Working Paper (2/3/71)

[redacted] MAYO

A. Alternative A This alternative can best be described as an upgraded, basic 4 bird Poppy system. It will include a number of techniques for improving the present performance, but the fundamental approach using main beam intercept, [redacted] location capability over a broad frequency range is retained.

Improvements incorporated in this alternative will include the following:

1. Improved three axis gravity gradient stabilization system including provisions for modulating spacecraft drag to help maintain proper spacing.

2. Redundant low level thrusters designed for daily operation if required.

3. Range and range-rate measurement between spacecraft in pairs.

4. Redundant programmable command system.

5. [redacted] measurement on all bands.

6. Redundant digital telemetry system.

7. Improved power control circuitry including dual battery packs.

The performance characteristics of alternative A will be similar to those of Mission 07 except for the areas where new design features offer improvements. The following characteristics apply:

a. Frequency range - .15 to 18 GHz

b. Main Beam Sensitivity -- -50 dBm to -80 dBm depending upon frequency range.

c. Parameter Measurement accuracy

[redacted]

TOP SECRET

HANDLE VIA CONTROL SYSTEMS ONLY

TOP SECRET [redacted]

1. Frequency_____

2. Pulse Width 1/10 μSec -

SAX 3. Signal Level 1 db except with Pol. mea.

4. Location_____

5. Geographic Coverage_____

6 - Polarization.

The cost for the alternative is estimated to be _____ and will require _____ months from final approval to launch.

B. Other Alternatives

Other alternatives will consist of Alternative A with one or more of the following options. Note that each option can be used in various combinations

Possible Options

1) High sensitivity downward looking monopulse DF System

a) 1, 2, 3, or (4) birds

64-18 Gc Russ

8 to 18 Gc Zero

b) 1 ~~or 2~~ systems/bird

Short On-Time Simultaneous

c) Different bands in different birds with ~~or matched~~ pairs

[redacted]

2) Wide band down link

R/I can't sell →

a) 1, 2, 3, or 4 birds

b) One or more bands/bird

c) High sensitivity or [redacted]

d) Matched pairs

3) Instantaneous freq. measurement

TOP SECRET [redacted]

HANDLE VIA [redacted] CONTROLLED ONLY

~~TOP SECRET~~ [redacted]

comb filter pest Comb Filter. Sort criteria

Discriminator. Measure only some signals by PRF sort.

a) 1, 2, 3, or 4 birds

b) One or more bands/bird

c) High sensitivity or [redacted]

d) Matched pairs

4) ~~CW measurement capability~~ 4421

~~a) 1, 2, 3, or 4 birds~~

~~b) One or more bands/bird~~

~~c) High sensitivity or~~ [redacted]

~~d) Matched pairs~~

electronic scanned E S array

5) High sensitivity side-looking programmable steered array

Work Sync Birds.

a) 1, 2, 3, or 4 birds

b) One or more bands/bird

c) High sensitivity or [redacted]

d) Matched pairs

890 n.mi.

determine revisit time - Two phased orbits,

6) Increase the total number of birds in orbit

a) Number added

b) Bands covered

1/hr with 989 [redacted] [redacted] grid sites; 3 launches. 4 [redacted] sites @ equator

8 pills + [redacted] do same thing

~~Drop coverage below 2 GHz~~

~~a) One or more birds~~

[redacted]

~~TOP SECRET~~ [redacted]

HANDLE VIA BYEMAN CONTROL SYSTEM ONLY

Other launch vehicle - spacecraft combinations may provide more cost effective combinations. Two possible alternatives are:

a) Two spacecraft on a scout. Cost ≈ $2.0. M

b) Four spacecraft on a Thor Delta. Cost ≈ $5.5. M

R&D - Hybrid system
How does monopulse help in processing.

Tony Tausig:
Regard how Poppy can help processing -