OUTGOING
NRL SPECIAL PROJECTS CONTROL NUMBER

BYE-61781-92

6/30/94

~~TS~~

DATE
661006

ORIGINATOR	SERIAL NO.	ENCLOSURES
8000	BYE-61781-92	00

RECEIVED	COPY NUMBERS	RECEIPT NO.
	1	H/C

SUBJECT
LM W/P DET OF POPPY SW

DISTRIBUTION INFO

ROUTE TO	COPY NO.	W/ ENCL	SIGNATURE	DATE OUT	DATE RET'D
1298	1	00		920604	

TRANSFER

DESTROY

NRL OUTGOING DOCUMEN

BYE-61781-92

1

DES/SHEET NO.

COPY NO.

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DATE -

FINISH FILE

4 October 66

Systems Analysis Staff- Technical Note

Determination of POPPY Swath Width

1. Figure 1 represents the frequency of intercepts from [redacted] radars dependent on their off-nadir distance as collected by POPPY on Mission 7104.

2. The CIA ROB lists [redacted] radars in the Sino-Soviet Bloc.

3. To determine the effective swath width of POPPY the data shown in Figure 1 is statistically weighted according to the following relationship:

$$SW_{*} = \frac{k}{\sqrt{f_{max}}} \sum_{n=1}^{\partial} (f_n)$$

* Determined for right and left of nadir where

SW = effective swath width of POPPY task against emmitting sources which transmitted useable data.

k = sample interval = 120 NM (from Figure 1)

n = interval

FIGURE 1: DISTRIBUTION OF INTERCEPT OFF-LINE AIR DISTANCE

CONTROL SYSTEM UNIT

EARTH

INTERCEPTS

70 60 50 40 30 20 10

Table 1 (From Figure 1)

n	NM	f_n left	f_n right
1	0 - 120	1	1
2	120 - 240	0	1
3	240 - 360	0	1
4	360 - 480	0	1
5	480 - 600	2	3
6	600 - 720	0	8
7	720 - 840	0	8
8	840 - 960	2	16
9	960 - 1080	14	25
10	1080 - 1200	29	68
11	1200 - 1320	35	61
12	1320 - 1440	43	67
13	1440 - 1560	38	48
14	1560 - 1680	32	25
15	1680 - 1800	14	6
16	1800 - 1920	6	1
17	1920 - 2040	0	0
		216	340

HANDLE VIA
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for SW_{left} $= \frac{120}{43}$ (216) = 603

and SW_{right} $= \frac{120}{68}$ (340) = 600

SW (POPPY 7104) = 1203

The expected number of intercepts per day may be determined according to the following relationship:

$$I = T\ L\ P_D\ N\ P_O\ P_P$$

Where I = expected number of intercepts per day

T = percent tasking

L = looks per day = kSW

Where k = .00235

P_D = probability of detecting signal

P_O = probability that the emitter is operating

P_P = probability that the intercepted signal is processed

N = number of radars

For POPPY Mission 7104

T = 5 % (NRO)
SW=1200 NM (From Above)
k = .00235 (Constant)
P_D = .99 (High probability due to POPPY design)
P_O = .2 (Early Warning Radars)
N = [redacted] (Number of [redacted] radars)
P_P = .25 (COMOR CET F-D-6)
I_{7104} = .05 x 1200 x .00235 x .99 x 294 x .2 x .25
= 2.07 intercepts / day

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For POPPY Mission 7105

T = 6.67%
SW = 1200 NM (From above calculation)
k = .00235 Constant
P_D = .99 (High probability due to POPPY design)
P_O = .2 (Early Warning Radar)
N = [redacted] (Number of [redacted] Radar)
P_P = .5 (COMOR CETF -D- 6)

I = .0667 x 1200 x .00235 x .99 x .2 x 294 x .5

= 5.53 intercepts / day

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Intercepts / Day = K Swath Width x % Track x P_{on} x P_{det} x P_{recog}

Intercepts / Day = K Sw x % track x P_{on} x P_{det} x $P_{recognize}$ x No

$1.30 = \frac{1}{425} 600 \times \frac{1}{3} \times P_{on} \times 1.0 \times \frac{2}{3} \times 8.0$

$P_{on} = \frac{1.3 \times 3}{200 \times 8} = \frac{39}{\pi(100)} = \frac{1}{400} = 0.3\%$

~~Top Secret~~ //

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	% Tasting	SW EDB	SW GS	Pkt % Processable	P Bag non Circ
Pappy		1200	2600	.25	.70 1.2
7104	.12	1200	2600	.50	.80 1.2
7105	4/9 x .7		~~?~~ 1300	.67	.75 1.0
Dunnion	1/3	~~500~~ 550	~~?~~ 1200	.67	.75 1.0
Tripos	1/3	~~650~~ 550		.90	.90 1.0
Setter	.9	390	340	.9	.9 1.0
MG	.9	150	~~150~~ 1200	.67	.75 1.1
S/S	1/3	500	1200		
F/T II					
S/S II					
F/T III					