FORM A-1 JOB ORDER ESTIMATE (SPRING, FY 1963)

B. NRL Problem No. [redacted]

A. Title (or brief description of proposed problem):

C. Branch Code 7190

D. Sponsors Project Number [redacted]

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Solar Radiation Satellites

E. FINANCIAL ESTIMATES COST ELEMENT	TOTAL FY 1962 Jul'61-June'62 MW	TOTAL FY 1962 Jul'61-June'62 Amount	1st HALF FY'63 Jul-Dec 1962 MW	1st HALF FY'63 Jul-Dec 1962 Amount	2nd HALF FY'63 Jan-Jun 1963 MW	2nd HALF FY'63 Jan-Jun 1963 Amount	TOTAL FY 1963 Jul'62-June'63 MW	TOTAL FY 1963 Jul'62-June'63 Amount
DIVISION ROUTINE COSTS: 11								
1. Straight Time Pay 12 + Fringe Benefits 15	271	52.9	154	33.1	161	34.5	315	67.6
2. Overtime 13, 14, 16, & 18	86	15.6	40	7.3	40	7.3	80	14.6
3. Materials, Travel & Misc. (73, 21, etc.)		106.0		60.0		60.0		120.0
SERVICE DIVISION SUPPORT:								
4. ESD Pay etc. 52311 12, 13, 14, 15, 16)	57	8.0	40	6.2	45	7.0	85	13.2
5. ESD Non-Salary Costs 52373 52381		2.6		2.0		2.0		4.0
6. Other Pay etc. (PW, CBA, etc.)	16	3.2	10	2.0	10	2.0	20	4.0
7. Other Non-Salary Costs		2.4		1.2		1.2		2.4
APPLIED OVERHEAD:								
8. Gen. & Adm. Overhead 88888	426	54.1	244	31.7	256	33.4	500	65.0
9. Division Indirect 9999	357	14.3	194	8.5	201	8.8	395	17.4
SUBTOTAL ROUTINE 10. Lines (1) through (9)		259.1		152.0		156.2		308.2
MAJOR CONTRACTS 11. & PROCUREMENTS 71		197.2		230.0		246.0		476.0
TOTAL 12. (Line 10 + Line 11)		456.3		382.0		402.2		784.2
13. Summer Employee Man-Weeks incl. in Line 1								
14. WAE Man-Weeks included in Line 1								

Round dollar estimates to nearest $100 and express in thousands, e.g. 6,420 = 6.4.

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	FY 1962 Budget	Extrapolation ONR	Extrapolation Other	Extrapolation Total	Division Request ONR	Division Request Other	Division Request Total	Proposed Budget ONR	Proposed Budget Other	Proposed Budget Total
Reg. M-Y	4.9						7			
R.P.M.							44			
Routine Mo. Proc.	320.5						308.2			
Total	325.4									

SOURCES OF FINANCIAL SUPPORT: (FISCAL YEAR 1963)

Please supply fiscal year 1963 support information on the chart below.

Bureau or Agency	% Should Support	Amount Probable Support	Cognizant Person Code	Cognizant Person Name	Basis of Expectation e.g. letter, fonecon
[redacted]					
[redacted]					
[redacted]					
[redacted]					
BuWeps	100		5170		
GENERAL ONR					
TOTAL					

COMMENTS RE FINANCIAL SUPPORT OR EXTRAORDINARY COSTS OTHER THAN MAJOR PROCUREMENTS

MAJOR CONTRACTUAL SERVICES AND PROCUREMENTS (ITEMS OF $5,000 OR MORE)

DESCRIPTION	TOTAL FY 1962 Jul'61-June'62	1st Half FY'63 Jul-Dec 1963	2nd Half FY'63 Jan-Jun 1964	TOTAL FY 1964 Jul'63-June'64
Keithley Development		40.0		40.0
Keithley μμ Ammeters		50.0		50.0
Keithley Electrom. & Power Supplies		50.0		50.0
Martin Ion Chambers		50.0		50.0
X-Ray Detectors		10.0		10.0
Lyman-α Detectors		15.0		15.0
Counter-Shift Register Assemblies		15.0		15.0
Data Analysis			150.0	150.0
Pulse-ion Ch.-Electrometer Dev. & Procurement			10.0	10.0
X-Ray Detector Dev.			10.0	10.0
X-Ray Detector Calib. Equip.			10.0	10.0
RCOP Photomultipliers			16.0	16.0
CELPAR Photomultipliers			10.0	10.0
Pulse Amplitude Analyzers			40.0	40.0
TOTAL (Same as Line 11)		330.0	246.0	476.0

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ESSENTIAL ESTIMATE (BOB Form A-11)

Problem No. 71000.32

Branch Code 7100

SOLAR RADIATION SATELLITES

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	TOTAL FY 1963	TOTAL FY 1964	TOTAL FY 1965
Average Number of Regular Scientific Employees	10	10	10
Total Routine Expenses	500.0	500.0	500.0
Total Major Procurements and Contracts	1000.0	1000.0	1000.0
Total Obligations	1500.0	1500.0	1500.0
SOURCE OF FUNDS General Obligation			
Other (Specify: EUROPE			
Detail of Major Procurements and Contracts			

Refer to Check Memo to Code 7000 (copy enclosed)

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Please Write Comments on Reverse Side

