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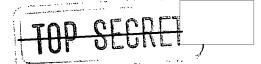
## RADAR TYPES BY PERCENTAGES AS OF MARCH 1961

Туре	Description	% of Total	
	Modern set		
	modern set	10.3	
TOKEN	older set	19.3	
STRIKE OUT,	older set	9.5	
ROCK CAKE	older set	4.2	
STONE CAKE	newer set	4.8	
variants	Search, anomalies of basic set	0.8	
	New	0.1	
	Friendly	2.8	
•	Friendly Fire Control Sets	0.2	
	Friendly Airfield Surveillance	1.6	
	Other Friendly radar	8.1	
	Unidentified or miscellaneous	4.5	

# Signals not yet heard:

1 Soviet Fire Control radar

- 2. Older Moscow Defense Radar (GAGE,
- 3. Surface-to-air missile guidance radar (New YO-YO)



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### SUMMARY OF INTELLIGENCE DERIVED

- 1. Summary and conclusions as they are related to the objectives of the project are outlined as follows
  - a. Signal Environment in "S" band over Sino-Soviet Bloc
- (1) <u>High signal-density over the USSR</u>. Examples are over 90 separate radars detected by the satellite within a minute at peak density and 30 40 per minute quite frequently. On an average density mission (e.g. Mission 905), 224 separate radars were intercepted. Only eleven of these radars were unidentified; 86% of total radars were Soviet Bloc sets.
- (2) <u>Variation in density</u>. This was most significant as function of time with a greater activity during daylight hours. Lower Soviet density was noted over west central Asia and Communist China. Highest density was observed along the Iron Curtain border in Europe, with lesser peaks indicated in the Black Sea and extreme southeastern Asia.

(3) <u>Important peak</u>	activity in Aighan -		
Pakistan border regions. A secondary concentration of	was		
noted along European borders of Bloc. This indicates i	mportance of these areas		
to Soviet defense.			
(4) Composition of Soviet radars.	appears to be the most		
common Soviet EW set. are rel	atively common, with slight		
preference for the newer sets. Standard Soviet EW dep	loyment shows about 60%,		
preference for newer 375 pps radars compared compared	to older sets. Although		
radars are in reduced usage, about 25% of Sovi	et search radars observed		
were of type. A few odd PRF variants of Soviet	EW radars were noted,		
the lower PRF's possibly being radar range extension m	odifications beyond		
200-mile current limitations.			
(5) Lack of unidentified, new or unus	ual Soviet Bloc equipment.		
This was noted despite large numbers of Soviet radars	employed and demonstrated		
interception capability against fire-control and naval r	idars. Such Soviet radars		
as CAGE and were not obse	ryed A indicating their		
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negligible contribution to current EW defenses. Lack of new equipment types is considered a significant finding.

Sino-Soviet Bloc:

Sino-Soviet Bloc:
(1) Ability to determine radar location dependent upon type of radar
and depth of data. Computation on isolated emitters permit location to be
determined on a single pass to within plus or minus 100 miles. If a given emitter
can be identified on subsequent passes, location accuracy is substantially
improved (plus or minus 50 miles has been achieved in test cases to date.) With
radars, which comprised about 25% of those intercepted,
computation should provide accuracy of location to within plus or
minus 30 miles. This same technique may also have application to
(2) Computer program potential. A computer program is fully tested
to perform the location function when proper inputs are ready. To date the most
comprehensive test of manual versus computer techniques (employed in a typical
mission but limited to burst selection comparison) results in 85% correlation.
Results on this same mission (905) indicate that at least 10% of the radars
were intercepted on both the leading and trailing rims of the annulus.
(3) Substantial contribution of unique data to Electronic Order
of Battle (EOB) assured. This demonstrated capability for coverage of the entire
Sino-Soviet Bloc with considerable flexibility of time and area may ultimately afford an
EOB of the interior of the Bloc for the first time. Mission 905 theffirst major
pass thoroughly analyzed - detected 224 radars, of which 86% were of Soviet
origin and reliably identified as such.
(A) Production of FOR to follow development of negociary data

processing techniques.

Inasmuch as both the volume of data and emitter location

problems recensitate machine methods, priority of EOB production has been scheduled to come after development of the data analysis and processing techniques.

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- c. Location and major emission characteristics of unknown and unique S-band emitters in Sino-Soviet Bloc:
- unidentified signals found, nknown and unique signals was characteristics of all missions (in Mission 905, all but eleven of the 224 signals were isolated).

  These unidentified signals are believed to be largely due to lack of scan rate, malfunctioning of equipment, unusual power sources or intentional variations from standard pulse rates to extend range.
- (2) <u>Potential</u>. The satellite in detection of anomolies in friendly equipments demonstrates its potential in case such unique Soviet equipment exists.
- d. Aid to development of more sophisticated processing techniques and intelligence applications.
- (1) <u>Significant advance in analytic state-of-the-art</u>. The semi-automatic analytic methods, especially the analog presentations, being developed will greatly expand the potential and adaptability of present manual signal analysis. Experience being gained in computer programming for fully automatic processing of this project data will be an invaluable asset in data handling problems of future collection systems. The complete manual readout of Mission 905 and its comparison with computer read-out has resulted in a more realistic definition of remaining problem areas.
- (2) <u>Importance of "in-house" capability</u>. The ability to handle high volume intercept processing being developed "in-house" will afford a capability to apply effectively, rapidly and economically this potential to high priority and sensitive projects.
- (3) Increased emphasis in high probability intercept equipment

  employment. The extensive implementation of high probability intercept equipment
  has been hampered in the past by the realization of the enormity of the data

  processing problem. Successful solution of this problem will expand such employment
  to better prevent technological surprise.

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pathe regrirences for higher quality and more refined data in present and future

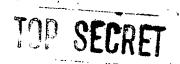
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e. Interceptions of friendly radars:

Europe apparently has more S-band radars active than the U.S. in the ZI.

Coverage of frie eutral radars should be of technical as well as occasional strategic interest.

(2) <u>Significant types identified</u>. Malfunctions and irregularities in performance are easily detected. Conically scanned fire-control radars were recognized and shipborne radars were detected. French, British, U.S., and west German radar types were observed in many friendly areas.



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