitive with FULCRUM. I did not discuss these figures but assured McMillan that Mr. McCone would be delighted to receive such information.

3. I then asked McMillan about the technical characteristics of the systems to which these monies had been committed, noting that his memorandum to Mr. McCone was primarily an accounting statement. Somewhat to my surprise, he began a description of both the Itek and Eastman Kodak cameras and talked

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for almost a half hour on these subjects. He described the Itek camera as having a 40" focal length and an F number between 2 and 2.5. As he sketched it for me (see attached), the optical path is folded inside a thin cylinder and is reflected from three planar and one spherical mirror. The camera is stationary, but one of the planar mirrors rotates so as to provide the scanning action. The film is moved past the exposure slip at a speed of 103" per second in a film drive which is mounted exterior to the cylindrical optical device. He indicated that two such cameras would be used to provide stereo coverage of approximately seven million square miles. They would use two enlarged Mark 5 reentry vehicles to bring back the film. He indicated that the payload (cameras plus film) for this mission would be 4,630 pounds. There would be no separate orbital control vehicle (spacecraft); rather the last (AGENA) stage of the TITAN III/X combination would be used for this purpose as it now is in CORONA. Lockheed is examining the possibility of using the AGENA in this role. There is one very important problem of this configuration since the over-all camera diameter is 7' and AGENA has a 5' diameter. Lockheed is therefore studying both (a) hammer-headed version in which a wider payload would ride atop the narrow AGENA and (b) the provision of a structural fairing outside the AGENA from the TITAN II base to provide a 9' diameter.

4. He then described the Eastman Kodak camera, characterising it as a combination of: (a) the servo-mechanism controls from the E-6 cameras and (b) the GAMBIT optics. He indicated to me that the focal length was not yet fixed but that it would probably wind up being a 65" focal length F 3.2 to 3.5 system with a 3' resolution. This system would give about seven million square miles of coverage. The system looks very much like FULCRUM in its optical layout. Light is reflected by a 45 degree reflecting mirror

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onto a spherical mirror which converges in through a slit in the 45 degree mirror and onto a film drive. He stated that the film would travel at only 30-60 inches per second, since there is no re-wind of the film, as in the Perkin-Elmer FULCRUM camera. The scanning action in the Eastman Kodak camera is achieved by rotating an external reflecting mirror about an axis parallel to the vehicle travel which produces the scanning action on the ground. The film drive must be coupled tightly to this rotating mirror. McMillan indicated that this camera too was going up on a TITAN III/X, which is basically a TITAN II with an AGENA third stage. The AGENA here would act as the orbital control vehicle. He did not give me a diameter for the Eastman camera payload combination, but I gather that it was either the 7' or 9' requirement to which Lockheed was designing.

5. It was not clear to me what the role of GE in all of this was, nor did McMillan make it clear. He did indicate that both Lockheed and GE were involved in spacecraft designs with which each of the two camera designs was now being married separately, making four combinations in all. I got the feeling that the GE effort is a backup to Lockheed. On the other hand, we note from GE sources that their effort is a broad-scale one involving 3 - 4 million dollars in a variety of spacecraft booster combinations, so I come away confused.

6. I asked McMillan explicitly whether he had any plans for using the TITAN IIIC in this role with its large payload and large diameter. He indicated that studies at Eastman had indicated that such a system could be only slightly improved over those which would be flown with present boosters (ATLAS/AGENA, TITAN II, TITAN III/X), thereby supporting the statement made by the Itek people in

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your presence last Monday. However, I felt somewhat uneasy about this response in that McMillan did not say that he did not have such a development but only that the Eastman studies had been negative on this point.

7. The conversation was cordial and centered purely on technical matters. McMillan and I were the only ones present, and I believe that this added a great deal to the progress we made in re-establishing technical communication between the two groups.

ALBERT D. WHEELON

ALBERT D. WHEELON
Deputy Director
for
Science and Technology

Attachment

cc: DCI
DDCI
C/SPS

Distribution:

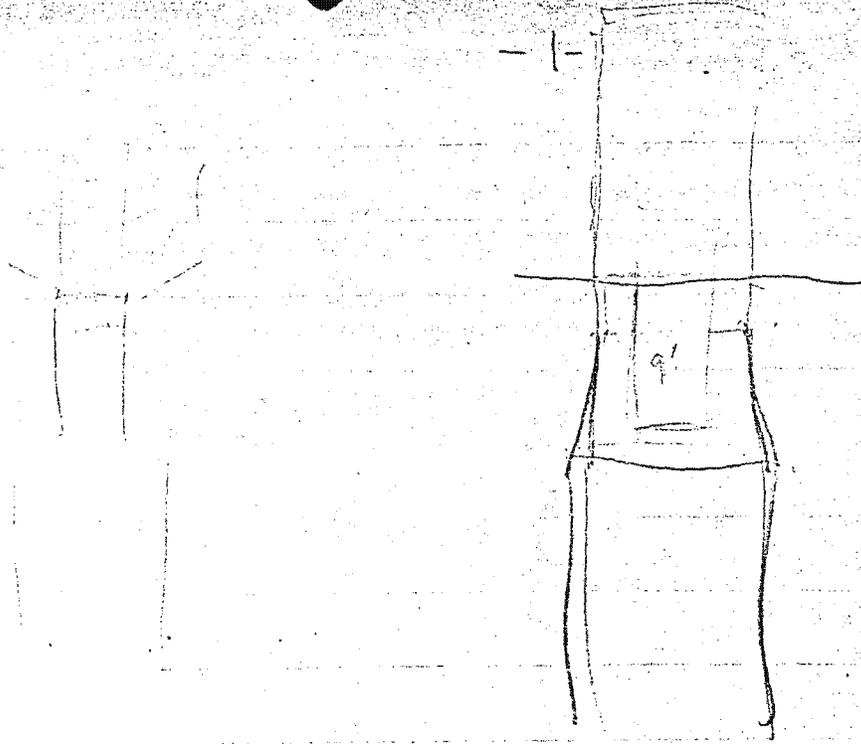
Copy 1 - DCI
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4 - FULCRUM (ADW) ✓
5 - chrono.
6&7 - DDS&T Reg.

