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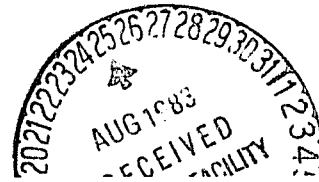
Supporting Research

June 1983

DATA MANAGEMENT PROCEDURES FOR TIEPOINT REGISTRATION, PRE- AND POST-PROCESSING, AND 'ICD116'

B. S. Nowakowski

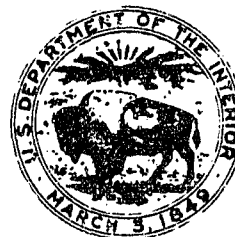
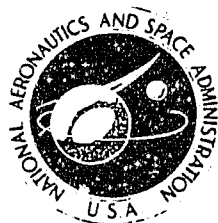
 **Lockheed Engineering and Management
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16. Abstract The title of the document is "Data Management Procedures for Tiepoint Registration, Pre and Post Processing, and 'ICD116'." The contents include two main sections: Section 1 is the procedures. With each procedure description, the pertinent execs are listed and purposes defined. The second section contains an example run of each of the 32 execs with user inputs identified. Additions and corrections will be incorporated in the master copy as required. The Data Processing Section will maintain current execs on their account; however, most of the software is uncontrolled, not acceptance tested and can be changed without notice. These procedures were written for and reside in the Data Processing Section of the Scientific Systems Department.					
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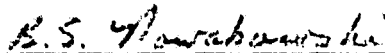
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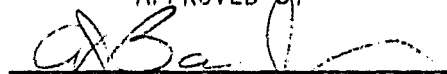
DATA MANAGEMENT PROCEDURES
FOR TIEPOINT REGISTRATION, PRE AND POST PROCESSING, AND 'ICD116'

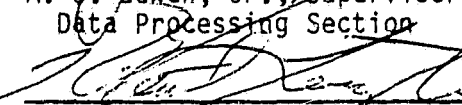
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1. THE PROCEDURES

1.1 IMAGE PREPROCESSING

The Gilbert/Vicar tiepoint registration will process any type or size of image data, but preprocessing is necessary to aid the user and make the process more manageable. The images must be in band sequential format. The following execs include most extracts and image preprocessing that will be required. If these are not adequate, please contact J. Gilbert for further help.

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
CONVERT EXEC	Converts various formats from BIL to BSQ.	p. 9
JIMBOB EXEC	Outputs TM SCROUNGE tape header information.	p. 21
RPCHK EXEC	Defines primary and secondary path/row and outputs beta angle in degrees and radians.	p. 27
MEANTIME EXEC	Outputs the approximate starting line and starting sample of an area of interest from a TM SCROUNGE tape.	p. 26
SARLAS EXEC	Extracts an area of interest from a TM SCROUNGE 'P' tape.	p. 29
SARLASA EXEC	Extracts an area of interest from a TM 'A' tape.	p. 30
SAR EXEC	Extracts an area within an extract.	p. 28
SIZE EXEC	Scales the image to a different size.	p. 32

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
DSIZE EXEC	Scales the image to a smaller size.	p. 10
LAS2IAS1	Averages every 14 lines and 14 pixels of TM SCROUNGE full frame.	p. 22

1.2 THE ICD116 PROCEDURE

If ERSYS registration is to be used, the images may be preprocessed using the appropriate execs in Section 1.1. ERSYS registration is more accurate than the tiepoint registration method, but is less flexible and requires more knowledge about the data. Input images should be BSQ and no larger than 1144 lines and 1144 pixels.

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
ICD116D EXEC	Prepares data for interface tape to registration using TM image data.	p. 16
ICD116M EXEC	Prepares data for interface tape to registration using the EROS formatted band sequential data.	p. 18
ICD116T EXEC	Writes the ICD116 output to tape.	p. 20
TAPSCAN EXEC	Checks for physical read errors and reports record sizes.	p. 35

1.3 THE GILBERT/VICAR TIEPOINT PROCEDURES

1.3.1

Display on the IAS, the reference image on screen 1 and the registrant on screen 2. (Please refer to IAS BASICS FOR THE NEW USER for display instruction.)

NOTE: If using MSS as reference and TM as registrant, the following exec will be useful.

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
SETUP EXEC (CMS)	Prepares setup IASCMD with proper arguments.	p. 31
SETUP IASCMD (IAS)	Displays MSS on screen 1 and TM image on screen 2.	p. 31

1.3.2

Choose and list tiepoint coordinates. This step requires patience and accuracy because the output registered image will be only as good as your tiepoints. The number of tiepoints depends on the particular registration program being used.

1.3.2.1

Using cursor form 0, place the cursor on a point in the reference; read and record the virtual image coordinates. (Please refer to IAS BASICS FOR THE NEW USER for cursor instruction.)

1.3.2.2

Now, place the cursor on the same point on the registrant; read and record the virtual image coordinates.

1.3.3

Execute the TIEPOINT EXEC - make sure all entries are correct; one mistake will destroy accuracy.

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
TIEPOINT EXEC	Converts IAS coordinates to coordinates used by the tiepoint programs.	p. 36

1.3.4

Execute the appropriate tiepoint program.

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
TIEREG4 EXEC	'exact fit' - requires very accurate tiepoints.	p. 37
TIEREG5 EXEC	'least squares fit' - averages errors globally.	p. 38
TIEREG5B EXEC	For TM images larger than 512L x 512P.	p. 39
TRIREG EXEC	For TM simulated data-uses triangulation.	p. 41
TRIBIG EXEC	For TM simulated images larger than 512L x 512P.	p. 40
LOOPTIE EXEC	Uses TIEREG5 and will register multiple bands with one set of inputs.	p. 23

1.3.5

Check registration quality - this should be done at various times to ensure quality and accuracy of the data and to save the user time.

