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Houston, Texas 77058

EARTH OBSERVATIONS DIVISION

SPACE AND LIFE SCIENCES DIRECTORATE

USER MANUAL

FOR THE

EARTH OBSERVATIONS DIVISION

R&D TO OLPARS DOT DATA CONVERSION

Job Order 76-662

(TIRF 79-0033)

Prepared By

Lockheed Engineering and Management Services Company, Inc.

Houston, Texas

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16. Abstract

This document describes in detail a system to reformat ground truth data and LANDSAT spectral data for use by the OLPARS system at the Rome Air Development Center. A summary of the three processors that make up this system is followed by operating instructions for users. This system is designed to operate on the Purdue/LARS IBM 3031 Computer. It uses several EOD-LARSYS system processors.

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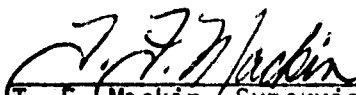R&D TO OLPARS DOT DATA CONVERSION
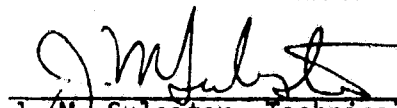
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CONTENTS

1. INTRODUCTION

Because of specific format requirements of the 'On Line Pattern and Recognition System' (OLPARS) an interfacing software module is required for off-loading the Classification and Mensuration Subsystem (CAMS) Development Data Base. This data, which consists of ground truth dot labels and LANDSAT radiance values was required in punched card form for use in scientific investigation by the Rome Air Development Center in Rome, New York. The purpose of this document is to provide for the user a description of this system and instructions on how to use it. Section 2 below gives a detailed account of the system while Sections 3 and 4 provide operating instructions for users and sample runs.

2. SYSTEM DESCRIPTION

The purpose of this system is to provide for the user on punched cards, ground truth dot label information and corresponding LANDSAT spectral values. This information is gathered by three seperate processors, all of which are functional on the LARS IBM 370 Virtual Machine Computer via remote terminals.

The first processor, GTDOTS will produce 209 dot labels from a ground truth image. In addition to the dot labels, GTDOTS will also give the total number of different crop categories and the number of dots in each category. This information is stored in an output file on the user's 'A' disk. GTDOTS is a simple EXEC file that calls upon 2 existing EOD-LARSYS routines to generate the dot labels and associated information. The EOD-LARSYS routines GTTCN and GTDDM (Ahlers 1978) are run using regular LARSYS Control Cards. This control card file (stored on the user's 'A' disk) is automatically edited by GTDOTS based on user input. The required input for GTDOTS is a LARS tape and file number for any available ground truth image. Output is a file on the user's 'A' disk containing the dot label information. Due to the requirements of OLPARS, the routine GTDDM has been modified to produce only type 1 dots (instead of the type 1 and type 2 dots)[1].

The second processor, LANDMRG, generates LANDSAT spectral values from up to 5 LACIE segments. This task is accomplished using the EOD-LARSYS program DAMRG (Aucoin 1978). DAMRG is also run from a control card file which is edited by LANDMRG based upon user input. Input is a LARS tape number and up to 5 file numbers (each file number being a LACIE segment), output is a file created on the user's 'A' disk containing the merged LANDSAT channels. The merging technique used in the DAMRG program is the 'channel merge' option. In this sense, merging means not to average spectral values from different acquisitions but simply to concatenate the channels. For example, 2 acquisitions with 4 channels each have the following structure before processing:

---

[1]Type 1 dots are cluster labeled dots, type 2 dots are bias correction dots.

```
ACQUISITION #1              ACQUISITION #2

  ┌─────────────┐             ┌─────────────┐
  │ 1  2  3  4 │             │ 1  2  3  4 │
  └─────────────┘             └─────────────┘

  Channels 1,2,3,4            Channels 1,2,3,4
```

After processing by DAMRG, the 2 above acquisitions are merged and take on the
following structure:

```
        ┌─────────────┬─────────────┐
        │ 1  2  3  4 │ 5  6  7  8 │
        └─────────────┴─────────────┘

          Channels 1,2,3,4,5,6,7,8
```

Channels 1,2,3 and 4 of acquisition #2 now play the role as channels 5,6,7
and 8 after merging. LANDMRG calls upon DAMRG to merge up to 5 acquisitions
in this manner. This version of LANDMRG is limited to processing 4 channel
LACIE segements. Like GTDOTS, LANDMRG is an interactive EXEC file that
prompts for input, the remaining processing is automatic.

The third and final processor, OLPARS, takes the output files created by
GTDOTS and LANDMRG, reformats the data, and punches it to cards. The format
of the punched card output is shown in Figure 4.4. When activated, OLPARS
calls a FORTRAN program to reformat the data and write it to the user's disk.
This disk file is then punched and sent to the Remote Spooling Communications
Subsystem (RSCS) with a status of 'HOLD'. At this point, processing is
complete and the user may return to process additional ground truth and/or
LANDSAT segments. Similar to GTDOTS and LANDMRG, OLPARS is an interactive
EXEC file run from a remote terminal.

Due to fixed output file naming conventions, GTDOTS or LANDMRG should be
run first and second, followed immediately by OLPARS. This order is necessary
since each of the three processors (GTDOTS, LANDMRG, OLPARS) will erase
previous output files before writing the new ones to the user's 'A' disk.

3. OPERATING INSTRUCTIONS

Before starting a terminal session, the user should link to the JSC750 'A' disk or to another appropriate minidisk (to be assigned) in order to access the necessary modules and text files needed for processing. One such module and its associated test file will override to current EOD-LARSYS version of GTDDM to generate type 1 dots only. The other modules and text files are called directly from OLPARS to reformat the data. To access JSC750, use the GETDISK command:

    GETDISK JSC750 191 199 F RR PASS AUCOIN

To avoid accessing the JSC750 disk every terminal session, users may copy the required modules and text files to their own disk directly. The files needed are:

GTDDM	MAP
GTD	MODULE
GTDWR	TEXT
OLPARS	TEXT

In addition to the above files, users must have the two control card files on their own disk. These files ('GTDOTS CC' and 'DAMRG CC') may also be copied from JSC750 using the COPYFILE command.

After the above tasks have been done, the user is ready to begin. First, the LARSYSP1 system must be loaded into the user's virtual storage area. This is done using the IPL command upon entering the CMS environment, i.e. key in the terminal 'IPL LARSYSP1'. Users at this point should erase any existing filenames that are reserved for the proper functioning of this system. These are 'FILE FT12F001', 'FILE FT17F001, and 'FILE FT18F001'.

All **three** processors begin with the following inquiry:

    TYPE ONE OF THE FOLLOWING TO CONTINUE:
        R - TO BEGIN PROCESSING
        I - FOR COMPLETE INSTRUCTIONS
        EXIT - TO EXIT AT ANY TIME

Until either R or I or EXIT is entered from the terminal, the inquiry is
repeated. If R is entered, processing will commence, if I is entered, brief
instructions similar to Section 2 above will be displayed at the terminal,
and if EXIT is entered, a return is made to the CMS environment.