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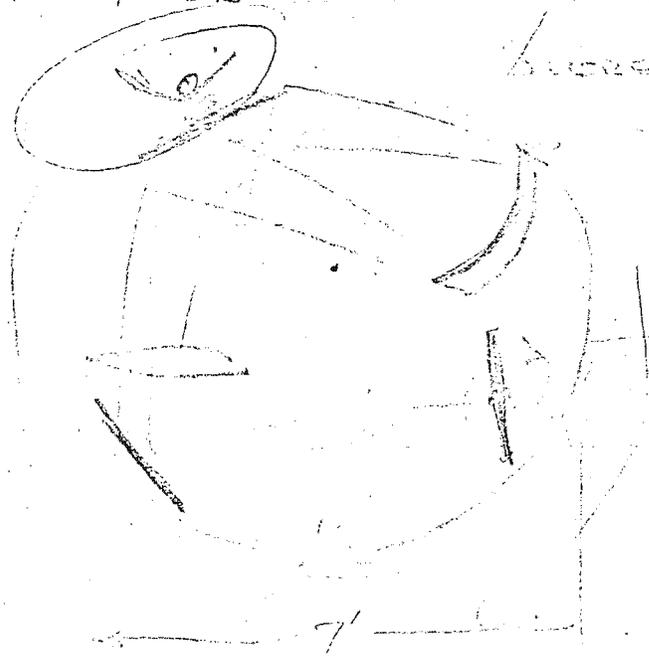
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Iter ~~from~~ LMSC
EL } GE

Iter. P=10" F=2 to 2.5
Thousands of Mirrors



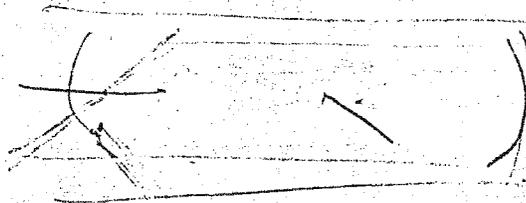
103" / sec
No OCR
Two 4630 lbs
Incl 10% margin
7.10° 2 More 5 ft
TITAN 3X

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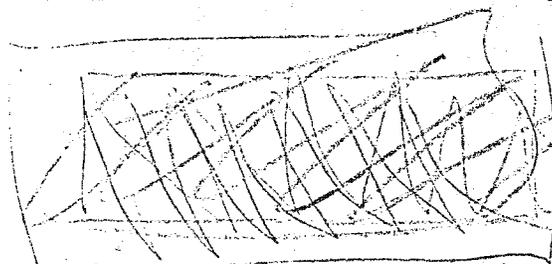
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GAMBIT OPTICS
OSCILLATING MIRROR

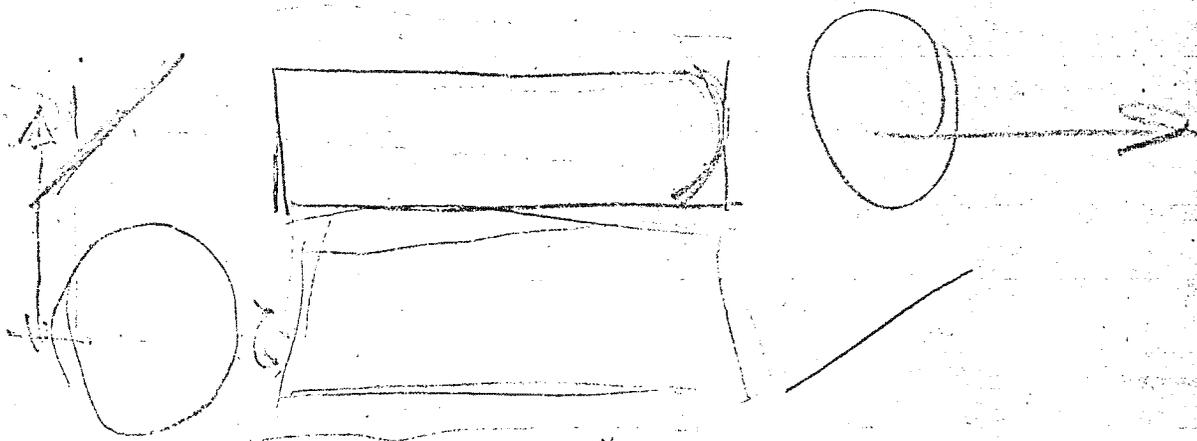


65" f32 77" C/A



3'
7 x 10⁶

3'
5 x 10⁶



60" f35

65" ~~TOP SECRET~~