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COLLEGE OF LIBERAL ARTS
DEPARTMENT OF BIOLOGICAL SCIENCES

February 12, 1973

TO: R. Stonesifer, Technical Officer, NASA

FROM: D. Slaymaker, Administrative Assistant
Proposal No. 327-Lowe, University of Arizona
for Contract No. NAS5-21819

RE: Type I Report No. 2 ("Determination of Species"
Proposal No. 327-Lowe), for the second two month period

"The objective of this study is the determination of specific spectral signatures for dominant desert scrub plant species (and their soil surface backgrounds) with use of overflight coverage as an intermediate link between permanent ground truth points and satellite imagery."

Our present status, is as follows:

1. We have changed our photographic equipment from a 35mm to a 70mm film format. Our original instrument package included a mount of several 35mm cameras which was hand held. All cameras were triggered simultaneously to produce a multi-spectral image set. This has proven unsatisfactory for two reasons:

   a. At our close working range to the subject plants, the parallax distortion becomes significant.

   b. 35mm film proves to be of insufficient size and quality for analysis with the E.R.T.S. additive viewer.

For these reasons, we have changed to one Hasselblad single lens reflex camera, mounted on a sturdy tripod. Using interchangeable camera backs and sliding filters, five different film-filter combinations are sequentially exposed for each subject. This provides a set of 70mm multispectral images which avoid parallax distortion by having all been exposed through the same lens.

This change in format has not necessitated the purchase of additional cameras, as the Hasselblad equipment involved is in-house property, on loan to the project. Also, arrangements to process the 70mm film required only slight modifications of facilities already available, and can and will proceed on or off campus within the limitations of the project budget and design.

2. The spectrometer which was to be provided by A.R.E.T.S. (as indicated in Attachment A, page 2 in our proposal) has been received by that office, and is now available to us.

3. From the initial analysis of E.R.T.S. imagery for our area, it appears that it may be necessary to use photo-enhancement techniques to compensate for the low contrast of the desert. We have begun developing procedures for doing this.

4. Due to variations in atmospheric conditions and film processing from overflight to overflight, particularly with U2 intermediate, a reference area of known spectral reflectance could be included in the study Site if film densities on the images from different dates are to be compared. Furthermore, this reference area should be large enough for its density to be isolated and determined on the E.R.T.S. image.

We are presently testing the feasibility of doing this with the tailings of the Silverbell Copper Mine near our Site. The tailings are a by-product of the mining process in which a gray sand forming a flat smooth surface of about 800 acres results. We have begun taking readings off of this surface with the spectrometer during E.R.T.S. overflight, and hope to be able to use this data to calibrate the resultant imagery with ground truth values.