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[redacted]
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3 February 1959

MEMORANDUM FOR RECORD:

SUBJECT: Trip Report -- CORONA

1. The following is a summary of items observed or discussed during a visit to Palo Alto, California to attend a CORONA project review conference on 23 January 1959. Major Charles Murphy, who also attended, will submit a separate report covering items within his area of interest.

2. Film: Based upon design criteria, the initial order for Project CORONA film was for 70 MM x 7,000 foot lengths of thin base film. It now appears that for the foreseeable future we will be unable to utilize 7,000 ft. loads due to a lack of adequate self contained electrical power and because of the weight limitations imposed. Discussions with Mr. E. L. Green, EK, indicate that 79 each 7,000 ft. rolls of CORONA film already have been spooled out of an order of 150 total. To date only 12 rolls of 3500 ft. material has been ordered and none has been delivered, although this appears to be the film which will be used during first phases of operational launches. After conferring with Mr. Kucera, [redacted] of LAC, and [redacted] on this matter, [redacted] informed Mr. Green per telecon on 29 January, to divert ten (10) each rolls of SO 1188 and 1221, respectively, to 3500 foot lengths. This action will provide the additional 3500 ft. lengths required and will not require additional expenditure of funds. Revised status of CORONA film is as follows:

EMULSION	LENGTH	ORDERED	REC'D	IN PRODUCTION
1188	7000	47	27	20
1221	"	46	20	26
1188	3500	16	0	16
1221	"	16	0	16
NG-TEST	7000	50	32	18

3. Camera Linear Coverage: Based on information previously provided it has been assumed that the CORONA camera system will provide 204° or 51 minutes of linear camera coverage utilizing a 3500 ft. roll of film. The only deviation from this figure would be a possible 1° (or 60 NM) deviation resulting from camera programmer error.

a. It now appears that the programmer error is closer to 3° (or 180 NM) for each turn-on and turn-off of the programmer sequence. For 7 photo passes, this cumulative error would, therefore, be 42° instead of 14° which would reduce linear coverage capability by 20%.

b. In addition to programmer error, the reduction of linear coverage resulting from a perigee less than optimum (140 statute miles) must also be considered. At the Palo Alto conference it was stated that the minimum perigee at which orbit could be sustained would be 98 NM (112 statute miles). At a perigee of 98 NM, linear camera coverage capability would be reduced as much as 40% due to the fact that photographs must be taken more often at lower altitudes than at higher altitudes to maintain the required 10% photographic overlap. Therefore, under the most pessimistic conditions (i. e., a 98 NM perigee and 3° programmer error at each turn-on and turn-off) revised linear photo coverage capability would be as follows:

Previously available - 204° or 12,240 miles.
Less maximum programmer error - 42° or 2,520 NM
Less maximum perigee differential - 40% or 4,896 NM
Revised total now available - 4,824 NM

4. IMC Error: The IMC system on the CORONA camera system is built to operate at a plus or minus 10% error. While this IMC error will not affect linear camera coverages these deviations can be expected to adversely affect photographic quality.

5. Photographic Exposure: The CORONA camera system is designed to utilize exposures of 1/500th, 1/1,000th , and 1/2,000th of a second at nominal scan rate. Exposure changes are accomplished by selection of a slit which, in conjunction with the aforementioned nominal scan rate, produces effective shutter speeds as indicated above. The exposure to be used at an optimum perigee will vary dependent upon any deviations from a pre-selected altitude. For example, if a 1/1,000th second shutter speed is selected for a nominal altitude of 120 NM and the actual perigee is 98 NM, then the effective exposure would be approximately 50% more or 1/1400th of a second. This would result in serious under exposure, which cannot be afforded due to the extremely low contrast results which may be expected even under optimum conditions.

6. Equipment Chamber Temperatures: During initial design conferences it was stated that the equipment chamber temperature would be maintained at 70° plus or minus 3°F. These figures were, of course, based upon theory and computation but represented the best information available at that time. It now appears that the ambient bay temperature may be as low as 40° plus or minus 10°F. During environmental testing of the mock-up of the film transport system it was discovered that a dangerous film brittleness occurred at temperatures below 40°. This environmental test, incidentally, covered temperature ranges only. The temperature problem, coupled with the zero humidity condition which will be encountered at CORONA altitudes, poses a potentially difficult problem. ITEC is presently investigating this problem and will conduct additional environmental film tests at temperature ranges below 40° and at vacuum humidity.

7. USAF IR Aircraft: After the group meeting at Palo Alto, Mr. Kucera mentioned that USAF had requested Colonel Shepherd of BMD to obtain project reaction concerning possible use of an IR-equipped USAF U-2 during the initial CORONA launches. The purpose of this request was to confirm test data previously obtained with the IRs and to possibly assist in plotting track of the CORONA package for recovery purposes. Col. Shepherd stated that the Air Force proposed to base the U-2 at Hawaii. However, in view of possible security problems involved incident to simultaneous operation of the U-2 and CORONA recovery facilities at Hawaii, [redacted] suggested that Johnson Island also be considered as a possible base of operations for the U-2 in the event this proposal is approved. This proposal was referred to the Director of Operations upon [redacted] return from the Palo Alto conference and has since been a subject for a formalized proposal from Col. Shepherd's group.

8. CORONA Recovery Procedures: Col. Matheson plans to visit the Hawaii Control Center (Recovery Network Headquarters) some time during early February. In conformance with [redacted] instructions, [redacted] will accompany Col. Matheson on this visit in order to gather on-the-spot information concerning procedures for recovery and handling of the photographic cassette. This procedure is now in rough draft form and will be augmented by information obtained during the trip to Hawaii. Col. Matheson is to advise Project Headquarters of the date during which he and [redacted] will make this trip. The visit is tentatively scheduled for the 10th or 17th of February.

[redacted]
Major, USAF

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Distribution:

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