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NPIC/P&DS/D/6-1375
18 May 1966

MEMORANDUM FOR THE RECORD

SUBJECT: Maintenance History of Chip Comparator Model 405-B
Serial No. 1 installed in IAD

KBR

1. Subject instrument was installed in November 1965. It has required adjustment to correct counting errors constantly since that time. Adjustment of both Interferometer and [] Trigger circuits are necessary.

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2. Maintenance requests to EPS for correction do not accurately reflect the actual up-time of this instrument due to infrequent use. The sequence of events preceding a service call has been as follows:

- a. EPS adjusts and checks instrument. IAD may or may not use instrument the same day.
- b. EPS checks instrument the following day. Usually it is still counting correctly, but not always.
- c. The next time IAD attempts to use the instrument (may not be for several days), it is not counting correctly in one or both axes.

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3. On February 8, 1966, [] a representative of [] Inc., performed the following maintenance on the Chip Comparator.

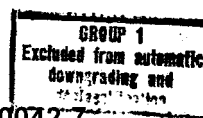
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- a. Increased the output of the high voltage circuit for both the X and Y axis.
- b. Replaced a printed circuit board in the X axis circuit.
- c. Adjusted the D.C. level of interferometer output signals for both axes.
- d. Adjusted [] Trigger circuits for both axes.

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4. [] was questioned as to why the interferometer circuits required frequent adjustment. He felt that changes in ambient temperature or line voltage fluctuations could be the cause, however, he had not experienced this problem at other [] installations.

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5. Since sufficient data to isolate the problem could not be obtained during [] visit, EPS agreed to maintain a detailed record of future counting problems. He supplied a spare line voltage regulator to be used to determine if voltage fluctuation was responsible. EPS connected the regulator, but no improvement resulted.

6. IAD agreed to make daily tests to help determine actual up-time of the instrument, but they did not follow through. However, spot checks by EPS showed that the counting problem still existed.

7. After approximately one month, [] was informed that the counting circuits still required frequent adjustment, and on 3 and 4 March 1966, he returned to perform a series of tests. During his checks he repaired bad solder connections in the oscillator power supplies of both axes and replaced a bad capacitor in the Y-axis Schmidt circuit. He then set up both axes and, after overnight operation obtained the following results.

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- a. Y-axis electrical drift was within tolerances.
- b. X-axis electrical drift was within tolerances.
- c. X-axis interferometer optics could not be aligned to allow an adequate safety factor.
- d. X-axis mercury lamp output appeared to be low.

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8. [] concluded that the X-axis interferometer optics required replacement, but he would have to return later for this operation. Both axes were operating when he left at 1615 on 4 March 1966. A check by EPS at 1000 on 7 March 1966, found the X-axis to be inoperative. Adjustments could not be made due to the faulty interferometer optics.

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9. On 5 and 6 April 1966, [] of [] made the following repairs on the comparator.

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- a. Replaced X-axis mercury lamp.
- b. Replaced X-axis corner cube.
- c. Aligned interferometer optics and digitizer circuits.

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10. Both axes were operating when they departed on 6 April, and a check by EPS on 9 April showed that the axes were still operating correctly. However, on 11 April both axes required adjustment of the [] circuits to compensate for interferometer signal level shift.

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11. During the remainder of the month of April, IAD did not use the instrument due to lack of confidence. Spot checks three times by EPS discovered the need for adjustment of both axes. EPS made the necessary adjustments.

12. On 5 May 1966, a spot check by EPS found both axes not counting correctly. The X-axis could not be adjusted due to insufficient signal amplitude near the stage limits. [] was informed that the X-axis was still malfunctioning, and on 11 May 1966, [] removed the X-axis interferometer and took it to his plant for study.

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Equipment Performance Section, DB/P&DS

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