3.1 GTDOTS

When processing commences, GTDOTS will ask the following from the user:

  ENTER TAPE NUMBER FIRST AND FILE NUMBER FOR THIS IMAGE:

If the user input here is not equal to two numbers, (a tape and file #) the
following error message is displayed:

  WRONG INPUT OR WRONG FORMAT ... TRY AGAIN

Until either a tape and file number or EXIT is entered, this cycle will
repeat. When this step has passed, GTDOTS will edit the control card file
'GTDOTS CC' and begin processing. If this control card file is not on the
user's 'A' disk, and error message is displayed and execution is terminated.
Also, if the output file 'FILE FT18F001' is not on the temp ('D') disk after
EOD-LARSYS has finished, an error message will be written to the terminal.
A sample run using GTDOTS is shown as Figure 4.1.

3.2 LANDMRG

When initiated, LANDMRG will prompt the user for a tape and file number(s):

ENTER TAPE NUMBER AND FILE NUMBER(S):

No input or more than 6 numbers (1 tape # plus 5 file #'s) will result in the following error message:

WRONG INPUT, WRONG FORMAT, TOO MANY, OR TOO FEW SITES ENTERED ... TRY AGAIN

After this step, LANDMRG will edit the control card file 'DAMRG CC' and begin processing. If this control card file is not on the user's 'A' disk an error message is displayed and execution is terminated. In addition, if the output file 'FILE FT12F001' is not on the temp ('D') disk after processing, an error message is displayed at the terminal. A sample run using LANDMRG is shown as Figure 4.2.

3.3 OLPARS

This final processor will take the 2 output files 'FILE FT12F001' (from LANDMRG), and 'FILE FT18F001' (from GTDOTS), reformat the data and write it onto a third file 'FILE FT17F001' which is then punched. Unlike the previous 2 processors, OLPARS requires no user input and is entirely automatic. This EXEC file calls upon the program 'OLPARS FORTRAN' to reformat the data and write it on to the user's 'A' disk as 'FILE FT17F001'. Before processing the data, OLPARS checks for the required input files 'FILE FT12F001' and 'FILE FT18F001'. If they are not on the user's 'A' disk an error message is written and execution terminated.

4. SAMPLE RUNS

In the next few pages sample runs displaying the use of GTDOTS, LANDMRG, and OLPARS are shown as Figures 4.1, 4.2, and 4.3. Each sample run illustrates execution of the respective processor from the CMS environment.

CMS

```
.ipl larswsr1
CMS / WSEPP REL 2 02/25/80 14:29
CMSZER SYSTEM NAME 'CMSZER' YSTAT NOT AVAILABLE.
R; T=0.07/0.14 12:27:30
```

.mtdots

```
     TYPE ONE OF THE FOLLOWING TO CONTINUE:
        R - TO BEGIN PROCESSING
        I - FOR COMPLETE INSTRUCTIONS
        EXIT - TO EXIT AT ANY TIME
.r
ENTER TAPE NUMBER FIRST AND FILE NUMBER FOR THIS IMAGE:
.7359 3
FILENAME FILETYPE  FM  FORMAT   RECS  BLKS
GTDOTS    CC       A1  F    80    16    2
EDIT:
READTAPE   UNIT=11,FILE=1
$GTTCN
READTAPE   UNIT=11, FILE=3
READTAPE   UNIT=11,FILE=3
```

```
AS OF SEPT. 21 EODLARSYS WILL ACCEPT LANDSAT 1 OR 2 FORMAT
TAPES.  TO READ THESE TAPES THE FORM CARD MUST SPECIFY FORM   3
INSTEAD OF 1 OR 2.
PLEASE CHECK SRTNEWS FOR INFORMATION REGARDING CHANGES
 INCORPORATED INTO EODLARSYS ON FRIDAY AUGUST 31.
THESE CHANGES EFFECT THE FOLLOWING:
    1) THE SELECT PROCESSOR
    2) THE ISOCLS/TESTSP PROCESSOR
    3) THE LARSYS II OUTPUT TAPE HEADER
```

```
ARE THE EOD-LARSYS INPUT CARDS IN THE CARD READER, ON DISK,
OR DO YOU WISH TO CREATE OR MODIFY THEM, OR DO YOU WISH TO GET A
STANDARD SET FROM THE EOD-LARSYS SYSTEM DISK?
(READER, DISK, EDIT, OR GET)
```

```
WHAT IS THE FILENAME OF THE EOD-LARSYS INPUT CARDS?
```

```
DO YOU WISH TO RUN INTERACTIVELY AT THE TERMINAL, OR HAVE
YOUR EOD-LARSYS JOB SENT TO A BATCH MACHINE?
(INTER OR BATCH)
```

```
DEV 192 DOES. NOT EXIST
```

```
WILL A 10 CYLINDER TEMP DISK SUFFICE FOR YOUR JOB?    (YES OR NO)
```

```
AT WHICH SITE DO YOU WISH TO RECEIVE THE PRINTER OUTPUT?
(AND OPTIONALLY PRINT STATUS)
```

Figure 4.1. Sample run of processor GTDOTS using tape #7359, file #3. User
            input is in lower case, system response is in upper case.

WILL YOUR EOD-LARSYS JOB BE USING AN MSS DATA TAPE OR FILE? (YES OR NO)

TYPE IN MSS DATA TAPE NUMBER OR FILE NAME (AND OPTIONALLY ENTER 800
                                        IF THE TAPE IS 800 BPI)

DO YOU DESIRE THE TAPE TO BE COPIED TO TEMPORARY DISK
STORAGE TO ALLOW EARLY RELEASE OF THE TAPE DRIVE? (YES/NO)

DO YOU WISH TO SAVE ANY INTERMEDIATE RESULTS PRODUCED BY
EOD-LARSYS, OR USE ANY PREVIOUSLY SAVED ONES? (YES OR NO)

 IO0002 TAPE 7359 HAS BEEN REQUESTED ON UNIT 181   (TAPMOUNT)
TAPE 181 ATTACHED
 IO0003 TAPE READY...   EXECUTION CONTINUING   (TAPMOUNT)

YOUR EOD-LARSYS JOB WILL NOW BE RUN

EXECUTION BEGINS...
 $GTT FUNCTION HAS BEEN PROCESSED
 $GTD FUNCTION HAS BEEN REQUESTED
TAPE 181 ON TAPE 500
TAPE 181 DETACHED
DEV 181 DOES NOT EXIST
DEV 182 DOES NOT EXIST
DEV 183 DOES NOT EXIST

DO YOU WANT TO RUN ANOTHER JOB?   (YES OR NO)

FILENAME FILETYPE FM   RECSH.   RECS   BLKS
FILE   FT18F001 D1 F   90   .13   17

* * 'FILE FT18F001' HAS BEEN CREATED ON TAPE   OR DISK. * *
* *   IT CONTAINS 209 GROUND TRUTH DOTS,LABELS, AND OTHER TYPES. * *
R; T=33.42/46.82 12:32:27

Figure 4.1 (Continued)

