

CORONA

14-00000-910

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6 MAY 1969

MEMORANDUM FOR: Chief, Design and Analysis Division, OSP

SUBJECT : CORONA Area Coverage, August 1968 to March 1969

REFERENCE : Memorandum to C/D&AD, [REDACTED] Subject: CORONA Area Coverage, January 1967 to July 1968, dated 25 September 1968

I. INTRODUCTION

1. This memorandum presents a summary of CORONA Area coverage data for August 1968 through March 1969. The previous paper, CORONA Area Coverage (dated 25 September 1968) included Mission 1047 which was launched in July 1968. New information for Missions 1104, 1048, 1105, and 1049 have been added to complete the year 1968. Missions 1106 and 1050 were flown in February and March 1969.
2. The Committee on Imagery Requirements and Exploitation (COMIREX) submits monthly reports which reflect the current coverage status of the USIB search requirements in terms of clear, stereo, panoramic photography of the USSR, East European Satellites, Communist China, and North Korea. As a result of the failure of a camera in Mission 1048, the decision was made to include mono coverage which is considered adequate to the search requirement. In February 1969, the USIB search requirement was modified to accept monoscopic coverage of these areas.
3. All data presented in this document have been extracted from the COMIREX monthly reports. The inclusive dates for area coverage status are shown in Table 1.

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II. CORONA AREA COVERAGE REQUIREMENTS

1. The following USIB Search requirement has been extracted from the 9 April 1969 COMIREX monthly report.

2. On 8 November 1966, USIB approved a plan for using KH-4 missions primarily in a search mode^a. In a modification of this requirement, USIB reaffirmed the KH-4 search requirement; accepted usable monoscopic coverage as meeting search requirements; deleted the former limitation on the amount of film to be employed against current intelligence tasks; and, noted that the remaining Mapping, Charting, and Geodesy area coverage support could be taken care of, without assignment of any unique KH-4 missions, by allocation of a portion of film on a non-interference basis when weather opportunities permit^b. In summary, the current requirement stipulates that cloud-free (about 90 percent) photography should be acquired as follows:

a. About 80 to 90 percent of the built-up areas (6.8 million sq. n. m.) of Soviet bloc and Communist China semiannually.

b. About 75 percent of the underdeveloped areas (2.8 million sq. n. m.) of the Soviet bloc and Communist China annually.

c. Approximately 2.5 million square nautical miles of intelligence coverage outside the Soviet bloc and Communist China annually.

d. Approximately 6.1 million square nautical miles (as of March 1969) of coverage outside the Soviet bloc and Communist China for Mapping and Charting.

^aMemorandum for Holders of [REDACTED]
8 November 1966.

[REDACTED], 4 February 1969.

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3. In addition to search and mapping and charting requirements, areas and targets of current intelligence interest are designated on a mission-to-mission basis. These targets may require a priority of "Extraordinary" requiring the camera to be turned on each time over the target regardless of weather or altitude, or they may be selected in lower priorities but designated for CORONA coverage because they may be effectively covered at this resolution.

III. SUMMARY

1. The CORONA system averaged 73 percent accomplishment of the semiannual area for all six-month periods ending between August 1968 through March 1969. Average number of missions and active days per six-month period for the eight monthly reports were 4.5 and 65, respectively.

2. The average collection against the annual requirement for all twelve-month periods was 75 percent. The average number of missions and active days per annual period were 8.3 and 117, respectively.

3. Figure 1 (1968) and Figure 2 (1969) present the monthly accomplishment status for annual and semiannual requirement areas. The March 1969 semiannual status is a record high even though Mission 1050 failed after one and one-half days on orbit. Mission 1050 was the fifth mission in this six-month period and the previous period encompassed only four missions. In effect, this early mission failure will not be noticed until the next period or so. The March 1969 status report on the annual requirement area reveals a decrease in coverage from 88 percent--a record high--in February to 81 percent. In this case, the March 1968 mission (Mission 1046) was dropped.

4. Figure 3 lists the Sino-Soviet area coverage for individual missions. In this table, gross coverage is defined as that area in clear, panoramic photography within the annual or semiannual region. This area is mission unique, i. e., no redundant coverage. Gross coverages by mission are plotted in

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Figure 1. In this figure it is noted that each mission beginning in August 1968 has more semiannual area coverage than the corresponding mission in 1966 or 1967.

