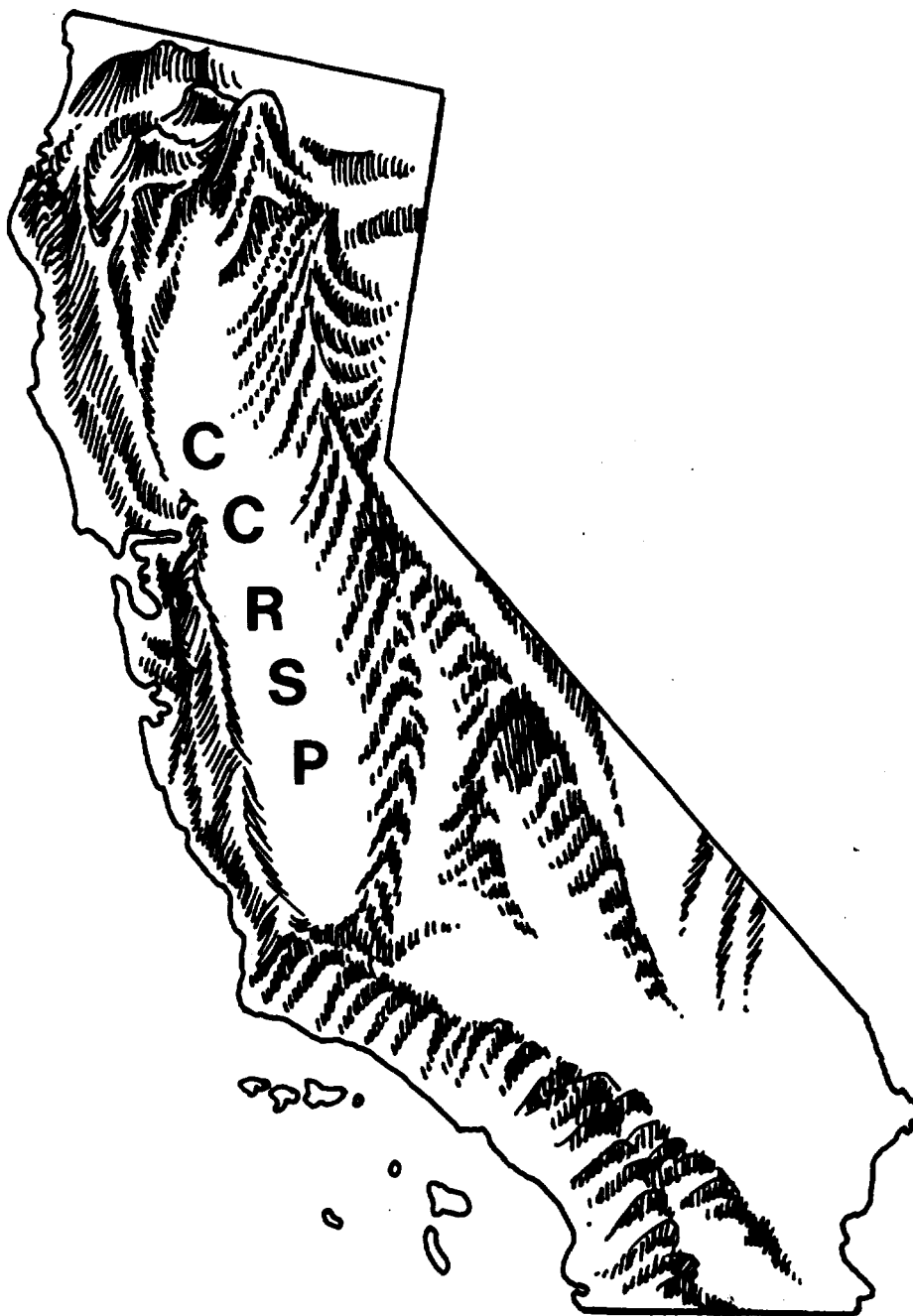


CALIFORNIA COOPERATIVE REMOTE SENSING PROJECT Implementation Plan - FY85

1984



**California Department
of Water Resources**

**NASA
Ames Research
Center**

**USDA
Statistical Reporting
Service**

**University of
California - Berkeley**

TABLE OF CONTENTS

	<u>PAGE</u>
I. Introduction	
A. Purpose.....	1
B. 1985 Operational Test.....	3
II. Software	
A. Overview.....	5
B. Tasks.....	6
III. Transect Data	
A. Overview.....	8
B. Tasks.....	8
IV. June Enumerative Survey	
A. Overview.....	9
B. Tasks.....	10
V. Communications Network/Hardware	
A. Overview.....	10
B. Tasks.....	11
VI. Analyst Aids	
A. Overview.....	12
B. Tasks.....	12
VII. Map Products	
A. Overview.....	13
B. Tasks.....	13

I. Introduction

A. Purpose

The California Cooperative Remote Sensing Project (CCRSP) is a joint effort among the U.S. Department of Agriculture-Statistical Reporting Service (SRS), the California Department of Water Resources (DWR), the Remote Sensing Research Program - University of California (RSRP), and NASA-Ames Research Center to develop a Landsat-aided crop inventory and mapping system for California. During 1985, a test will be performed of an inventory system developed by CCRSP and an evaluation made of the systems performance characteristics.

