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MONITOR WEATHER CONDITIONS FOR CLOUD SEEDING CONTROL

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May 1, 1974

Type I Progress Report for Period from March 1, 1974 - April 30, 1974

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Prepared for:

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Greenbelt, MD 20771

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Type I Progress Report
ERTS-A

- a. Title: Monitor Weather Conditions for Cloud Seeding Control
ERTS-A Proposal No.: 642
- b. GSFC ID No. of P.I.: IN 024
- c. For the period from March 1, 1974 to April 30, 1974: There were no problems impeding the progress of this investigation.
- d. Progress in reporting period:

Progress during the reporting period consisted solely of routine operation of the ERTS network including required servicing and maintenance. Cloud seeding operations continued through the reporting period as the season began to draw to a close. May 16 was scheduled as the last day of the 73-74 experimental season. The cloud seeding contractor continued to make routine use of ERTS data in the control of cloud seeding operations and in near-real time monitoring of weather parameters at remote sites in the cloud seeding target area during non-seeded days.

Some minor maintenance problems were encountered at two of the ERTS sites during the reporting period and access to the sites was often difficult due to bad road conditions caused by an early runoff. The largest part of the field work by the contractor, however, continued to be in servicing the ERTS precipitation sensors. Precipitation gage servicing and ERTS maintenance was accomplished mostly by contractor personnel from their Durango office, although some maintenance was accomplished by Fort Collins based personnel. Following is a description of maintenance and servicing requirements for each of the ERTS sites:

1. Palisade Lake

No problems were experienced with the ERTS data collection platform although some minor and intermittent problems were encountered with the precipitation sensor connected to channel 3. These problems appear to have been solved when the gage was serviced by contractor personnel on April 3. On this date a new evaporation retardant and antifreeze solution was added to the weighing bucket in the sensor. The intermittent sensor problem, thus, appears to be due to unusual sensor exposure at this site. The precipitation gage at this site is located in a dense stand of aspen trees and the faulty readings may be due to fall-in from the trees during high-wind periods or may be due to antifreeze problems caused by the cold location of this site. The problem becomes more noticeable after three inches of water equivalent are collected in the sensor.

2. Wolf Creek North

The data collection platform at this site has worked well for the entire reporting period. The sensor on channel 1 which measures water temperature failed abruptly on March 16, however, and reported temperatures that were much too high. A full analysis of the cause of this problem is not yet available.

3. Castle Creek

Data from this site continued to be of high quality with no maintenance or servicing required during the reporting period.

4. Runlett Park

An electronics technician was flown to this site by helicopter on March 5 to solve a problem with wind speed data coming over channel 3. The problem was determined to be an input FGT and the sensor was moved to channel 5. Corresponding changes were made in ERTS computer programs by Bureau personnel. On April 15 a sudden drop in battery voltage (to 5.7 volts) occurred similar to the problem experienced on January 18, 1974. Subsequent data from this site was of poor quality and could not be used. No special maintenance trip to this site was scheduled since the data collection season was almost over. An analysis of this problem will be provided after the site is deactivated in late May. At this time it seems likely that the problem is the same one that caused the January failure. The heavy power drain at this site and the inability of the solar panel to consistently provide this power under all weather conditions is probably the cause of the problem.

5. Muleshoe

The ERTS instrumentation continued to operate well at this site during the reporting period. No maintenance or servicing were required.

6. Wolf Creek Pass

The Wolf Creek Pass DCP and sensors continued to operate properly during the reporting period. A routine servicing trip for the precipitation gage was accomplished at 1800 MDT on March 10, 1974.

7. Lime Mesa

No maintenance was required during the reporting period. The precipitation gage at Lime Mesa was serviced by helicopter on April 22.

III. Progress Planned for Next Reporting Period

A. Five of the seven ERTS DCP's will be removed from the field for summer storage in Durango, Colorado. The two remaining ERTS DCP's, located at Wolf Creek North and Wolf Creek Pass, will operate throughout the summer period.

B. An analysis of satellite visibility statistics will be completed for each of the winter sites. Preliminary conclusions will be drawn on the applicability of using simple surveying measurements at proposed sites to forecast the frequency of data relay to ground receiving sites via ERTS satellite.

C. A cost-effectiveness analysis of the ERTS data collection system will be completed. Comparisons will be based on a manual method of collecting data at the same sites with similar sampling frequencies.

e. Results to date are:

1. The near real-time DCS platform data transfer to time-share computer is a working reality. Seven stations are now being automatically monitored and displayed with a system delay of 3 to 8 hours from time of data transmission to time of data accessibility on the computer.

2. The DCS platform system has proven itself a valuable tool for near real-time monitoring of mountain precipitation. Data are being used operationally by the Bureau's cloud seeding contractor for control of cloud seeding operations and for verification of weather forecasts.

3. The DCS platforms, as deployed in this investigation, have proven themselves to be reliable weather resistant systems for winter mountain environments in the southern Colorado mountains.

f. Publications:

Olin Foehner, Monitor Weather Conditions for Cloud Seeding Control, ERTS Investigation Number 642. Presentation of paper to Discipline Panel Review, ERTS Investigations, Goddard Space Flight Center, Greenbelt, Maryland. October 24, 1973.

C.D. Whiteman, Satellite Data Collection Systems. Report to Bureau of Reclamation by Western Scientific Services, Inc. October 10, 1973.

g. Recommendations: None

h. Changes in standing order forms:

12-26-73 addition

i. ERTS image descriptor forms: N/A

j. Changes in data request forms:

1-11-74 addition

k. Seven DCS platforms are in place and operational. One spare platform acts as a backup to the other units.