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19 AUG 1969

TECHNICAL MEMORANDUM NO. 26

SUBJECT : Some Implications of CORONA Scheduling for FY 70-71

PREPARED BY: [redacted]

INTRODUCTION

1. There is currently considerable interest in the scheduling of the remaining CORONA missions, in terms of when they will be launched, at what altitude they will be flown, and whether they will use an STB or UTB film load. There are innumerable factors that are related in one fashion or another to the determination of these launches. Concerns have been expressed over "coverage," "scale or resolution," effort of failures, etc. and what they might entail. Unfortunately, there is no set of data that can be prepared to demonstrate clearly the proper action.

2. This paper addresses primarily the issue of the trade-off between the four currently identified options with respect to type of film load utilized, perigee altitude flown and average expected accomplishment for the semi-annual search area. These four options are defined in Table 1 along with the total coverage obtainable. Also presented in this memorandum are some pertinent data concerning launch scheduling. No attempt is made to provide recommendations, but rather to highlight some of the hopefully significant trade-offs.

ANALYSIS APPROACH

1. A basic assumption of this study is that the manner in which the CORONA system will be operated for any mission during this period is primarily a function of the then current priority items, as has been true historically. The analysis approach used in this study was to correlate historical coverage data with key parameters, and then utilize these key parameters as "predictors" based on the differences in capability of the four configuration options.

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2. Specifically, the AMS coverage data as reported in the monthly COMIREX status reports was used to correlate the semi-annual search area Accomplishment Level (percent of area covered by unique cloud-free photography) with the Total Gross Coverage (total of the individual mission semi-annual search area accomplishment figures in sq.n.mi.) for all six month periods from 1 January 1967 to date. This data is presented in Figure 1. Next, Mission Gross Accomplishment (sq.n.mi. covered by unique cloud-free photography) was correlated with the Total Area Photographed (sq.n.mi. framed within the semi-annual search area, including cloud covered and redundant photography) for each mission during CY 1968. Total area covered data was only available for this period, and was obtained from the SOC. This data is presented in Figure 2.

3. Choosing a desired Accomplishment Level, the required Total Gross area required can be obtained from Figure 1. Dividing by the number of launches in the period defines the mission Accomplishment required, which used with Figure 2 data provides the per mission requirement Total Area Photographed. Finally, dividing this required Total Area Photographed by the total mission area coverage capability from Table 1 gives the percent of film load that must be expended against semi-annual search area to maintain that average coverage Accomplishment Level.

RESULTS

1. The above approach was applied for five and six launches per year. The results are presented in Figures 3 and 4 for the four configuration options. Data is presented in the form of Expected Accomplishment Level vs the Percent Film Load for Semi-annual Search Area. It should be noted that the latter refers to any film expended over the 6.8 million n.mi.^{2} semi-annual search area for whatever reason, i.e., holiday or high-priority area coverage. The dashed line represents the average percent of film load expended in this manner during CY 1968. Referring to Figure 1, representing 2 1/2 years of data, the accomplishment levels shown in Figures 3 and 4 can be expected to vary by ± five percent from the data shown. There are (and most likely will be) anomalous periods as seen in Figure 1 for the periods ending with Missions 1038 and 1049.

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TABLE 1

J-3 CONFIGURATION OPTIONS

UTB	at	100 n.mi.	13.5 million n.mi.^{2}
UTB	at	85 n.mi.	9.5 million n.mi.^{2}
STB	at	100 n.mi.	9.2 million n.mi.^{2}
STB	at	85 n.mi.	6.3 million n.mi.^{2}