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
FLICKER IASCMD	To 'blink' reference against registrant.	p. 12
IAS CURSOR	To measure one tiepoint against another.	IAS BASICS FOR THE NEW USER
IAS DISPLAY	To compare different images and band-to-band registration.	

1.4 IMAGE POST-PROCESSING

The following steps are used by data management to ensure user uniformity and versatility. Registration output images will be written to tape in BIL format with a header and gains and biases applied. This output tape will be FR80 and RT&E data base compatible. These execs should be completed in order.

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
URITE2 EXEC	Converts the images to BIL format.	p. 42
EXPAND2 EXEC	Adds a header and gains and biases.	p. 11
WRTAPE EXEC	Writes the above to tape.	p. 45
TAPCHK EXEC	Outputs selective parts of the tape for checking the accuracy and validity of tape.	p. 33

At this point, the entire tape should be converted and checked on the IAS to make sure image data on the tape is correct. The following exec is helpful for converting an entire tape to IAS format.

<u>Name</u>	<u>Purpose</u>	<u>Example</u>
TAPCON	Converts 1 or more files from tape to IAS format.	p. 34

2. DOCUMENTED 'EXECS' USED IN THE PROCEDURES
(in alphabetical order)

The user of the following 'execs' is assumed to be familiar with CMS and the IAS, and is using the SCREEN account. The documentation provided is an example of the 'EXEC' run with arrows indicating user response. These execs will in turn execute the appropriate programs. The majority will require that the user be linked to Jimmy Gilbert's T and U library disks. A few require Bill Hocutt's disk, or the IAS disk. Some 'execs' reside only on the SCREEN account. Below the typed name of each exec is the exec name which will link to the appropriate disks.

CONVERT EXEC
(GRABIAS)

→ If tape is to be converted, mount on TAP1.

→ cconvert
*** IAS Format Conversion Program ***

Enter One Of The Following Codes
For The Input Format

- U - Universal Format
- A - USCA Format
- L - LIVES Format
- V - VICAR Format
- E - EROS Format
- P - PFC Format
- Q - Band Sequential Format
- R - Registration Output Format
- N - None (No Format Format)
- W - Universal Format (Production Version - Header Gain and Bias Applied)
- Z - Lives Format (Production Version - Header Gain and Bias Applied)
- S - Enter CMS Subset
- X - Exit this program

→ Enter Input Medium ... Disk or Tape (D/T)

→ Enter FN FT FM for Data Set Number 1

→ 4995 81338 a

→ EXECUTION BEGINS...

→ *** Enter The Number Of Channels (Default=4) ***

→ *** Enter The Starting Line Of The Image (Default=1) ***

→ *** Enter The Starting Sample (Default=1) ***

→ *** Enter The Number Of Lines Of The Image To Output (Default=All) ***

→ *** Enter The Number Of Samples Per Channel To Output (Default=All) ***

→ Enter blank for default output filename (CHANNEL1, CHANNEL2,)

→ Output filename for channel 1 !!

→ e31 FILEDEF 20 DISK E31 IASIMAGE * (RECFM F LRECL 392 ELKSIZE 392

→ Output filename for channel 2 !!

→ e32 FILEDEF 21 DISK E32 IASIMAGE * (RECFM F LRECL 392 ELKSIZE 392

→ Output filename for channel 3 !!

→ e33 FILEDEF 22 DISK E33 IASIMAGE * (RECFM F LRECL 392 ELKSIZE 392

→ Output filename for channel 4 !!

→ e34 FILEDEF 23 DISK E34 IASIMAGE * (RECFM F LRECL 392 ELKSIZE 392

→ *** IAS Format Conversion Program ***

Enter One Of The Following Codes
For The Input Format

- U - Universal Format
- A - USDA Format
- L - LIVES Format
- V - VICAR Format
- E - EROS Format
- P - PFC Format
- Q - Band Sequential Format
- R - Registration Output Format
- N - None (No Format Format)
- W - Universal Format (Production Version - Header Gain and Bias Applied)
- Z - Lives Format (Production Version - Header Gain and Bias Applied)
- S - Enter CMS Subset
- X - Exit this program

→ X
R: T=4.32/8.56 07:24:42

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DSIZE EXEC
(GILBEAR)

```
→ dsize
→ Enter The FN, FT and FM of The File to Be Down Sized
→ boreal chan1 a
*** Enter The File Mode Of The Output Data Set ... ( Default = A ) ***
→ EXECUTION BEGINS...
→ *** ENTER THE NUMBER OF LINES IN THE AVERAGING (LINC) ***
→ 2
→ *** ENTER THE NUMBER OF SAMPLES IN THE AVERAGING (SINC) ***
→ 2
**BLIP**
**BLIP**
*** PROCESSING COMPLETE ***
FILENAME FILETYPE FM FORMAT LRECL RECS BLCKS DATE TIME
BOREAL ACHAN1 A1 V 316 316 99 6/09/83 8:20:56
R;
```

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EXPAND2 EXEC
(GILBEAR)
(HOCUTT)

→ expand2 9656 82234U
THIS PROGRAM IS DESIGNED TO READ UP TO 100 IMAGES FROM THE INPUT TAPE, CALCULATE BIAS AND GAIN VALUES FOR EACH FILE, AND TO COPY THE IMAGES FROM THE INPUT TO THE OUTPUT TAPE WHILE INSERTING THE BIAS AND GAIN VALUES IN THE HEADER OF EACH RECORD. AN OPTION HAS BEEN ADDED TO PERMIT DISK TO DISK PROCESSING OF A SINGLE FILE. THE INPUT FILE IS WRITEN TO OUTPUT A AND THE OUTPUT FILE IS TM TEMP T. THESE FILE NAMES ARE SET IN THE EXEC AND MAY BE CHANGED. THE BIAS AND GAIN VALUES ARE ALSO APPLIED TO ALL PIXEL VALUES.

