28 FEB. 1969.

MEMORANDUM TO HOLorenzen preparatory for SORS Committee Briefing (19 MARCH 1969)

BACKGROUND:

In early April, 1968 prior to CNO luncheon with MR. EATON, chairman of the EATON COMMITTEE which had some SIGINT review underway, it was decided by OP-92, that [redacted] OORER should be briefed on the NAVY'S only SIGINT program in SPACE. Several aspects of this briefing are now significant with regards to the subject before SORS committee (Raising the priority of use of the NRP in support of the JCS Requirement for Ocean Surveillance). At CNO invitation the NRO was requested to authorize certain trials, using the 7105 spacecraft and the digital system located at [redacted] to demonstrate the capability of the Program "C" [redacted]

[redacted]

Evidence: FINDINGS:

1. The first three ship locations provided were provided by [redacted] with over a month elapsed in between each of these fixes. About this time the 7105ALPHA spacecraft developed battery problem which in the first analysis appeared to jeopardize the future use of this payload.

[redacted]

TOP SECRET [redacted]

Byeo59314-94 HANDLE VIA BYEMAN CONTROL SYSTEM ONLY

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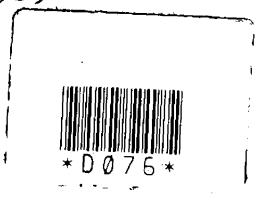
HANDLE VIA BYEMAN

CONTROL SYSTEM

~~PROJECT EARPOP~~

BYE 57343-69

NSGA Box 1
FPO New York, NY 09514
February 20, 1969



Mr. Lee Hammarstrom
Code 5614
Naval Research Lab.
Washington D.C. 20840

Dear Lee,

Enclosed is a preliminary outline of more inputs for the central control panel.

Read it over and we will discuss it when I return in a few weeks. I think it's especially attractive when one considers that a small computer can now be purchased for between $7000 and $9000.

If you are still thinking of spending money on a control panel, I think this is the way to go.

See you in a few weeks.

Sincerely yours,

Earl Lybarger

Earl Lybarger

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1. INTRODUCTION

It is the purpose of this presentation to provide other inputs for the designing of the central control panel. Emphasis is placed on having the system controlled from one point by one man. Many inputs can be handled before up-time and after down-time. Processing checks can be made more rigorously to insure proper collection.

2. SYSTEM

The approach is taken in this preliminary outline to present the central control panel tied together with a small computer. A small computer can remove all the manual interfaces requiring only decisional inputs via a TTY keyboard. This would alleviate having switches crowded together on one panel since the computer can check their status and note on the TTY keyboard any discrepancies. Some decisions must be must be entered and are peculiar to each pass, hence via the keyboard. Other inputs change weekly or rarely, hence input could be via a card reader. Figure 1 shows a system block diagram.

A. Keyboard. The TTY keyboard is the major input-output conversation for the control of the system system. An operator should be able to perform all duties of collection from this one station. Header/ Trailer information would be entered here as well as up-time, down-time, etc. In fact all pertinent information during a pass would be controlled from here.

B. Ephemeris and Tasking. Since this information changes only once a week or so, it would be advantageous to have this information stored on a more permanent form of storage in order to avoid re-entering it by hand for every pass. This could be via a high speed reader or a card reader.

