Laser-Scan Ltd.

DTMCONVERT

Reference Manual

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Version 1.0 F J Brown, I McLeman, D R Catlow 04-June-1988

First issue of DTMCONVERT reference documentation.

Version 1.1 D R Catlow 09-June-1988

Examples and error messages for DTEDIFF added to the chapter on Module DTEDIFF.

Version 1.2 D R Catlow, A D Trigg 24-August-1988

NTF2DTI chapter modified to reflect introduction of LSLA type DTI header. IIS2DTI and DTI2IIS chapters added.

Version 1.3 D R Catlow 06-March-1989

IIS2DTI and DTI2IIS chapters modified to correct a number of minor errors.

Version 1.4 R J Hulme 30-October-1989

Minor changes to the DTED2DTI chapter to explain that the program will now cope with records which are offset from the SW corner, setting the posts in the area for which there is no data to null.

Version 1.5 A P Brown 1-November-1989

Two new chapters for DEM2DTI and DTI2DEM added. Both way conversion between USGS DEM format and DTI files.

Version 1.6 C C Brunt 6-January-1990

DTI2DTED chapter changed to include DENSITY command, and omit the ENABLE/DISABLE PME command.

Version 1.7 C C Brunt 6-January-1990

No changes.

Version 1.8 S Townrow 21-August-1990

New chapter MNT2DTI added for a utility to convert from an IGN MNT file to a DTI file.

Version 1.9 S Gupta 20-August-1991

Modified chapter on NTF2DTI to reflect enhancement of NTF2DTI to be able to read NTF datasets from disk files in addition to being able to read from a magnetic tape device.

Version 2.0 S Gupta 10-September-1991

Modified chapter on NTF2DTI.

Version 2.1 S Gupta 16-September-1991

Created new utility DTI2NTF. Created reference documentation and added chapter to reference manual.

Version 2.2 J Barber 15-October-1991

DTI2NTF message section added.

Version 2.3 J Barber 18-May-1992

DTI2NTF qualifier /DENSITY can now take a value of 6250 bpi.

DTI2IIS new qualifier /HEADER to specify how many 512 byte header blocks to write to the IIS file.

IIS2DTI new qualifier /HEADER to specify how many 512 byte header blocks to expect in the IIS file.

Version 2.4 J Barber 10-June-1992

NTF2DTI now reads NTF level 1.1 with variable length records.

IIS2DTI has a new qualifier /WIDTH to specify that the program is to read data in an extension to the 500 format with only one swathe across the dataset. The /WIDTH qualifier specifies the number of bytes per record, equal to the number of columns in the dataset.

Version 2.5 J Cadogan 18-December-1992

NTF2DTI can now read datasets which span multiple tape volumes. This is described in the new subsection **Handling multiple volume datasets** in the **DESCRIPTION** section.

Version 2.6 J Barber 09-July-1993

NTF2DTI can now read Version 2.0 level 5 NTF data.

DTI2NTF can now write Version 2.0 level 5 NTF data.

DTI2NTF new qualifier /VERSION = 'real'.

Version 2.7 J Cadogan 18-December-1996

DTED2DTI now has ENABLE/DISABLE FULL and SHOW FULL commands.

PREFACE

Intended audience

This manual is intended for all users of the Laser-Scan DTMCONVERT package running under the VAX/VMS operating system.

Structure of this document

This document is composed of 2 major sections.

The first chapter provides an introduction to DTMCONVERT and is intended as a quick reference guide to the salient features of the DTMCONVERT package.

There then follow the User Reference Guides for the individual modules which comprise DTMCONVERT. Each individual module contains the same basic categories of information. These are:

MODULE	- the name of the DTMCONVERT module.
REPLACES	- which older Laser-Scan programs it replaces.
FUNCTION	- a synopsis of what the module does
FORMAT	- a summary of the module command format and command qualifiers. Default qualifier settings are indicated.
PROMPT	- how it prompts the user.
PARAMETERS	- description of expected command parameters.
COMMAND QUALIFIERS	- description of all command qualifiers. Qualifiers are ordered alphabetically and default argument values are indicated.
DESCRIPTION	- the definitive description of the module action.
EXAMPLES	- annotated examples of module useage.
MESSAGES	- all classes of message are listed and described and suggested user action given. The messages are divided into sections according to message severity within which the messages are ordered alphabetically by message mnemonic.

Where applicable, additional categories are available for some modules. Some modules, for example, have a "RESTRICTIONS" category.

Associated documents

For summary information about DTI (Digital Terrain Image) files see the MATRIX Reference Manual

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Conventions used in this document

Convention	Meaning
<CR>	The user should press the carriage return key on the terminal
<CTRL/x>	The phrase <CTRL/x> indicates that the user must press the key labelled CTRL while simultaneously pressing another key, for example, <CTRL/Z>.
$ **GO<CR>**	Command examples show all user entered commands in **bold** type.
25 columns complete . . .	Vertical series of periods, or ellipsis, mean either that not all the data that DTMCONVERT displays in response to the particular command is shown or that not all the data that the user would enter is shown.
file-spec...	Horizontal elipsis indicate that additional parameters, values or information can be entered.
[logical-name]	Square brackets indicate that the enclosed item is optional. (Square brackets are not, however, optional in the syntax of a directory name in a file-specification, or in the syntax of a substring specification in a VMS assignment statement).
'integer'	An integer number is expected in the specified input or output field.
'real'	A real number is expected in the specified input or output field.