5. Mapping and Charting area coverage is presented in Figure 5. Coverage for this requirement category appears to be low. The last six CORONA missions have collected a total of 0.243 million sq.n.m. of which 5,000 sq.n.m. are located within the equatorial belt.

IV. DISCUSSION

A. SEMIANNUAL SEARCH

1. The unique percent contribution by mission to the semiannual search status for January 1968 through March 1969 is presented in Figure 6 and Figure 7. Beginning with Mission 1047, the photography was reviewed and the acceptable monoscopic coverage has been included. In Figure 6, the gross coverage is accounted separately for stereo and stereo/mono. The status increase from 55 percent to 78 percent in December 1968 is attributable to monoscopic coverage as well as the contribution of Mission 1049.

2. The December 1968 report includes the acceptable monoscopic area coverage in Figure 6. This additional periodic coverage is 13 percent, i. e., the differences in contributions of Missions 1047, 1104, 1048, and 1105 to the November 1968 and December 1968 status reports. The gross monoscopic area coverage of these four missions is 21 percent which increases the gross area coverage about 20 percent (119 percent vice 98 percent). Monoscopic coverage is not reported separately and is only identifiable for these missions.

3. The method of determining the unique percent contribution by missions is described by the following example. For the six-month period ending in May 1968, Mission 1102 contributes its gross coverage of 23 percent. Mission 1045 contributes an additional 25 percent,

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although the unique mission coverage was 32 percent. The remaining 7 percent of Mission 1045 was duplicate coverage of area accomplished by Mission 1102. Next unique coverage of Mission 1046 is determined with respect to Missions 1102 and 1045. Finally, the coverage of Mission 1103 is unique with respect to Missions 1102, 1045, and 1046.

B. ANNUAL SEARCH

1. The individual mission contributions to the annual search status reports are presented in Figure 8 and Figure 9. Annual area which appears in acceptable monoscopic photography is identifiable for Missions 1045, 1046, 1103, 1047, 1104, 1048, and 1105. Beginning with Mission 1049 in December 1968 the acceptable area is reported as a single number which includes mono. The additional gross monoscopic coverage is 19 percent; accomplishment status increase due to mono photography is estimated at 7 to 11 percent.

2. The record high annual status of 87.5 percent in February 1969 is attributable to the additional monoscopic area as well as Mission 1106 which had a 7 percent contribution.

C. INDIVIDUAL MISSIONS

1. Mission 1106 in February 1969 was the first CORONA system to utilize the [redacted] operationally. The total collection of 3.00 million sq. n. m. or 31.2 percent of the Sino-Soviet area (34.8 percent semiannual and 22.5 percent annual requirement area) ranks next to Missions 1048 and 1035. The average collection per mission from August 1968 to March 1969 is 25.3 percent of the Sino-Soviet area (9.6 million sq. n. m.). Since January 1967, the average total collection of 19 missions has been 21.6 percent. Averages for semiannual and annual requirement areas since January 1967 have been 24.3 and 15.5 percent, respectively.

2. Mission 1048 (September 1968) has been credited with a total accomplishment of 3.34 million sq. n. m. or 34.8 percent of the Sino-Soviet area. This collection is the highest of an

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individual mission since January 1966. The semiannual coverage was 42.4 percent while annual coverage amounted to 16.4 percent. Mission 1035 which accomplished 41.6 percent in September 1966 is the only other mission to collect more than 34 percent of the semiannual requirement area. However, the 42.4 percent collection of Mission 1048 can be considered as 29 percent stereo and 13 percent mono. On this basis several missions have collected more stereo coverage than Mission 1048.