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CMS

.landmrg

```
      TYPE ONE OF THE FOLLOWING TO CONTINUE:
         R - TO BEGIN PROCESSING
         I - FOR COMPLETE INSTRUCTIONS
         EXIT - TO EXIT AT ANY TIME
.r
      ENTER TAPE NUMBER AND FILE NUMBER(S):
.3936 1 2 3
FILENAME FILETYPE  FM   FORMAT   RECS   BLKS
DAMRG    CC        A1   F    80    21      3
EDIT:
DATAPE       INPUT/UNIT=11, FILE= 6
OPTION       ANGCOR
DATAPE       INPUT/UNIT=11, FILE= 4
OPTION       ANGCOR
DATAPE       INPUT/UNIT=11, FILE= 3
OPTION       ANGCOR
DATAPE       INPUT/UNIT=11, FILE= 2
OPTION       ANGCOR
DATAPE       INPUT/UNIT=11, FILE= 1
OPTION       ANGCOR
EDIT:
CHANNEL      1,2,3,4
DATAPE       OUTPUT/UNIT=12,FILE=1
CHANNEL      1,2,3,4
DATAPE       OUTPUT/UNIT=12,FILE=1
CHANNEL      1,2,3,4
DATAPE       OUTPUT/UNIT=12,FILE=1
CHANNEL      1,2,3,4
DATAPE       OUTPUT/UNIT=12,FILE=1
CHANNEL      1,2,3,4
DATAPE       OUTPUT/UNIT=12,FILE=1
EDIT:
OPTION      ANGCOR
DATAPE    INPUT/ UNIT=11, FILE= 1
DATAPE     INPUT/ UNIT=11, FILE= 1
DATAPE      INPUT/ UNIT=11, FILE= 1
DATAPE      INPUT/UNIT=11, FILE= 1
OPTION      ANGCOR
DATAPE    INPUT/ UNIT=11, FILE= 2
DATAPE     INPUT/ UNIT=11, FILE= 2
DATAPE      INPUT/ UNIT=11, FILE= 2
DATAPE      INPUT/UNIT=11, FILE= 2
OPTION      ANGCOR
DATAPE    INPUT/ UNIT=11, FILE= 3
DATAPE     INPUT/ UNIT=11, FILE= 3
DATAPE      INPUT/ UNIT=11, FILE= 3
DATAPE      INPUT/UNIT=11, FILE= 3
EDIT:
```

Figure 4.2.   Sample run of processor LANDMRG using tape #3936, files 1,2,
              and 3. User input is in lower case, system response is in
              upper case.

DO YOU WISH TO SAVE ANY INTERMEDIATE RESULTS PRODUCED BY
EOD-LARSYS, OR USE ANY PREVIOUSLY SAVED ONES? (YES OR NO)

 I0002 TAPE 3936 HAS BEEN REQUESTED ON UNIT 181   (TAPMOUNT)
TAPE 181 ATTACHED
 I0003 TAPE READY...   EXECUTION CONTINUING   (TAPMOUNT)

YOUR EOD-LARSYS JOB WILL NOW BE RUN

EXECUTION BEGINS...
 $DAM FUNCTION HAS BEEN REQUESTED
TAPE 181 ON TAPE 404
TAPE 181 DETACHED
DEV 182 DOES NOT EXIST
DEV 183 DOES NOT EXIST
DEV 184 DOES NOT EXIST

DO YOU WANT TO RUN ANOTHER JOB?   (YES OR NO)

FILENAME FILETYPE FM   FORMAT   RECS   BLKS
FILE   FT12F001 D1   V   3060   12   7
FILENAME FILETYPE FM   FORMAT   RECS   BLKS
FILE   FT12F001 A1   V   3060   12   9

    A FILE 'FILE FT12F001' CONTAINING THE SPECTRAL VALUES OF THE MERGED
    LANDSAT ACQUISITIONS HAS BEEN CREATED ON YOUR 'A' DISK.
R; T=10.37/23.16 09:59:50

Figure 4.2 (Concluded)

CMS

.olpars

TYPE ONE OF THE   JING TO CONTINUE:
R - TO BEGIN PROCESSING
I - FOR DETAILED INSTRUCTIONS
EXIT - TO EXIT AND STOP EXECUTION

.i

Instructions for using OLPARS:
This exec file is the last step in the OLPARS data reformatting
system. It is entirely automatic and no user input is required.
'OLPARS EXEC' will execute a fortran program to read the files
'FILE FT12F001' and 'FILE FT18F001' off the user's 'A' disk,
reformat the data and write it to an output file 'FILE FT17F001'.
This output file is then punched on cards, with a status of HOLD.

```
FILENAME   FILETYPE   FM   FORMAT   RECS   BLKS
FILE       FT12F001        F  1040     12      9
FILENAME   FILETYPE        FORMAT   RECS   BLKS
FILE       FT18F001   A1   F    80    212     22
EXECUTION BEGINS...
FILENAME   FILETYPE   FM   FORMAT   RECS   BLKS
FILE       FT17F001   A1   F    80    213     73
PUN FILE 3795   TO   RSCS      COPY 01    HOLD
R; T=1.82/2.69  17:59.08
```

Figure 4.3. Sample run of processor OLPARS. With the exception of the
instructions, user input is in lower case, system response is
in upper case.

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DESCRIPTION OF CARD DECK

The data deck consists of ncls + 2 cards which describe the data, followed by the data cards.

Card 1:   The number, in integer format, of LANDSAT channels (ndim) for this run.

Card 2:   The number, in integer format, of ground truth crop categories (ncls) in the data set.

Cards 3 thru ncls + 2:   A four character crop category name (col. 1-4) and the number of vectors within this crop category (nvec) in integer format, right justified to column 18.

The data vector deck: Contains the LANDSAT radiance values with at least 1 space between each value.

The example on the next page illustrates a deck consisting of three crop categories (nod1, nod2, and nod3). Followed immediately are the corresponding 125 ten-channel vectors.

Figure 4.4   - OLPARS deck format.