The overall schedule for FY85 is given in Table 1. For organizational purposes it has been divided into three phases: development and testing, pilot test, and operational test. The intent of this document is to define the work that needs to be accomplished during FY85 with major emphasis placed on development and testing. Details of the pilot test for crop classification and estimation will be outlined at a later date when it becomes more apparent as to what software and analysis tools will be available for the May 1 test. Map product procedures will not be developed in time for the May test but these procedures will be pilot tested by September 30. Some items, such as ground data, have been completely delineated. Other areas, such as digital analysis, have not been detailed for the operational test phase because they are dependent on pilot test results. A complete plan for conducting the operational test will be written by July 15.

This implementation plan is divided into major project elements. One person has been identified for monitoring and coordinating work being conducted within a single element. Each element has been subdivided into various

Table 1. Project Schedule for FY85.

	O	N	D	J	F	M	A	M	J	J	A	S
DEVELOPMENT & TESTING												
Software Completed and Modules Tested												
Analysis Aids Defined												
CCRSP Review				I								
Analysis Procedures Implemented												
MIDAS Training Manual Written												
Ground Data Terms Defined												
Ground Data Forms Designed												
Ground Data Digitization Plan												
PILOT TEST												
Test Plans Detailed												
Test Conducted on DMR MIDAS												
Decision Made on Operational Use of MIDAS									I			
Analyst Training on DMR MIDAS												
OPERATIONAL TEST												
JES Training Schools								II				
Transect Data Collections												
JES Data Collection												
Ground Data Digitizing and Processing												
Test Plan Completed										I		
Landsat Data Processing Begins												I
State Level Estimates Provided to SSU												
County Level Estimates Provided to SSU												
Map Products Generated												

tasks with assignment of responsibilities and completion dates. New problems and tasks will be identified as work progresses. Updates will be added to this plan on an "as needed basis." It is hoped that this document can be a baseline which co-op members can use as a coordination tool in pursuing the objectives of the CCRSP.

B. 1985 Operational Test

A general description of the operational test is given below so that cooperators can focus on what is required for this phase. The objectives of this test are:

- Provide direct expansion and Landsat regression estimates for cotton, corn, rice, tomatoes, almonds, grapes, tree fruit, alfalfa, small grains (wheat vs. barley if possible) at the state and analysis district level by December 1, 1985.
- Provide Landsat based estimates for the above crops at the county level by February 15, 1986.
- Provide direct expansion and Landsat regression estimates for broader categories such as sown crops, row crops, irrigated, non-irrigated at the state and/or county level by February 15, 1986.
- Produce various thematic maps from the Landsat analyses during the first quarter of 1986.

The Landsat analysis area is given in Figure 1. It covers 19 counties and requires seven scenes. Data from three dates per scene will be obtained starting in May and ending in early August. MSS bands 2 and 4 will be used from each date to produce a six channel data set for analysis. No Kauth-Thomas transformation will be performed.

Transect ground data obtained from approximately 2300 sites will be used for developing training statistics. JES ground data from approximately 600 segments will be used for acreage estimation. A 10 to 20 percent sample of these segments will be selected for testing classifier performance.

Areas such as urban and residential will be masked out of the classified data. Standard USDA regression procedures will be used to obtain acreage estimates. Map products will be generated from the classified results for areas of interest.

It is hoped that the MIDAS-VAX-CRAY network can be used to process all data for the operational test, and that this can be accomplished in Sacramento by SRS and DWR personnel. But if results of the pilot test indicate otherwise, the processing load will be split between MIDAS and BBN. Analysis assignments will be made among the cooperators based on the objective of meeting the December 1, 1985 crop estimates deadline.

II. Software

A. Overview

Various software requirements have been identified. Some are modifications to PEDITOR and non-PEDITOR modules while others are for new software. The following is a breakdown of software tasks, the agency/person responsible for each task, and a completion date. Completion date is defined as the date in which the software has been written and tested.

