

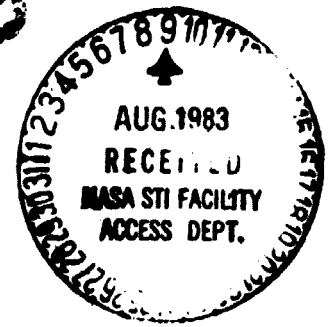
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EVALUATION OF RADIOMETRIC AND GEOMETRIC  
CHARACTERISTICS OF LANDSAT-D IMAGING SYSTEM

First Quarterly Report

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1. PROBLEMS - All data has been delivered. The data collected over the Western United States have low sun angles which make analysis difficult. The low sun angle causes significant signal-to-noise ratio problems, particularly in the 1.6 and 2.2 micrometer bands. Also some data is obscured by snow cover.
2. ACCOMPLISHMENTS - The Podwysocki et. al. paper (Attachment 1) discusses early results. Work performed since, includes analysis of the Death Valley and Las Vegas scenes for geologic mapping. These two scenes were chosen because they were snow free. The Florida scenes are being analyzed for the sensing of carbonate-bearing beach sand distribution. Attachment 2 is a copy of the 1:100,000 scale satellite image map of Dyersburg printed with the TM scene on one side and the standard line map on the reverse. It is interesting to note that compilation errors in the line maps were caught and corrected by comparing it to the image maps. Further work is being pursued in an effort to improve the process of lithographing TM data. Attachment 3 is a lithograph of seven different color versions of the Dyersburg quadrangle rendered from combinations of six different bands.
3. SIGNIFICANT RESULTS - Results are given in the attachments. In addition, it was discovered in the Macon, Georgia scene, that areas of high clay content in the Georgia-Koalin sensing districts were able to be defined.
4. PUBLICATIONS, etc. a) A Preliminary Evaluation of Landsat-4 Thematic Mapper Data for their Geometric and Radiometric Accuracies (Attachment 1).  
b) 1:100,000 Scale Satellite-Image Map of Dyersburg (Attachment 2).  
c) Landsat-4 Thematic Mappers: Examples of Image Color Rendition of the Dyersburg Quadrangle Area (Attachment 3).  
d) Evaluation of the Cartographic Potential of the Thematic Mapper as Flown on Landsat-4 by Alden P. Colvocoresses, July 1983 (not yet released for distribution by USGS).  
e) Results of Analysis of Portion of Las Vegas Scene for Mapping Hydrothermally Altered Rocks presented by M. Podwysocki at the Flagstaff annual Geosat Meeting, June 1983.

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d) Results of analysis of TM data for Geologic Mapping presented by M. Podwysocki at the Twenty-First Goddard Memorial Symposium.

5. RECOMMENDATIONS -
- o The gain and translation factors on TM channel 4 need to be clarified.
  - o The banding in groups of 16 scanlines needs to be corrected.
  - o The geometrical correction to convert from A to P tape format need to be published.
6. DATA UTILITY -
- o The higher resolution (over MSS) causes the TM data to approach more closely the quality of high altitude photographs. It appears, at this stage, in the research that it can be used for map inspection and in certain instances for limited map revision. Image maps can be made at a scale of 1:100,000 and perhaps up to 1:62,500.
  - o It has been shown that TM data can help locate rocks containing minerals with high hydroxol content, such as clays, gypsum, alunite, and sericite.