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United States Department of the Interior

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GEOLOGICAL SURVEY
EROS Data Center
Sioux Falls, South Dakota 57198

E83-10121
CR-169724

December 30, 1982

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Memorandum



To: Technical Officer

From: Principal Investigator AW 31

Subject: Quarterly Report; Landsat 4 Investigations of Thematic Mapper
and Multispectral Scanner Applications (PCN902-91548; S-10757-C)

1) Problems

The most significant problem in this effort is the lack of timely data collection over the two primary eastern test sites. No data have been collected over the Black Hills and the acquisition over Washington came after tree leaf drop.

2) Accomplishments

This project was initiated in September 1982 when the first thematic mapper data were received from NASA Goddard Space Flight Center. Initial data screening, data handling and program testing were completed on the four-band Detroit scene (E-1432-99TM; July 25, 1982) and the seven-band northeast Arkansas scene (E-1439-TM; August 22, 1982). Data were received in early December for one primary eastern test site (Washington, D.C.-40109-15140; November 2, 1982) and one secondary eastern test site (Allegheny National Forest-40043-15244; August 28, 1982). Data were not acquired over the other primary eastern test site (Black Hills) or other secondary test sites. A detailed data analysis plan has been prepared for the two primary eastern test sites (Washington, D.C. and Black Hills). This plan includes testing various discipline applications and their associated data bases, and acquisition of large scale aerial photographs and ground based data. A comprehensive digital data base has been built for a portion of the Black Hills test site and is composed of historic Landsat MSS data; elevation, slope, and aspect data; land cover data; geologic data; thematic mapper simulator data; and digitized high altitude aircraft data. An aerial photo mission over Washington, D.C. was planned but deferred until next spring or summer. The Washington, D.C. test site will be initially analyzed over the next two months using the data acquired on November 2, 1982. The thematic mapper and multispectral scanner data of the Washington area were resampled at 25 and 50 meters respectively, with map projection to UTM grid. Preliminary analyses of these data will include the evaluation of urban forestry, agriculture,

(E83-10121) LANDSAT 4 INVESTIGATIONS OF
THEMATIC MAPPER AND MULTISPECTRAL SCANNER
APPLICATIONS Quarterly Report (EROS Data
Center, Sioux Falls, S. Dak.) 3 p
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and water quality features and conditions. Analysis of the Black Hills site will be deferred to July of 1983 following acquisition of data in the spring or early summer seasonal state. The Black Hills data will be acquired via the Canadian station (Prince Albert) if Goddard cannot make the acquisition.

Geodetic verification software has been developed on a PDP 11/60 with an interactive display and digitizer. Two multispectral scanner scenes (84014415472X0 - Alabama 20,37, 84010915140X0 - Washington, D.C. 15.33) have been verified. Results will be presented at the January 11 meeting. Software to verify the thematic mapper data is in hold since the necessary data fields in the thematic mapper ancillary records are not sufficiently understood. We have been in contact with Valerie Thomas, GSFC, on this problem.

The northeast Arkansas scene was chosen for initial testing of various combinations of color composites. This work has been centered on the selection of an appropriate transfer function for capturing scene radiance on a color film medium. With the establishment of an appropriate transfer function, the following band combinations will be made and submitted for evaluation by a group of professional image interpreters.

The initial band combinations for making color composites will be:

Band Combinations

R	G	B
1	2	3
2	3	4
1	2	4
3	5	4
3	7	4
6	5	4
3	4	6
4	5	7
4	2	3

3) Significant Results

None

4) Publications

None

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5) Recommendations

None

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6) Data Utility

There appears to be some minor radiometric striping in the thematic mapper data for the Washington, D.C. scene.



Donald T. Lauer