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TECHNICAL MEMORANDUM

SOFTWARE FOR ANALYZING DATA CONTAINED IN OUTPUT FILES CREATED BY THE SPATL AND MLTCRP ROUTINES OF THE ACCURACY ASSESSMENT SOFTWARE SYSTEM

By

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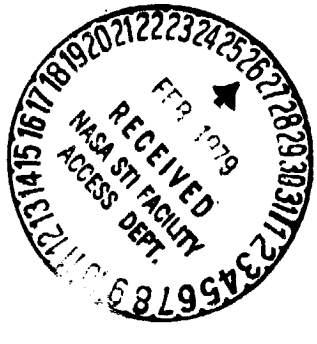

October 1978

LEC-12825

SOFTWARE FOR ANALYZING DATA CONTAINED IN OUTPUT FILES CREATED BY THE SPATL AND MLTCRP ROUTINES OF THE ASSESSMENT SOFTWARE SYSTEM

INTRODUCTION

The output files from the Accuracy Assessment routines SPATL and MLTCRP contain information about individual Procedure 1 processings of Large Area Crop Inventory Experiment (LACIE) blind sites. To analyze this data and aggregate the results over many blind sites, a program was developed to sort the data, and was used as a basis for other programs to investigate analyst dot labeling accuracy, clustering purity, and classification accuracy. This memorandum describes the operation of this software.

BASIC PROGRAM FOR SORTING OUTPUT FILES – ANALYZE

Program ANALYZE uses the header information in the output files from MLTCRP or SPATL to sort the data on the basis of state, segment number, processing date, number of acquisitions, and dot type. (A description of the contents of these output files is contained in refs. 1 and 2.) ANALYZE requires two data files as inputs: DATSEL.DAT, which contains the selection criteria for the run, and INPUT.DAT, which contains the name of the output files to be used and the range of output file version numbers to be accessed. The input file INPUT.DAT can contain any additional information necessary for the processing of the data. The file must contain a minimum of two lines. The first line is the name of the output files to be accessed in the form DB0:[110,6] MCRP. The device and user identification code (UIC) are optional if they are the same as the device and UIC in which the task resides. The second line contains the starting and ending version numbers in an octal format (04,1X,04). Any additional information may follow this second line.

Input file DATSEL.DAT contains two lines for each selection criterion. The first line is the general selection criterion, and the second line is the specific selection basis. A sample data set using each of the criteria follows.

```
SEGMENT
 5 1005,1007,1923,1215,1515
STATE
 4 CO,ND,SD,MT
NUMBER OF ACQ.
 3
DATE
 7200,7300
DOTS
 3  1,2,3
(blank line)
```

The blank line indicates the end of a data set. More than one set of selection criteria can be included in the data set, each separated by a blank line. A line containing "END" must follow the blank line after the last set of selection criteria. If no selection is to be made for a particular criterion, it is not included in the data set. The limits on the selection criteria are: (1) the number of segments cannot exceed 10; (2) the number of states cannot exceed 5; and (3) the number of dot types cannot exceed 4.

Program ANALYZE produces a line printer listing indicating the file name accessed, the range of version numbers used, the basis for selection, and the number of files selected by the program.

Appendix A is a compiled listing of program ANALYZE. Three subroutines are required: DATSEL, which is used to input the selection criteria; SELECT, which determines if the individual files meet the selection criteria; and SELIST, which produces the line printer listing of the information concerning the selection process.

There are six blocks in the main program where code can be written to perform individual analyses using the output files selected by the program. The inserts, labeled 0 through 5, are used as follows.

0 — Comments concerning the analysis to be performed

1 — Array specifications and DATA statements necessary for the analysis

2 — Input of additional data about the processing from input file INPUT.DAT

3 — Initialization of aggregation arrays before the files are accessed

4 — Computations based on a file which has met the selection criteria

5 — Outputting the final results of the computations (This section is located after all files have been checked.)

The programs described in the following paragraphs are all based on ANALYZE.

PROGRAM TO DETERMINE ANALYST DOT LABELING ACCURACY — DOTANL

The program DOTANL uses the data contained in the fourth record of the SPATL output files to determine the analyst dot-labeling accuracy. The program creates a two-dimensional array; one dimension corresponds to the ground truth crop code and the other dimension corresponds to the analyst label. This array is loaded with a count of the mutual occurrences of a ground truth crop code and an analyst label for all of the analyst-labeled dots in a file. DOTANL produces a line printer output with the number of dots which were labeled in each of the analyst categories for each ground truth crop code. The total number of dots in each crop code and the total number of dots with each label are shown. The program can also produce a percentage of correct classification for each crop code.

Input file DATSEL.DAT is set up for the particular criteria required. Input file INPUT.DAT has the name of the SPATL files on the first line, and the version numbers to be accessed on the second line. Following the second line is a set of lines indicating the proper analyst label for each crop code. This information is loaded in the form of beginning crop code, ending crop code, and the correct analyst label, using FORTRAN format (3I5). If a particular crop code is not included, the percent correct column is left blank. When all of the crop codes have been used, a blank line is entered to indicate an end of data. If the percent correct option is not desired, a blank line should follow the line containing the range of version numbers.

Appendix B is a sample output line printer listing obtained from DOTANL.

PROGRAM TO ANALYZE CLUSTER PURITY — CLUANL

The program CLUANL uses the data contained in the fourth and sixth records of the MLTCRP output files to analyze the cluster purity for individual segments and to determine overall cluster purity. The program calculates two measures of cluster purity based on a two-category ground truth division of the pixels. The first measure is the average proportion, which is calculated by the following formula:

$$\text{Average proportion} = \frac{1}{N}\left(\sum_i N_i P_i\right)$$

where

N is the total number of subpixels in clusters other than the DO/DU cluster

N_i is the number of subpixels in the i*th* cluster

P_i is the proportion of the majority constituent in the cluster

The second measure of cluster purity is the average variance, which is calculated by:

$$\text{Average variance} = \frac{1}{N}\left(\sum_i N_i P_i (P_i - 1)\right)$$

Variables are defined above.