Ed Sheffner will be responsible for monitoring software tasks within the CCRSP and for the development of a coherent MIDAS software package. Any new software requirements identified by co-op members are to be submitted to Ed so that they can be coordinated with on going tasks and responsibilities.

B. Tasks

The following tasks have been defined:

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>RESPONSIBILITY</u>	COMPLETION
			<u>DATE</u>
1.0 SEGED	Make changes in RATFOR version of 1984 non-PEDITOR program to calibrate segments entering LAT./LONG. coordinates of one point/map size and allow saving calibration for multiple segments per quad sheet. Use of 5 digit number allowed if 65000 is not exceeded.	AMES/Gary	11/15
1.1 PICK	Write pre-processor to PICK to allow analyst to set up double crop patterns.	SRS/Martin	2/15
1.2 STATED	Set class limit at 254.	AMES/Buzz	completed*
1.3 CRAY	Develop new CRAY programs for creating multitemporal tapes.	SRS/Martin	2/15
1.4 CRAY	Change multitemporal function in CRAY submission program. Install on MIDAS and add reformat function.	SRS/Martin	2/15
		AMES/Buzz	4/15
1.5 MCPEDIT	Incorporate into CPEDIT.	AMES/Gary	4/15
1.6 CLASSY	Ignore fill data (255).	SRS/Martin	2/15
1.7 CLASSIFY	Determine if chi-square option is needed.	Berkeley/Randy	12/31
1.8 GROUP	Set class limit to 254 and allow entering class assignments as a range. Install program on MIDAS	SRS/Bob	11/15
		AMES/Gary	1/1
1.9 CMBMSK	Add option to overlay masks and combine more than two masks in one operation.	Berkeley/Paul	4/30

* not tested

1.10	Compute percent correct using clusters and ground data and output intersection matrix.	Berkeley/Paul	3/15
1.11	Reformat EDIPS data (BIL) to BBN format.	AMES/Buzz	completed*
1.12	Compile 6 band tape of MSS 2 and 4 plus capability to determine filler.	AMES/Buzz	1/1
1.13	Capability to obtain CRAY block format tapes.	AMES/Buzz	12/15
1.14	PEDITOR - ELAS file conversion	AMES/Buzz	completed
1.15	Create CIE file for simultaneous display of classified data from multiple segments.	Berkeley/Paul	4/15
1.16	Produce temporal profiles and cluster plots using Printronix. (In future may be displayed on CRT)	Berkeley/Paul/ Tony	3/15
1.17	Write program to check for errors in keypunched transect data.	Berkeley	2/15**
1.18	Write program to take keypunched transect data and create ground truth files.	Berkeley	2/15**
1.19	Write SAS program to output segment total files from JES data to tape. Develop capability to read segment totals tape onto MIDAS.	SRS/Peggy Berkeley	2/15 4/15
1.20	Determine if VIPER stat package needed on MIDAS.	Berkeley/Randy/ Tony	12/31
1.21	Determine if Printronix plotter will be available in Sacramento for segment shifting. Develop/modify software required to run plotter.	SRS/Richard AMES	

*Not Tested

**Exploring use of UNIX utilities to accomplish task

1.22 See Task 5.4

1.23 See Task 6.4

III. Transect Data

A. Overview

An independent data set for classifier training will be collected using a systematic transect sampling technique. Transects will be developed on a county basis using DWR's land use maps, Landsat imagery, and aerial photography. A sample of approximately 2300 stop points will be selected at two mile intervals along the transects. Each transect will be run twice during the crop year by DWR field personnel and CCRSP members.

Jay Baggett will be the implementation leader and coordinator for transect data collection and processing.

B. Tasks

The following tasks have been identified:

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>RESPONSIBILITY</u>	<u>COMPLETION DATE</u>
2.0	Establish survey definitions	DWR/Jay	12/1
2.1	Design survey form	DWR/Jay	12/15
2.2	Develop keypunch instructions	SRS/George	12/15
2.3	Duplicate DWR maps	DWR/Jay	11/1
2.4	Color maps & create block tabulations	*	1/1
2.5	Produce 1:1,000,000 scale crop distributions	*	1/15

2.6	Layout transect and test against DWR survey	*	2/15
2.7	Predraw fields on quad sheets	*	3/15
2.8	Data collection preparation meeting	*	4/1
2.9	Run transect	*	4/15 - 5/1 7/15 - 8/10
2.10	Verify field boundaries using TM	*	8/10
2.11	Keypunch field labels	SRS/SSO	9/15
2.12	Digitize fields	DWR/Jay SRS/SSO	8/10 - 9/15

* - DWR, Berkeley, SRS

IV. June Enumerative Survey

A. Overview

Approximately 600 JES segments will be used in the Landsat analysis. These segments will be used only for estimation (except for the 10-20% subsample needed for testing classifier performance), therefore, no field level edit will be conducted at the SSO. In the digitization process only segment boundaries need to be digitized along with some identifiable features for segment shifting. No ground truth files will be created for these segments. An intentions follow-up survey will be conducted.

