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23 July 1962

To Code 5170

From Code 5435A

Subject FY'63 BudgetPlanning, Experiment Guide lines for

1. Budget estimates are based on a requirement for/~~xxxxx~~ two launches of two Greb payloads each, on the Thor-Agenaand one launch of two Greb Payloads on a Thor-Able Star in FY'63. Slightly different restrictions exist in the definitions of the payloads for each of these launches so they shall be handled in time sequence:

A. Novenber Thor-Agena.

1. ~~Xxx~~ Two Payloads each 20 inches in diameter each having two Data link transmitters (on frequencies at/least 200 kc in ~~xx~~ a given separated by payload) with two pulse widths being used on each transmitter.

2. Four Separate"Collection-Bands" will be instrumented for in each payload....Bands ~~#XXXXXXXXXXXX~~ A_1, B_1, C_1 and D_1, will be in the Payload #121 Bands ~~# XXXXXXXXXXXX~~ A, B, C, and D, will be in Payload #120. ~~XX~~ Data Link (PL#121)

3. Frequency f_1/the narrow will repeat the Pulse from Band ~~X~~ C_1 and the wide pulses from Band/~~X~~ A_1 with the Narrow pulses being variable so as to provide roughly a 50% duty cycle beginning at 150 microseconds and the wide pulses being about 350 microseconds long for all repetition rates.

4. Frequency f_3 of the Data Link for Payload #121 will repeat the Narrow pulses on Band D_1 and the wide pulses of Band B_1 with the pulse widths ~~xxxxxxxxxxxx~~ the same as for Data Link Frequency f_1.

5. The antennas for Bands C and D and for Bands C_1 and D_1 respectively will have a system of six monopoles symmetrically placed(three above and three below the equator) of the spherical shell, each monopole being less than 4 inches long. This antenna arrangement/ ideally gives the omnidirectional ~~xxxxxx~~pattern for incoming signals of any polarization.

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6. The antenna system for Bands A and A_1 respectively will be two monopoles mounted at the ~~North~~ and South Poles of the ~~spherical~~ shell, giving dipole coverage for incoming signals of a single polarization.

7. The antenna system for Bands B and B_1 will be a combination of four elements mounted on the equator 90° apart(and equally spaced from the telemetry and Data Link turnstile) and the two monopoles mounted at the North and South Poles; resulting is a ~~symmetrical~~ system of six monopoles for these bands and the omnidirectional ideal patterns for incoming signals of any polarization. The equatorial antennas will be no longer than 9 inches and the Polar mounted monopoles will not exceed 20 inches in length; with the lower (South Pole) one being of a roll-up design.

8. The A and A_1 Bands will be (besides the afore mentioned ~~xxx~~ monopoles) associated with a six section tubular band-pass filter, a video amplifier and a bias distribution box with 4 terminals for each of the 2 monopole antenna.

9. Associated with each monopole (6) of ~~xxx~~ Bands B, C, B_1 and C_1, are a ~~video amplifier~~, a 4 section tubular coaxial Band-Pass Filter, a coaxial detector mount and a Bias Distribution box with six inputs and two output microdot connectors.

10. Associated with each monopole antenna (6) connected to Band ~~xxx~~ D_1, are ~~video amplifier~~, six channel bias distribution box, a 4 section filter and a coaxial detector mount. Band D_1 will have for each of the six monopoles it used, a ~~video amplifier~~, a six channel bias box, and a rectangular($1^{\frac{3}{4}}$ x $\frac{1}{2}$" x $3\frac{1}{2}$") combined filter and detector mount.

11. Each Band will have a single video amplifier giving four amplfiers which will feed four trigger amplifiers (two short and two long pulses)

12. Command System will furnish a selection of any band or combination of bands for simultaneous operation.

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GREB Program Costs

Payload Costs (Thor Agena) Nov. PL - 120 and 121	1,800K
Payload Costs (Thor Able Star) Jan. PL - 110 and 112	2,200K
Payload Costs (Thor Agena) May PL - 123 and 126	1,400K
Field Modernization Program for New Concept and Field Support	1,150K
R and D for Standarization of Hardware for Max Flexibility for Flight Units	450K
Total	7,000K

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on 18 July 1962

① Budget estimates are based on a requirement for three launches of two Oreb payloads each on Thor-Agena vehicles in FY 1963. Four launches could be handled by NTL but the decisionmaking on what to do and when to do it is so slow that 4 launches are not possible. Three launches per year is ~~optimistic~~ sufficiently optimistic considering that decisions for ~~four~~ launches are made ~~only~~ singly, not in groups of three or four.

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(2) Payloads to be flown will ~~have the~~ ~~follow~~ contain the basic system of crystal video receivers and data link transmitters providing real-time readout of four input channels on two data link channels. Command system will contain complete redundancy on all functions ~~and~~ using the simple system with four tone amplifiers ~~tone modulated system~~ on the output of each of two ~~command~~ receivers. The basic system will have the following characteristics:

a. Two input channels on a set of six monopole antennas whose length will not ~~exceed~~ 4½ inches. These six are

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equally spaced on the sphere, three above and three below the equator to provide an omnidirectional pattern to incoming signals of any polarization.

b. One input channel ~~feeds~~ to two whips ~~dipole~~ on the payload axis will provide dipole coverage. These antennas can be as long as 20 inches, with no minimum length.

c. One input channel on ~~to~~ four elements ~~on the~~ equally spaced 90° apart on the equator will provide coverage. Turnstile coverage on a fourth band. The length of these units cannot exceed ~~to~~ 9 inches.

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d. It is planned that each antenna element will be accompanied by two filters and a detector, making a total of 24 filters and 12 detectors per payload.

e. ~~Each band will the output of~~
The six detector output for one band will be combined in ~~a~~ one network feeding a single Video amplifier. Four amplifiers will be in each ~~payload~~ sphere.

f. ~~Four~~ Four video amplifiers will feed four trigger amplifiers (2 short pulse, 2 long pulse) which feed two data link transmitters whose ~~frequency~~ frequencies are about .5 mc apart in the 149 to 150 mc range.

g. The ~~data~~ command system will provide a selection ~~of~~ any ~~band~~ band or combination of bands for simultaneous operation.

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