CLUANL also calculates histograms of the clusters based on small-grains proportions and of cluster small-grains proportions weighted by pixels. The program analyzes cluster labeling accuracy based on three labels for the type 1 dot closest to the mean of the cluster: analyst label, the classifier label, and the ground truth label. The program determines the number labeled as small grains, and those labeled as nonsmall grains for clusters with a majority of small grains and for clusters with a majority of nonsmall grains. Appendix C shows a typical listing for CLUANL. The program also has the capability of printing out the following information about the individual clusters:

a. Cluster number

b. Number of subpixels in cluster

c. Number of ground truth crop codes in cluster

d. Analyst label and location of dot used to label cluster

e. Classifier label for dot used to label cluster

f. Ground truth label for dot used to label cluster

g. Ground truth label and proportion for largest crop code in cluster

h. Same information for second largest crop code

i. Same information for third largest crop code

j. Same information for fourth largest crop code

k. Proportion of cluster not in the four largest crop codes

l. Proportion of either small grains or nonsmall grains, whichever is larger

m. Majority class (small grains or nonsmall grains) for cluster.

This printout is currently suppressed, but can be obtained by the removal of two comment characters (C) in print statements.

In order to use Program CLUANL, the DATSEL.DAT input file is set up for the particular criteria required, with type 1 dots. Input file INPUT.DAT has the name of the MLTCRP files on the first line, and the version numbers to be accessed on the second line. Following the second line of the data set is the information needed to sort the pixels into small grains or nonsmall grains. The information is loaded in the form of beginning crop code, ending crop code, and small-grains category. The small-grains category is a four-digit number, of which the first digit is the small-grains class, and the remaining three digits are the percentage of small grains in the crop code. This explicit percentage is used for strip fallow crop codes.

Program CLUANL can be used to investigate cluster purity for any crop by changing the input data set.

PROGRAM FOR ANALYZING CLASSIFICATION ACCURACY — CLSANL

Program CLSANL uses the data from records 4, 5, and 6 of the MLTCRP output files to determine the small-grains proportions at different stages in the Procedure 1 processing. The program makes three passes through the output files for type 1, 2, and 3 dots. Therefore, DATSEL.DAT must be the following:

```
DOTS
 1 1
DOTS
 1 2
DOTS
 1 3
END
```

Input file INPUT.DAT is the same as CLUANL.

Program CLSANL calculates the following proportions:

a. Ground truth proportion — Determined from the data in record 5 using the transformation in input data set INPUT.DAT.

b. Uncorrected machine proportion — Calculated from record 5. No threshold pixels are considered in determining the proportion.

c. Bias corrected machine proportion — The uncorrected machine proportion is bias corrected using the analyst labels for the type 2 or type 3 dots. (The type 3 dots are type 2 dots which were changed by the analyst after the classification results were available.) If type 3 dots are not present, type 2 dots are used for the bias correction.

d. Type 2 dots proportion using classifier labels — Uses the labeled type 2 dots as a random sample of the segment and calculates a proportion based on the classifier label for each dot.

e. Type 2 dots proportion using ground truth labels — Uses the labeled type 2 dots as a random sample of the segment and calculates a proportion based on the ground truth label for each dot.

f. Type 2 dots proportion using analyst labels – Uses the labeled type 2 dots as a random sample of the segment and calculates a proportion based on the analyst label for each dot.

g. Cluster proportion using analyst labels – The pixels in each cluster are sorted on the basis of the analyst label for the type dot used to label the cluster, and a proportion determined on this basis.

h. Cluster proportion using ground truth labels – The pixels in each cluster are sorted on the basis of the ground truth label for the type 1 dot used to label the cluster, and a proportion determined on this basis.

i. Machine proportion bias corrected using the ground truth labels for the type 2 data – The bias correction is made by comparing the classifier labels with the ground truth labels for the type 2 dots.

Appendix D is the line printer listing obtained from CLSANL. Data contained in this listing is also written to a disk file called CLSANL.DAT, which is used for automatic plotting of the classification accuracy calculated by the program. Both the line printer listing and the output file have the information ordered by state and segment number.

REFERENCES

1. Carnes, J. G.: Modification to the Accuracy Assessment Analysis Routine SPATL to Produce an Output File. LEC-12175, JSC-14297, June 1978.

2. Carnes, J. G.: Modification to the Accuracy Assessment Analysis Routine MLTCRP to Produce an Output File. LEC-12176, JSC-14298, June 1978.

