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(E84-10175) LANDSAT 4 BAND 6 DATA  
EVALUATION Quarterly Report (Rochester  
Inst. of Tech., N. Y.) 4 p EC A02/MF A01

N84-31737

CSCI 05B

Unclass

G3/43 00175

LANDSAT 4 BAND 6 DATA EVALUATION

Contract #NAS5-27323

7th Quarterly Report

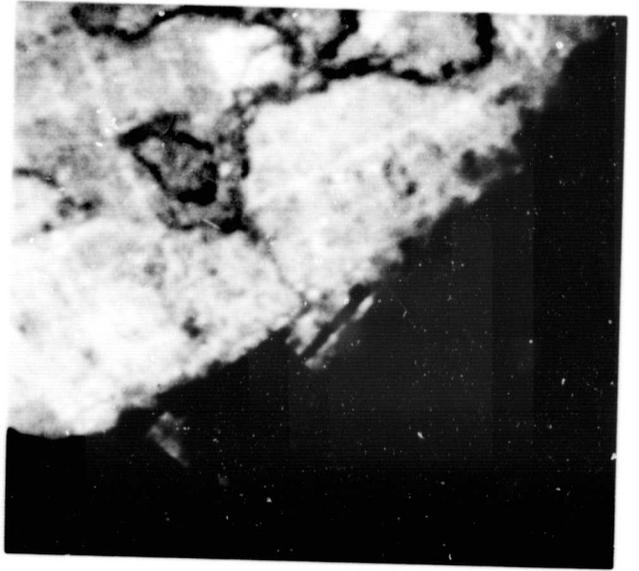
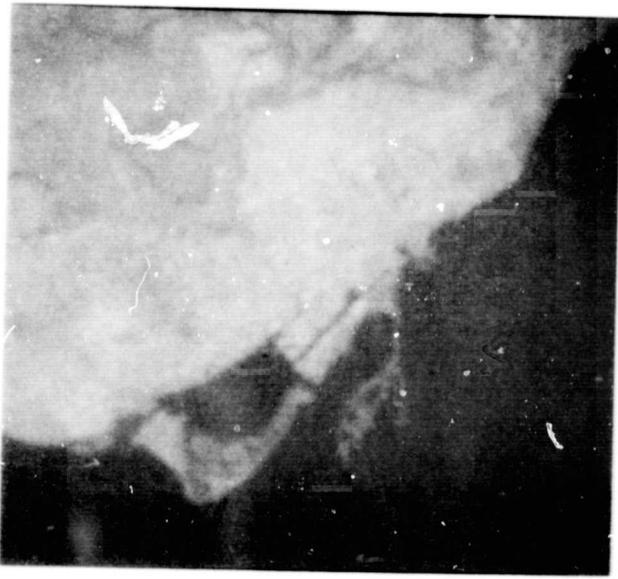
June 15, 1984

Prepared for:

NASA/Goddard Space Flight Center  
Greenbelt, Maryland 20771

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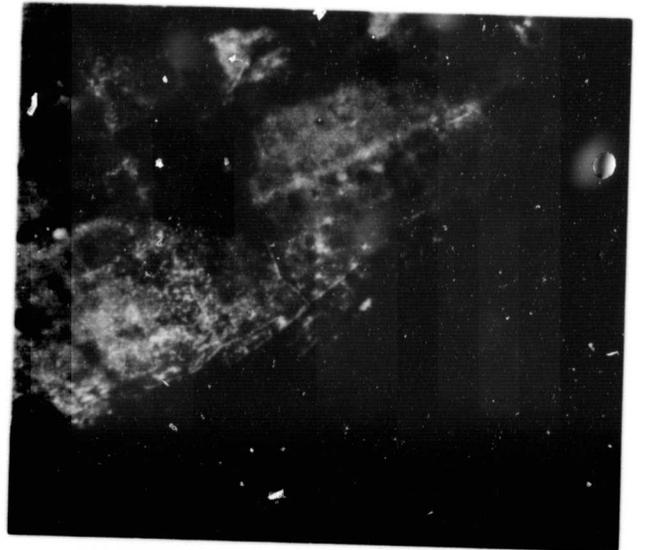
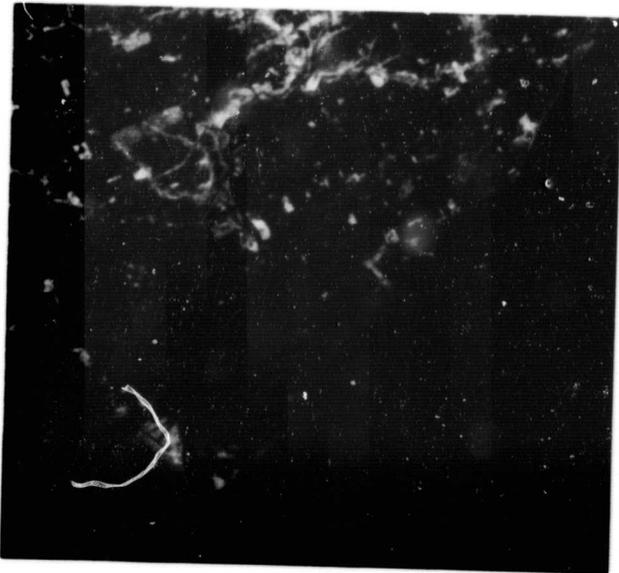


Figure 1

### 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.

### Problems:

Delay in acquisition of TM data. Particularly simultaneous TM and underflight data has delayed much of the major thrust of the effort. With resumption of regular TM data collection we anticipate no problems in completing the proposed effort. A proposal has been submitted for an extension to the program.

### Accomplishments:

Efforts this reporting period have concentrated on preparedness for TM underflight. No clear sky conditions occurred under a TM overpass. We anticipate underflight data collection during the next reporting period.

Data analysis efforts have concentrated on development of techniques to more accurately display thermal infrared data. Figure 1 shows a series of images of a portion of a TM frame of Lake Ontario. The top left frame is the TM Band 6 image, the top right image is a conventional contrast stretched image. The bottom left image is a Band 5 to Band 3 ratio image. This image was used to generate a primitive land cover classification. Each land cover (Water, Urban, Forest, Agriculture) was assigned a Band 6 emissivity value. The ratio image was then combined with the Band 6 image and atmospheric propagation data to generate the bottom right image. This image represents a display of data whose digital

count can be directly related to estimated surface temperature. Sensor calibration, atmospheric transmission, path radiance, target emissivity and reflected sky radiance have all been accounted for. The resolution of the processed image appears higher because the process cell is actually the size of the shortwave TM pixels. Thus, both the quantitative value and the qualitative appearance of the thermal infrared image is improved by this process. Efforts in quantitative assessment of TM Band 6 images are continuing.

Significant Results:

See Figure 1

Publications:

Schott, J.R. "The Role of the Atmosphere in Modeling the Thermal Infrared Radiation Imaged by Airborne or Space-Based Sensors" Proceedings of the Council for Optical Radiation Measurement Conference, Gaithersburg, Maryland June 1984.

Recommendations:

None this reporting period.

Funds Expended:

\$54,560 representing 46% of the total program effort.

Data Utility:

The potential for quantitative assessment of thermal features TM Band 6 appears very high based on the limited data received thus far.

JRS/crs

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