FIGURE 1

ACCOMPLISHMENT LEVEL VS TOTAL PERIOD GROSS

SEMI-ANNUAL SEARCH AREA

JAN 1967 - JULY 1969

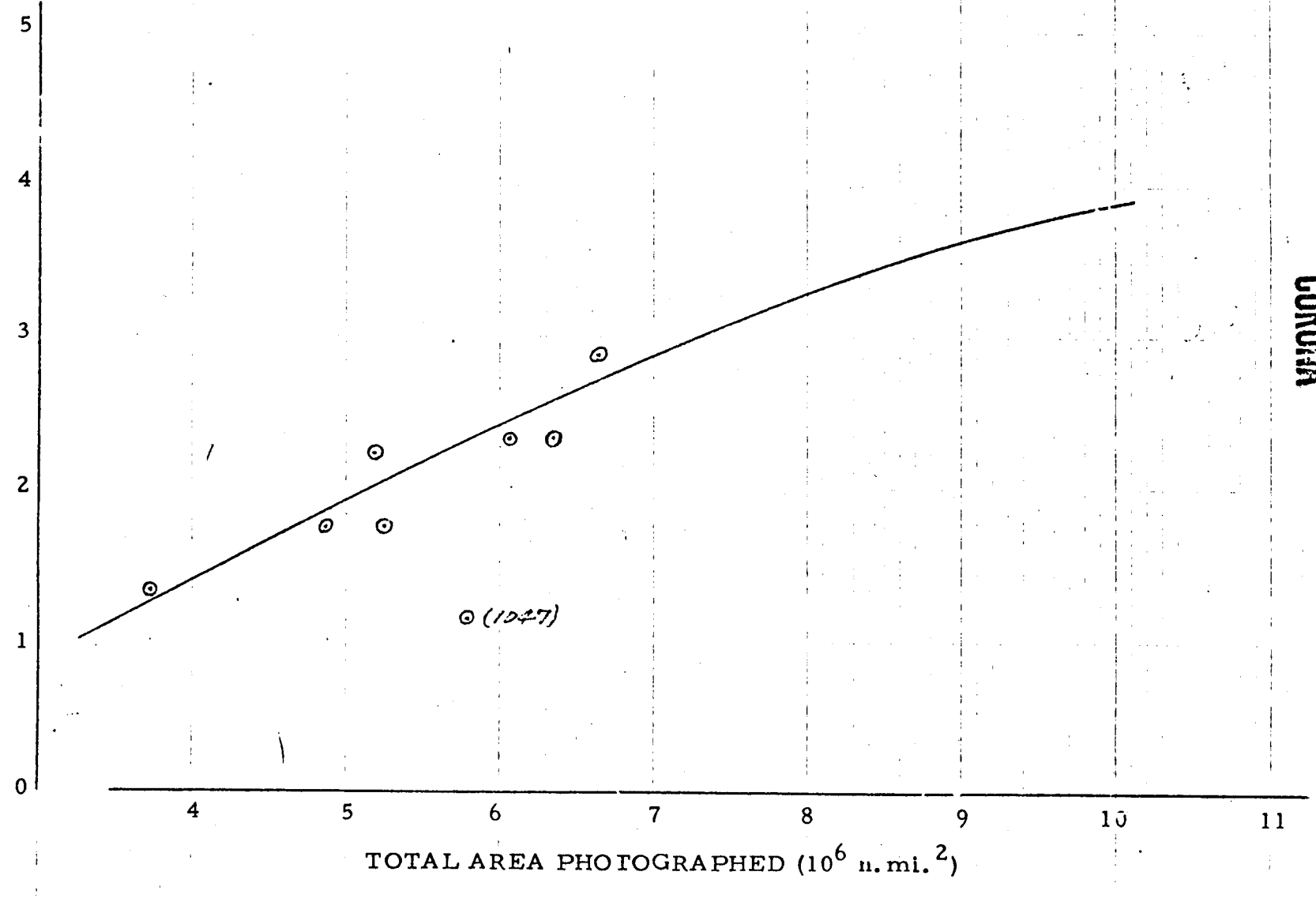
(AMS DATA)

MISSION GROSS VS TOTAL AREA PHOTOGRAPHED

SEMI-ANNUAL SEARCH AREA

(CY 1968 DATA)

