

CONFIDENTIAL

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9 August 1965

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Forwarded herewith are three copies of the progress report for the month of July 1965.

If you have any questions please let me know.

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Yours truly

[Redacted]

Contracts Manager

AKM:ecp
encls

Declass Review by NGA.

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6 August 1965

Monthly Progress Report No. 1
for the Month of July



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At the start of this period, the main tasks in Phase I of this program were delineated. These are:

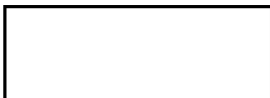
- ✓ 1. Design of variable gamma video amplifier, black level clamp and shadow suppression circuitry for the ARES viewer.
- ✓ 2. Addition of manually controlled second and third order transformations to the ARES viewer to correct for oblique and panoramic distortion.
- ✓ 3. Mathematical analysis of superimposition and weighting to determine optimum processing parameters.
4. Experimental work using the ARES viewer, modified by items 1 and 2 above, to evaluate image integration techniques.
5. Formulation of a design for a prototype image integration viewer.

The first three items were started in July. Some experiments were made on the ARES viewer to determine the effect of a blanking pulse on the correlation circuitry. Pulses of widths varying from 1 to 10 microseconds were applied to the scanning CRT's, with the ASN disconnected. These pulses had no effect on the correlation either with static or moving imagery. It therefore appears feasible to use a synchronous black level clamp, in which the DC black level is established by a pulse of approximately 2 microseconds at the edge of each frame. Modifications to the scanning and viewing circuits have been made and will be tested next month.

For the variable gamma amplifier, we propose to use two amplifiers in parallel, one with gamma equal to 0.5, the other with gamma equal to 2.0 and to combine the outputs in varying proportion. The basic amplifier has been designed and bench testing with a staircase waveform, but will not be tested in ARES until the black level clamp is operating.

The circuit for a second order modulator has been sketched out. This will be tried out with oblique and panoramic imagery to determine whether or not third order corrections are necessary in addition.

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A mathematical analysis of the weighting problem has been carried out. The problem was: given N photographic inputs containing the same signal, but different signal-to-noise ratios, how should each input be weighted in order to maximize the output signal-to-noise ratio. It was found that the output is optimized when the inputs are weighted in proportion to their signal-to-noise ratios. If this is done, then the signal-to-noise ratio of the integrated image can always be increased by adding more inputs. An input with zero signal-to-noise ratio will not degrade the output because it will be added with zero weight. The next step in this analysis will be to determine the effect of the resolution of the input materials on the resolution of the integrated output.

Plans for Next Period

During the next month, we expect to complete and test the black level clamp and variable gamma amplifier for the ARES viewer. The second order transformation circuitry will also be completed. Superimposition tests will be started using imagery as obtained from different viewpoints under different illumination and seasonal conditions. The theoretical analysis of the factors affecting resolution of the integrated image will be continued.

The contractor certifies herein that he has completed no less than 14% of Phase I of this contract.



Manager, Graphic Processing Division

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