APPENDIX A

COMPILED LISTING FOR PROGRAM ANALYZE

```
FORTRAN IV-PLUS V02-51          08148:26    22-SEP-78          PAGE 1
ANALYZE.FTN  /TITLE CAS/RA

0001          PROGRAM ANALYZE
              C
              C     INSERT #0
              C     ********************************************************
              C     *                                                      *
              C     *                                                      *
              C     ********************************************************
              C
0002          COMMON /SELIST/LL(22)
0003          DIMENSION IREC1(20),IDATA(5)
0004          BYTE FLN(30)
              C
              C     ENTER ARRAY SPECIFICATIONS AT THIS POINT.
              C
              C     INSERT #1
              C     ********************************************************
              C     *                                                      *
              C     *                                                      *
              C     ********************************************************
              C
0005          DATA FLN/'D','B','L','I','N','L','A','I','D','A','T','S','P',
             *'A','T','L','B','L','T','.','D','L','T','I','O','O','O','O',0/
              C
              C     THIS IS A BASIC PROGRAM FOR DOING ANALYSIS ON THE OUTPUT FILES
              C     FROM SPATIAL ALIGNMENT.  THE BASIC PROGRAM REQUIRES THE SUBROUTINES
              C     DATSEL,SELECT,AND SELLST.
              C
              C     PROGRAM DEVELOPED BY J. CARNES - 5/22/78
              C
              C     THE DATA FILE "INPUT.DAT" CONTAINS THE FILE NAME FOR THE INPUT
              C     FILES, THE STARTING AND ENDING VERSION NUMBERS, AND ANY OTHER
              C     INFORMATION NEEDED TO PROCESS THE FILES, LUN = 2
              C
              C     THE DATA FILE "DATSEL.DAT" CONTAINS THE INFORMATION FOR SELECTING
              C     THE FILES TO BE USED IN THE ANALYSIS.  THE FORMAT OF THIS FILE
              C     CAN BE FOUND IN THE COMMENTS FOR THE SUBROUTINE DATSEL, LUN = 3
              C
              C     THE OUTPUT FILES ARE ASSIGNED LOGICAL UNIT NUMBER = 4
              C
0006          OPEN(UNIT=2,NAME='INPUT.DAT',TYPE='OLD',ACCESS='SEQUENTIAL',
             *     FORM='FORMATTED',CARRIAGE CONTROL='NONE')
0007          READ(2,900)(FLN(I),I=1,20)
0008      900 FORMAT(20A1)
0009          READ(2,901) IVER1,IVER2
0010      901 FORMAT(34,1X,I1)
              C
              C     OTHER INFORMATION ABOUT THE PROCESSING CAN BE READ IN AT THIS
              C     POINT.  LU'S USED AT THIS POINT = 2,5,6
              C
              C     INSERT #2
              C     ********************************************************
              C     *                                                      *
              C     *                                                      *
              C     ********************************************************
              C
0011          CALL CLOSE(2)
```

```
C
C     DISABLE ERROR COUNTING AND PRINTOUT FOR ANY SUCH FILE,
C     ERROR NUMBER 37.
C
0012        CALL ERRSET(25,,.TRUE.,,.FALSE.,,.TRUE.,,.FALSE.,,15)
0013        OPEN(UNIT=5, NAME='ANSEL.DAT',TYPE='OLD',ACCESS='SEQUENTIAL',
     *          FORM='FORMATTED',CARRIAGE CONTROL='NONE')
C
C     LOAD SELECTION CRITERIA INTO ISEL ARRAY
C
0014     10 CALL DATSEL(7)
C
C     INITIALIZE ANY COMPUTATION ARRAYS AT THIS POINT.
C     LUNS USED AT THIS POINT ARE = 3,5,6
C
C     INSERT #3
C     ********************************************************************
C     *                                                                  *
C     *                                                                  *
C     ********************************************************************
C
0015        NFILES=0
0016        IVER=IVER+1-1
0017     20 IVER=IVER+1
0018        ENCODE(4,903,FLNM(26)) IVER
0019     903 FORMAT(I4)
0020        OPEN(UNIT=4,NAME=FLNM,TYPE='FLD',ACCESS='SEQUENTIAL',
     *          FORM='UNFORMATTED',CARRIAGE CONTROL='NONE',ERR=60,READONLY)
C
C     READ IN FIRST RECORD TO CHECK FOR SELECTION
C
0021        READ(4) (IREC1(I),I=1,16)
0022        REWIND(4)
0023        IDATA(1)=IREC1(1)
0024        IDATA(2)=IREC1(2)
C
C     DETERMINE NUMBER OF ACQUISITIONS
C
0025        DO 30 I=1,4
0026     30 IF(IREC1(6-I).NE.0) GO TO 40
0027     40 IDATA(3)=5-I
0028        IDATA(4)=IREC1(4)
0029        IDATA(5)=IREC1(9)
0030        CALL SELECT(ISEL,7,IFLG)
0031        IF(IFLG.EQ.0) GO TO 50
0032        NFILES=NFILES+1
C
C     AT THIS POINT, ANY COMPUTATIONS BASED ON THIS FILE CAN BE MADE.
C     LUNS USED AT THIS POINT ARE = 3,4,5,6
C
C     INSERT #4
C     ********************************************************************
C     *                                                                  *
C     *                                                                  *
C     ********************************************************************
C
```

```
0033          5  CALL CLOSE(4)
0034          6  OPEN(UNIT=2,TYPE='NEW',NAME='LP:')
              C
              C  PRINT BASIS FOR SELECTION TO LINE PRINTER
              C
0035              WRITE(2,902)
0036          902 FORMAT(1H1)
0037              CALL SELECT(FILES,C,PLOT,IVEC,IVER2)
              C
              C  AT THIS POINT, THE RESULTS OF THE DECOMPOSITIONS CAN BE DETERMINED,
              C  AND PRINTED OUT.  LUN'S USED AT THIS POINT = 3,5,6
              C
              C  INSERT #5
              C  *                                                    *
              C  *                                                    *
              C  *                                                    *
              C
0038              GO TO 10
0039              END
```

```
FORTRAN IV-PLUS V02-51      [illegible]126    2[illegible]-SEP-79          PAGE 4
ANALYZE,FT[illegible]      /TR[illegible]CKS/[illegible]

PROGRAM SECTIONS

NUMBER   NAME        SIZE               ATTRIBUTES

  1      $CODE1   000650   212          RW,I,CON,LCL
  2      [illegible]ATA   [illegible]56    27          [illegible],LCL
  3      $IDATA   000224    74          RW,D,CON,LCL
  4      $VAR[illegible]   [illegible]134    46          [illegible],LCL
  6      SEL      000054    22          RW,D,OVR,GBL

VARIABLES

NAME   TYPE  ADDRESS     NAME  TYPE  ADDRESS     NAME  TYPE  ADDRESS     NAME   TYPE  ADDRESS     NAME   TYPE  ADDRESS

I      I*2   4-000120    IFLG  I*2   [illegible]132   IVER  I*2   [illegible]130   IVER1  I*2   4-000122    IVER2  I*2   4-000124
NFILES I*2   4-000126

ARRAYS

NAME   TYPE  ADDRESS     SIZE              DIMENSIONS

[illegible]  L*1   4-000[illegible]2  000036   15    (30)
IDATA  I*2   4-000[illegible]  000012    5    (5)
[illegible]  I*2   [illegible]  [illegible]   20    (20)
ISEL   I*2   6-000000  000054   22    (22)

LABELS

LABEL  ADDRESS     LABEL  ADDRESS     LABEL  ADDRESS     LABEL  ADDRESS     LABEL  ADDRESS

10     1-000206    20     1-000242    30     **          40     1-00050[illegible]   50     1-000560
60     1-000576    900'   3-000000    901'   3-000004    902'   3-000016    903'   3-000012

FUNCTIONS AND SUBROUTINES REFERENCED

CLOSE   [illegible]TSEL  E[illegible]SET  [illegible]   SELECT  SE[illegible]ST

TOTAL SPACE ALLOCATED = 001372   381

NO FPP INSTRUCTIONS GENERATED
```

