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Appraisal of Sary-Shagan Area

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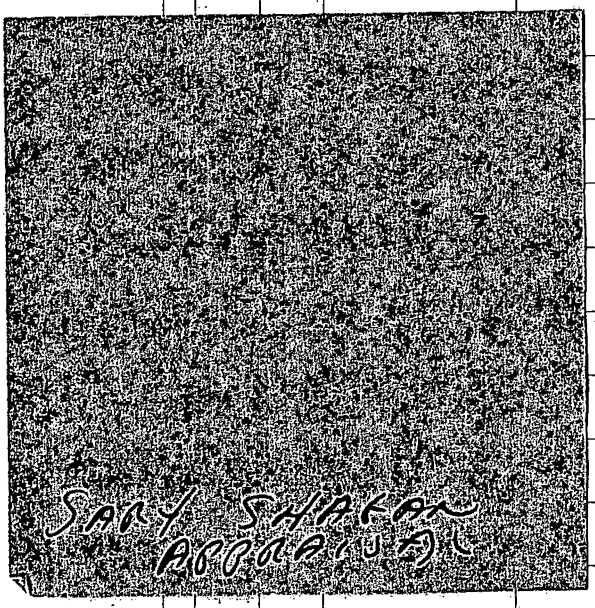

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ROUTE SHEET
NDW-NRL-5511/1552 (Rev. 5-54)

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5614	7/23/68	RDM		
5600	7/18/68	RDM		Has seen rough.
5000	7/23	[illegible]		

IPKG 65-68

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SUBJECT: Appr of msn 7105/7106 in Sary-Shagan area

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MEMORANDUM FOR NATIONAL RECONNAISSANCE OFFICE/SOC

Via: Director, Program "C"

Subj: Appraisal of Sary-Shagan area by Mission 7105 and 7106

Ref: (a) WAHOO cite #3140 DTG 271759Z June 1968

Encl: (1) TABLE 1, Part A; Part B; Part C
(2) TABLE 2, Example 1; Example 2
(3) TABLE 3

1. In response to reference (a) the following is provided. The reply breaks down into two areas (1) time over-target and (2) frequency coverage. Time over the area of interest, where the payloads can intercept and locate signals, is presented first on a weekly basis to give a perspective on how much time is available for fulfilling search and location requirements. The second item, frequency coverage, is presented with the emphasis on ABM requirements, however, specific band groupings can be Tasked over the complete Sino-Soviet emitter spectrum from 153 MHZ to 15.1 GHZ in a large number of flexible combinations.

2. Elaboration on the capabilities follows: Table 1, Part A lists the total minutes of processable coverage using an arbitrary 120 second lower limit intercept-time for the various combinations of collection sites against the Sary-Shagan complex for a collection period of one week. Table 1, Part B indicates closure-time for an average orbit of that weekly total. This was obtained by averaging all orbits passing within the line-of-site horizon of Sary-Shagan. Table 1, Part C is a tabulation of the total coverage against 4 - beams (of $\pm$ 15° Azmith by 10° Vertical) antenna sectors centered on 59°, 89°, 239° and 269° bearings for one week and using the same average orbit used above.

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3. In Table 2 are examples of two possible tasking arrangements. One is oriented to ABM coverage and the other to General Search coverage. Example #1 is a band grouping which covers the R F bands of the ABM emitters. [redacted] 2. Hen House; 3. [redacted] 4. Hen Egg; 5. Ship Wheel) with additional coverage available in other bands. Mission 7106 will have through multiple [redacted] This will be available [redacted] This type of tasking is used in the example shown. Example #2 is a General Search tasking to illustrate coverage of 165 MHZ to 15.1 GHZ. The 7105 R F capabilities are covered in the existing tasking groups and should be added to 7106 coverage since with the expected orbit conditions only a small amount of interference would exist. Other tasking modes which might be arranged would be to use the signal [redacted] options on 1 or 2 payloads with the same bands tasked on the remaining payloads to combine parametric information [redacted]

4. Combining the time and frequency coverage to obtain a "Figure of Merit" of time coverage per mega-hertz per week over Sary-Shagan is presented below. The following examples are provided with ground stations considered fully operational.

(1) For the ABM Figure of Merit

Time Coverage (Table 1, Part A)	40,740 Sec/Week
Frequency Coverage [redacted] from Table 2 Example #1)	1,292 MHZ
ABM Time - Frequency coverage Figure of Merit	$5,2Y10^7$ MHZ Sec/Week

(2) For General Search Figure of Merit

Time Coverage (Table 1, Part A)	40,740 Sec/Week
Frequency Coverage (Table 2, Example #2) . .	10,460 MHZ
General Search Time Frequency Coverage Figure of Merit	$4.2X10^8$ MHZ Sec/Week

This "Figure of Merit" could be computed for the combined 7105-7106 Missions to show the improvement of increased coverage. It is fully realized that over a given week many different band combinations might be used to fulfill the various requirements. The above discussions are intended to give examples

of the capabilities which might be operationally used to meet specific requirements. Density or long emitter pulse problems whichcan be determined only on specific orbits with the operating sensitivities, band limits, processing techniques etc., available only after launch, must certainly be taken into consideration.