% OF TIME IN SUNLIGHT
7101A + 7101B
PL 120 + PL 121

100
95
90
85
80
75
70
65
60

(Curve-3)

DEC 21 26 31 5 10 15 20 25 30 4 9 14 19 24 1 6 14
1962 1963
JAN FEB MARCH

Approved for Release: 2024/06/08 C05025910

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Summary:

The present 7101 A and B Satellites each provide four RF intercept bands. 7101 A covers the bands 165 to 200 MC, 320 to 390 M.C., 510 to 610 M.C. and 2000 to 2750 M.C. 7101 B covers the following bands 192 to 237 M.C. 380 to 480 M.C., 570 to 710 M.C. and 2600 to 3250 M.C. These Satellites were launched into a 70° Orbit on 13 Dec 1962. A rather poor orbit was achieved having an Apogee of 1485 Miles and a Perigee of 120 Miles altitude. This causes the horizon coverage from the Satellite continuously to vary from approximately ~~2500~~ Miles to 1800 Miles in diameter.

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~~SECRET~~ Frequency coverage with this collection system includes [redacted] percent of the [redacted] rum between 1000 and 4000 Mc/s and ~~38~~ 42% of the region between 100 and 1000 Mc/s. ~~with~~ Extremely high probability of intercept of any search radar with readonably high power exists. Some additional frequency coverage between 100 and 1000 Mc/s was obtained in ~~our~~ the last ~~package~~, 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 ~~with their attendant components~~ in use by the Sino-Soviet Bloc. The following summary covers very early analysis of results in each of the bands covered.

~~SECRET~~ [redacted]

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[redacted]

mc Band.
satellite,
165-200 ~~Old Band A-1, Bravo Receiver (wide Pulses)~~).

1. In this frequency band, TALL KING Radar are 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 as contemplated

192- 237 mc ~~Old satellite, Collection band B-1, Bravo receiver (wide pulses).~~
B/W

1. The [redacted] radar which is ~~one of the~~ a prime [redacted] radar of the U.S. has been apearing 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.

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

3. 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 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 [redacted] 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.

[redacted]

~~320 to 390 mc Band A, Collection band A-2, Receiver Charlie Wide pulse.~~

1. [redacted] Radar of the [redacted] System in [redacted] have been appearing regularly in the dapa. 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.

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

3. The signals in this band have not been observed in the [redacted] areas.

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

Band
380 to 480 mc ~~GIB satellite, Band B-2, Receiver Charlie wide pulses.~~

1. So far the data analyzed has indicated no signals were present in this band. It is somewhat surprising 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.

Band
510 to 610 mc. ~~GIA satellite, Collection band A-3, Receiver Charlie Narrow pulses~~

1. The [redacted] has produced the most intercepts in this band. ~~Its distribution in the Soviet Satellite countries is rather wide.~~ This radar also appears in [redacted] The scan rates vary considerably from 14 seconds to 40 seconds per scan with a PRF in the vacinity of 198 to 200 pulses per second. This radar has not yet been reported in China. Spread to other nations may be significant political implication.

2. [redacted] "L"Band conponents are heard frequently in this band. Characteristics ~~of [redacted]~~ 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

3. [redacted] the usual characteristics of 5.6 second scan rate with ~~mostly a fixed~~ widely varying PRF from 385 to 800 pps are intercepted widely [redacted] so far as determined thus far.

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~~SECRET~~ [redacted]

4. [redacted] radar are also present in this band. These radar are located in [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 ~~C1B stacllite, Band i-j, Receiver Charlie Narrow pulses~~.

1. Only a few [redacted] are appearing in this frequency range, indicating that the majority of these radar are below ~~the~~ 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 fre[redacted]

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

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

4. The portions of this band which overlaps the next lower band/has not produced a large number of signals in common, [redacted]

5. 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 that 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.

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~~2000 to 2750 mc GOLA satellite, Band A-4, Receiver Bravo, Narrow pulses.~~ Band

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

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

3. ~~The bulk of~~ 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]

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

5. 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 GOLA satellite, Band B-4, Receiver Bravo, Narrow pulses.~~ Band

1. The signal density in this band is considerably higher than that encountered in June 1960 September 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 possibly non-Soviet since 1960.

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

3. [redacted] "S-Band" emitters are located throughout the entire Sino-Soviet Bloc.

4. A unique S Band [redacted] type radar has been intercepted from [redacted] area with the following characteristics, PRF -340 pps, circular Scan Rate 19.95 seconds. The appearance of such a [redacted] radar is not surprising in [redacted]

5. [redacted] are evident in Large numbers throughout the data.

6. [redacted] Rock Cake/Stone Cake family are also numerous. These radars exhibit typical published characteristics.

7. To date no new [redacted] identified types have been evident. Numerous Soviet [redacted] radar have similar characteristics which makes accurate identification

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difficult.

8. ~~From field observations report signals on one frequency band appear to be PRF locked with signals of another frequency band such as might be expected from [redacted] which would be keyed in synchronism from a common modulator.~~

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 [redacted] 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 low 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 ~~[redacted]~~ in the same frequency band ~~using~~ with the 150-foot parabola ~~and moon bounce techniques~~ as a means of aiding evaluation of location techniques by ~~this means~~ both systems.

These results are preliminary and subject to modification with time.

NRL utilizing Moon Bounce Techniques