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TABLE 1

INCLUSIVE DATES OF AREA COVERAGE STATUS

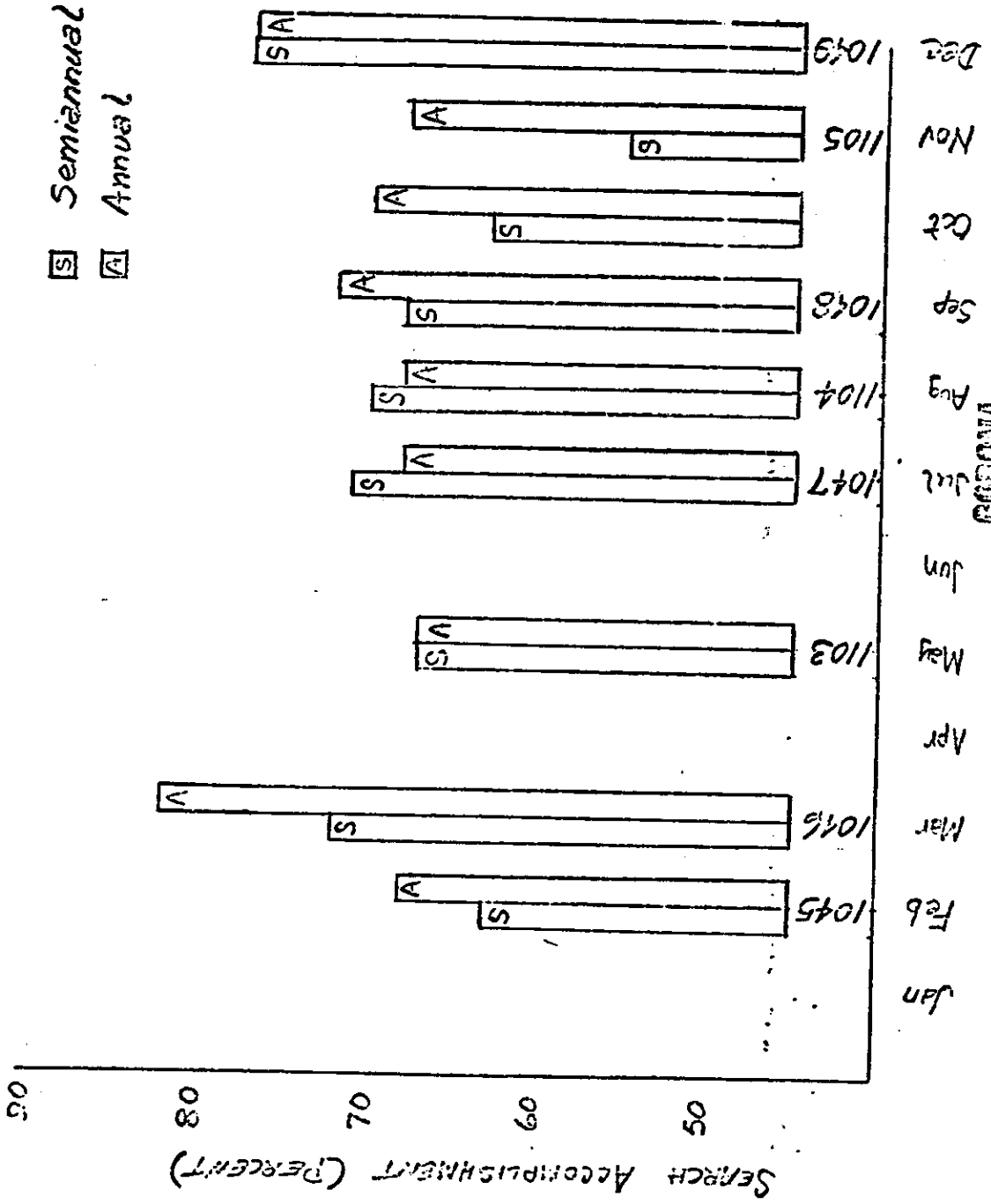
<u>Month</u>	<u>Last Mission</u>	<u>Built-Up Areas</u>	<u>Underdeveloped Areas</u>
Mar 69	1050	1 Oct 68 - 31 Mar 69	1 Apr 68 - 31 Mar 69
Feb 69	1106	1 Sep 68 - 28 Feb 69	1 Mar 68 - 28 Feb 69
Jan 69	1049	1 Aug 68 - 31 Jan 69	1 Feb 68 - 31 Jan 69
Dec 68	1049	1 Jul 68 - 31 Dec 68	1 Jan 68 - 31 Dec 68
Nov 68	1105	20 Jun 68 - 21 Nov 68	8 Dec 67 - 21 Nov 68
Oct 68	1048	1 May 68 - 31 Oct 68	1 Nov 67 - 31 Oct 68
Sep 68	1048	14 May 68 - 2 Oct 68	9 Sep 67 - 2 Oct 68
Aug 68	1104	25 Jan 68 - 22 Aug 68	14 Aug 67 - 22 Aug 68

