SUMMARY

The present 7-101 A and B Satellites each provide four RF intercept bands. 7-101 A covers the bands 165 to 200 Mc, 320 to 390 Mc, 510 to 610 Mc and 2000 to 2750 Mc. 7-101 B covers the following bands 192 to 237 Mc, 380 to 480 Mc, 570 to 710 Mc and 2600 to 3250 Mc. These satellites were launched into a 70^0 orbit on 13 December 1962. A rather poor orbit was achieved having an apogee of 1485 miles and a parogee of 120 miles altitude. This causes the horizon coverage from the satellite to vary continously from approximately 5500 miles to 1800 miles in diameter.

Frequency coverage with this collection system includes 42 % of the spectrum between 1000 and 4000 Mc/s and 57% of the region between 100 and 1000 Mc/s with extremely high probability of intercept of any search radar with reasonably high power exists. Some additional frequency coverage between 100 and 1000 Mc/s was obtained in the last DYNO II Satellite and future efforts will complete coverage of the spectrum. It is considered urgent to thus cover the spectrum over a fairly long time frame to search for new systems and new bands in use by the Sino-Soviet Bloc. The following summary covers very early analysis of results in each of the bands covered.

165-200 Mc Band

In this frequency band, TALL KING Radar is the major source of signals and they are widely displaced throughout the Soviet Union. These signals are so strong that side lobes may appear in the data. At present this is not confusing the analysis. So far the data indicates a heavy concentration on the Southern border. In some areas these radar seem to have supplanted certain of the S-band early warning radar. To date no evidence of staggered pulsing has been present. All the standard parameters of TALL KING have been observed. At present these radar only appear in the Soviet Union [redacted] TALL KING is the best widely-deployed EW radar in the USSR, hence its deployment in hard-to-reach areas of the Soviet Bloc will be of great interest. The failure of the Soviets to deploy their best and newest radars in China is of interest and continued confirmation of this is of high intelligence priority. Staggered pulsing and lower prf rates may indicate greater range, so study of signals for such anomalies not yet observed is contemplated.

192-237 Mc Band

The [redacted] which is a prime [redacted] radar of the [redacted] has been appearing often in the data. The principal locations of these radar are in [redacted] All of the usual characteristics have been noted in the data. PRF's of 12.5 and 25 pps have been observed.

Some intercepts of other radar in this band appear [redacted] and are of lesser power.

To date the Soviet Long Range, High-Power Radar postulated by some persons to probably be in this band have not appeared.

Performance in this band indicates that any moderate powered Sino-Soviet radar used periodically for EW should be detected. The fact that no new such equipments are yet noted in the data is extremely encouraging. Repeated detection of the [redacted] is also comforting as proof that any similar Soviet system in real use would be observed in the bands covered. These friendly radars may provide some means of crude checks of location techniques at these low frequencies. This is the first time we have worked below 550 Mc/s with this collection system, and results are most encouraging.

320 to 390Mc Band

[redacted] Radar of the BMEWS System in Greenland, have been appearing regularly in the data. The PRF of this radar is extremely stable at 25.8 pulses per second. Scan times average about 4 seconds. Burst structures show evidence of pulse pairs with duration as long as 233 milliseconds.

No other signals have appeared in the data analyzed to date.

The signals in this band have not been observed in the Asia and the Far East areas.

The same comments apply to these signals as to the [redacted]

380 to 480 Mc Band

So far the data analyzed has indicated no signals were present in this band. It is somewhat surpirsing that some of the [redacted] radars have

not appeared in this data; it is apparent that those within detection range operate at a somewhat lower r-f than the nominal 400 Mc/s.

510 to 610 Mc Band

The [redacted] has produced the most intercepts in this band. This radar also appears in [redacted] The scan rates vary considerably from 14 seconds to 40 seconds per scan with a PRF in the vicinity of 198 to 200 pulses per second. This radar has not yet been reported in China. Spread to other nations may have significant political implications.

[redacted] L" Band components are heard frequently in this band. Characteristics are normal for this radar. The degree of synchronization with S-band equipment can be checked with this package unlike the last collection effort. A fairly small percentage of S-band radars appear to utilize this L-band component or are able to do so.