data vector deck

4   18   20   80

data class names,
nvec

NOD3   125

NOD2   125

NOD1   125

ncls   3

ndim   10
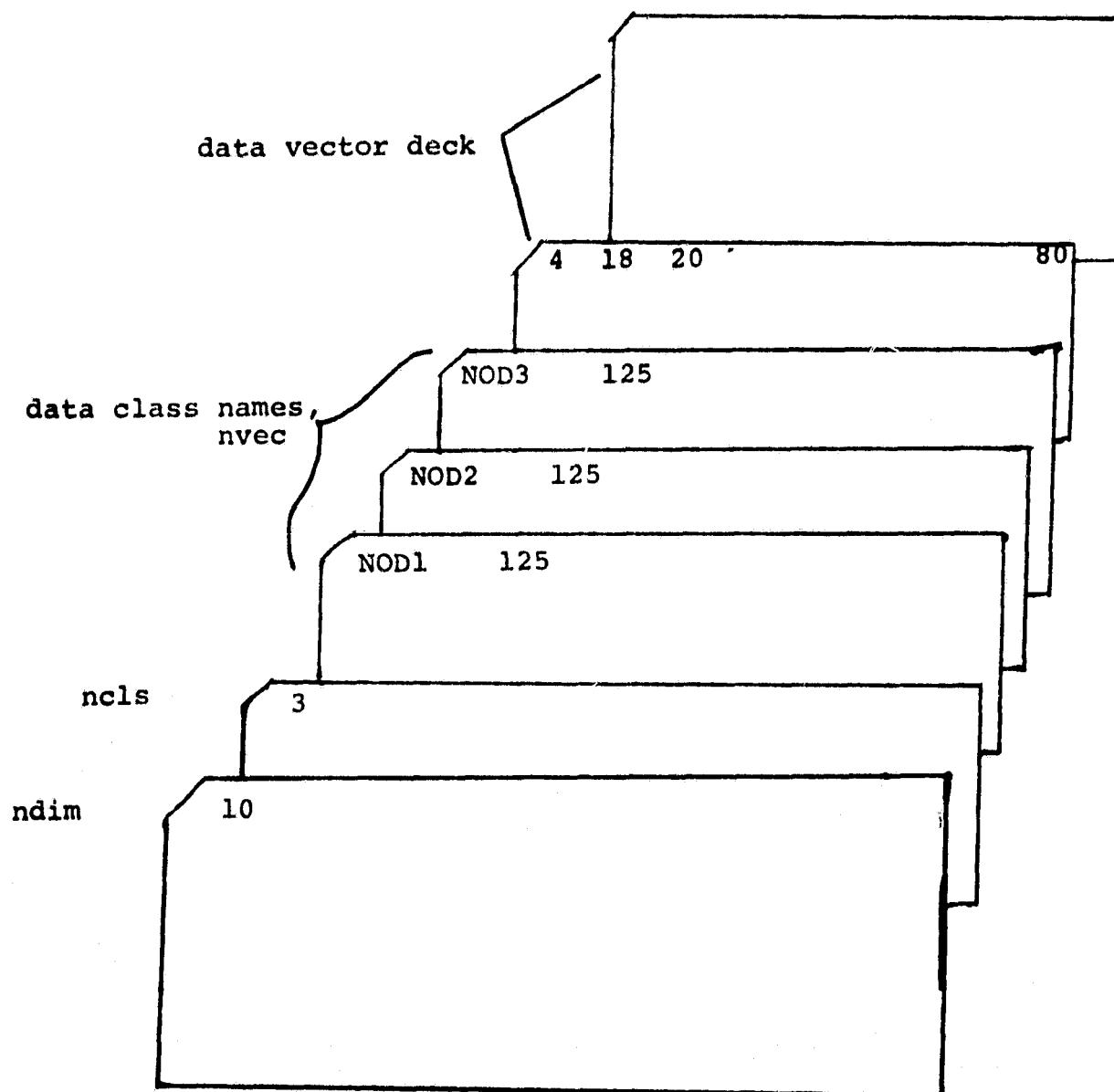
Figure 4.4 - OLPARS Sample deck.

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5. LISTINGS

Listings for the FORTRAN Program and EXEC files making up this system are presented in the next several pages. The order of the listings are GTDOTS EXEC, LANDMRG EXEC, OLPARS EXEC, followed by OLPARS FORTRAN.

5-1

```
       &CONTROL OFF NOMSG
-L10 &BFGTYPE

      TYPE ONE OF THE FOLLOWING TO CONTINUE:
        P - TO BEGIN PROCESSING
        I - FOR COMPLETE INSTRUCTIONS
        EXIT - TO EXIT AT ANY TIME
&END
*
*   TEST FOR CORRECT RESPONSE
*
      &READ ARGS
      &IF &INDEX NE 1 &GOTO -L10
      &IF &% = EXIT &EXIT
      &IF &$ = R &GOTO -L30
      &IF &$ = I &GOTO -L20
      &IF &$ NE P &IF &$ NE I &GOTO -L10
-L20 &BFGTYPE
      INSTRUCTIONS FOR USING GTDOTS-
        THIS FXEC PROCEDURE WILL INITIATE 2 EODLARSYS PROCESSORS TO
        PRODUCE 209 LABELED DOTS FROM A GROUND TRUTH IMAGE. INPUT FOR
        THIS PROCESSOR IS A TAPE # AND FILE #. OUTPUT IS A FILE 'FILE
        FTIBF001' ON THE USERS 'A' DISK THAT CONTAINS THE 209 DOTS,LABELS,
        AND CROP TYPES. BEFORE PROCEEDING MAKE SURE THE CONTROL CARD FILE
        'GTDOTS CC' IS ON YOUR 'A' DISK. WHEN PROMPTED FOR INPUT
        ENTER THE TAPE # FIRST AND THEN THE> FILE # AS FOLLOWS:

        TAPE# FILE#

        WHERE:
        TAPE# = LARS TAPE # IN WHICH THE GROUND TRUTH IMAGE RESIDES.
        FILE# = FILE # ON THE TAPE FOR A PARTICULAR IMAGE

        EXAMPLE: FOR TAPE # 7619 AND FILE # 13, WHEN PROMPTED FOR INPUT
                 SIMPLY TYPE

                 7619 13

        TO END EXECUTION WHEN PROMPTED FOR INPUT, TYPE 'EXIT'.
        FOR MORE INFORMATION SEE THE DOCUMENTATION AND FLOW CHARTS
        FOR THIS PROCESSOR.
&END
-L30 &TYPE ENTER TAPE NUMBER FIRST AND FILE NUMBER FOR THIS IMAGE:
      &READ ARGS
*
*   TEST FOR CORRECT RESPONSE
*
      &IF &$ = EXIT &EXIT
      &IF &INDEX NE 2 &GOTO -L40
      &GOTO -L50
-L40 &TYPE WRONG INPUT OR WRONG FORMAT ...TRY AGAIN
      &GOTO -L30
*
*   CHECK TO SEE IF 'GTDOTS CC' IS ON THE 'A' DISK,IF NOT TYPE ERROR AND EXIT
*
-L50 LIST GTDOTS CC A
      &IF &RETCODE NE 0 &GOTO -L60
*
*   NOW STACK THE EDIT COMMANDS TO EDIT THE 'GTDOTS CC' FILE
*
      &STACK I /UNIT=11
      &STACK DEL
      &STACK UI
      &STACK INPUT READTAPE UNIT=11, FILE=&2
      &STACK C/UNIT/ UNIT
      &STACK C/ FIL/FIL
      &STACK FILE
      EDIT GTDOTS CC A
      &GOTO -L70
-L60 &TYPE THE CONTROL CARD (CC) FILE 'GTDOTS CC' DOES NOT EXIST
      &TYPE ON YOUR 'A' DISK. PLEASE CORRECT THIS PROBLEM AND TRY
      &TYPE THIS ROUTINE LATER.
      &EXIT
*
*   STACK THE EODLARSYS RESPONSES
*
-L70 &IF &READFLAG = STACK DESBUF
      CONWAIT
      &STACK DISK
```

```
      &STACK GTDOTS
      &STACK INTFR
      &STACK YES
      &STACK HOUSTON
      &STACK YFS
      &STACK &1
    . &STACK NO
      &STACK NO
      &STACK NO
      EXEC EODLARSYS
*
* NOW COPY THE FILE 'FILE FT18F001' FROM THE 'D' DISK TO THE 'A' DISK
*
      L FILE FT18F001 D
      &IF &RETCODE NE 0 &GOTO -L80
      LIST FILE FT18F001 A
      &IF &RETCODE = 0 ERASE FILE FT18F001 A
      COPY FILE FT18F001 D = = A
      &BEGTYPE
*
* *  'FILE FT18F001' HAS REEN CREATED ON YOUR 'A' DISK. * *
* *  IT CONTAINS 209 GROUND TRUTH DOTS,LABELS, AND CROP TYPES. * *
&END
      &EXIT
-L80 &TYPE FRROR - FOR SOME REASON EOD - LARSYS DID NOT COMPLETE ITS JOB
      &TYPE 'FILE FT18F001 ' DOES NOT EXIST ON THE 'D' DISK. CHECK THE
      &TYPE PRINTER OUTPUT.
```