ORIGINAL PAGE IS OF POOR QUALITY

```
      SUBROUTINE DATSEL(LUN)
      COMMON /SEL/ISEL(24)
      DIMENSION ISEG(10),ISTATE(5),IDATE(2)
      DIMENSION ISORT(6),IDMT(4)
      EQUIVALENCE (ISORT(1),ISEL(1)),(ISEG(1),ISEL(4)),
     *(ISTATE(1),ISEL(14)),(IDATE(1),ISEL(19)),(IDMT(1),ISEL(21))
C
C     THIS SUBROUTINE LOADS THE SELECTION DATA FROM A DISK DATA FILE
C     INTO THE ARRAY ISEL. THIS ARRAY IS THEN USED BY SUBROUTINE SELECT
C     TO SORT OUTPUT FILES.
C
C     SUBROUTINE DEVELOPED BY J. CARNES - 5/15/78
C
C     ISEL - ARRAY FOR TRANSFERRING SELECTION DATA FROM SUBROUTINE
C     ISORT - ARRAY INDICATING IF SELECTION IS TO BE MADE FOR A
C     PARTICULAR CRITERION (ZERO INDICATES NO SELECTION)
C           ISORT(1) - NUMBER OF SEGMENTS (UP TO 10)
C           ISORT(2) - NUMBER OF STATES (UP TO 5)
C           ISORT(3) - NUMBER OF ACQUISITIONS
C           ISORT(4) = 1 IF SELECTION IS FOR RANGE OF ACQUISITION
C                      DATES
C           ISORT(5) - NUMBER OF DOT TYPES (UP TO 4)
C           ISORT(6) - NOT USED
C     ISEG - ARRAY FOR SEGMENT NUMBERS
C     ISTATE - ARRAY FOR STATE NAMES
C     IDATE - ARRAY FOR STARTING AND ENDING BASE ACQUISITION DATES
C     IDMT - ARRAY FOR DMT TYPES
C
C     LUN IS LOGICAL UNIT NUMBER ASSOCIATED WITH DATA FILE. THE DATA
C     FILE MUST BE OPEN ON ENTERING THE SUBROUTINE.
C
C     THE INPUT FILE HAS 2 LINES FOR EACH SELECTION CRITERION.
C     THE FIRST LINE IS THE CRITERION.  THE SECOND LINE IS THE SELECTION
C     BASIS. THE FOLLOWING IS A SAMPLE DATA SET. A BLANK LINE MUST
C     FOLLOW THE DATA. IF NO SELECTION IS TO BE MADE FOR A CRITERION,
C     IT IS NOT INCLUDED IN THE DATA SET. THE ORDER IS NOT IMPORTANT.
C
C     SEGMENT
C      5 1005,1007,1923,1215,1515
C     STATE
C      4 CO,ND,SD,MT
C     NUMBER OF ACQ.
C      3
C     DATE
C     7200,7300
C     DOTS
C      3 1,2,3
C
C     THE PREVIOUS LINE IS BLANK
C     TO STOP THE PROGRAM PUT 'END' AS THE LAST CARD AFTER THE BLANK
C
      DO 10 I=1,22
   10 ISEL(I)=0
   20 READ(LUN,900) ICRIT
  900 FORMAT(A2)
      IF(ICRIT.EQ.'  ') RETURN
```

```
0011            IF(ICRIT.NE.'SE') GO TO 3
0012            READ(LUN,901) ISMRT(1),(ISMRT(I),I=1,ISMRT(1))
0013        901 FORMAT(I2,10(1X,I4))
0014            GO TO 20
0015         3  IF(ICRIT.NE.'ST') GO TO 4
0016            READ(LUN,902) ISMRT(2),(ISMRT(I),I=1,ISMRT(2))
0017        902 FORMAT(I2,5(1X,A2))
0018            GO TO 20
0019         4  IF(ICRIT.NE.'DA') GO TO 50
0020            READ(LUN,903) ISMRT(3)
0021            GO TO 20
0022        50  IF(ICRIT.NE.'DAT') GO TO 60
0023            ISMRT(4)=1
0024            READ(LUN,903) (IDATE(I),I=1,6)
0025        903 FORMAT(2(I4,1X))
0026            GO TO 20
0027        60  IF(ICRIT.NE.'DO') CALL CLOSE(LUN)
0028            IF(ICRIT.EQ.'PL') STOP
0029            READ(LUN,904) ISMRT(5),(IDMRT(I),I=1,ISMRT(5))
0030        904 FORMAT(I2,2(1X,I1))
0031            GO TO 20
0032            END
```

PROGRAM SECTIONS

NUMBER	NAME	SIZE		ATTRIBUTES
1	SCODE1	001724	234	RW,I,CON,LCL
3	[illegible]	[illegible]	23	[illegible]
4	$VARS	000004	2	RW,D,OVR,LCL
5	[illegible]	[illegible]	1	[illegible]
6	SEL	000054	22	RW,D,OVR,GBL

ENTRY POINTS

NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS
DATSEL		1-000000												

VARIABLES

NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS
I	I*2	4-000000	ICRIT	I*2	4-000002	LUN	I*2	F-000002*						

ARRAYS

NAME	TYPE	ADDRESS	SIZE		LIVE SIZES
IDATE	I*2	6-[illegible]	000004	2	(2)
IDAT	L*1	6-000050	000004	2	(4)
ISEM	I*2	6-[illegible]	[illegible]	12	(12)
ISEL	I*2	6-000000	000054	22	(22)
ISTAT	L*1	6-000[illegible]	000006	3	(6)
ISTATE	I*2	6-000032	000012	5	(5)

LABELS

LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS
10	**	20	1-[illegible]	30	1-000242	40	1-[illegible]	50	1-000437
60	1-000546	900'	3-000000	901'	3-000004	902'	3-000014	903'	3-000030
904'	3-[illegible]								

