Type I Progress Report

for Period Ending December 15, 1973

A. A study to explore the use of remote sensing to determine native arid plant distribution, MMC #250

B. GSFC #UN613

C. Problems: None

D. Accomplishments during the reporting period:

1. Enlargement of linear density ERTS transparencies.

Portions of June 25, 1973 linear density ERTS transparencies including the Avra Valley study areas were enlarged along with the corresponding density scales. These enlargements will be used as a tool for mapping vegetation types and for evaluating various adding and subtracting methods of simultaneous multiband viewing, especially in relation to distinguishing borders.

2. Progress in the development of technology and hardware of airborne radiometric data collection.

Under construction is a radiometer-videorecorder interface that will allow radiometric data to be recorded on the sound track portion of a videotape as the terrain is recorded on the video portion. Bands for the four ERTS channels are being provided for in the design, as is an additional band for recording with a recently developed far-infrared radiometer. When construction is complete, a low altitude record of an ERTS scanline will be made simultaneously with the satellite flyover so that a detailed comparison of low altitude data and satellite readout will be possible. The estimated completion date is February 1, 1974.

3. Choice of aerial routes.

Using U-2 and ERTS imagery, we located a road approximating the direction of an ERTS scan line in the Avra Valley study site paralleling the direction of an ERTS scan line. Our aircraft equipped with radiometric equipment will fly along this road. A ground study along the road was made on November 23 wherein particular attention was given to locating a vegetation gradient made up of typical vegetation types. An attempt will be made to recognize these vegetation types from the aircraft radiometric data which will match ERTS in spectral and spacial resolution. The data obtained will be comparable to the ERTS tape-based data along the same scan line.

4. Presentation at Fourth Annual Conference on the Application of Remote Sensing of Arid Land Resources and Environment.

On November 16, some results of our investigations were presented to the Fourth Annual Conference on the Application of Remote Sensing of Arid Land Resources and Environment held at the University of Arizona. An abstract of the presentation is enclosed with this progress report, (section F).

Accomplishments planned for the next reporting period:

1. Completion of the construction of hardware for airborne low altitude radiometric data collection.

Construction of the hardware for radiometric data collection from a low-altitude aircraft has been slowed by the overly long shipping delays of certain parts. The completion of construction is imminent, however.

2. Vegetation distribution maps for the Avra Valley study areas.

Addition and subtraction photographic techniques employed with ERTS bands 5 and 7 will be used to enhance vegetation in the Avra Valley on ERTS linear density transparencies. A density slicer will be used to distinguish different vegetation types that will be checked in the field. The ultimate product will be maps of native arid plant communities in the Avra Valley.

E. Significant Results: None

F. Abstract of a paper presented November 16, 1973 at the Fourth Annual Conference on the Application of Remote Sensing of Arid Land Resources and Environment at the University of Arizona in Tucson.

ERTS-1 IMAGERY AND NATIVE PLANT DISTRIBUTIONS

H. Brad Musick, William McGinnies, Edward Haase, and Larry K. Lepley

The signature of a desert scene is comprised of various components: vegetation; bareground; litter of dead plants, and shadow.

An Exotech ERTS radiometer was used to collect ground truth spectral signature data for various types of scenes including ground with and without annuals and various shrubs. When these signature data are plotted with infrared (MSS Ban 6 or 7) reflectivity on one axis and red (MSS Band 5) reflectivity on the other axis, clusters of data from the various types of scenes are distinct. This method of expressing spectral signature data appears to be more useful for distinguishing types of scenes than a simple infrared to red reflectivity ratio.

G. Recommendations: None

H. Changes in Standing Order Forms: None

I. ERTS Image Descriptor Forms: None

J. Data Request Forms: None

K. Other Information: None