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```
      &CONTROL OFF NOMSG
-L10  &BEGTYPE

      TYPE ONE OF THE FOLLOWING TO CONTINUE:
          R - TO BEGIN PROCESSING
          I - FOR COMPLETE INSTRUCTIONS
          EXIT - TO EXIT AT ANY TIME
&END
      &READ ARGS
*
*   TEST FOR CORRECT RESPONSE
*
      &IF &INDEX NE 1 &GOTO -L10
      &IF &5 = EXIT &EXIT
      &IF &5 = I &GOTO -L20
      &IF &5 = R &GOTO -L30
      &IF &5 NE R &IF &5 NE I &GOTO -L10
-L20  &BEGTYPE
      INSTRUCTIONS FOR USING LANDMRG:
          THIS FXEC PROCEDURE WILL MERGE UP TO 5 LANDSAT ACQUISITIONS (FOR
      LATER USE WITH GROUND TRUTH DOT LABELS) INTO A SINGLE FILE HAVING
      THE NAME 'FILE FT12F001' ON THE USERS OWN 'A' DISK. WITH A TOTAL
      OF 4 CHANNELS/ACQUISITION, THIS MEANS UP TO 20 CHANNELS WILL BE
      WRITTEN TO THE OUTPUT FILE. THE REQUIRED INPUT FOR THIS ROUTINE IS
      A TAPE # AND FILE NUMBER(S); THEY MUST BE ENTERED IN THE FOLLOWING
      FORMAT WHEN PROMPTED FOR INPUT:

          TAPE# FILE1 FILE2 FILE3 . . . FILEN

          WHERE:
          TAPE# = IS THE TAPE # CONTAINING THE LANDSAT ACQUISITIONS.
          FILEN = IS A FILE # ON THE TAPE CORRESPONDING TO THE ACQUISITION(S)
                  DESIRED TO BE MERGED. UP TO 5 FILE NUMBERS CAN BE SPECIFIED.
                  NOTE: THIS ARRANGEMENT REQUIRES ALL FILE #'S TO BE ON THE
                  SAME TAPE.

          EXAMPLE: YOU WISH TO MERGE THE ACQUISITIONS CORRESPONDING TO FILES
                  2, 6, AND 17 ON TAPE # 7391. WHEN PROMPTED FOR THE INPUT
                  YOU WOULD TYPE:

                  7391 2 6 17

          IF AT ANY TIME WHEN PROMPTED FOR INPUT YOU WISH TO STOP AND EXIT
      THIS PROCESSOR, TYPE 'EXIT' AND YOU WILL RETURN TO THE CMS ENVIRON-
      MENT. FOR MORE INFORMATION SEE THE DOCUMENTATION FOR THIS SYSTEM.
&END
-L30  &BEGTYPE
      ENTER TAPE NUMBER AND FILE NUMBER(S):
&END
      &READ ARGS
      &IF &5 EQ EXIT &EXIT
      &IF &INDEX = 0 &GOTO -L30
      &IF &INDEX GT 6 &GOTO -L40
      &GOTO -L50
-L40  &BEGTYPE
      WRONG INPUT,WRONG FORMAT,TOO MANY,OR TOO FEW SITES ENTERED ...TRY AGAIN
&END
      &GOTO -L30
*
*  CHECK TO SEE IF DAMRG IS ON THE 'A' DISK; IF NOT ISSUE ERROR AND EXIT
*
-L50  LIST DAMRG CC A1
      &IF &RETCODE NE 0 &GOTO -L60
      &NUM = &INDEX - 1
      &GOTO -L70
-L60  &BEGTYPE
      ERROR-THE REQUIRED FILE 'DAMRG CC' DOES NOT EXIST ON YOUR 'A' DISK.
          PLEASE CORRECT THE PROBLEM AND TRY THIS PROCESSOR LATER.
&END
      &EXIT
*
*   THE NEXT 4 LOOPS ,EDIT   THE 'DAMRG CC' FILE
*
*
*   THIS LOOP ERASES ALL OCCURENCES OF THE CONTROL CARD 'INPUT/UNIT=11...'
*
-L70  &LOOP 3 5
          &STACK L /INPUT
          &STACK DEL
```

```
FILE: LANDMRG  FXEC      A    PURDUE / LARS 3031

      &STACK U1
      &STACK FILE
      EDIT DAMRG CC A
      &IF &READFLAG EQ STACK DESBUF
*
*   THIS LOOP ERASES ALL OCCURENCES OF THE CONTROL CARD 'CHANNEL  1,2,3,4'
*
      &LOOP 3 5
        &STACK L /1,2,3,4
        &STACK DEL
        &STACK U1
      &STACK FILE
      EDIT DAMRG CC A
      &IF &READFLAG EQ STACK DESBUF
*
*   THIS LOOP INSERTS &NUM 'DATAPE  INPUT/UNIT=...' CONTROL CARDS
*
      &GLOBAL1 = 0
      &LOOP 9 &NUM
        &GLOBAL1 = &GLOBAL1 + 1
        &F = 1 + &GLOBAL1
        &IF &GLOBAL1 = 1 &STACK L/ANGC
        &IF &GLOBAL1 NE 1 &STACK U1
        &STACK INPUT DATAPE INPUT/ UNIT=11, FILE= &&F
        &STACK C /INP/ INP
        &STACK C/INP/ INP
        &STACK C/INP/ INP
        &STACK C/ UNI/UNI
      &STACK FILE
      EDIT DAMRG CC A
*
*   THIS LOOP INSERTS &NUM 'CHANNEL    1,2,3,4' CONTROL CARDS INTO THE DAMRG
*   CONTROL CARD FILE
*
      &GLOBAL1 = 0
      &LOOP 6 &NUM
        &GLOBAL1 = &GLOBAL1 + 1
        &IF &GLOBAL1 = 1 &STACK L/OUTPUT
        &IF &GLOBAL1 NE 1 &STACK U1
        &STACK INPUT CHANNEL 1,2,3,4
        &STACK C/1,2/ 1,2
        &STACK C/1,2/ 1,2
      &STACK FILE
      EDIT DAMRG CC A
*
*   EDITING OF THE CONTROL CARD FILE 'DAMRG CC' IS NOW COMPLETE
*
*
*   STACK THE EODLARSYS RESPONSES
*
      &IF &READFLAG = STACK DESBUF
      CONWAIT
      &STACK DISK
      &STACK DAMRG
      &STACK INTER
      &STACK YES
      &STACK HOUSTON
      &STACK YES
      &STACK &1
      &STACK NO
      &STACK NO
      &STACK NO
      EXEC EODLARSYS
*
*   NOW COPY THE FILE 'FILE FT12F001' FROM THE 'D' DISK TO THE 'A' DISK
*
      LIST FILE FT12F001 D
      &IF &RETCODE NE 0 &GOTO -L80
      LIST FILE FT12F001 A
      &IF &RETCODE = 0 ERASE FILE FT12F001 A
      COPY FILE FT12F001 D = = A
      &BEGTYPE