FUNCTIONS AND SUBROUTINES REFERENCED

CLOSE

TOTAL SPACE ALLOCATED = 001054 282

42 PPP USER OTIONS GENERATED

```
0001          SUBROUTINE SELECT(IDATA,IFLG)
0002          COMMON /SEL/ISEL(20)
0003          DIMENSION ISEG(10),ISTATE(5),IDATE(2),IDATA(5)
0004          BYTE IS_RT(6),ID_T(4)
0005          EQUIVALENCE (IS_RT(1),ISEL(1)),(ISEG(1),ISEL(4)),
             *(ISTATE(1),ISEL(9)),(ID_TE(1),ISEL(19)),(ID_T(1),ISEL(21))
          C
          C   THIS SUBROUTINE IS USED TO START THE PLOTOP AND SPATL OUTPUT FILES
          C   BY ANY OF THE FOLLOWING CRITERIA:
          C        1. INDIVIDUAL SEGMENT(S)(UP TO 10 SEGMENTS)
          C        2. STATE(S)(UP TO 5 STATES)
          C        3. NUMBER OF ACQUISITIONS
          C        4. RANGE OF BASE ACQUISITION DATES
          C        5. DAT TYPE(S)(UP TO 4 DAT TYPES)
          C
          C   SUBROUTINE DEVELOPED BY D. CARNES - 5/10/78
          C
          C   ISEL = ARRAY FOR TRANSFERRING SELECTION DATA TO SUBROUTINE
          C   IDATA = ARRAY FOR TRANSFERRING SITE DATA TO SUBROUTINE
          C        IDATA(1) = SEGMENT NUMBER
          C        IDATA(2) = STATE
          C        IDATA(3) = NUMBER OF ACQUISITIONS
          C        IDATA(4) = BASE ACQUISITION DATE
          C        IDATA(5) = DAT TYPE
          C   IS_RT = ARRAY INDICATING IF SELECTION IS TO BE MADE FOR A
          C   PARTICULAR CRITERION(ZERO INDICATES NO SELECTION)
          C        IS_RT(1) = NUMBER OF SEGMENTS
          C        IS_RT(2) = NUMBER OF STATES
          C        IS_RT(3) = NUMBER OF DAT TYPES
          C        IS_RT(4) = 1 IF SELECTION IS FOR RANGE OF ACQUISITION
          C                   DATES
          C        IS_RT(5) = NUMBER OF DAT TYPES
          C        IS_RT(6) = NOT USED
          C   ISEG = ARRAY FOR SEGMENT NUMBERS
          C   ISTATE = ARRAY FOR STATE NAMES
          C   IDATE = ARRAY FOR START AND ENDING BASE ACQUISITION DATES
          C   IDAT = ARRAY FOR DAT TYPES
          C
          C   IFLG = RETURN FROM SUBROUTINE (IFLG=1 = OUTPUT FILE SELECTED,
          C          IFLG=0 = OUTPUT FILE NOT SELECTED)
          C
0006          IFLG=0
0007          IF(IS_RT(1).EQ.0) GO TO 20
0008          DO 10 I=1,IS_RT(1)
0009       10 IF(IDATA(1).EQ.ISEG(I)) GO TO 20
0010          RETURN
0011       20 IF(IS_RT(2).EQ.0) GO TO 40
0012          DO 30 I=1,IS_RT(2)
0013       30 IF(IDATA(2).EQ.ISTATE(I)) GO TO 40
0014          RETURN
0015       40 IF(IS_RT(3).EQ.0) GO TO 50
0016          IF(IDATA(3).NE.IS_RT(3)) RETURN
0017       50 IF(IS_RT(4).EQ.0) GO TO 60
0018          IF(IDATA(4).LT.IDATE(1).OR.IDATA(4).GT.IDATE(2)) RETURN
0019       60 IF(IS_RT(5).EQ.0) GO TO 80
0020          DO 70 I=1,IS_RT(5)
```

```
      70  IF(IDATA(5).EQ.INPT(I)) GO TO 80
          RETURN
      80  IFLG=1
          RETURN
          END
```

SELECT,FTN /TR:RLC:S/WI

PROGRAM SECTIONS

NUMBER	NAME	SIZE		ATTRIBUTES
1	$CODE1	000454	1F0	RW,I,CON,LCL
3	$IDATA	00 012	5	RW,D,CON,LCL
4	$VARS	000002	1	RW,D,CON,LCL
5	$TEMPS	00 002	1	RW,D,CON,LCL
6	SEL	000054	22	RW,D,REL,GBL

ENTRY POINTS

NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS
SELECT		1-000000												

VARIABLES

NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS
I	I*2	4-000000	IFLG	I*2	F-000004*									

ARRAYS

NAME	TYPE	ADDRESS	SIZE		DIMENSIONS
IDATA	I*2	F-000002*	000012	5	(5)
IDATE	I*2	6-000044	000004	2	(2)
IDLT	L*1	5-000000	000004	2	(4)
ISEG	I*2	6-000006	000024	10	(10)
ISEL	I*2	6-000000	000054	22	(22)
ISORT	L*1	6-000050	000006	3	(6)
ISTATE	I*2	5-000002	000012	5	(5)

LABELS

LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS
10	**	20	1-000140	30	**	40	1-000240	50	1-000274
60	1-000335	70	**	80	1-000436				

TOTAL SPACE ALLOCATED = 000546 179

NO FPP INSTRUCTIONS GENERATED

```
      SUBROUTINE SELLST(NFILES,LUN,FLNM,IVER1,IVER2)
      COMMON /SEL/ISEL(22)
      DIMENSION ISEG(10),ISTATE(5),IDATE(2)
      BYTE ISORT(6),IDPT(4),FLNM(20)
      EQUIVALENCE (ISORT(1),ISEL(1)),(ISEG(1),ISEL(4)),
     *(ISTATE(1),ISEL(14)),(IDATE(1),ISEL(19)),(IDPT(1),ISEL(21))
C
C     THIS SUBROUTINE IS USED TO MAKE A LINE PRINTER LISTING OF THE
C     BASIS FOR SELECTION OF OUTPUT FILES, AND THE NUMBER OF FILES
C     MEETING THE SELECTION CRITERIA.
C
C     SUBROUTINE DEVELOPED BY J. CARNES - 9/12/78
C
C     ISEL - ARRAY FOR TRANSFERRING SELECTION DATA TO SUBROUTINE
C     ISORT - ARRAY INDICATING IF SELECTION IS TO BE MADE FOR A
C     PARTICULAR CRITERION (ZERO INDICATES NO SELECTION)
C           ISORT(1) - NUMBER OF SEGMENTS (UP TO 10)
C           ISORT(2) - NUMBER OF STATES (UP TO 5)
C           ISORT(3) - NUMBER OF ACQUISITIONS
C           ISORT(4) - 1 IF SELECTION IS FOR RANGE OF ACQUISITION
C                      DATES
C           ISORT(5) - NUMBER OF DOT TYPES (UP TO 4)
C           ISORT(6) - NOT USED
C     ISEG - ARRAY FOR SEGMENT NUMBERS
C     ISTATE - ARRAY FOR STATE NAMES
C     IDATE - ARRAY FOR STARTING AND ENDING BASE ACQUISITION DATES
C     IDPT - ARRAY FOR DOT TYPES
C
C     NFILES - INPUT TO SUBROUTINE OF NUMBER OF FILES SELECTED
C     LUN - LOGICAL UNIT NUMBER FOR OUTPUT
C
      WRITE(LUN,907)
  907 FORMAT(1H0,'*****************************************************')
      WRITE(LUN,908)(FLNM(I),I=1,20),IVER1,IVER2
  908 FORMAT(1H0,'OUTPUT FILES USED - ',20A1,' VERSIONS ',O4,' - ',O4)
      WRITE(LUN,900)
  900 FORMAT(1H0,'COMPUTATIONS BASED ON ALL FILES'/
     *' WITH THE FOLLOWING CHARACTERISTICS'//)
      IF(ISORT(1).EQ.0) GO TO 10
      WRITE(LUN,901) ISORT(1),(ISEG(I),I=1,ISORT(1))
  901 FORMAT(1H ,I2,' SEGMENTS               - ',I4,9(',',I4))
   10 IF(ISORT(2).EQ.0) GO TO 20
      WRITE(LUN,902) ISORT(2),(ISTATE(I),I=1,ISORT(2))
  902 FORMAT(1H ,I1,' STATES                 - ',A2,4(',',A2))
   20 IF(ISORT(3).EQ.0) GO TO 30
      WRITE(LUN,903)ISORT(3)
  903 FORMAT(1H ,'NUMBER OF ACQUISITIONS  - ',I1)
   30 IF(ISORT(4).EQ.0) GO TO 40
      WRITE(LUN,904)(IDATE(I),I=1,2)
  904 FORMAT(1H ,'BASE ACQUISITION DATES  - ',I4,' TO ',I4)
   40 IF(ISORT(5).EQ.0) GO TO 50
      WRITE(LUN,905) ISORT(5),(IDPT(I),I=1,ISORT(5))
  905 FORMAT(1H ,I1,' DOT TYPES              - ',I1,3(',',I1))
   50 WRITE(LUN,906) NFILES
  906 FORMAT(1H0,'NUMBER OF FILES SELECTED - ',I4/
     *' *****************************************************'//)
```