INDICATE THE SIZE OF THE IMAGES ON THE INPUT TAPE.

1:	196	X	117	X	7
2:	386	X	308	X	7
3:	196	X	117	X	4
4:	497	X	426	X	3
5:	497	X	426	X	4
6:	386	X	308	X	4
7:	512	X	560	X	4
8:	392	X	324	X	4
9:	392	X	324	X	3
10:	196	X	162	X	3
11:	392	X	351	X	7
12:	392	X	324	X	7
13:	392	X	324	X	6

→ 12

FILEDEF 10 DISK 9658 82234U A (BLOCK 3060 RECFM U PERM
FILEDEF 8 DISK TM9658 82234U A (BLCK 3060 RECFM U PERM
FILEDEF 6 DISK EXPAND OUT A (LRECL 132 BLKSIZE 132 RECFM F PERM
EXEC CLRSCRN
LOAD GBL12 EXPAND2 BSCAL1 TCDAY
START
EXECUTION BEGINS...
*** ENTER A 1 FOR DISK INPUT OR A 2 FOR TAPE INPUT***

→ 1

PROCESSING FILE 1
SUBROUTINE PSREAD
SUBROUTINE TAPERF
COPYING FILE NO 1
ENTER JOB ID (TASK TITLE)
--30 CHAR MAX--
tm scrounceunregistered
ENTER RUN ID (FILE TITLE)
--14 CHAR MAX--
chan c missreg

EXTRACTION COMPLETE

PRINT EXPAND OUT A
R:

FLICKER IASCMD
(GRABIAS)

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```
→ input flicker iascmd  
FILED OF DISK FLICKER IASCMD * (RECFM F LRECL 80 FLSIZE 80  
1  
(C)  
(E)  
GGOTO R1)  
or input command file  
→ go r1  
!!
```

→ HIT TRACKBALL BUTTON 1 TO STOP FLICKER

GILBEAR EXEC

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→ GILBEAR
GETDISK TEMP MAXIMUM CLEAR B
DKLNK105E TEMP 151 NOT LINKED; R/W BY PR001
DKLNK105E TEMP 152 NOT LINKED; R/W BY JSC1645
DKLNK105E TEMP 153 NOT LINKED; R/W BY SRSG10
TEMP 154 HAS BEEN ATTACHED AS 192.. (003000 KILCBYTES)
192 HAS BEEN ACCESSED AS B DISK.
LINK GILBEAR 191 499 RR
DASD 499 LINKED R/O; R/W BY GILBEAR; R/O BY 003 USERS
LINK GILBEAR 500 500 RR
DASD 500 LINKED R/O; R/W BY GILBEAR; R/O BY 003 USERS
ACC 499 T
T (499) R/O
ACC 500 U
U (500) R/O
R:

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GRABIAS EXEC

→ grabias
IAS program disk attached as 'Q' disk.
Send MAIL to IASMAINT with comments, suggestions, and problems
TAPE 380 ATTACHED
DEVICE 380 ATTACHED AS REQUESTED
dealing with the Image Analysis Station.
Enter 'HELP IAS NEWS' for latest IAS information.
R;

HOCUTT EXEC

→ HOCUTT
CP LINK JSC716 191 291 RR PASS= UGT
DASD 291 LINKED R/O; R/W BY JSC716
ACC 291 M
M (291) R/O
R:

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ICD116D EXEC
(GILBEAR)

The information needed for this exec can be obtained from the JIMBOB EXEC, SARLAS EXEC, RPCHK EXEC, Jess Mansfield and Jim Boatright.

```

→ ICD116D
*** ENTER THE NUMBER OF CHANNELS TO FORMAT INTO ICD116 FORMAT ***
→ 7
*** ENTER THE FILE MODE OF THE OUTPUT ***
→ a
*** ENTER THE FILE NAME OF THE EXTRACT ED IMAGE DATA SET ***
→ tm8931
*** ENTER THE ( ALPHA MERIC ) FILE TYPE OF THE EXTRACT ED IMAGE **
→ 82246ex
*** ENTER THE FILE MODE OF THE EXTRACT ED IMAGE ***
→ a
GLOBAL TXTLIB PORTMOD2 CMSLIB WBLIE FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 20 DISK ICD116 OUTPUT1 A { RECFM U BLOCK 360
FI 21 DISK ICD116 OUTPUT2 A { RECFM U BLOCK 3596
FI 22 DISK ICD116 OUTPUT3 A { RECFM U BLOCK 4048
FI 23 DISK ICD116 OUTPUT4 A { RECFM U BLOCK 3596
FI 31 DISK TM893L 82246EX1 A { RECFM U BLOCK 4000 PERM
FI 32 DISK TM893L 82246EX2 A { RECFM U BLOCK 4000 PERM
FI 33 DISK TM893L 82246EX3 A { RECFM U BLOCK 4000 PERM
FI 34 DISK TM893L 82246EX4 A { RECFM U BLOCK 4000 PERM
FI 35 DISK TM893L 82246EX5 A { RECFM U BLOCK 4000 PERM
FI 36 DISK TM893L 82246EX6 A { RECFM U BLOCK 4000 PERM
FI 37 DISK TM893L 82246EX7 A { RECFM U BLOCK 4000 PERM
FI 40 DISK CMS EXEC A ( RECFM F BLOCK 80
LOAD ICD116D ( CLEAR START NOMAP
EXECUTION BEGINS...
THE TIME IS 8:45:56
THE DATE IS 3/15/83
*** ENTER THE EXTRACTION STARTING LINE ***
→ 1
*** ENTER THE EXTRACTION STARTING SAMPLE ***
→ 3416
*** ENTER WRS PATH ***
→ 027
*** ENTER WRS ROW ***
→ 031
*** Enter The Line Number Of The WRS Center ***
→ 1545.8
*** Enter The Sample Number Of The WRS Center ***
→ 1676.8
The Beta Angle Default Is 2.889986
Do You Wish To Change This Value (Y/N) ??
→ y
*** Enter The Beta Angle ***
→ 2.942608
*** ENTER THE SEGMENT NUMBER ***
→ 893
*** ENTER SEGMENT CENTER LAT DEGREES ***
→ 42
*** ENTER LAT MINUTES ***
→ 23
*** ENTER LAT SECONDS ***
→ 47
*** ENTER LAT N/S ***

```

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```

→ D
*** ENTER THE SEGMENT CENTER LONG DEGREES ***
→ 94
*** ENTER LONG MINUTES ***
→ 10
*** ENTER LONG SECONDS ***
→ 29
*** ENTER LONG E/W ***
→ W
*** ENTER SUN ELEVATION ANGLE ***
→ 33
*** ENTER SUN AZIMUTH ***
→ 151
*** ENTER PATH-ROW NOMINAL LONG DEGREES ***
→ 94
*** ENTER LONG MINUTES ***
→ 32
*** ENTER LONG E/W ***
→ W
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
**BLIP**
*** LSSET IMAGE RECORD GENERATION CCMELETE ***
*** LSSET TRAILER RECORD GENERATION COMPLETE ***
FLIST ICD116 OUTPUT* A ( D
FILENAME FILETYPE FM FORMAT RECS BLKS DATE TIME
ICD116 OUTPUT1 A1 V 360 1 3/15/83 8.46.28
ICD116 OUTPUT2 A1 V 3596 2 3/15/83 8.48.03
ICD116 OUTPUT3 A1 V 1192 8008 9338 3/15/83 8.56.58
ICD116 OUTPUT4 A1 V 3596 7 25 3/15/83 8.56.59
ERASE CMS EXEC A
R:

```

ICD116M EXEC
(GILBEAR)

This exec uses EROS formatted band sequential data and writes a band interleave ICD116. This exec needs cleanup. Please contact Jimmy Gilbert when needed.

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ICD116T EXEC
(GILBEAR)

A scratch tape must be mounted on TAP1.

```
→ icd116t  
TAP1 181 ON TAPE 4C1  
→ *** Enter The File Mode Of The ICD116 Data Sets ***  
→ a  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
  **BLIP**  
R:  
→ tape wtm  
→ R:  
→ tape wtm  
R:
```

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LOOPTIE EXEC
(GILBEAR)



```
LOOPTIE
DESCRIPTOR
EXECUTIVE
*** ENTER THE FN, FM AND FT OF THE IMAGE TO BE REGISTERED ***
*** ENTER THE FN, FM AND FT OF THE REGISTERED IMAGE OUTPUT ***
*** ENTER THE FN, FM AND FT OF THE Tiepoint Data Set ***
EXECUTION BEGINS... PROCESSED ***
*** ENTER THE NUMBER OF LINES TO OUTPUT ***
*** ENTER THE NUMBER OF SAMPLES TO OUTPUT ***
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
EXECUTIVE
*** ENTER THE FN, FM AND FT OF THE IMAGE TO BE REGISTERED ***
*** ENTER THE FN, FM AND FT OF THE REGISTERED IMAGE OUTPUT ***
*** ENTER THE FN, FM AND FT OF THE Tiepoint Data Set ***
EXECUTION BEGINS... PROCESSED ***
*** ENTER THE NUMBER OF LINES TO OUTPUT ***
*** ENTER THE NUMBER OF SAMPLES TO OUTPUT ***
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*** PROCESSING COMPLETE ***
FILE NAME: C:\22462  FN: A1  FORMAT: V  RECS: 392  LINS: 324  DATE: 2/22/83  TIME: 10.49.11
DESCRIPTOR
EXECUTIVE
*** ENTER THE FN, FM AND FT OF THE IMAGE TO BE REGISTERED ***
*** ENTER THE FN, FM AND FT OF THE REGISTERED IMAGE OUTPUT ***
*** ENTER THE FN, FM AND FT OF THE Tiepoint Data Set ***
EXECUTION BEGINS... PROCESSED ***
*** ENTER THE NUMBER OF LINES TO OUTPUT ***
*** ENTER THE NUMBER OF SAMPLES TO OUTPUT ***
*BLIP*
*BLIP*
*BLIP*
*BLIP*
*BLIP*
```


MEANTIME EXEC
(GILBEAR)

→ Meantime
EXECUTION BEGINS...
→ *** Enter The Scene Center Latitude (Degrees) ***
41
→ *** Enter The Scene Center Latitude (Minutes) ***
45

→ *** Enter The Scene Center Longitude (Degrees) ***
94
→ *** Enter The Scene Center Longitude (Minutes) ***
29

→ *** Enter Latitude Direction ... 0 = North, 1 = South ***
0
→ *** Enter Longitude Direction ... 0 = East, 1 = West ***
1
Scene Center Latitude Is 41.748968
Scene Center Longitude Is -94.468644
→ ??? Are These Values Correct ... (0 = Yes, 1 = No) ???
0

→ *** Enter The Number Of Lines To Extract ***
512
→ *** Enter The Number Of Samples To Extract ***
512

→ *** Enter The Extraction Center Latitude (Degrees) ***
42
→ *** Enter The Extraction Center Latitude (Minutes) ***
24

→ *** Enter The Extraction Center Longitude (Degrees) ***
94
→ *** Enter The Extraction Center Longitude (Minutes) ***
10

*** Computed Starting Line Is 56 ***
*** Computed Starting Sample Is 3602 ***
*** Enter The Number Of Lines To Extract ***

RPCHK EXEC

→ RPCHK
 JSC 735 191 HAS BEEN ATTACHED AS 243.
 G (243) R/O
 243 HAS BEEN ACCESSED AS G DISK.
 EXECUTION BEGINS...
 ENTER LAT AND LON TO CONVERT IN DEGREES MINUTES SEC (999 DEG TO EXIT)
 → LAT = DD DD MM SS
 → LON = DD DD MM SS
 → -390 37 03
 36.05 -90.62

