25X1A [redacted]#1249
REGISTERED

9 September 1966

25X1A [redacted]
Colonel, USAF
25X1A Assistant for Plans and Development, NPIC

Subject: [redacted] Digitizer Interferometer Modifications Applicable to Model 405B Chip Comparator

25X1A Reference: a) [redacted] letter dated 8 July 1966

25X1A b) [redacted] letter #1237 dated 22 July 1966

25X1A [redacted]

In accordance with our letter, reference (b), we stated that our test program on possible "fixes" to improve the stability of the Interferometer was to be completed at the end of August. We also stated that we would report to you of our results at that time. We have completed our test program and achieved the results expected. A summary of our testing and results are given below.

"TEST PROGRAM

A) Temperature Regulation

Brief study was given to temperature regulation by means of a proportional controller purchased from [redacted] 25X1A
25X1A [redacted] No serious problems showed up initially, but further consideration indicated that illumination control would be more satisfactory. Control of illumination would regulate temperature to compensate for the variations of RF generator output.

B) Illumination Control

A control circuit was breadboarded and temperature checked on the bench with a heat gun. The circuit was designed for use with a Clairex type CL705 photoconductive cell. Although the water was heated above room ambient, the mercury lamp was being cooled below the temperature at which it would operate in air with no water circulation. The circuit actuated a relay providing "on-off" control to a heater in the water tank of the Interferometer.

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With the above set-up in the temperature controlled room, numerous variables were investigated. These included tank insulation, a fan to cool the tank, a stirrer, various types of pumps, water flow rates, location of the pump inlet, and insulating tubing for the water tubing.

TEST RESULTS

The most satisfactory operation was obtained with the exit temperature from the lamp coil at 108 degrees F. Temperature varied approximately ± 1 degree F. At this exit temperature the average water tank temperature was 107 degrees F in a room ambient of 72 degrees F. Cycle time was approximately 5 minutes on, and 5 minutes off. Under these conditions, a photomultiplier amplifier output signal voltage held within a total range of 0.25 volt. This value should be satisfactory. This value was calculated from measurements made at high photomultiplier gain which gave higher sensitivity to temperature variations."

The conditions of the apparatus were as follows:

A) The tank used was the existing plastic tank with holes drilled in the sides for insertion of the pump inlet and the heater.

B) Water flow rate - 4 ounces per minute.

C) Pump was a [redacted] centrifigual impeller pump. Little difference was observed with and without a stirrer when the pump inlet was located close to the heater, which it would be in the final design. 25X1A

D) The fan was found not to be necessary under the above conditions.

E) Tubing length - 12 feet each.

We have assured ourselves that the approach taken is valid. We are presently modifying five (5) production Interferometers with the "fixes" and will retest these five production units to assure ourselves that the breadboard "fix" proves valid when production designed, engineered and produced. The production units are presently in the factory to be completed by September 16, 1966. The test program will begin on September 19, 1966, and will run for approximately two (2) weeks.

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We understand that [redacted] will visit our plant on September 21-22, 1966, and we have invited him to view the tests on these production units. It is felt that upon completion of these production units, modification kits can be made for all your Interferometers, and the modifications made in a relatively short period of time. We will keep you informed of our activities, as well as show the physical changes to [redacted] during his visit.

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We appreciate your patience in this regard, and wish to again thank you for your assistance in bringing this matter to our attention. The results should be beneficial to all parties. If we can provide you with any additional information, please do not hesitate to contact us.

Very truly yours

[redacted]

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