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```
FORTRAN IV-PLUS V02-[illegible]          [illegible]    22-SEP-78        PAGE 12
SELLST.FTN      /TR:BLOCKS/WR

0029            RETURN
0030            END
```

SELLST.FTN /TR:BLOCKS/NR

PROGRAM SECTIONS

NUMBER	NAME	SIZE		ATTRIBUTES
1	SCODE1	000716	231	RW,I,CON,LCL
3	LIT	000246	242	RW,I,CON,LCL
4	SVARS	000002	1	RW,D,CON,LCL
5	[illegible]	000002	1	RW,D,CON,LCL
6	SEL	000054	22	RW,D,OVR,GBL

ENTRY POINTS

NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS
SELLST		1-000000												

VARIABLES

NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS	NAME	TYPE	ADDRESS
I	I*2	4-000000	IVER1	I*2	F-000010*	IVER2	I*2	F-000012*	LUN	I*2	F-000004*	NFILES	I*2	F-000002*

ARRAYS

NAME	TYPE	ADDRESS	SIZE		DIMENSIONS
FLAG	L*1	F-000022*	000035	15	(30)
IDATE	I*2	6-000044	000004	2	(2)
IHIT	L*1	5-000056	000004	2	(4)
ISEG	I*2	6-000006	000024	10	(10)
ISEL	I*2	5-000000	000054	22	(22)
ISORT	L*1	6-000070	000006	3	(6)
ISTATE	I*2	6-000032	000012	5	(5)

LABELS

LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS	LABEL	ADDRESS
10	1-000310	20	1-000416	30	1-000462	40	1-000554	50	1-000656
900'	3-000152	901'	3-000266	902'	3-000344	903'	3-000412	904'	3-000454
905'	3-000526	906'	3-000600	907'	3-000000	908'	3-000070		

TOTAL SPACE ALLOCATED = 001742 497

0 PPP INSTRUCTIONS GENERATED

ANALYZE,LP1=ANALYZE,DATSEL,SELECT,SELLST

APPENDIX B

SAMPLE OUTPUT FROM PROGRAM DOTANL

INPUT FILES USED = L110,6JSPATL VERSIONS 1 = 1060

COMPUTATIONS BASED ON ALL FILES
WITH THE FOLLOWING CHARACTERISTICS:

2 STATES = MT,SD,
2 NET TYPES = 1,2,

NUMBER OF FILES SELECTED = 169

ANALYST DOT LABELING ACCURACY

CROP CODE	DOT LABELS 1	2	3	4	5	6	7	8	9	TOTAL	PERCENT CORRECT
1	6	3	0	5	0	0	0	0	0	14	
2	7	3	0	0	0	1	0	0	0	11	
3	11	2	1	12	0	1	0	0	0	27	
4	3	2	0	10	0	1	0	0	0	16	
5	3	7	0	6	0	0	0	0	0	16	
6	5	3	0	14	0	0	0	0	0	22	
7	1	3	0	6	0	0	0	0	0	10	
8	4	6	0	9	0	0	0	0	0	19	
9	5	4	0	3	0	0	0	0	0	12	
10	6	4	0	10	0	0	0	0	0	20	
11	6	5	1	2	0	0	0	0	0	14	
12	14	8	0	0	0	0	0	0	0	26	
13	6	2	0	2	0	0	0	0	0	10	
14	7	4	0	3	0	0	0	0	0	14	
15	10	8	0	9	0	0	0	0	0	27	
16	0	0	0	2	0	0	0	0	0	2	
17	0	2	0	3	0	0	0	0	0	5	
18	0	1	0	0	0	0	0	0	0	1	
19	0	5	0	1	0	0	0	0	0	5	
20	0	5	0	3	0	0	0	0	0	8	

22	0	2	0	4	0	0	0	0	0	6
23	0	5	0	0	0	0	0	0	0	5
24	0	2	0	0	0	0	0	0	0	2
25	0	6	0	0	0	0	0	0	0	6
26	0	1	0	0	0	0	0	0	0	1
27	0	2	0	0	0	0	0	0	0	2
29	0	3	0	3	0	0	0	0	0	6
30	0	2	0	0	0	0	0	0	0	2
61	0	3	0	0	0	0	0	0	0	3
69	2	0	0	2	0	0	0	0	0	4
75	0	0	0	3	0	0	0	0	0	3
80	7	5	0	105	0	1	0	0	0	118
90	48	25	0	299	0	6	0	0	0	378
92	16	44	0	585	0	1	0	0	0	646
93	0	1	0	10	0	0	0	0	0	11
94	0	1	0	43	0	0	0	0	0	44
95	0	0	0	19	0	0	0	0	0	19
96	1	2	0	76	0	0	0	0	0	79
97	0	2	0	15	0	0	0	0	0	17
98	0	0	0	23	0	0	0	0	0	23
99	124	28	4	113	0	1	0	0	0	270
100	3	127	3	119	0	4	0	0	0	256
101	19	71	19	196	0	11	0	0	0	316
102	3	3	0	6	0	0	0	0	0	12
103	0	8	0	43	0	2	0	0	0	53
104	3	77	0	72	0	1	0	0	0	153
105	13	30	7	414	0	3	0	0	0	467
106	22	19	6	293	0	3	0	0	0	343
107	95	93	9	3471	0	10	0	0	0	3674
108	2	2	0	140	0	0	0	0	0	144
109	0	3	0	0	0	0	0	0	0	3

112	0	2	0	14	0	1	0	0	0	17
113	1	6	0	48	0	0	0	0	0	55
124	7	8	0	23	0	0	0	0	0	38
125	0	40	0	51	0	8	0	0	0	99
126	4	44	0	29	0	3	0	0	0	80
127	1	1	0	12	0	0	0	0	0	14
129	18	311	0	193	0	5	0	0	0	527
130	0	0	0	3	0	0	0	0	0	3
140	0	2	0	2	0	0	0	0	0	4
150	0	0	0	4	0	0	0	0	0	4
151	0	0	0	4	0	0	0	0	0	4
154	0	2	0	3	0	2	0	0	0	7
169	0	0	0	3	0	0	0	0	0	3
174	134	47	8	187	0	0	0	0	0	376
175	8	82	0	173	0	0	0	0	0	263
176	4	55	9	99	0	0	0	0	0	167
179	3	4	0	5	0	0	0	0	0	12
181	0	0	0	2	0	0	0	0	0	2
224	0	0	0	1	0	0	0	0	0	1
240	0	0	0	178	0	0	0	0	0	178
242	0	3	1	120	0	0	0	0	0	124
250	8	21	0	123	0	0	0	0	0	152
251	1	1	0	24	0	0	0	0	0	26
252	1	4	0	7	0	1	0	0	0	13
253	0	2	0	85	0	0	0	0	0	87
254	21	33	18	935	0	1	0	0	0	808
TOTAL	883	1310	80	8109	0	87	0	0	0	10187

APPENDIX C

SAMPLE OUTPUT FROM PROGRAM CLUANL

122([illegible] 7353 1 5? 41 29 1 6 3 1334