INPUT LATITUDE = 36.05 INPUT LONGITUDE = -90.62
 LAT AND LON IN RADIANS = 0.62919104 -1.58155823
 ENTER NUMBER OF LINES & PIXELS

→ XXXXX XXXXX
 C5000 05000
 5000 5000
 ACI SIZE LINES= 5000 PIXELS= 5000

DAY PATH ROW
 PRIMARY 23 35
 SECONDARY 24 35
 NIGHT PATH ROW
 PRIMARY 121 209
 SECONDARY 120 209

DAY PATH ROW
 PRIMARY 23 35
 SECONDARY 24 35
 NIGHT PATH ROW
 PRIMARY 121 209
 SECONDARY 120 209

SCENE CENTERS LATITUDE LONGITUDE

	DEG	MIN	SEC	DEG	MIN	SEC
PRIMARY DAY	36	05	00	-90	07	00
SECONDARY DAY	36	05	00	-91	40	00
PRIMARY NIGHT	36	05	00	-90	50	00
SECONDARY NIGHT	36	05	00	-89	18	00

SCENE ANGLES DEGREES ORIENTATION

	DEG	MIN	SEC	DEG	MIN	SEC
PRIMARY DAY	10	18	70	174	3	13
SECONDARY DAY	10	18	70	174	3	13
PRIMARY NIGHT	10	18	70	174	-3	09
SECONDARY NIGHT	10	18	70	174	-3	09

CLEARANCES TOP BOTTOM LEFT RIGHT

	TOP	BOTTOM	LEFT	RIGHT
PRIMARY DAY	-1175	-1425	-1251	-305
SECONDARY DAY	-1556	-1034	501	-2717
PRIMARY NIGHT	-1246	-1354	-746	-1410
SECONDARY NIGHT	-1632	-958	-3127	571

→ ENTER LAT AND LON TO CONVERT IN DEGREES MINUTES SEC (999 DEG TO EXIT)
 → LON = DD DD MM SS
 000

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SAR EXEC
(GILBEAR)

```
→ SAR  
→ *** Enter The FN, FT And FM Of The Input Imagery ***  
→ tm0886 022464  
→ *** Enter The FN, FT And FM Of The Output Image ***  
→ tm0886 022464  
EXECUTION BEGINS...  
  
→ nter The Starting Line  
31  
  
→ nter The Starting Sample  
49  
  
→ nter The Number Of Lines  
324  
  
→ nter The Number Of Samples  
392  
FILENAME FILETYPE FN FORMAT RECS BLKS DATE TIME  
TM0886 022464 R1 V 392 324 123 2/22/83 3.48.47  
R;
```


SARLAS EXEC
(GILBEAR)

```
→ sarlas

  *** TM Extraction Program ***
  *** LASLIR Tape Input ***

→ *** Enter The Segment Number ***
  893
→ *** Enter The Acquisition Date ***
  32294
→ *** Enter The Tape Letter Designator ***
  10
→ *** Enter The First Tape Numeric Value ***
  8647

→ *** Enter The Starting Line Of The Extraction ***
  56
→ *** Enter The Starting Sample Of The Extraction ***
  3602
→ *** Enter The Number Of Lines To Output ***
  512
→ *** Enter The Number Of Samples To Output ***
  512
→ *** Enter The Band To Be Extracted, 0 For No More ***
  1
  10002 TAPE 108647 HAS BEEN REQUESTED ON UNIT 101 (TAPMOUNT)
  10003 TAPE READY... EXECUTION CONTINUING (TAPMOUNT)
  EXECUTION BEGINS...
→ *** Enter The Band To Be Extracted, 0 For No More ***
  2
  EXECUTION BEGINS...
→ *** Enter The Band To Be Extracted, 0 For No More ***
  0
  *** Extraction Run Completed ***
R;
```

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SARLASA EXEC
(GILBEAR)

→ Tape must be positioned at the beginning of the appropriate file.

→ SARLASA HURONA BAND4 A

GLOBAL TXFLIB CHSLIB FORTMOD2 WCBLIB FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 10 TAP1 (RECFM FB LRECL 6656 BLOCK 26624
FI 11 DISK HURONA BAND4 A (RECFM U BLOCK 6656
LOAD FLIP (CLEAR NCMAP START
EXECUTION BEGINS...

→ *** Enter The Starting Line ***

2393

→ *** Enter The Starting Sample ***

3560

→ *** Enter The Number Of Lines To Output ***

1024

→ *** Enter The Number Of Samples To Output ***

1536

BLIP

BLIP

BLIP

BLIP

*** Processing Complete ***

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SETUP EXEC

SETUP IASCMD
(GRABIAS)

→ setup 295 82234
→ R: ias
Johnson Space Center
Interactive Analysis Station (IAS)
TAPE 380 ON TAPE 380
→ !!
input setup iascmd
FILEDEF 3 DISK SETUP IASCMD * (RECFM F LRECL 80 ELKSIZE 80
INIT
CURSOR FORM 0
CURSOR RED
CURSOR BLINK 0
IMAGE 0 1 2 3 4 5 6
ERASE IMAGE
SIZE 196 162
IMAGE 1
WRITE IMAGE MSS295 4
FILEDEF 4 DISK MSS295 4 * (RECFM F LRECL 196 BLKSIZE 196
SIZE 392 324
IMAGE 2
WRITE IMAGE TM295 822344
FILEDEF 4 DISK TM295 822344 * (RECFM V LRECL 392 BLKSIZE 392
IMAGE 1
ZOOM 2
OS OFF
PUT 1 6
IMAGE 2
ZOOM OFF
PUT 2 5
SCREEN 1
ZCOM OFF
IMAGE 5
End of input command file

