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DATE 21 Aug.	: 1973

APOLLO 17 LACE BACKGROUND NOISE

ANOMALY

Prepared by _

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Approved by_

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APOLLO 17 LACE BACKGROUND NOISE ANOMALY

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SUMMARY

The cause of the background noise is attributed, by process of elimination, to the analyzer itself. Testing on the prototype and qualification models has not been able to reproduce the problem. The Principal Investigator considers that he is not losing science data and thus it is recommended that the presently agreed operational procedures be continued.

INTRODUCTION:

The Lunar Atmospheric Composition Experiment (LACE) has experienced a zero offset condition in the low and mid mass channels of the science data since the experiment was first initialized on the moon. The offset manifests itself as a ramp which increases with decreasing mass (increasing high voltage sweep). The science data is superimposed on the ramp and thus not obssured by it, although the output gives the appearance that data may be missing towards the low end of the ramp.

ANALYSIS:

Analysis of the problem has been performed by Bendix and the Principal Investigator and is summarized below.

Tests on the prototype model, including alteration of the wire routing to simulate high voltage crosstalk effects, have not duplicated the problem.

Operation of the qualification model indicates no similar ramp on any mass channel, even though the vacuum conditions and multiplier sensitivity are good.

Command changes have been executed on the flight model in an effort to isolate the fault area. The commands causing no change in the effect are

- 1) Changes in analyzer optics (J. plates)
- 2) Filaments ON/OFF
- 3) Multiplier gain

while the following modes did affect the anomaly

1) High voltage stepper ON/OFF



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- 2) Discriminator high/low (slight effect only)
- 3) Ion source heater ON/OFF. The heater affects the analyzer temperature and the effect appears to be temperature dependent.
- 4) Sweep step lock. The background level remains constant at the value for the respective step when the sweep is stopped with the high voltage on.

The premission calibration data for the flight unit was reviewed closely and evidence of the anomaly was found.

Review of the experiment circuit designs and construction revealed no obvious defects. The prototype and qualification models do not exhibit the problem, thus indicating that no inherent design problem exists. The fact that evidence of the problem existed before flight indicates that nothing happened to the system during its transportation to the moon.

CONCLUSIONS:

The conclusion is that a problem exists on the mechanical analyzer on the flight model as no other cause can be determined. The problem is temperature and voltage dependent.

This ASTIR is considered closed as no further analysis can be performed at this time. If further information or significant change in operation occurs, the problem will be reviewed in that light and an appendix to this TM will be prepared.

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