

FIFTH BI-MONTHLY PROGRESS REPORT
UNIVERSITY OF ALASKA
ERTS PROJECT 110-1
May 30, 1973

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E 7.3 10636
CR-132095

- A. TITLE OF INVESTIGATION: Coordination and Establishment of Centralized Facilities and Services for the University of Alaska ERTS Survey of the Alaskan Environment
- B. PRINCIPAL INVESTIGATOR/GSFC ID: Albert E. Belon/UN318
- C. PROBLEMS IMPEDING THE INVESTIGATION:

The CDU-200 Color Display Unit to be used for the processing and display of ERTS digital data has not yet been delivered by the manufacturer, Interpretation Systems, Inc. (ISI). ISI has now promised delivery on June 20, 1973. Although we have developed other methods of processing and displaying ERTS digital data, they are much less effective and more costly than the CDU-200 approach would provide.

PROGRESS REPORT:

1. Accomplishments during the reporting period
 - a. Coordination and management of the U of A ERTS program

Acquisition of Alaskan ERTS data for the winter period February, March and April resumed during the reporting period. Some 400 scenes involving 8000 data products were received, logged-in, and transmitted to the principal investigators of the 12 U of A ERTS projects. A convenient map reference for these ERTS scenes reveals excellent cloud-free coverage of northern and western Alaska. Contrary to late winter and early spring weather statistics cloud-free coverage of interior and south-central Alaska has been very poor so far because, coincidentally, clear skies and overflights of ERTS appeared to be anti-correlated.

A remote sensing short course emphasizing ERTS applications was given in Juneau during the week of April 2-9, by scientific and technical personnel of project 110-1. The five day course involved formal lectures as well as workshop sessions using ERTS and aircraft data, and it was directed toward the operational needs of state and federal agencies in southeastern Alaska. Approximately 40 government employees attended the course and now are or intend using ERTS data in support of their operational activities. The government response to our remote sensing course appeared to be highly favorable because it has since prompted the Governor of Alaska, The Honorable William A. Egan to write a letter strongly supporting the NASA ERTS program to NASA officials and members of Congress.

E73-10636) COORDINATION AND ESTABLISHMENT
OF CENTRALIZED FACILITIES AND SERVICES
FOR THE UNIVERSITY OF ALASKA ERTS SURVEY
OF THE ALASKAN ENVIRONMENT (Alaska Univ.,
Fairbanks.) 6 p HC \$3.00
N73-24395
Unclas 00636
G3/13 C5CL 14B

We successfully conducted negotiations with the Juneau office of the U. S. Forest Service for the free loan of a Bausch and Lomb Zoom transfer scope, model ZT4, in exchange for an ERTS mosaic of southeastern Alaska in reconstituted color-infrared (MSS band 4, 5, and 7). According to the terms of the agreement, the zoom transfer scope is loaned to us for the period June 1 to July 15, with a possible extension to July 31, 1973.

Internal coordination of the U of A ERTS program continued actively through frequent consultations with investigators, review and editing of reports and journal articles, preparation of revised ERTS standing orders and data requests and negotiations of these with our NASA technical monitor, Mr. E. Crump; and through technical assistance and supervision of work orders for the 12 U of A ERTS projects.

b. Establishment of data processing facilities
Optical and photographic instrumentation.

As indicated in the previous section, we have acquired a Bausch and Lomb Zoom Transfer Scope on temporary loan from the U. S. Forest Service. This instrument was installed and demonstrated to U of A investigators by personnel of project 110-1. It has been in almost constant use since its installation in the U of A ERTS Data Users Room on May 28, 1973.

The other items of optical and photographic instrumentation purchased or constructed with project 110-1 support are fully operational and in frequent use. A possible exception is the color-additive viewer which seems to require recurring maintenance and adjustment, thus discouraging frequent usage by investigators.