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SIZE EXEC
(GILBEAR)

```
→ size
Enter The FN, FT and FM of The File to Be Resized
→ 08932464 1asimage a
*** Enter The Resampling Process To Be Used ***
    (N) ... Nearest Neighbor - (Default)
    (B) ... Bilinear
    (C) ... Cubic Convolution

→ b
*** Enter The File Mode Of The Output Data Set ... ( Default = A ) ***
→ a
EXECUTION BEGINS...
→ *** ENTER THE NUMBER OF LINES TO OUTPUT ***
    351
→ *** ENTER THE NUMBER OF SAMPLES TO OUTPUT ***
    392
*** PARAMETER MENU ***

    DEBUG
    DEBUG
    MENU
    EXIT

→ *** ENTER KEYWORD PARAMETER ... OR RETURN ***
→ *** PROCESSING COMPLETE ***
FILENAME FILETYPE  FM  FORMAT  RECS  BLKS  DATE  TIME
08932464  NIASIMAG  A1  V      392   136  1/17/83 13.24.22
E;
```

Note: NEAREST NEIGHBOR - interpolation to integer pixel and is the fastest and simplest method.

BI-LINEAR - interpolation to fractional pixel and uses nearest 4 pixels.

CUBIC CONVOLUTION - interpolation to fractional pixel and uses nearest 16 pixels. This method is the most pleasing to the eye.

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TAPCHK EXEC
(HOCUTT)

→ If tape is used, mount on TAP1.

→ tapchk
→ IS THE INPUT DATA FROM DISK OR TAPE D/T
→ t
O 181
TAPE 181 ON TAPE 4C3
FILEDEF 20 TAP1 (BLOCK 3060 RECFM U PERM
FILEDEF 10 DISK TAPCHK OUT A (LRECL 80 BLKSIZE 80 RECFM F PERM
GLOBAL TYTLIB CMSLIB FORTMOD2 FCRTIBAN PTIO WDBLIB
LOAD TAPCHK
START
EXECUTION BEGINS...
*** ENTER THE TAPE NUMBER OR FILE NAME ***
→ frh10
R; T=0.86/2.25 12:30:22
→ t tapchk out

TAPE CHECK PROGRAM RAN ON 3/25/83

FRH10

SEGMENT 893 DATE 8/ 2/82
TAPE GENERATED ON 1/26/83
BY THE EODL UNIVERSAL WRITE PROGRAM
WITH 245 BITS PER WORD IN THE GENERATING COMPUTER
THE DATA CONSISTS OF 4 CHANNELS
WITH 1 RECORD FOR EACH DATA SET
LANDSAT NUMBER 4
ACTIVE BANDS 1 2 3 4 0 0 0
EACH DATA RECORD CONTAINS 1800 BYTES
THE TAPE LABEL IS
"TM893 82214 REGISTERED TO TM893 82246
TAPE NUMBER RUN ID TM893
START PIXEL 1 STCP PIXEL 392
324 DATA RECORDS IN THE FILE
TAPCHECK FINISHED

ORIGINAL FILE ID
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TAPCON EXEC
(GRABIAS)

→ Tape must be mounted on TAP1.

CONVERSION ROUTINE

TAPE NO.
START FILE
NO. OF FILES TO PROCESS

→ TAPCON ZTIAS 6250 1 2
CP REWIND 181
DEV 181 DCFS NOT EXIST
+++ R(00040) +++
TAPMOUNT 6250 TAP1 RO
IO002 TAPE 6250 HAS BEEN REQUESTED ON UNIT 181 (TAPMOUNT)
TAPE 181 ATTACHED
IO003 TAPE READY... EXECUTION CONTINUING (TAPMOUNT)
TAPE FPF 0
EXEC IASCCP ZTIAS
Enter Input Medium ... Disk or Tape (D/T)
TAPE 181 CN TAPE 4C2
How many segments do you want to skip?
EXECUTION BEGINS...
*** SITE ID IS 7777 ***

*** ACQUISITION DATE IS 084 82 ***

*** NUMBER OF PIXELS PER LINE IS 512 ***

CH= 1 BIAS= 32.20 SCALE= 3.70
CH= 2 BIAS= 30.00 SCALE= 3.10
CH= 3 BIAS= 16.30 SCALE= 3.00
CH= 4 BIAS= 12.50 SCALE= 3.00
FILEDEF 20 DISK 77770841 IASIMAGE * (RECFM F LRECL 512 ELKSIZE 512
FILEDEF 21 DISK 77770842 IASIMAGE * (RECFM F LRECL 512 ELKSIZE 512
FILEDEF 22 DISK 77770843 IASIMAGE * (RECFM F LRECL 512 ELKSIZE 512
FILEDEF 23 DISK 77770844 IASIMAGE * (RECFM F LRECL 512 ELKSIZE 512
BLIP
BLIP
BLIP
BLIP
7777084 4 512 512
EXEC IASCCP ZTIAS
Enter Input Medium ... Disk or Tape (D/T)
TAPE 181 CN TAPE 4C2
How many segments do you want to skip?
EXECUTION BEGINS...
*** SITE ID IS 7777 ***

*** ACQUISITION DATE IS 192 82 ***

*** NUMBER OF PIXELS PER LINE IS 512 ***

CH= 1 BIAS= -175.20 SCALE= 12.70
CH= 2 BIAS= -15.00 SCALE= 6.50
CH= 3 BIAS= -181.70 SCALE= 5.70
CH= 4 BIAS= -118.00 SCALE= 4.10
FILEDEF 20 DISK 77771921 IASIMAGE * (RECFM F LRECL 512 ELKSIZE 512
FILEDEF 21 DISK 77771922 IASIMAGE * (RECFM F LRECL 512 ELKSIZE 512
FILEDEF 22 DISK 77771923 IASIMAGE * (RECFM F LRECL 512 ELKSIZE 512
FILEDEF 23 DISK 77771924 IASIMAGE * (RECFM F LRECL 512 ELKSIZE 512
BLIP
BLIP
BLIP
BLIP
7777192 4 512 512
ALL DONE WITH THIS TAPE...
CP QUERY TIME
TIME IS 10:52:37 CST THURSDAY 06/09/83
CCNNECT= 00:09:09 VIRTCPU= 000:20.59 TOTCPU= 000:47.80
R:

TAPSCAN EXEC
(GILBEAR)

→ Tape must be mounted on TAP1.

