

LARS CONTRACT REPORT 110983

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QUARTERLY PROGRESS REPORT

FOR

LANDSAT-4 IMAGE DATA QUALITY ANALYSIS

FOR PERIOD INCLUDING

AUG. 10 - NOV. 9, 1983

NASA CONTRACT NAS5-26859

TO: NATIONAL AERONAUTICS & SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT ROAD
GREENBELT, MD 20771

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PURDUE UNIVERSITY
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WEST LAFAYETTE, IN 47906-1399

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(E84-10036) LANDSAT 4 IMAGE DATA QUALITY
ANALYSIS Quarterly Progress Report, 10 Aug.
- 9 Nov. 1983 (Purdue Univ.) 5 p
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Introduction

This report covers work done on NASA Landsat-4 data quality evaluation under Contract NAS5-26859 for the period August 10 through November 9, 1983. Progress was made in radiometric data quality evaluation and information content evaluation of Thematic Mapper data. Two papers were presented at conferences in the period.

Problems

No data or contractual problems occurred during the period.

Publications

A paper entitled "Resolution Estimation for the Landsat-4 Thematic Mapper" was presented at the Symposium on Techniques for Extraction of Information from Remotely Sensed Images in Rochester, NY, August 19, 1983. The paper will appear in a conference proceedings in January 1984.

A paper entitled "Landsat-4 Data Quality Evaluation Results" was presented at the 8th Pecora Symposium on Remote Sensing in Sioux Falls, SD, October 4, 1983. The paper will appear in a proceedings to be published early in 1984.

Recommendations

No recommendations are made in this report.

Funds Expended

The funds expended on the project are reported periodically by the Purdue Office of Contract and Grant Business Affairs to the sponsor on NASA Form 533M. These are issued monthly. Specific disclosure of funds expended in this report is not allowable.

Significant Results

In the previous quarterly report, a description was presented of a detailed spectral analysis of TM data. This analysis showed detailed spectral class discrimination (42 classes were found) and high separability. In this quarter, a comparative analysis of coincident MSS data was completed and the results indicate that there are half as many (21) separable spectral classes in the MSS data than in TM. In addition, the minimum separability between classes was also much less in MSS data. These are the first detailed TM information content results over a diversity of scene class types (urban, crop, forest, water, soil) and are a significant contribution in this project. A tabulation of test pixel results is presented below for the TM and MSS classification comparisor.

**CLASSIFICATION ACCURACY FOR TEST DATA
in the Des Moines, Iowa Area.**

Scene ID:40049-16264

<u>CLASS</u>	TM PER POINT CLASSIFIER (All 7 Bands) <u>%Correct</u>	TM PER POINT CLASSIFIER (Best 4 Bands) <u>%Correct</u>	MSS PER POINT CLASSIFIER (All 4 Bands) <u>%Correct</u>
Forest	99.0	97.1	91.2
Corn	92.0	76.8	30.8
Soybeans	100.0	99.8	99.3
Bare Soil	99.7	99.0	55.6
Grass	96.8	87.6	1.9
Water	100.0	96.8	98.9
Urban	91.7	99.9	50.2
Overall	95.7	92.6	67.4

Radiometric data quality was further investigated for the TM by computing power spectrum estimates for dark-level data from Lake Michigan gathered on October 25, 1982. Two significant coherent noise frequencies were observed, one with a wavelength of 3.12 pixels and the other with a 17 pixel wavelength. The amplitude was small (nominally .6 digital count standard deviation) and the noise appears primarily in Bands 3 and 4. No significant levels were observed in other bands. Scan angle dependent brightness

effects were also evaluated and only Band 1 demonstrated significant variation in mean brightness east to west with a change in digital count of 5 units. All other bands showed less effect.

Significant effort was expended preparing the two cited papers and preparing material for a contract workshop at GSFC on December 6, 1983.