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FIGURE 1

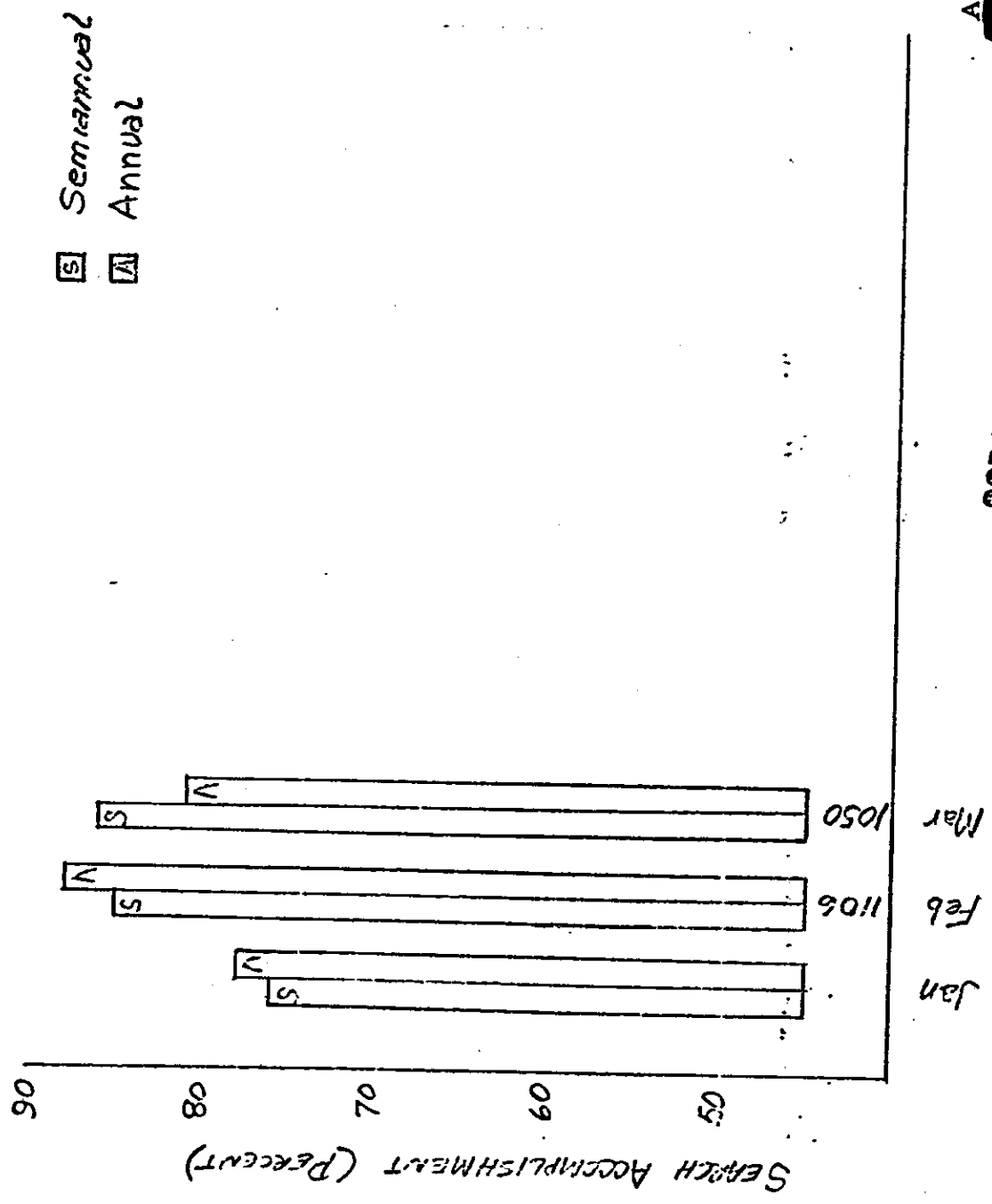
CORONA PERFORMANCE (1968)



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FIGURE 2

CORONA PERFORMANCE (1969)