Instrumentation for digital processing and display of ERTS data

All items of digital processing instrumentation which we contemplated adapting and utilizing for the U of A ERTS program in our revised data handling plan are now in frequent use. The one major exception, of course, is the color display unit CDU-200 which has not yet been delivered by the manufacturer. As it was mentioned in section C of this report, we expect delivery of the CDU-200 on June 20, 1973. During the reporting period we were in frequent contact with the manufacturer of the CDU-200, reviewing their progress and problems and repeatedly urging them in the strongest possible words to expedite delivery of the equipment.

c. Development of ERTS data processing techniques

Photographic and optical data processing - This aspect of project 110-1 activities has been completed to the extent specified in the ERTS contract and within the funding available for this purpose. The techniques which have been developed are described in detail in the first semi-annual report and the revised data handling plan submitted in February 1973.

During the reporting period we attempted to identify areas of spruce beetle forest infestation on the Kenai Peninsula and on the west shore of Cook Inlet. Several thousand acres are affected and the infestation is becoming of increasing concern to the State Department of Natural Resources because it is apparently growing rapidly. For this study we utilized color reconstituted ERTS scenes obtained with a color-additive viewer and by a photographic process, color-infrared aerial photographs and vegetation maps. Previous attempts to identify the spruce beetle infestation were inconclusive because the only available ERTS scene of the area was acquired on November 3, 1973, when the sun angle was less than 10° , and because there are no large stands of spruce which have been totally killed by the infestation. The use of the recently borrowed zoom transfer scope with the available data has convinced us that the ERTS scene shows subtle differences in hues and primarily shade in the infested areas. A computer print-out of a portion of the digital tape for that scene was compared to the corresponding aerial photograph and appeared to confirm our conclusions. We are now in the process of preparing spectral signatures for the infested spruce and surrounding healthy vegetation.

Digital data processing - These activities have been somewhat curtailed by project 110-1 during April and May in order to conserve funds for the installation of the CDU-200 and for development of the associated PDP-11 computer programs. As indicated in Section C, delivery of the CDU-200, often postponed previously, has been promised by the manufacturer for June 20, 1973.

IBM 360 computer programs, developed previous to this period and reported in various progress reports, have been used extensively to provide data processing services for the following projects:

- Projects 110-1 and Code Y - Identification of spruce beetle infestation
- Project 110-2 - Vegetation and land use classification
- Project 110-7 - Caribou habitat and migration
- Project 110-13 - Snow distribution survey of Mt. Wrangell volcano
- Project 110-14 - Identification of archeological sites

For each project, one or more selected areas were converted to CDU format tapes from the MSS tapes and digital image print-outs with several variations of print character assignments were made. Two versions of classification by signature subroutines were written and implemented for project 110-2. A new program to produce frequency distributions of picels by intensity levels or classifications for any selected area was written and immediately used by projects 110-2 and 110-14. As a by-product, this program calculates the areal extent of a given intensity or a given classification, depending on whether a CDU level tape or a CDU classification tape is used as input. At the present time another new computer program is being developed to produce cross-plots of the intensity levels

in each band. It is expected that results from this program will expedite the definition of multispectral signatures needed to produce classification maps.

2. Plans for the next reporting period
 - a. Coordination - These activities will continue at approximately the same level of effort and will include:
 - a general meeting of U of A ERTS investigators about June 23 or June 26 when the CDU-200 and VP-8 image analyser are installed and checked-out.
 - frequent consultations with investigators and graduate students involved in the U of A ERTS program
 - receipt, cataloguing and transmittal to investigators of 1973 ERTS data, and assistance in the preparation of revised standing orders and data requests.

- b. Establishment of ERTS data processing facilities

The manufacturer, ISI, will deliver the CDU-200 on June 20. They have also agreed to let us have for a period of at least one month an interfaced VP-8 image analyser, as partial compensation for the late delivery of the CDU-200. Three ISI specialists for the hardware and software components of the systems will come to Fairbanks to complete the installation and testing of the equipment and to train our staff in its operation. Two of our staff, Mr. Robert Porter, computer programmer and Ms. Irene Soos, electronic engineer will work closely with ISI personnel in the installation and testing of the equipment and in the review of the documentation for the system. It is expected that the VP-8 image analyser will be almost immediately available for use by U of A ERTS investigators; the CDU-200 will be made available gradually, as the necessary computer programs are developed.