→ tapscan
*** Record 1 --- 360 Bytes
There are 1 Records in the file
All Are of Length 360 Bytes
R;

→ tapscan
*** Record 1 --- 3596 Bytes
There are 2 Records in the file
All Are of Length 3596 Bytes
R;

→ tapscan
*** Record 1 --- 1192 Bytes
BLIP
BLIP
BLIP
BLIP
There are 8008 Records in the file
All Are of Length 1192 Bytes
R;

→ tapscan
*** Record 1 --- 3596 Bytes
There are 7 Records in the file
All Are of Length 3596 Bytes
R;

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TIEPOINT EXEC
(GILBEAR)

```
→ tiepoint
→ *** Enter A Unique File Name Identifier ***
→ newtie
EXECUTION BEGINS...
→ *** Enter The Number Of Lines In The Reference Image ***
→ 324
→ *** Enter The Number Of Lines In The Registrant Image ***
→ 512
→ *** Enter Reference X ***
→ 27
→ *** Enter Reference Y ***
→ 255
→ --- Enter Registrant X ---
→ 94
→ --- Enter Registrant Y ---
→ 286
→ *** Enter Reference X ***
→ 341
→ *** Enter Reference Y ***
→ 255
→ --- Enter Registrant X ---
→ 403
→ --- Enter Registrant Y ---
→ 290
→ *** Enter Reference X ***
→ 304
→ *** Enter Reference Y ***
→ 18
→ --- Enter Registrant X ---
→ 371
→ --- Enter Registrant Y ---
→ 49
→ *** Enter Reference X ***
→ 71
→ *** Enter Reference Y ***
→ 32
→ --- Enter Registrant X ---
→ 133
→ --- Enter Registrant Y ---
→ 63
→ *** Enter Reference X ***

FILENAME FILETYPE FM FORMAT RECS BLKS DATE TIME
NEWTIE TIEPTS L1 F 30 5 1 1/17/83 13.02.25
R:
```


TIEREG4 EXEC
(GILBEAR)

Four tiepoints are needed that are between the center point and the corners, but closer to the corners.

```
→ tiereg4
→ *** Enter The FY, FM And FT Of The Image To Be Registered ***
→ tms93 32294ex1 a
→ *** Enter The FY, FT And FM Of The Registered Image Output ***
→ tms93 reg1
→ *** Enter The FY, FT And FM Of The Tiepoint Data Set ***
→ newtie tiepts a
→ EXECUTION BEGINS...
→ *** TIEPOINT DATA PROCESSED ***
→ *** ENTER THE NUMBER OF LINES TO OUTPUT ***
→ 324
→ *** ENTER THE NUMBER OF SAMPLES TO OUTPUT ***
→ 392
→ *** PROCESSING COMPLETE ***
FILENAME FILETYPE FM FORMAT RECS BLKS DATE TIME
TMS93 REG1 A1 V 392 324 125 1/17/93 13.09.24
R:
```


TIEREGSB EXEC
(GILBEAR)

Approximately 25 well distributed tiepoints are needed, but more may be needed according to the size.

```
→ TIEREGSB
→ * * * Enter The FN, FT and FD Of The Image To Be Regist ered * * *
→ * * * Enter The FN, FT and FD Of The Regist ered Image Output * * *
→ * * * Enter The FN, FT and FD Of The Tiepoint Data Set * * *
→ EXECUTION POINTS
EXECUTION BEGINS...

** TIEPOINT DATA PROCESSED ***

→ ** ENTER THE NUMBER OF LINES TO OUTPUT ***
392

→ ** ENTER THE NUMBER OF SAMPLES TO OUTPUT ***
392
*LLIP*
*LLIP*
*LLIP*
*LLIP*
*LLIP*
*LLIP*
*LLIP*

** PROCESSING COMPLETE ***
FILE NAME FILETYPE FN VOLMAT RECS BLKS DATE TIME
T00006 022404 A1 V 392 324 125 2/22/83 7.32.17
P:
```

TRIBIG EXEC
(GILBEAR)

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Because this registration works locally, the user must determine where and the number of corrections or tiepoints that are needed.

```
→ EXEC TRIBIG
→ *** Enter The FN, FM And FT Of The Image To Be Registered ***
→ ns001 chan3 g
→ *** Enter The FN, FT And FM Of The Registered Image Output ***
→ ns001 reg3 a
→ *** Enter The FN, FT And FM Of The Tiepoint Data Set ***
→ newts tiepts a
EXECUTION BEGINS...
→ *** Enter The Debug Level ... 0 = None ***
→ *** Enter The Output Starting Line ***
→ *** Enter The Number Of Lines To Output ***
→ 324
→ *** Enter The Number Of Samples To Output ***
→ 392
```

+
+
+

NTri 118
*** TIEPOINT Data Processed ***

+
+
+
+
+
+

*** 50 Lines Processed ***

+
+
+

*** 50 Lines Processed ***

+
+
+
+

*** 50 Lines Processed ***

+
+
+
+

*** 50 Lines Processed ***

+
+
+
+
+

*** 50 Lines Processed ***

+
+
+

*** Processing Complete ***

FILENAME	FILETYPE	FN	FORMAT	RECS	BLKS	DATE	TIME
NS001	REG3	A1	V	392	324	160	5/26/83 16.54

TRIREG EXEC
(GILBEAR)