AVERAGE [illegible] = [illegible] AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 134926.0

CLASS STATISTICS [illegible]

AVERAGE PROPORTI = [illegible] AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS [illegible]

AVERAGE PROPORTI = [illegible] AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 134926.0

CLASS = 1 [illegible] 0.0000 0.0000 0.0000

CLASS = 2 [illegible] 0.0000 0.0000 0.0000

1279 KS 7245 7188 7048 [illegible] 8290 8040 1 41 4 29 1 6 3 170

AVERAGE PROPORTION = 0.8819 AVERAGE VARIANCE = 0.0871 TOTAL SUBPIXELS = 137592.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTION = 0.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTION = 0.8819 AVERAGE VARIANCE = 0.0871 TOTAL SUBPIXELS = 137592.0

CLASS = 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0.0000 0.0000 0.0000

CLASS = 2 3 1 0 0 0 2 0 1 0 2 0 1 0 2 0.6667 0.6667 0.6667

1279 KS 7279 7194 7158 A20J 0 8040 1 34 48 29 1 6 3 1264

AVERAGE PROPORTION = 0.9469 AVERAGE VARIANCE = 0.0438 TOTAL SUBPIXELS = 137592.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTION = 0.7842 AVERAGE VARIANCE = 0.1658 TOTAL SUBPIXELS = 14738.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTION = 0.9679 AVERAGE VARIANCE = 0.0280 TOTAL SUBPIXELS = 121894.0

CLASS = 1 7 0 0 0 0 7 0 0 0 7 0 2 0 9 0.0000 0.0000 0.7857

CLASS = 2 41 15 0 0 0 26 0 15 0 26 0 2 0 39 0.6341 0.6341 0.9512

1579 NE 7215 7174 0 0 0 7279 1 40 43 29 1 6 3 1212

AVERAGE PROPORTION = 0.9434 AVERAGE VARIANCE = 0.0311 TOTAL SUBPIXELS = 137592.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTION = 0.8200 AVERAGE VARIANCE = 0.1353 TOTAL SUBPIXELS = 10086.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTION = 0.9747 AVERAGE VARIANCE = 0.0229 TOTAL SUBPIXELS = 127506.0

CLASS = 1 [illegible] 6 [illegible] 6 [illegible] 0 0.0000 0.0000 1.0000

CLASS = 2 37 4 [illegible] 2 [illegible] 35 [illegible] 0 [illegible] 37 0.9919 0.9459 1.0000

1602 ND [illegible] 7122 7135 [illegible] 7322 1 42 27 34 1 6 3 1060

AVERAGE PROPORTION = 1.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 69678.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTION = 0.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTION = 1.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 69678.0

CLASS = 1 [illegible] 0 0 0 0 0 0 [illegible] 0 0 0 0 0 0 0.0000 0.0000 0.0000

CLASS = 2 [illegible] 0 [illegible] 0 0 0 0 [illegible] 0 0 0 0 0 0 0.0000 0.0000 0.0000

1602 ND 7233 7184 [illegible] 0 6 [illegible] 0 7322 1 39 27 34 1 6 3 1068

AVERAGE PROPORTION = 1.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 74572.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTION = 0.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTION = 1.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 74572.0

CLASS = 1 [illegible] 0 0 0 0 0 0 0 [illegible] 0 0 0 0 0 0 0.0000 0.0000 0.0000

CLASS = 2 26 0 12 0 0 14 0 0 12 14 0 0 0 26 0.5385 0.5385 1.0000

1616 ND 7232 7159 7141 7192 0 7315 1 46 41 30 1 7 3 1480

AVERAGE PROPORTION = 1.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 137592.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTION = 0.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTION = 1.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 137592.0

CLASS = 1 [illegible] 0 0 0 0 0 0 0 [illegible] 0 0 0 0 0 0 0.0000 0.0000 0.0000

CLASS = 2 41 0 15 0 0 26 0 0 15 26 0 0 0 41 0.6341 0.6341 1.0000

1616 ND 7242 7159 7122 7141 0 7315 1 41 41 30 1 7 3 1450

AVERAGE PROPORTION = 1.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 137592.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTI = [illegible] AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS FOR CLASS [illegible]

AVERAGE PROPORTI = 1.[illegible] AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 137592.0