      A FILE 'FILE FT12F001' CONTAINING THE SPECTRAL VALUES OF THE MERGED
      LANDSAT ACQUISITIONS HAS BEEN CREATED ON YOUR 'A' DISK
&END
      &EXIT
-L80  &TYPE FOR SOME REASON, EOD - LARSYS DID NOT COMPLETE ITS JOB, THE
      &TYPE FILE 'FILE FT12F001 ' DOES NOT EXIST ON THE  'D' DISK. CHECK
```

19

FILE: LANDMPG FXEC   A   PURDUE / LARS 3031

&TYPE THF PRINTER OUTPUT FOR POSSIHLE ERRORS.

"

&TYPE THF PRINTER OUTPUT FOR POSSIHLE ERRORS.

FILE: OLPARS   EXEC   A   PURDUE / LARS 3031

      &CONTROL OFF NOMSG
-L10 &BEGTYPE

      TYPE ONE OF THE FOLLOWING TO CONTINUE:
         R - TO BEGIN PROCESSING
         I - FOR COMPLETE INSTRUCTIONS
         EXIT - TO EXIT AND STOP EXECUTION
&END

*   TEST FOR CORRECT RESPONSE
*

      &READ ARGS
      &IF &S EQ EXIT &EXIT
      &IF &INDEX NE 1 &GOTO -L10
      &IF &S = R &GOTO -L30
      &IF &S = I &GOTO -L20
      &IF &S NE R &IF &S NE I &GOTO -L10
-L20 &BEGTYPE
      INSTRUCTIONS FOR USING OLPARS:
         THIS EXEC FILE IS THE LAST STEP IN THE OLPARS DATA REFORMATTING
         SYSTEM. IT IS ENTIRELY AUTOMATIC AND NO USER INPUT IS REQUIRED.
         'OLPARS EXEC' WILL EXECUTE A FORTRAN PROGRAM TO READ THE FILES
         'FILE FT12F001' AND 'FILE FT18F001' OFF THE USER'S 'A' DISK,
         REFORMAT THE DATA AND WRITE IT TO AN OUTPUT FILE 'FILE FT17F001'.
         THIS OUTPUT FILE IS THEN PUNCHED ON CARDS, WITH A STATUS OF HOLD.

&END
*
*   GET THE JSC770 DISK AND DEFINE THE FILEDEFS HERE
*
-L30 GLOBAL TXTLIB CMSLIB FORTRAN
      GETDISK JSC770 191 200 B/A RR PASS AUCOIN NOPRINT
      FILEDEF 12 DISK FILE FT12F001   (RECFM U BLOCK 30600 PERM
      FILEDEF FT18F001 DISK FILE FT18F001 A1 (LRECL 80 BLOCK 80 PERM
      FILEDEF FT17F001 DISK FILE FT17F001 A1 (LRECL 80 BLOCK 80 PERM
      FI 15 TERM (PERM
      FI 6 PRINTER (PERM
*
*   CHECK FOR 'FILE FT12F001' AND 'FILE FT18F001' ON THE USER'S 'A' DISK
*
      LIST FILE FT12F001 A
      &IF &RETCODE NE 0 &GOTO -L40
      &GOTO -L50
-L40 &BEGTYPE
      THE FILE(S) 'FILE FT12F001' (LANDSAT SPECTRAL VALUES) AND/OR
      'FILE FT18F001' (GROUND TRUTH DOT LABELS) DO NOT EXIST ON YOUR
      'A' DISK. PLEASE CORRECT THIS PROBLEM AND TRY THIS PROGRAM LATER.
&END
      &EXIT
-L50 LIST FILE FT18F001 A
      &IF &RETCODE NE 0 &GOTO -L40
*
*   CHECK FOR A FILE 'FILE FT17F001', IF ONE EXISTS, ERASE IT
*
      LIST FILE FT17F001 A
      &IF &RETCODE NE 0 ERASE FILE FT17F001 A
*
*   NOW BEGIN TO PROCESS THE DATA USING THE PROGRAM 'OLPARS FORTRAN'
*
      LOAD OLPARS (CLEAR START
*
*   CHECK TO SEE IF THE OUTPUT FILE 'FILE FT17F001' WAS CREATED PROPERLY
*   THIS FILE CONTAINS THE REFORMATTED GROUND TRUTH CROP TYPES AND
*   LANDSAT SPECTRAL VALUES
*
      LIST FILE FT17F001 A
      &IF &RETCODE NE 0 &GOTO -L60
*
*   NOW PUNCH THE REFORMATTED DATA
*
      REMOTE D TO HOUSTON
      SPOOL D HOLD
      PUNCH FILE FT17F001 A
      &EXIT
-L60 &BEGTYPE
      ERROR - THE FILE 'FILE FT17F001' WAS NOT FOUND ON YOUR 'A' DISK
              AFTER EXECUTION.
&END

21