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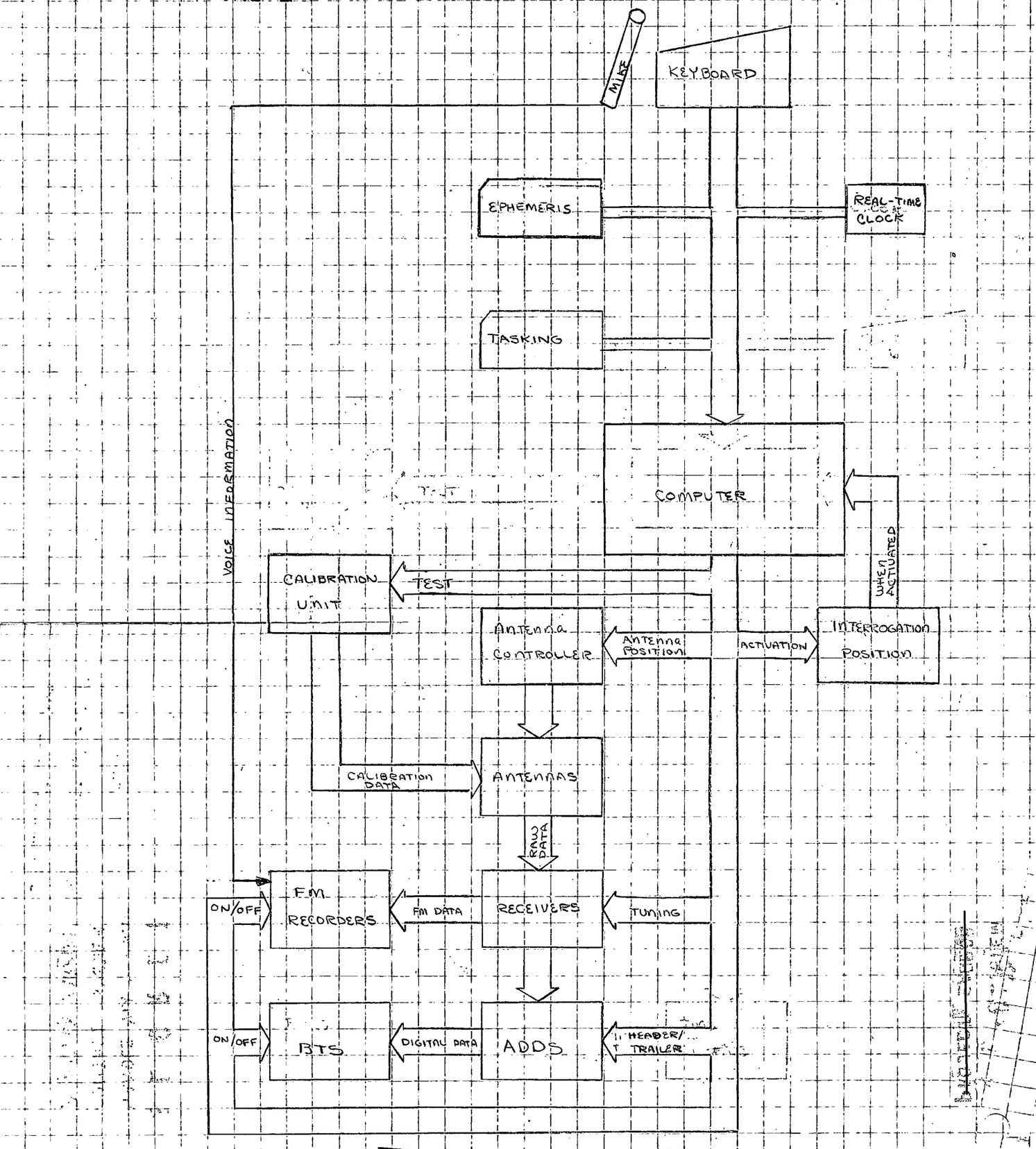
Interrogation / Collection

FIGURE 1



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2C. Clock. A real time clock would be necessary to aid in the activation of the vehicles at a given time, cause interrupts to adjust the tracting antenna, and provide a reference time. This clock could also initiate interrogation of an operator for Header information 10 minutes prior to up-time.

2D. Computer. It would be the function of the computer to control and perform the following functions:

a. Transfer the Header information to the BTS prior to the pass
b. Interrogate the vehicles and activate according to tasking.
c. Perform and supervise calibration.
d. Insure that all needed equipment is turned on and switches set appropriately.
e. Tune the receivers as described in the tasking.
f. Contain orbital information for the purpose of controlling the antennas.
g. Transfer Trailer information to the BTS after the pass is down.
h. Automatically turn on and off the FM and Digital recorders that collect the data at the appropriate time.

A small computer would be more than adequate since not all of these functions are performed at one time. During the data collection, for instance, the computer would only be tracking the vehicles.

2E. Existing Peripheral Equipment. Although this may appear to be a massive redesign effort, it is really quite compatible with our present equipment. It means acquiring a computer to tract the vehicles as the first step. The next step might be to automatically tune the receivers since this feature is already available on the receivers. Transfer of Header/Trailer information could be installed with the present Datran.

2F. New Requirements. Steps should be taken to insure that the new digital interrogation unit will be compatible with such a system. Modifications must be made to turn the recorders on and off as well as setting switches on the ADDS. In general it appears that only minor changes would be required.

3. SUMMARY

Although some areas need further definition, it appears that a system integration such as this would pull the collection operation into a simpler package to operate. Processing checks can be made more rigorously to insure proper collection.

APPENDIX A

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COMPUTER CRITERIA- Below are listed the requirements that would be necessary to do this task and offer flexibility for expansion and R&D.

a. Fast cycle time (1-2 μsec)
b. Minimum of 4K of core and expandable
c. Have a 16 bit word or larger
d. Multi-level programmable priority interrupts
e. Compact in size
f. Low cost
g. High reliability
h. Input/Output compatibility with mag tape, TTY, BTC for our equipment, card or high speed reader input.
i. Have a real time clock or a programmable clock

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APPENDIX B

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PDP-8/2 Digital Computer Modules

with ASR-33 cost: $8,500.00

4096 12 bit words

1.6 usec cycle time

MAC Lockheed Electronics

cost: with 4k of core and TTY $11,950.00

16 bit word, memory expandable to 64k

4 interrupt levels (6 usec interrupt response)

1 usec cycle time

NOVA Data General Corp.

cost: with 4K of core and TTY $7,950.00

4096 16 bit words and expandable

Read only memory

2.6 usec cycle time

I/O up to 64 external devices

16 levels of programmed priority interrupts

additional core per 4k $3,650.00

size: 5¼" tall and fits in a 19" rack

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