CLASS = 1 [illegible] 0 0 0 0 0 0 0 0 0 0 0 0.0000 0.0000 0.0000

CLASS = 2 41 0 15 0 [illegible] 0 15 26 0 0 0 41 0.6341 0.6341 0.0000

1619 ND 7213 7175 7158 7132 0 7327 1 30 47 35 1 7 3 1914

AVERAGE PROPORTI = 0.9854 AVERAGE VARIANCE = 0.0316 TOTAL SUBPIXELS = 137592.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTI = 0.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTI = 0.9846 AVERAGE VARIANCE = 0.0316 TOTAL SUBPIXELS = 137592.0

CLASS = 1 0 0 0 0 0 0 0 0 0 0 0 0.0000 0.0000 0.0000

CLASS = 2 47 0 22 0 25 0 22 25 0 1 0 46 0.5319 0.5319 0.0787

1619 ND 7213 7175 7158 7132 0 7327 1 31 46 35 1 7 3 1864

AVERAGE PROPORTI = 0.9844 AVERAGE VARIANCE = 0.0315 TOTAL SUBPIXELS = 137592.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTI = 0.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTI = 0.9844 AVERAGE VARIANCE = 0.0315 TOTAL SUBPIXELS = 137592.0

CLASS = 1 2 0 0 0 0 0 0 0 0 0 0 0 0.0000 0.0000 0.0000

CLASS = 2 46 0 22 0 0 24 0 0 22 24 0 3 0 43 0.5217 0.5217 0.0348

1622 ND 7137 7159 7122 0 0 7326 1 36 42 29 1 6 3 1596

AVERAGE PROPORTI = 0.9957 AVERAGE VARIANCE = 0.0043 TOTAL SUBPIXELS = 137592.0

CLASS STATISTICS FOR CLASS NUMBER 1

AVERAGE PROPORTI = 0.0000 AVERAGE VARIANCE = 0.0000 TOTAL SUBPIXELS = 0.0

CLASS STATISTICS FOR CLASS NUMBER 2

AVERAGE PROPORTI = 0.9957 AVERAGE VARIANCE = 0.0043 TOTAL SUBPIXELS = 137592.0

CLASS = 1 2 0 0 0 0 0 0 0 0 0 0 0 0.0000 0.0000 0.0000

CLASS = 2 [illegible] 0 [illegible] 0 0 [illegible] 0 0 0 0 0 0.0000 0.0000 0.0000

APPENDIX D

SAMPLE OUTPUT FROM PROGRAM CLSANL

****

OUTPUT FILES USED - [113,63]CRP   VERSIONS   1 - 1023

COMPUTATIONS BASED ON ALL FILES
WITH THE FOLLOWING CHARACTERISTICS:

1 DOT TYPES   - 3,

NUMBER OF FILES SELECTED -   55

****

SEG. NUMB	STATE	PROC DATE	ACQ. #1	ACQ. #2	ACQ. #3	ACQ. #4	DU	NUMBER GT PXL	NUMBER DT PXL	PROPORTION SOURCE	---PROPORTIONS--- WIN. WHT	SPR. WHT	NON-WHEAT	
1000	CO	7203	7187	0	0	0	0	22932	22669	GROUND TRUTH	42.99	0.36	56.65	
										UNCORR. MACH.	46.28	0.00	53.72	-2.92
										BIAS CORR.	46.18	0.00	53.82	-2.83
										TYPE 2 CLAS	45.76	0.00	54.24	-2.42
										TYPE 2 G TH	41.67	0.00	58.33	1.68
										TYPE 2 AILB	46.67	0.00	53.33	-3.32
										CLU AI LABL	46.49	0.00	53.51	-3.14
										CLU GT CODE	48.48	0.00	51.52	-5.13
										CLU MAJOR.	40.55	0.00	59.45	2.79
										GT BIAS COR	41.07	0.00	58.93	2.28
1005	CO	7203	7159	7123	6326	0	0	22932	22685	GROUND TRUTH	34.67	0.00	65.33	
										UNCORR. MACH.	14.77	0.00	85.23	19.90
										BIAS CORR.	16.38	0.00	83.62	18.29
										TYPE 2 CLAS	22.03	0.00	77.97	12.64
										TYPE 2 G TH	36.67	0.00	63.33	[illegible]
										TYPE 2 AILB	16.67	0.00	83.33	18.01
										CLU AI LABL	15.69	0.00	84.31	18.98
										CLU GT CODE	39.17	0.00	60.83	-4.50
										CLU MAJOR.	24.72	0.00	75.28	9.96
										GT BIAS COR	35.75	0.00	64.25	-1.07
1005	CO	7236	7177	7159	6326	6254	0	22932	22629	GROUND TRUTH	34.67	0.00	65.33	
										UNCORR. MACH.	16.42	0.00	83.58	18.26
										BIAS CORR.	19.91	0.00	80.09	14.76
										TYPE 2 CLAS	16.67	0.00	83.33	18.01
										TYPE 2 G TH	36.67	0.00	63.33	-1.99
										TYPE 2 AILB	20.00	0.00	80.00	14.67
										CLU AI LABL	16.41	0.00	83.59	18.26
										CLU GT CODE	20.82	0.00	79.18	13.85
										CLU MAJOR.	27.38	0.00	72.62	7.29
										GT BIAS COR	36.57	0.00	63.43	-1.89
1007	CO	7193	7159	6363	6273	0	0	0	22730	GROUND TRUTH	30.58	0.00	69.42	
										UNCORR. MACH.	22.03	0.00	77.97	8.55
										BIAS CORR.	33.90	0.00	66.10	-3.32
										TYPE 2 CLAS	15.52	0.00	84.48	15.06
										TYPE 2 G TH	26.67	0.00	73.33	3.91
										TYPE 2 AILB	30.00	0.00	70.00	0.58
										CLU AI LABL	0.00	0.00	0.00	-69.42
										CLU GT CODE	0.00	0.00	0.00	-69.42
										CLU MAJOR.	29.11	0.00	70.89	1.47
										GT BIAS COR	29.86	0.00	70.14	0.72

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