Segments needed for testing will be identified prior to the JES. Supervisory enumerators will assign these segments to their best enumerators to assure the most accurate ground data possible for test purposes. All fields within test segments will be digitized and ground truth files generated.

George May will have overall responsibility for the JES ground data element.

B. Tasks

The following tasks have been identified:

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>RESPONSIBILITY</u>	<u>COMPLETION DATE</u>
3.0	Establish definitions for additional JES items	SRS/George	12/1
3.1	Develop specifications for JES questionnaire	SRS/George	12/1
3.2	Determine changes to enumerators manual	SRS/George	12/15
3.3	Select test segments	Berkeley/Randy	4/1
3.4	Develop intentions survey form	SRS/George	4/1
3.5	Obtain new photography	AMES/Ed	5/1
3.6	JES Training School participation	Cooperators	5/8 and 5/15
3.7	Conduct JES	SRS/SS0	5/21 - 6/21
3.8	Digitize non-test segments	SRS/SS0	
		DWR/Jay	12/1 - 4/1
3.9	Intentions follow-up survey	SRS/SS0	7/15 - 8/1
3.10	Digitize remaining segments	SRS/SS0	8/20
3.11	Trace segment ground data	SRS/SS0	10/1

V. Communications Network/Hardware

A. Overview

Kermit will be used to transfer files, such as stat and mask files, between MIDAS stations and main frame computers. It will be used also for transferring digitized files from the Northstar and Osborne to MIDAS. Kermit

is currently operational on the MIDAS at DWR, Berkeley, and BBN. Large files, such as full frame data sets, will be sent via mail or hand carried. It is anticipated that the Telenet public network will be available for terminal users so that long distance telephone calls can be minimized.

The UUCP network will be implemented on all MIDAS stations. It will be used for electronic mail and to allow updates of MIDAS software to each station. It is hoped that cooperators can purchase 2400 baud modems to allow faster data transfer rates between stations.

Tony Travlos will be in charge of communications/hardware recommendations and implementations.

B. Tasks

The following tasks have been defined:

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>RESPONSIBILITY</u>	COMPLETION
			<u>DATE</u>
4.0	Installation of Kermit at AMES on MIDAS, VAX (SEA & Jupiter)	AMES	12/1
4.1	Implement UUCP on MIDAS Stations	Berkeley/Tony	1/1
4.2	Purchase 2400 baud modems	Cooperators	3/1
4.3	Operational-mode testing of both networks	Berkeley/Tony	4/1
4.4	Write users manual for Kermit and UUCP	Berkeley/Tony	6/1

VI. Analyst Aids

A. Overview

Several tools for analysis are currently being examined. Research on some of these items will continue in 1985 but a recommendation on what to incorporate in the FY85 operational test will be outlined by mid-January. This will allow time to make software modifications and implement procedures prior to the pilot test.

Randy Thomas has overall responsibility to coordinate this project element.

B. Tasks

The following tasks have been outlined:

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>RESPONSIBILITY</u>	<u>COMPLETION DATE</u>
5.0	Determine if more than residential and urban will be masked	Berkeley/Cathy/ Randy	1/15
5.1	Develop schedule for digitizing land cover masks	DWR/Jay	2/1
5.2	Write procedures and software specifications for cluster editing	Berkeley/Shari	1/15
5.3	Write procedures and software specifications for error analysis	Berkeley	1/15
5.4	Develop software for cluster editing and error analysis	Berkeley	4/15

VII. Map Products

A. Overview

Map products will be generated from the classified data tapes from the operational test. Colored maps for selected 7.5' quad sheets will be produced which display land covers and township/range lines. Color products will also be generated for selected quadrants of a Landsat scene at a 1:1,000,000 scale.

Chris Hlvaka has overall responsibility for map products.

B. Tasks

The following tasks have been defined:

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>RESPONSIBILITY</u>	<u>COMPLETION DATE</u>
6.0	Determine procedures for locating framing window using coordinates	AMES	-
6.1	Evaluate speckle removal	AMES/DWR/SRS	-
6.2	Implement speckle removal software if required	AMES	-
6.3	Determine procedures for producing line printer plot	AMES	-
6.4	Develop/Modify software for 6.3	AMES	-
6.5	Map product procedures fully tested and on-line	AMES	9/30