```
C                                                                      OLP00010
C------OLPARS---------------------------------------------------------OLP00020
C                                                                      OLP00030
C     PURPOSE                                                          OLP00040
C         THE PURPOSE OF THIS PROGRAM IS TO READ 2 INPUT FILES, 'FILE  OLP00050
C         FT12F001' AND 'FILE FT16F001' OFF THE USER'S 'A' DISK, REFORMAT OLP00060
C         THE DATA FROM THESE FILES, AND WRITE THIS REFORMATTED DATA TO OLP00070
C         A DISK FILE 'FILE FT17F001' ON THE USER'S 'A' DISK.          OLP00080
C                                                                      OLP00090
C     USAGE                                                            OLP00100
C         THIS PROGRAM IS CALLED FROM THE EXEC FILE 'OLPARS EXEC'.     OLP00110
C                                                                      OLP00120
C     MAJOR PROGRAM VARIABLES, ARRAYS                                  OLP00130
C                                                                      OLP00140
C         VARIABLE,ARRAY      COMMON BLK      DESCRIPTION              OLP00150
C         -------------       ----------      -----------             OLP00160
C                                                                      OLP00170
C         DOTNUM(209)                         ARRAY CONTAINING THE GROUND TRUTH OLP00180
C                                             DOT NUMBERS (1 - 209)    OLP00190
C         ID(5)               TAPERD          VARIABLE CONTAINING THE NUMBER OF OLP00200
C                                             LANDSAT CHANNELS (FROM UNIT 12) OLP00210
C         IDATA(380)                          ARRAY CONTAINING A LINE OF LAND- OLP00220
C                                             SAT SPECTRAL VALUES, ALL CHANNELS OLP00230
C         MSSDAT(20,209)                      ARRAY WITH UP TO 20 CHANNELS OF OLP00240
C                                             209 LANDSAT SPECTRAL VALUES EACH OLP00250
C         NCHAN                               NUMBER OF CHANNELS       OLP00260
C         NCLS                                NUMBER OF CROP TYPES (CLASSES) IN OLP00270
C                                             THE GROUND TRUTH DOT FILE 'FILE OLP00280
C                                             FT16F001'                OLP00290
C         NTYPE(26)                           ARRAY CONTAINING THE 4 LETTER OLP00300
C                                             CROP TYPES               OLP00310
C                                                                      OLP00320
C     SUBROUTINES AND SUBPROGRAMS REQUIRED                            OLP00330
C         DIRECT CALLS ARE MADE TO EOD-LARSYS ROUTINES TAPHDR, FLDINT OLP00340
C         AND LINERD                                                   OLP00350
C                                                                      OLP00360
C     METHOD USED                                                      OLP00370
C         FIRST ALL LINES (AND ALL CHANNELS) WITH THE LANDSAT SPECTRAL OLP00380
C         VALUES FROM 'FILE FT12F001' ARE COPIED INTO THE ARRAY       OLP00390
C         MSSDAT(I,J).  THEN FROM 'FILE FT16F001', THE NUMBER OF CROP  OLP00400
C         TYPES, AND DOT NUMBERS ARE REFORMATTED ALONG WITH THE LANDSAT OLP00410
C         SPECTRAL VALUES AND WRITTEN TO UNIT 17 ('FILE FT17F001') ON  OLP00420
C         THE USER'S 'A' DISK.                                         OLP00430
C                                                                      OLP00440
C------------------------------------------------------------------------OLP00450
C                                                                      OLP00460
                                                                       OLP00470
0001        IMPLICIT INTEGER (A-Z)                                     OLP00480
0002        DIMENSION BLOCK(6),FFTVEC(30),IDATA(380),MSSDAT(20,209),NTYPE(26) OLP00490
           A,NTYPEA(26),DOTNUM(209)                                    OLP00500
0003        DATA B,S,G,H,H,C,J,E,P,L,Y,V,T,K,Z,M,X,N,O/'B','S','G','B','H', OLP00510
           A'C','J','F','P','L','Y','V','T','K','Z','M','X','N','O'/    OLP00520
0004        DATA WHEA,WHES,WHET,BARL,HAYS,CORN,SORG,SUGB,POTA,SUNF,SOYB, OLP00530
           AVEGE,TIMB,SOIL,WATE,MANM,OBST,NOID,OTHE/'WHEA','WHES','WHET','BARL OLP00540
           A','HAYS','CORN','SORG','SUGB','POTA','SUNF','SOYB','VEGE','TIMB' OLP00550
           A,'SOIL','WATE','MANM','OBST','NOID','OTHE'/                OLP00560
0005        COMMON /TAPERD/IUNIT,IFRST,FSCAN,SAMEND,SAMINC,READY,       OLP00570
           AMSCAN,LINC,ID(209),DSL,LHUF(30),JREC(30),IBYTE(30),        OLP00580
           ANCHES,FILEND,LIVEND,LININC,NSAMP,NOCHAN,FORMT             OLP00590
0006        DATAPE=12                                                  OLP00600
0007        CALL TAPHDR(DATAPE,0)                                      OLP00610
0008        DATA BLOCK/1,11,1,1,19,1/                                  OLP00620
0009        DATA FETVEC/1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20/ OLP00630
0010        NCHAN=ID(5)                                                OLP00640
0011        NUM=NCHAN*19                                               OLP00650
0012        CALL FLDINT(BLOCK,FETVEC,NCHAN)                            OLP00660
0013        DO 40 LINE=1,11                                            OLP00670
0014           CALL LINERD(IDATA,ENDTAP)                               OLP00680
0015           IF(ENDTAP.EQ.-1)WRITE(15,30)                            OLP00690
0016           IF(ENDTAP.EQ.-1) GO TO 150                              OLP00700
C                                                                      OLP00710
C     THIS LOOP COPIES LINES OF SPECTRAL VALUES INTO THE ARRAY MSSDAT(I,J) OLP00710
```