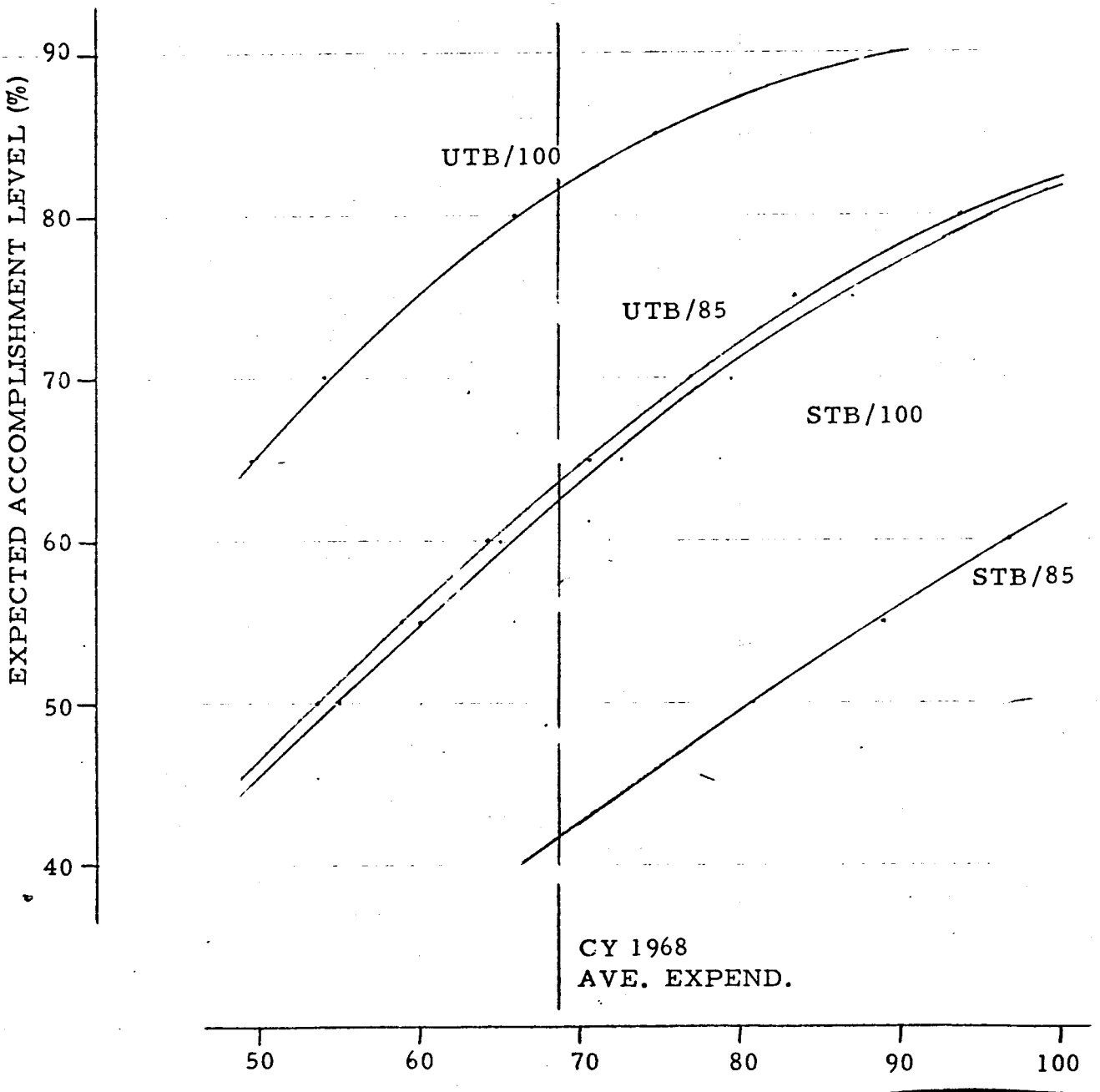
FIGURE 2



EXPECTED ACCOMPLISHMENT VS FILM EXPENDITURE FIGURE 3

SEMI-ANNUAL SEARCH AREA

FIVE MISSIONS PER YEAR



EXPECTED ACCOMPLISHMENT VS FILM EXPENDITURE FIGURE 4

SEMI-ANNUAL SEARCH AREA

SIX MISSIONS PER YEAR