[redacted] radars with the usual characteristics of 5.6 second scan rate with widely varying PRF from 385 to 800 pps are intercepted widely [redacted] as far as determined thus far.

[redacted] radar are also present in this band. These radar are located [redacted] and exhibit most of the usual parameters for this equipment. PRF of 380 pps have been observed rather than the 500 pps listed in most references, carrying this radar's characteristics.

570 to 710 Mc Band

Only a few [redacted] Radar are appearing in this frequency range, indicating that the majority of these radar are below the frequency cutoff of this band. This is interesting, since peripheral intercepts indicate the [redacted] has one beam sometimes used around 605 Mc/s. Apparently few now use this higher frequency.

[redacted] "L" Band components and [redacted] have not been observed in the data analyzed to date for this band. Peripheral intercepts indicate center frequency of operation is at 575 Mc/s or lower on both sets.

Numerous signals of new types are evident, particularly from the [redacted] Some of these are [redacted] since their characteristics are common to many of [redacted] Radars. Study of these will be of interest since the region 610-710 Mc/s has not been covered by this collection effort previously.

The portions of this band which overlap the next lower band of the other bird, has not produced a large number of signals in common, thus limiting the data [redacted]

None of the data analyzed to date has shown any intercepts of the type previously referred to as Soviet ABM Type. Although analysis effort is thus far early, it is evident this signal is not being employed with the regularity of our own established systems, such as the [redacted] series.

Should this signal be detected again, better frequency resolution should be possible in conjunction with collection band A-3.

2000 to 2750 Mc Band

The density in this portion of the "S-band" is considerably lower than the 2600 to 3250 Mc portion employed in the other satellite.

The majority of the radars intercepted have been [redacted] of the ROCK CAKE/STONE CAKE types.

The [redacted] family have been appearing in the data from this band. These signals should provide the principle targets for the evaluation of the [redacted] program.

No new radar types have been evident to date. A [redacted] signal has been aurally detected, which could be [redacted] equipment or a [redacted] type signal.

The much lower density of signals (as compared to B-4) will permit much quicker screening of data for new signal types.

2600 to 3250 Mc Band

The signal density in this band is considerably higher than that encountered in June - September 1960 on DYNO I. Counts as high as 15 radar illuminations per second have been observed compared to 9 or 10 on DYNO I. Incidents have noted from field observations that when missile

range activity is taking place, signal densities in this band are higher than normal. This indicates probable build-up of both Soviet and radar since 1960.

To date, due to high signal density, signal analysis has been limited to manual methods in this band.

"S-band" emitters are located throughout the entire Soviet Bloc.

A unique S-band V-beam Token type radar has been intercepted from Java area with the following characteristics: PRF - 340 pps, circular Scan Rate 19.95 seconds. The appearance of such a ("Token") radar is not surprising in Indonesia but had not been confirmed in operation. (Five such radars were reported as ordered during 1962). This further indication of build-up of Soviet equipment in this area is of political significance.

are evident in large numbers throughout the data.

ROCK CAKE/STONE CAKE family are also numerous. These radars exhibit typical published characteristics.

To date no new or unidentified types have been evident. Numerous Soviet radar have similar characteristics which makes accurate identification difficult.

Thus far the non-appearance of significant numbers of new radars is very encouraging, and indicates some insurance against Soviet technological surprise. The many bands utilized in the packages this time will permit some study of cross-band operation, synchronized pulse and antenna rotations, such as between L and S-band components of the 375 pps family.

The times of operation of the TALL KING as a function of days in the weeks and hours will be of greater significance than the S and L-band observations previously made due to the greater range of this radar and thus its greater importance to Soviet defenses. The lower density of TALL KING signals will permit readily such studies. We shall also be most interested in its use in the Arctic areas not now reached by other collection means. Furthermore, it is hoped that the data can be correlated with the efforts of NRL utilizing Moon Bounce techniques in the same frequency band with the 150-foot parabola as a means of aiding evaluation of location techniques by both systems.

These results are preliminary and subject to modification with time.