```
         C
0017                DO 40 I=1,NUM
0018     30    FORMAT(///,10X,'ERROR - END OF FILE REACHED ON UNIT 12')
0019           IF(I.LE.19)MSSDAT(1,(LINE-1)*19+I)=IDATA(I)
0020           IF(20.LE.I.AND.I.LE.38)MSSDAT(2,(LINE-1)*19+I-19)=IDATA(I)
0021           IF(39.LE.I.AND.I.LE.57)MSSDAT(3,(LINE-1)*19+I-38)=IDATA(I)
0022           IF(58.LE.I.AND.I.LE.76)MSSDAT(4,(LINE-1)*19+I-57)=IDATA(I)
0023           IF(77.LE.I.AND.I.LE.95)MSSDAT(5,(LINE-1)*19+I-76)=IDATA(I)
0024           IF(96.LE.I.AND.I.LE.114)MSSDAT(6,(LINE-1)*19+I-95)=IDATA(I)
0025           IF(115.LE.I.AND.I.LE.133)MSSDAT(7,(LINE-1)*19+I-114)=IDATA(I)
0026           IF(134.LE.I.AND.I.LE.152)MSSDAT(8,(LINE-1)*19+I-133)=IDATA(I)
0027           IF(153.LE.I.AND.I.LE.171)MSSDAT(9,(LINE-1)*19+I-152)=IDATA(I)
0028           IF(172.LE.I.AND.I.LE.190)MSSDAT(10,(LINE-1)*19+I-171)=IDATA(I)
0029           IF(191.LE.I.AND.I.LE.209)MSSDAT(11,(LINE-1)*19+I-190)=IDATA(I)
0030           IF(210.LE.I.AND.I.LE.228)MSSDAT(12,(LINE-1)*19+I-209)=IDATA(I)
0031           IF(229.LE.I.AND.I.LE.247)MSSDAT(13,(LINE-1)*19+I-228)=IDATA(I)
0032           IF(248.LE.I.AND.I.LE.266)MSSDAT(14,(LINE-1)*19+I-247)=IDATA(I)
0033           IF(267.LE.I.AND.I.LE.285)MSSDAT(15,(LINE-1)*19+I-266)=IDATA(I)
0034           IF(286.LE.I.AND.I.LE.304)MSSDAT(16,(LINE-1)*19+I-285)=IDATA(I)
0035           IF(305.LE.I.AND.I.LE.323)MSSDAT(17,(LINE-1)*19+I-304)=IDATA(I)
0036           IF(324.LE.I.AND.I.LE.342)MSSDAT(18,(LINE-1)*19+I-323)=IDATA(I)
0037           IF(343.LE.I.AND.I.LE.361)MSSDAT(19,(LINE-1)*19+I-342)=IDATA(I)
0038           IF(362.LE.I.AND.I.LE.380)MSSDAT(20,(LINE-1)*19+I-361)=IDATA(I)
0039     40    CONTINUE
0040     50    FORMAT('1',8(5X,I3))
         C     WRITE(15,50)((MSSDAT(I,J),I=1,NCHAN),J=1,209)
         C
         C     READ THE GROUND TRUTH DOT FILE 'FILE FT18F001 A1'
         C     NCLS = NUMBER OF CROP TYPES FOR THIS GROUND TRUTH IMAGE
         C
0041           READ(18,60) NCLS
0042     60    FORMAT(17X,I2)
         C
         C     THIS LOOP READS THE CROP TYPES    (NTYPE(I)) AND THE NUMBER
         C     OF EACH TYPE   (NUMBER(I)).
         C
0043           DO 70 I=1,NCLS
0044     70    READ(18,80)NTYPE(I),NUMBER(I)
0045     80    FORMAT(1X,A1,1X,I4)
         C
         C     NOW CONVERT THE 1 LETTER CROP TYPE ID'S INTO 4 LETTER ID'S
         C
0046           DO 90 I=1,NCLS
0047           IF(NTYPE(I).EQ.W) NTYPE(I)=WHEA
0048           IF(NTYPE(I).EQ.S) NTYPE(I)=WHES
0049           IF(NTYPE(I).EQ.G) NTYPE(I)=WHET
0050           IF(NTYPE(I).EQ.B) NTYPE(I)=BARL
0051           IF(NTYPE(I).EQ.H) NTYPE(I)=HAYS
0052           IF(NTYPE(I).EQ.C) NTYPE(I)=CORN
0053           IF(NTYPE(I).EQ.J) NTYPE(I)=SORG
0054           IF(NTYPE(I).EQ.E) NTYPE(I)=SUGR
0055           IF(NTYPE(I).EQ.P) NTYPE(I)=POTA
0056           IF(NTYPE(I).EQ.L) NTYPE(I)=SUNF
0057           IF(NTYPE(I).EQ.Y) NTYPE(I)=SOYB
0058           IF(NTYPE(I).EQ.V) NTYPE(I)=VEGE
0059           IF(NTYPE(I).EQ.T) NTYPE(I)=TIMB
0060           IF(NTYPE(I).EQ.K) NTYPE(I)=SOIL
0061           IF(NTYPE(I).EQ.Z) NTYPE(I)=WATE
0062           IF(NTYPE(I).EQ.M) NTYPE(I)=FANM
0063           IF(NTYPE(I).EQ.X) NTYPE(I)=OBST
0064           IF(NTYPE(I).EQ.O) NTYPE(I)=OTHE
0065     90    IF(NTYPE(I).EQ.N) NTYPE(I)=NOID
         C
         C     READ IN THE DOT NUMBERS
         C
0066           READ(18,100)(DOTNUM(I),I=1,209)
0067     100   FORMAT(6X,I3)
         C
         C     NOW WRITE OUT TO THE OUTPUT UNIT THE NUMBER OF CHANNELS(NCHAN),THE
         C     # OF CROP TYPES(NCLS),THE CROP TYPES (NTYPE(I)), AND THE # OF
         C     DOTS FOR THIS CROP TYPE (NUMBER(I)).
```

```
                    C
0068                     WRITE(17,110) NCHAN                                          OLP01430
0069                110  FORMAT(1X,I4)                                                OLP01440
0070                     WRITE(17,110) NCLS                                           OLP01450
0071                     WRITE(17,120) (NTYPE(I),NUMBER(I),I=1,NCLS)                  OLP01460
0072                120  FORMAT(A4,10X,I4)                                            OLP01470
                    C                                                                 OLP01480
                    C   OUTPUT THE SPECTRAL VALES OF THE PIXELS                       OLP01490
                    C                                                                 OLP01500
0073                     DO 130 K=1,209                                              OLP01510
0074                130  WRITE(17,140) (MSSDAT(J,DOTNUM(K)),J=1,NCHAN)                OLP01520
0075                140  FORMAT(20(1X,I3))                                            OLP01530
0076                150  STOP                                                         OLP01540
0077                     END                                                          OLP01550
                                                                                     OLP01560
```

COMMON BLOCK /TAPERD / MAP SIZE 4C8

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IUNIT	0	IFRST	4	FSCAN	8	SAMEND	C	SAMINC	10
READY	14	NSCAN	18	LINC	1C	ID	20	DSL	340
LBUF	344	JREC	3BC	IBYTE	434	NHUFS	4AC	FILENO	480
LINEND	4B4	LININC	4B8	NSAMP	49C	NOCHAN	4C0	FORMT	4C4

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
TAPHDR	164	FLUINT	168	LINERD	16C	IBCOM#	170		

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
W	190	S	194	G	198	B	19C	H	1A0
C	1A4	J	1A8	E	1AC	P	1B0	L	1B4
Y	1B8	V	1BC	T	1C0	K	1C4	Z	1C8
M	1CC	X	1D0	N	1D4	O	1D8	WHEA	1DC
WHES	1E0	WHET	1E4	BARL	1E8	HAYS	1EC	CORN	1F0
SORG	1F4	SUGR	1F8	POTA	1FC	SUNF	200	SOYB	204
VEGE	208	TIMB	20C	SOIL	210	WATE	214	MANM	218
OAST	21C	POID	220	OTHE	224	DATAPE	228	NCHAN	22C
NUM	230	LINE	234	ENDTAP	238	I	23C	NCLS	240

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
BLOCK	244	FETVEC	25C	IDATA	264	MSSDAT	6C4	NTYPE	4A14
NUMBER	4A7C	DOTNUM	4AE4						

FORMAT STATEMENT MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
30	4E28	50	4E57	60	4E63	80	4E69	100	4E73
110	4E79	120	4E7F	140	4E87				

```
*OPTIONS IN EFFECT*   ID,EBCDIC,SOURCE,NOLIST,DECK,NOLOAD,MAP
*OPTIONS IN EFFECT*   NAME = OLPARS  , LINECNT =      75
*STATISTICS*     SOURCE STATEMENTS =        77,PROGRAM SIZE =      23506
*STATISTICS*   NO DIAGNOSTICS GENERATED
```

6. REFERENCES

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Aucoin, P. J., "As-Built" Design Specification for a Merging Program for Formatted Image Data Files, LEC-12653, JSC-14432, Job Order 71-593, Contract NAS 9-15200, August 1978.