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JOHN CONLON
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M E M O

TO   : W. Boenning

FROM   : J. C. deBroekert

SUBJECT: Suggested Improvements in POPPY [   ]

    One of the overhead program collection requirements which has
been very difficult to satisfy is that of main beam [   ]
[   ]   Most of the collection systems which have been deployed
cannot make this measurement with sufficient accuracy. The multi-
group payloads cannot because the high sensitivity receivers designed
for minor lobe intercept will saturate on strong radar main beams.
The P-11 series suffer from receiving omni antenna patterns with
fluctuations up to 10 dB or more during a spin. Further degradation
of accuracy occurs in the amplitude fluctuations of the direct record
tape recorder.

    A look at the POPPY system shows composite antenna patterns
which are typically within [   ]; furthermore, many are
gravity gradient stabilized which would permit calibration for an-
tenna gain with known emitter locations. The [   ]
preserves measurement accuracy in the down-link.

    It appears that POPPY is the ideal program for making accurate
[   ] on radar main beams. Some refinement of circuitry
in the video amplifier and [   ] portions of the receivers could prob-
ably improve the circuit errors from the present [   ] worst case to
perhaps [   ] This would yield an overall [   ] (with
antenna gain calibration) accurate to perhaps [   ] As an
example that these accuracies are possible, operation of Fanion I
against col. vans gave [   ] often within [   ] of the
transmitted level. Occasionally, measurements were [   ] in
error.

        Accurate [   ] requires:

        (1) Accurate antenna patterns (preferably spherical and
             independent of linear polarization angle)

        (2) Constant receiver gain with frequency and temperature

        (3) Accurate logarithmic or tapped video amplifier (temp-
             erature stable)

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- 2 -

(4) [ ]

(5) PCM conversion accuracy

Items 1, 2 and 5 appear to be already well provided by the present POPPY configuration. Some improvements should be made in items 3 and 4. The log amplifier has been explored extensively at Stanford by [ ] just recently, and information could be made available by personal contact. Improvements in the pulse peak amplitude circuit to become independent of pw and temperature can be made by use of a pulse shaping circuit (Fig. 1) and/or the feedback loop pulse stretcher (Fig. 2).

Use of these or other techniques tailored to the constraints of power, space and weight available, and to reliability could provide a much needed capability [ ]

Another area where improvements could be made is in more accurate [ ] Although this requirement can be, and is, being satisfied by other parts of the overall program, POPPY could make accurate measurements [ ] If the measurements are not made with good accuracy (i.e., ± 0.1 μsec or ± 5%) the confidence in the data and usefulness to the community will be very small. If good accuracy is not achieved, the experiment may not be worth repeating. We would be happy to discuss specific circuit techniques which have been used to achieve the required accuracy in SAMPAN I and II.

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