Because this registration works locally, the user must determine where and how many tiepoints are needed.

```
→ EXEC TRIREG
→ *** Enter The FN, FM And FT Of The Image To Be Registered ***
→ ns001 chan3 g
→ *** Enter The FN, FT And FM Of The Registered Image Output ***
→ ns001 reg3 a
→ *** Enter The FN, FT And FM Of The Tiepoint Data Set ***
→ newtms tiepts a
→ EXECUTION BEGINS...
→ *** Enter The Debug Level ... 0 = None ***
→ *** Enter The Output Starting Line ***
→ *** Enter The Number Of Lines To Output ***
→ 324
→ *** Enter The Number Of Samples To Output ***
→ 392
+
+
+
NTri 118
*** TIEPOINT Data Processed ***
+
+
+
+
+
+
*** 50 Lines Processed ***
+
+
+
*** 50 Lines Processed ***
+
+
+
+
*** 50 Lines Processed ***
+
+
+
+
*** 50 Lines Processed ***
+
+
+
+
*** 50 Lines Processed ***
+
+
+
+
*** Processing Complete ***
FILENAME FILETYPE FM FORMAT RECS BLKS DATE TIME
NS001 REG3 A1 V 392 324 160 5/26/93 16.54
```

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URITE2 EXEC
(GILBEAR)
(HOCUTT)

```
→ write2 9657 82234u
→ Enter the Band
1
1 1 324 392 1
GLOBAL TXTLIB FORTMOD2 CMSLIB WEBLIB FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 21 DISK TM9657 82234U1 A ( RECFM U BLOCK 3000 PERM
→ Enter the Band
2
1 1 324 392 2
GLOBAL TXTLIB FORTMOD2 CMSLIB WEBLIB FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 22 DISK TM9657 82234U2 A ( RECFM U BLOCK 3000 PERM
→ Enter the Band
3
1 1 324 392 3
GLOBAL TXTLIB FORTMOD2 CMSLIB WEBLIB FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 23 DISK TM9657 82234U3 A ( RECFM U BLOCK 3000 PERM
→ Enter the Band
4
1 1 324 392 4
GLOBAL TXTLIB FORTMOD2 CMSLIB WEBLIB FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 24 DISK TM9657 82234U4 A ( RECFM U BLOCK 3000 PERM
→ Enter the Band
5
1 1 324 392 5
GLOBAL TXTLIB FORTMOD2 CMSLIB WEBLIB FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 25 DISK TM9657 82234U5 A ( RECFM U BLOCK 3000 PERM
→ Enter the Band
6
1 1 324 392 6
GLOBAL TXTLIB FORTMOD2 CMSLIB WEBLIB FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 26 DISK TM9657 82234U6 A ( RECFM U BLOCK 3000 PERM
→ Enter the Band
7
1 1 324 392 7
GLOBAL TXTLIB FORTMOD2 CMSLIB WEBLIB FTIO
FI 5 TERM
FI 6 TERM
FI 15 TERM
FI 16 TERM
FI 27 DISK TM9657 82234U7 A ( RECFM U BLOCK 3000 PERM
```


WRTAPE EXEC
(HOCUTT)

→ A scratch tape must be mounted on TAP1.

→ wrtape tm295 82234u
FILEDEF OUTMOVE TAP1 (LRECL 3060 BLOCK 3060 RECFM U PERM DEN 1600
FILEDEF INMOVE DISK TM295 82234U (LRECL 3060 BLOCK 3060 RECFM U PERM
MOVEFILE
R;

→ wrtape tm9501 82234u
FILEDEF OUTMOVE TAP1 (LRECL 3060 BLOCK 3060 RECFM U PERM DEN 1600
FILEDEF INMOVE DISK TM9501 82234U (LRECL 3060 BLOCK 3060 RECFM U PERM
MOVEFILE
BLIP
R;

→ wrtape tm9653 82234u
FILEDEF OUTMOVE TAP1 (LRECL 3060 BLOCK 3060 RECFM U PERM DEN 1600
FILEDEF INMOVE DISK TM9653 82234U (LRECL 3060 BLOCK 3060 RECFM U PERM
MOVEFILE
BLIP
R;

→ wrtape tm9654 82234u
FILEDEF OUTMOVE TAP1 (LRECL 3060 BLOCK 3060 RECFM U PERM DEN 1600
FILEDEF INMOVE DISK TM9654 82234U (LRECL 3060 BLOCK 3060 RECFM U PERM
MOVEFILE
R;

→ wrtape tm9655 82234u
FILEDEF OUTMOVE TAP1 (LRECL 3060 BLOCK 3060 RECFM U PERM DEN 1600
FILEDEF INMOVE DISK TM9655 82234U (LRECL 3060 BLOCK 3060 RECFM U PERM
MOVEFILE
BLIP
R;

→ wrtape tm9656 82234u
R;
FILEDEF OUTMOVE TAP1 (LRECL 3060 BLOCK 3060 RECFM U PERM DEN 1600
FILEDEF INMOVE DISK TM9656 82234U (LRECL 3060 BLOCK 3060 RECFM U PERM
MOVEFILE
R;

→ wrtape tm9657 82234u
FILEDEF OUTMOVE TAP1 (LRECL 3060 BLOCK 3060 RECFM U PERM DEN 1600
FILEDEF INMOVE DISK TM9657 82234U (LRECL 3060 BLOCK 3060 RECFM U PERM
MOVEFILE
BLIP
R;

→ wrtape tm9658 82234u
FILEDEF OUTMOVE TAP1 (LRECL 3060 BLOCK 3060 RECFM U PERM DEN 1600
FILEDEF INMOVE DISK TM9658 82234U (LRECL 3060 BLOCK 3060 RECFM U PERM
MOVEFILE
BLIP
R;

→ tape wtm
R;