

SECRET

P-319

28 October 1960

MEMORANDUM FOR: The Record**SUBJECT** : Trip report, [redacted], Advanced Development Laboratory.

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1. I visited AIL on 15 and 16 September, 1960 for project review purposes. Discussions were held with [redacted]

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2. At the time of this visit the planned expansion of personnel at AIL was well underway. Approximately ten new senior level engineers have been hired over this past Summer and are presently engaged in a wide variety of projects including RD-114. Some 16 engineers are assigned full-time to our work with a planned further expansion as work on the countermeasure receiver and the Smuggler A program expands. This is my first visit in several years where inadequate manpower has not been a problem. On the contrary, it would now appear as if AIL is in a good position to take on even more work, if the opportunity presents itself. This is particularly true of the Radar section with which we have not had any dealings in the past. This section, under [redacted] has substantial experience in both ground and airborne micro-wave systems up through X-band. There potential for exploitation in the ELINT R&D field, particularly, could very properly be applied to some of our newer problems in this area. In this connection it was again suggested that several key personnel be processed for TOP SECRET approvals. [redacted] indicated he would expedite this matter.

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3. Project Discussion:

XBR-5 Receiver

As has been the case for the past three months' work is concentrated on cleaning up the design of the high band tuner. As of this visit what is hopefully the last of a long series of "bugs" had just been eliminated. In this case it was a coupling problem between the oscillator and mixer. With the solution apparently found work can now go forward on fabricating the final engineering model with an expected delivery date of late October.

Reviewing the status of this program with [redacted] it was pointed out that while problems such as have been encountered with the high band tuner these past several months are normal in a development program of this kind. It was felt that if more of his personal time had been available for close supervision of the engineering team they might very well have been solved sooner or, for that matter, never have arisen at all.

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He agreed in substance and indicated that with the additional manpower now available to him this was less likely to happen in the future. I agreed.

Performance characteristics continue to hold up well and it is expected that the receiver when finally delivered will meet all expectations for performance, environmental characteristics and appearance. Two sets will be retained by ADL for continuing life tests.

[redacted] Study

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[redacted] reviewed the status of this program as follows:
[redacted] is progressing quite nicely with present effort concentrating on the design of a satisfactory audio coupling circuit for the power line transmitter. Several potentially useful circuits are presently being evaluated. One in particular shows much promise and is presently useful with as little as 2 watts of power in the AC line. Crude tests in the laboratory also indicate promising results insofar as the "transformer problem" is concerned. Specifically, an audio signal has been extracted from one leg of a three phase line after insertion on a different leg of the delta transformer. Future effort will require measurements in a more realistic transformer situation. To do this it was suggested that space be rented in a motel down the street from the laboratory and two way measurements be made.

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[redacted] is presently operating in a setup wherein the audio signal is placed directly into the video amplifier of a Television set on a 5 kc/s single sideband carrier and extracted by means of the [redacted] receiver. Future effort will be directed at introducing a more realistic RF link into the path. In addition, a 30 cycle Humbug receiver will be required for the complete filtering of the TV line spectrum from the desired audio.

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Funds for this study program are predicted to run out sometime in November at the present rate of expenditure. In anticipation of this and in order to avoid any hiatus, the outline of a new phase (and the proposal covering same) was discussed. It was decided that three specific programs would be desired in a single task covering [redacted] and a new broad-band approach to be called [redacted]

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BRA-1, Distribution Amplifier

The first engineering prototypes has been completed and was successfully demonstrated.

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Appearance and performance are excellent. Two units will be delivered early in October with the remaining ten following closely behind. Two units will be retained at ADL for life tests.

A request for a sixty-day time extension will be forwarded to DL shortly, along with a request for a small increase in costs. The latter to cover final design clean-up and several unanticipated, but necessary, accessories, including 12 input balun transformers and 12 connector cables per unit. The manual will include an EPL.

XRR-8, Countermeasures Receiver

[] has set up his project team and work is beginning to move ahead at a good rate. Breadboarding has commenced on the oscillators, RF and IF circuit with good results. Analysis of the passive pre-selectors is yielding promising data. Design parameters for the first and second IF and the RF heads have been fixed. First IF will be at 25 mc/r with a 10 mc/r bandwidth; second IF at 6 mc/r with a 0.25 mc/r bandwidth, limiter/discriminate at 6 mc/r with a 1 mc/r response. The four RF head will cover the following frequencies:

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1. at 28-110 mc/r
2. at 105-250 mc/r
3. at 230-505 mc/r
4. at 500-1020 mc/r

The importance of the final packaging was stressed and I pointed out that a vigorous discussion of this matter was important prior to initiation of mechanical design. Accordingly, it was decided that this would be accomplished sometime early in November.

A preliminary component investigation yielded the following totals for the receiver circuits:

Oscillators:	2	transistors	and	1	varactor
First IF	:	7	"		
Second IF	:	3	"		
Audio	:	3	"		
Limiters	:	2	"		

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The preliminary circuit outline follows:

[redacted] A

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The crystal controlled FM transmitter has been successfully breadboarded including oscillator, frequency divider, varactors, crystal and modulator. It is presently operating at 35% efficiency with 43 mw output and 6 volt collector fires. Deviation up to 500 Kc has been achieved with minimal distortion.

Field strength measurements are being taken on a Rhode and Schwartz receiver in open fields, residential areas and built-up downtown areas.

[redacted] is presently concentrating on receiver design parameters and a review of the original study program analysis.

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Future Programs:

a. The AOB requirement for commercial "Hi-Fi" tuners operating in the 55-85 mc/r region was received and a time table established.

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[redacted] will investigate and submit a proposal during October. 50X1
If costs permit, preliminary models will be modified under Task XVI.

b. [redacted] ideas for an inexpensive transmitter receiver 50X1
[redacted] 50X1

c. The [redacted] requirement was received and a formal proposal 50X1
requested by mid-October.

d. The general problem of radar power measurements was pre-
sented and the technical aspects reviewed. No proposal was requested
at this time since specific operating parameters had not been
sufficiently defined. ADL did appear interested in this type of pro-
gram and it is my opinion that their Radar Section has the personal
to carry it out quite satisfactorily. In any event, several other
potential contractors will also be given this requirement and the
best approach selected. Present planning calls for four proposals
in November and program initiation in December.

Reports

The continuing problem of timely reports was again discussed 50X1
with [redacted] It was decided that a bi-monthly letter
report covering all aspects of RD-114 would hereafter be required.
Three major progress reports annually in October, February, and
June will be prepared covering specific details of each active
program under RD-114. In addition, a separate final engineering
report will be submitted on each individual project when appropriate.

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