5. While this example was directed at the center of Sary-Shagan, the same R F spectrum coverage is obtained over the entire Sino-Soviet Block with approximately the same time coverage for any specific location as for Sary-Shagan. For ABM intelligence and other geographical and/or spectrum dispersed activities Mission 7106 provides frequency (see Table 2) and instantaneous geographical (approximate 11 million square miles) coverage similtaneously over many high interest locations such as Sary-Shagan, Angarsk, Moscow, etc.

6. It should be noted that the use of fully operational stations (field digitizer) provides a most significant improvement in over-all capabilities. Table 3 compares the capabilities of a fully operation station to that of an analog station.

Acting

TABLE 1

TIME COVERAGE

Part A (A weekly totals)

STATIONS				
One Week 7106	679 Minutes	602 Minutes	273 Minutes	490 Minutes
One Week 7105/7106	1358 Minutes	1204 Minutes	546 Minutes	980 Minutes

Part B (Average Closure Figures)

Average Orbit Time	12.4 Minutes	10.1 Minutes	4.5 Minutes	8.2 Minutes

Part C (Beam Coverage)

One Week Against Beams 7105	189 Minutes	119 Minutes	77 Minutes	119 Minutes
One Week Against Beams 7105/7106	398 Minutes	238 Minutes	154 Minutes	238 Minutes

NOTE: Times are in minutes for easier handling

Encl (1)
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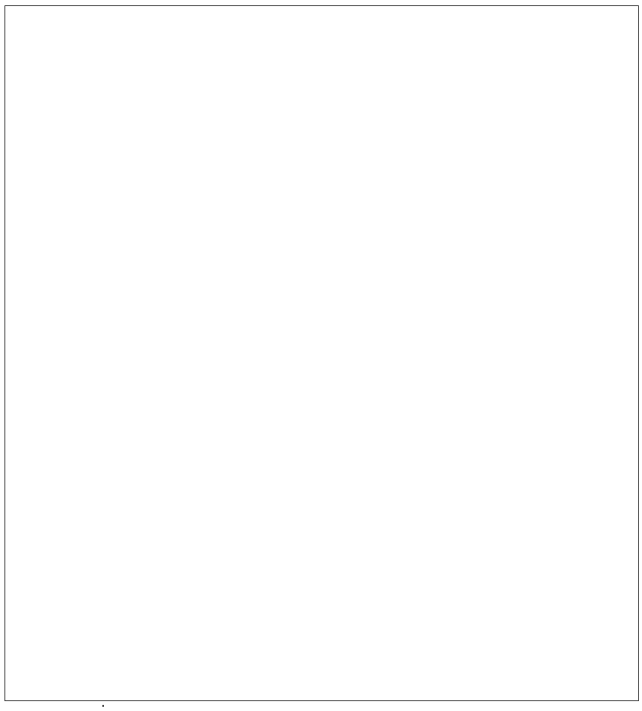
TABLE 1

FREQUENCY COVERAGE EXAMPLES

Example #1 ABM Mode

BANDS COVERED ON A ABM LOCATION TYPE TASKING/PASS



EXAMPLE #2

GENERAL SEARCH MODE

PAYLOAD 7106 A

B Transmitter		C Transmitter	
Width	Freq. (MHZ)	Width	Freq. (MHZ)
W	2680-2930	W	450-550
X	165-200	X	650-820
Y	1800-2100	Y	2580-2680
Z	350-450	Z	200-240

PAYLOAD 7106 B

B Transmitter		C Transmitter	
Width	Freq. (MHZ)	Width	Freq. (MHZ)
W	8600-9340	W	9340-9500
X		X	2930-3120
Y	5250-5850	Y	5850-6700
Z	9500-10,000	Z	920-1080

PAYLOAD 7106 C

Width	Freq. (MHZ)	Width	Freq. (MHZ)
W	550-650	W	4850-5250
X	835-970	X	2100-2580
Y	7300-7900	Y	1080-1350
Z	7900-8600	Z	240-350

PAYLOAD 7106 D

Width	Freq. (MHZ)	Width	Freq. (MHZ)
W	14,600-15,100	W	6700-7300
X	3120-330	X	3300-3600
Y	4050-4850	Y	1350-1800
Z		Z	3600-4050

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TABLE 3

	FULLY OPERATIONAL STATIONS		ANALOG STATIONS	
1.	4-Ball 2 Trans 4 Band/Transmitter =	32 Bands	2-Ball 2 Trans 2 Bands =	18 Bands
2.	Most accurate PRI system available	Yes		No
3.	P R F - [redacted] system	Yes		No
4.	[redacted] system	Yes		No
5.	Capability to watch all known ABM bands at one time	Yes		No
6.	Capability to watch any or all of the Sino-Soviet emitter families from 165 to 15.1 gc	Yes		No
7.	Location accuracy to meet requirements	Yes		No
8.	QRC-Field Station ABM or other high national interest location capability	Yes		No

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