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**LANDSAT 4 BAND 6 DATA EVALUATION**

Contract #NAS5-27323

10th Quarterly Report

March 15, 1985

Prepared for:

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## Objectives:

The objectives of this investigation are to evaluate and monitor the radiometric integrity of the Landsat-D Thematic Mapper (TM) thermal infrared channel (Band 6) data to develop improved radiometric preprocessing calibration techniques for removal of atmospheric effects.

## Accomplishments:

Efforts this reporting period have concentrated on analysis of the 6/22/84 underflight and satellite image. The satellite data were corrected for atmospheric and sensor response effects and converted to expected surface temperatures. The underflight data were calibrated for atmospheric effects and used to identify large areas of uniform temperature. The temperature of these areas as measured by the calibrated underflight data were compared to the satellite estimates of temperature. Surface temperature data collected by the Canada Center for Inland Waters were also compared to satellite data. The results plotted in Figures 1 indicate that significant systematic errors exist. A complete analysis of the source of these errors is being undertaken. It is clear, however, that a major source of the error is the internal sensor calibration. This error has been discussed with NASA and potential sources of the problem are being investigated. The sensor response function corrections and radiometric computations employed by NASA to compute temperatures were reproduced and do not appear to be the source of the problem. It is more likely that internal detector gain and possibly offset values are not being adequately monitored and compensated for.

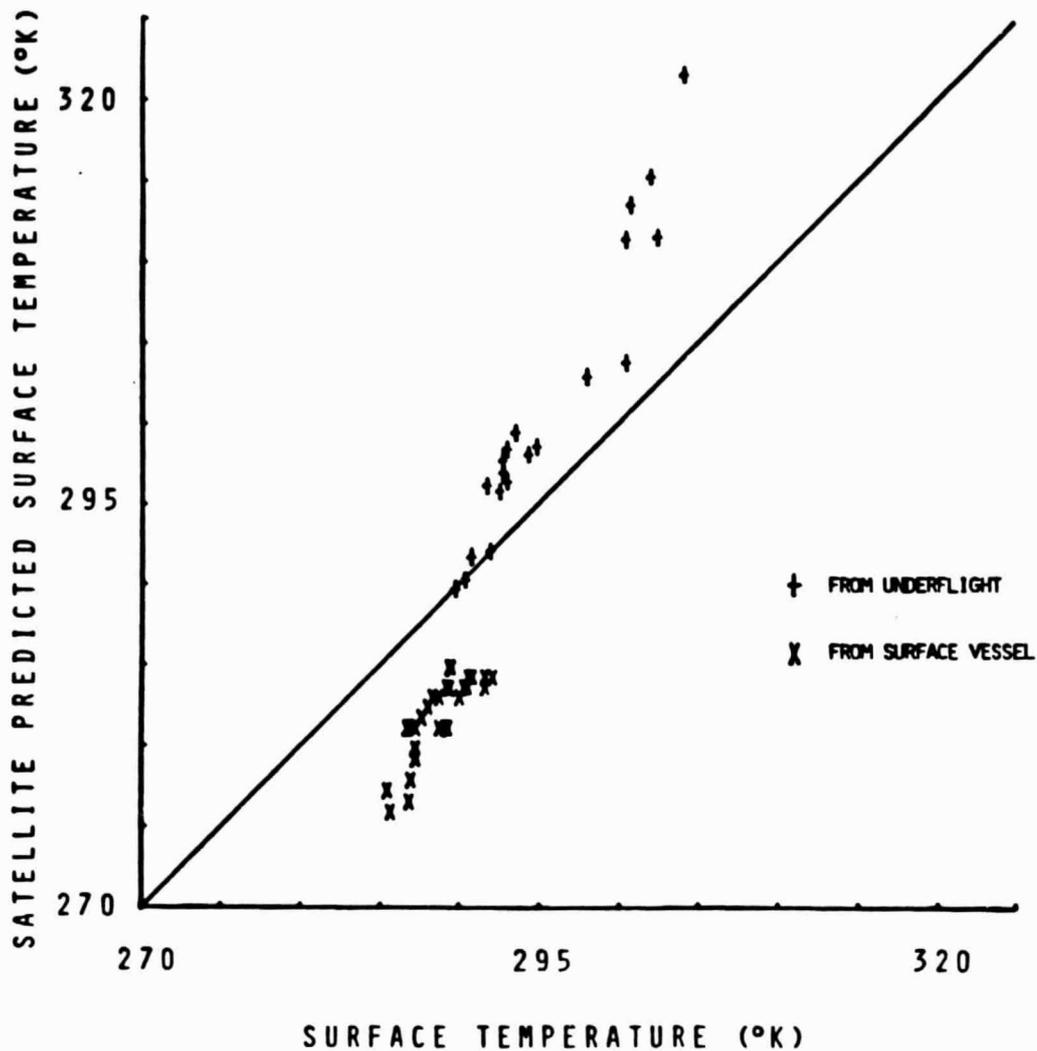


FIGURE 1

Significant Results:

The Landsat 5 TM band 6 radiometric calibration appears to have significant gain calibration error as indicated in Figure 1. The source and reproducibility of this systematic error has not yet been adequately defined. The error can be accounted for using underflight or ground truth data (N.B. considerable care should be taken if ground truth data are employed due to the large footprint of the satellite). When the underflight data were used to correct the satellite data, the residual error when the predicted temperatures were compared to measured surface temperature was 1.3K for the 6/22/84 scene.

Publications:

None

Data Utility:

N.A.