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 FIGURE 3

MISSION PERFORMANCE SUMMARY

Launch Date	Active Days	Semiannual Search ($6.8 \times 10^6 \text{ nmi}^2$)		Annual Search ($2.8 \times 10^6 \text{ nmi}^2$)		Total Sino-Soviet Area ($9.6 \times 10^6 \text{ nmi}^2$)	
		$\frac{\text{Gross}}{10^6 \text{ nmi}^2}$	Pct	$\frac{\text{Gross}}{10^6 \text{ nmi}^2}$	Pct	$\frac{\text{Gross}}{10^6 \text{ nmi}^2}$	Pct
1104 1968	16	1.75	25.7	0.08	2.9	1.83	19.1
1048	14	2.88	42.4	0.46	16.4	3.34	34.8
1105	18	2.31	34.0	0.78	27.9	3.09	32.2
1049	11	2.32	34.1	0.49	17.5	2.81	29.2
1106	10	2.37	34.8	0.63	22.5	3.00	31.2
1050 1969	2	0.13	1.9	0.35	12.5	0.48	5.0

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 FIGURE 4

CORONA AREA COVERAGE
 (AUG 1966 TO MAR 1969)

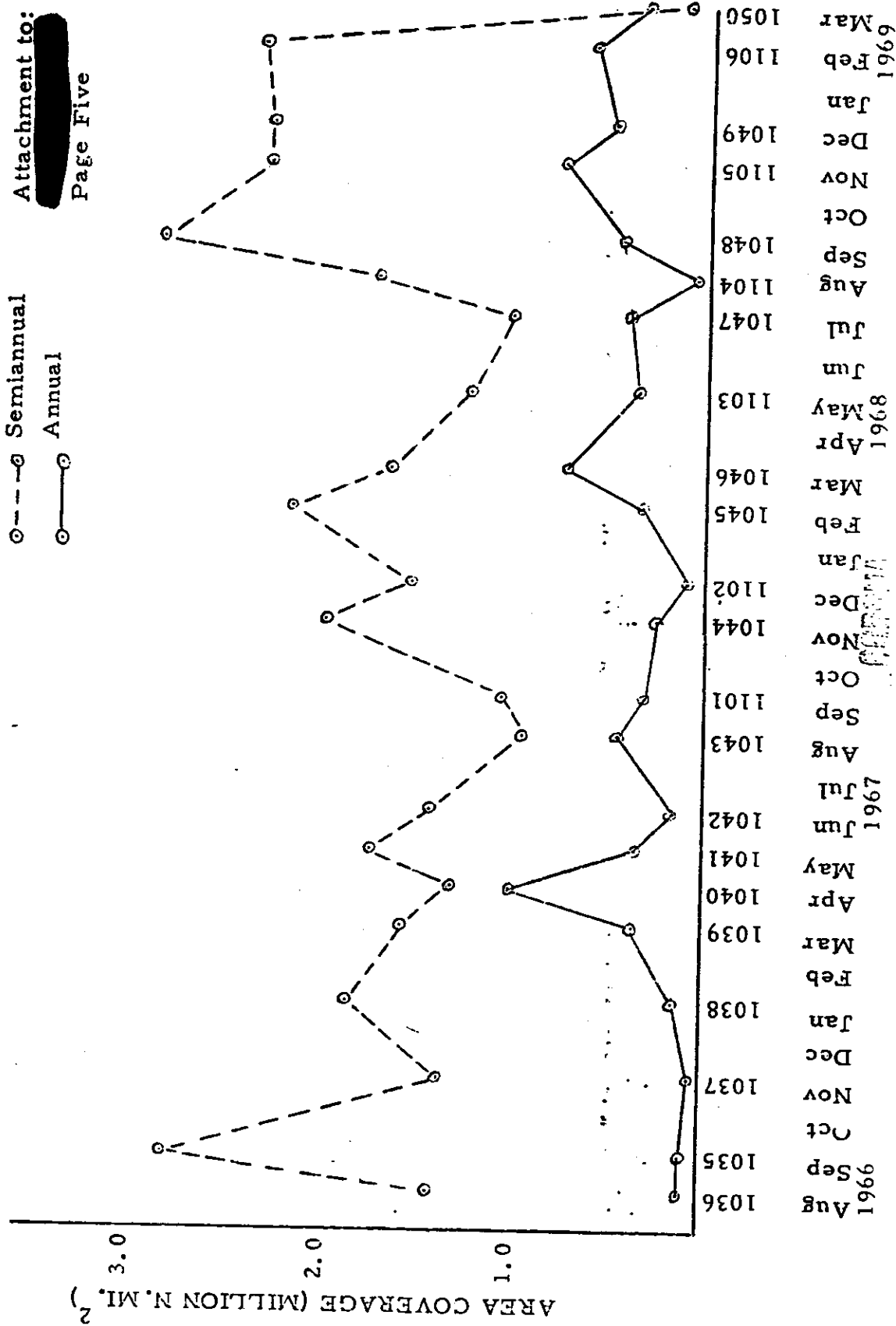


FIGURE 5

CORONA MISSION PERFORMANCE

MC&G COVERAGE

<u>Mission Number</u>	<u>Sino-Soviet (10⁶nmi²)</u>	<u>Equator Belt (10⁶nmi²)</u>	<u>All Other (10⁶nmi²)</u>	<u>Total (10⁶nmi²)</u>
1104	0.019	0.	0.031	0.049
1048	0.065	0.	0.033	0.098
1105	0.	0.	0.	0.
1049	0.032	0.005	0.059	0.096
1106	No Change			
1050	No Change			

1968

1969

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FIGURE 6

CORONA MISSION PERFORMANCE

SINO-SOVIET BLOC SEARCH (SEMIANNUAL)

PERCENT CONTRIBUTION BY MISSION

6 Month Period Ending	MISSION NUMBER												Period Status	Totals Days
	1101	1044	1102	1045	1046	1103	1047	1104	1048	1105	1049	(Stereo) (Stereo & Mono)		
Jan 68	16	29	23	32	25	18	15	24	29	30			63	51
Feb 68			14	15									73	66
Mar 68	16	22	13	13	10									
Apr 68														
May 68			23	25	13	6							67	58
June 68														
July 68			23	25	13	6	4						71	74
Aug 68				32	18	6	5	9					70	75
Sept 68					25	12	12	10	10				68	75
Oct 68						18	14	15	16				63	60
Nov 68							15	17	12	10			55	64
Dec 68							17	19	18	15	10		78	75

