

E7.3-110.9.3.
CR-13556/

"Made available under NASA sponsorship
in the interest of early and wide dis-
semination of Earth Resources Survey
Program information and without liability
for any use made thereof."

EVALUATION OF USEFULNESS OF SKYLAB EREP S-190 AND S-192
IMAGERY IN MULTISTAGE FOREST SURVEYS

EREP Investigation #473

Period Covered: August 1, 1973 to September 30, 1973

Contract Number: NAS 9-13289

Principal Investigations Management Office
Lyndon B. Johnson Space Center

Technical Monitor: Mr. Ryborn Kirby

Principal Investigator:
Philip G. Langley
Earth Satellite Corporation

Monthly Plans and Progress Report

E73-11093) EVALUATION OF USEFULNESS OF
SKYLAB EREP S-190 AND S-192 IMAGERY IN
MULTISTAGE FOREST SURVEYS Progress
Report, 1 Aug. - (Earth Satellite Corp.,
Berkeley, Calif.) 5 p HC \$3.00 CSCL 02F

N73-32260

Unclas
G3/13 01093

EVALUATION OF USEFULNESS OF SKYLAB EREP S-190 AND S-192
IMAGERY IN MULTISTAGE FOREST SURVEYS

OVERALL STATUS

In our previous reports we mentioned an experiment to test the usefulness of our newly developed digital interpretation system. With this system classifier output is related to volume estimates of known land parcels to estimate differential timber volume levels associated with each land class.

We also mentioned that it would probably be inappropriate to regress the digital interpretation directly on known ground volumes, as this would not be attempted in an operational situation. Therefore we reported on the development of a highlight U2 volume interpretation model.

We recently completed the digital interpretation experiment for our first test area. We regressed not only on U2 estimated timber volumes, but also directly onto known ground volumes.

We tested our system on a 64-square-mile area in Northern California's Trinity Alps. A systematic experiment was conducted in which 16 possible combinations of two ERTS MSS bands, the difference between these bands, and a contrast measure extracted from them were tried.

From the experimental outcome we estimated that a gain of 50% in sampling precision can be obtained in a multistage forest survey when using the digital volume estimation system. Especially the

difference between bands proved to be of major importance for the estimation of biomass in the form of timber volume. Contrast contributed positively to the estimated gain, but its contribution was small and probably not statistically significant.

The experimental outcome also confirmed the notion that a better correlation can be obtained between space image interpretation results and highflight photographic estimates than between the space image estimates and the ground truth.

In addition to the digital interpretation experiment, we completed the transfer of all parcel boundary information from the U2 RC-10 photographs to the RB-57 photographs. This boundary annotation is needed for the development of volume interpretation models for the RB-57 photography, and for the application of these models in the simulated test survey.

EXPECTED ACCOMPLISHMENTS FOR NEXT PERIOD

Our expected accomplishments for the next period fall into the following categories:

1. Multi-spectral combining of the S-190A images was postponed due to a personnel scheduling problem. However, we will proceed with this evaluation in the coming period.
2. All GLO land section boundary points were transferred to the RB-57 imagery. However, we still must perform the resection and the projective transformation to annotate the boundaries

on the S-190A imagery. Comparator measurements for this resection have been performed.

3. As soon as we receive S-192 tapes with data taken over our test area, we will continue the development of software for the conversion of these tapes to our standard format. The present programs are in a state where we think it no longer profitable to work with the test tapes, due to anticipated changes between the test tapes and the expected tapes with our test area data.
4. We will complete the experiments with our digital interpretation system mainly to assess the influence of a water body on our estimated sampling gains.
5. We will begin program preparations for the simulated forest survey in which a large number of primary sampling units will be digitally interpreted.

SIGNIFICANT RESULTS FOR THIS PERIOD

We tested a unique digital timber volume estimation system with digital data for two ERTS MSS bands. The system was tested on a 64-square-mile area in Northern California's Trinity Alps. The outcome of a systematic experiment in which possible combinations of the two bands (MSS 5 and 7) were tried, showed that an estimated gain in precision of 50% can be obtained in a multistage sampling design.

Especially the difference between the two bands proved to be of major importance for the estimation of biomass in the form of timber volume.

Identical tests as the one performed will be conducted with various S-192 bands when the digital data become available.

SUMMARY OUTLOOK FOR THE REMAINING EFFORT TO BE PERFORMED

As present we are somewhat behind with the multi-spectral combining of the S-190A images. However, this task will be performed during the present period.

The results obtained with our digital interpretation system are encouraging. Therefore, we have decided to temporarily postpone the LARS interpretation of the S-192 tapes, and focus first on our digital volume estimation system. The test procedures for this system are all completely defined and can be applied directly to the S-192 tapes when available.

With exception of the above conditions, it seems that the investigation is proceeding as planned. We hope that we will receive S-192 tapes during the coming period, so that we can continue the investigation as outlined in the milestone plan.

TRAVEL PLANS

None for the next reporting period.