- c. Development of ERTS data processing techniques

Since the optical and photographic techniques have already been developed, we will concentrate our activities in this area to the supervision of the performance of work orders for the other U of A ERTS projects by project 110-1 technical staff.

The principal activity will be the development of computer programs for the CDU-200 and supervision of the operation of the VP-8 image analyser. It is anticipated that Mr. Robert Porter will devote his full time to this activity during the month of July.

Scientific staff of project 110-1 will continue their attempt to identify, classify and map spruce beetle forest infestations on the Kenai Peninsula. The emphasis will be placed on digital data processing and automatic classification. This investigation is jointly supported by project 110-1, because it involves the development of data processing techniques, and by a NASA Code Y grant, because of its practical importance to the State of Alaska.

E. SIGNIFICANT RESULTS:

None to be reported during current period

F. PUBLICATIONS:

1) Issued Report

Anderson J. H. and A. E. Belon, A New Vegetation Map of the Western Seward Peninsula, Alaska, Based on ERTS-1 Imagery, Interim Scientific Report on NASA Contract NAS5-21833, University of Alaska, February 1973.

2) In press

Miller, J.M. and A. E. Belon, A Multidisciplinary Survey for the Management of Alaskan Resources Utilizing ERTS Imagery, Proceedings of NASA ERTS-1 Symposium, Washington, D. C., March 1973.

Anderson, J. H., L. Shapiro and A. E. Belon, Vegetative and Geologic Mapping of the Western Seward Peninsula, Alaska, Based on ERTS-1 Imagery, Proceedings of NASA ERTS-1 Symposium, Washington, D. C., March 1973.

Miller, J.M. and A. E. Belon, Seeing Alaska from Space, Alaska Magazine, to be published September 1973.

3) In preparation

Belon A. E. and J. M. Miller, Applications of Satellite Remote Sensing to Surveys of the Alaskan Environment and Resources, 1972-73 Annual Report, Geophysical Institute, University of Alaska, to be released September 1973.

G. RECOMMENDATIONS:

None

H. CHANGE IN STANDING ORDER:

None

I. IMAGE DESCRIPTOR FORMS:

Attached

J. ERTS DATA REQUEST:

April 12, 1973	Not received
April 17, 1973	Not received
April 30, 1973	Not received
May 4, 1973	Not received

ERTS IMAGE DESCRIPTOR FORM
(See Instructions on Back)

DATE May 30, 1973

PRINCIPAL INVESTIGATOR Albert E. Belon

GSFC UN318

ORGANIZATION Geophysical Institute, University of Alaska

NDPF USE ONLY
D _____
N _____
ID _____

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*				DESCRIPTORS
	Sea-Ice	Polynya	Land	Snow	
1226-22153	x	x	x	x	
1226-22160	x	x	x	x	
1226-22162	x	x	x	x	
1226-22165	x	x	x	x	
1227-22212	x	x	x	x	
1227-22214	x	x	x	x	
1227-22221	x	x	x	x	
1227-22223	x	x	x	x	
1228-20435	x	x	x	x	
1241-21580	x	x	x	x	
	Rivers	Lakes	Mtns	Snow	
1218-21305	x		x	x	Sand dune
1217-21251	x	x	x	x	
1234-21211	x	x	x	x	

*FOR DESCRIPTORS WHICH WILL OCCUR FREQUENTLY, WRITE THE DESCRIPTOR TERMS IN THESE COLUMN HEADING SPACES NOW AND USE A CHECK (✓) MARK IN THE APPROPRIATE PRODUCT ID LINES. (FOR OTHER DESCRIPTORS, WRITE THE TERM UNDER THE DESCRIPTORS COLUMN).

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