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FIGURE 7

CORONA MISSION PERFORMANCE

SINO-SOVIET BLOC SEARCH (SEMIANNUAL)

PERCENT CONTRIBUTION BY MISSION

MISSION NUMBER

1104 1048 1105 1049 1106 1050

Gross Pct. 26 42 34 34 35 2 (Stereo & Mono)

Days on

Orbit

16 14 18 11 10 2

6 Month

Period Ending
(Month) (Mission)

Jan 69 1049
Feb 60 1106
Mar 69 1050

26 24 17 10

42 21 11 10
42 21 11 10 1

Period
Status

76 85 86

Total
Days

59 53 55

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FIGURE 8

CORONA MISSION PERFORMANCE

SINO-SOVIET BLOC SEARCH (ANNUAL)

PERCENT CONTRIBUTION BY MISSION

MISSION NUMBER

Gross Pct.	36	13	6	16	11	10	4	13	25	13	16	2	12	24	1105	1049
Days on Orbit	9	15	15	15	13	9	15	14	15	14	16	16	14	18	18	11

(Stereo)
(Stereo & Mono)

12 Month
Period Ending

12 Month Period Ending	Jan 68	Feb 68	Mar 68	Apr 68	May 68	June 68	July 68	Aug 68	Sept 68	Oct 68	Nov 68	Dec 68	Period Status	Totals Days
Jan 68	25	13	4	6	7	6	3	10	19	8	3		68	105
Feb 68	34	8	3	6	5	2	8	13					82	120
Mar 68			6	10	7	3	10	17	8				67	110
Apr 68			6	10	9	3	10	19	8	3			68	111
May 68			6	10	9	3	10	19	8	3	1		68	127
June 68			11	10	10	4	10	19	9	4	1	5	72	126
July 68				10	10	1	12	23	11	9	1	4	70	113
Aug 68					4	13	22	9	6	1	5	8	68	122
Sept 68					15	23	10	8	2	8	3		78	118
Oct 68														
Nov 68														
Dec 68														

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FIGURE 9

CORONA MISSION PERFORMANCE

SINO-SOVIET BLOC SEARCH (ANNUAL)

PERCENT CONTRIBUTION BY MISSION

	MISSION NUMBER											
1045	1046	1103	1047	1104	1048	1105	1049	1106	1050			
15	28	16	17	3	16	28	18	23	13			

Gross Pct. (Stereo & Mono)

Days on Orbit

12 Month

Period Ending (Month) (Mission)

Jan 69 1049
Feb 69 1106
Mar 69 1050

Period Status

78
88
81

Total Days

118
114
101

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