Convention	Meaning
FSN 'integer' ('integer')	FSN followed by two integer arguments indicates an IFF feature serial number. The integer number enclosed in round brackets is the feature internal sequence number.
00003DE7	A hexadecimal address of a location within an IFF file. DTMCONVERT modules express all IFF addresses using hexadecimal radix. The address is always padded with leading zeros to a standard field width of 8 characters.

Command line interpretation

DTMCONVERT utilities use the LSLLIB Command Interpreter (CMDLIB) to get and parse the program command lines.

DTMCONVERT command line decoding operates in decimal radix.

CHAPTER 1

INTRODUCTION

INTRODUCTION

The Laser-Scan DTM software packages provide tools for the production, validation, manipulation and viewing of matrix data, particularly of elevation (height) data. The DTMCONVERT package consists of software modules for the conversion of DTM data to and from Laser-Scan DTI (Digital Terrain Image) format. For a detailed description of DTI format files see the MATRIX Reference Manual.

This manual provides a module by module reference guide to the package.

CHAPTER 2

MODULE DTI2DTED

MODULE DTI2DTED
UTILITY DTI2DTED

REPLACES MCE utility DTI2DTED

FUNCTION

DTI2DTED creates a DMA DLMS DTED tape (Defense Mapping Agency Digital Land Mass Simulation Digital Terrain Elevation Data) from a disk file containing a Laser-Scan DTI (Digital Terrain Image) matrix.

FORMAT

$ DTI2DTED

COMMAND QUALIFIERS

None, DTI2DTED is command driven.
Commands are entered as arguments to the program prompt DTI2DTED>

DTI2DTED command defaults.

On program startup, the following command defaults apply:

APPEND - disabled.

DEBUG - disabled.

DENSITY - 1600.

DEVICE - MTA0:.

DIAGNOSTICS - disabled.

GRID - disabled.

DESCRIPTION

General

DTI2DTED creates a DMA DLMS DTED tape (Defense Mapping Agency Digital Land Mass Simulation Digital Terrain Elevation Data) from a disk file containing a Laser-Scan DTI (Digital Terrain Image) matrix.

The type of tape file produced depends on the type of input DTI file. By default, UHL1 and LSLA (and the now historical MIKE and ALVY) type DTI files are translated into a Change 2 DTED file (with no DSI or ACC blocks), while a TED4 (DTED) DTI file produces a Change 3/4 DTED tape file.

The ENABLE GRID command causes all DTI files irrespective of header type to be translated into a GRID DTED tape file with zero-filled DSI and ACC blocks.

Preparing To Use DTI2DTED

Before running DTI2DTED, the tape to be read must allocated and mounted foreign. Assuming that the tape is loaded on tape unit MTA0:

$ **ALLOCATE MTA0:<CR>**
$ **MOUNT/FOREIGN MTA0:<CR>**
$ **DTI2DTED<CR>**
DTI2DTED> ! You are now ready to issue DTI2DTED commands.

See later for detailed examples of interaction with DTI2DTED.

Using DTI2DTED

DTI2DTED will offer the user the following prompt:

DTI2DTED>

Unless using the default magnetic tape device (MTA0:) the user should select the appropriate device with the DEVICE command. The tape is written by default at 1600bpi. To select another density, use the DENSITY command before DEVICE, APPEND, or FILEIN.

By default, when the first FILEIN command is given, DTI2DTED will rewind and initialise the magnetic tape. If this action is not required the APPEND command should be given prior to the first FILEIN command.

If the APPEND command is given the first FILEIN command will cause DTI2DTED to rewind the magnetic tape and then search through the data, counting the manuscripts, until it finds the end of volume tapemarks.

It then positions the write head between the two tapemarks at the end of the tape. All DTI files supplied using FILEIN commands will then be formatted and appended to the tape after the existed manuscript(s).

Remember, unless the APPEND command is given, DTI2DTED will overwrite and destroy any data previously on the tape.

The user may now use the FILEIN command to specify a DTI file for transfer to the tape in DTED format.

After the first FILEIN command is entered, and unless the APPEND command was given, DTI2DTED will prompt for the reel 'number' to be inserted in the volume header label. The reel 'number' consists of up to 6 characters, and will be left justified and padded with spaces if less are given.

Unless the APPEND command was given the tape is now initialised.

DTI2DTED will now prompt for a 'file identifier' to be inserted in the HDR1 header label. The file identifier consists of up to 17 alpha characters, and will be left justified and padded with spaces if less are given. If no file identifier is supplied a default of 'UKMCETERRAIN' will be used.

If the DTI file is found to be of LSLA (or the historical MIKE or ALVY) type, then the program prompts for the longitude and latitude of the origin (SW corner) of the map. These must be typed in in the format in which they appear on the DTED tape i.e. DDDMMSSH where H is a hemisphere letter (E, W, N, S).

N.B. For a LSLA (or MIKE and ALVY) type DTI the matrix intervals present in the file are taken to be in units of tenth arc seconds unless the ENABLE GRID command is specified (when they are assumed to be in metres). The intervals are copied directly to the UHL record. For a UHL1 or TED4 type DTI, the intervals are stored as metres on the ground.

After transferring the file to the tape DTI2DTED will return to the DTI2DTED> prompt, when another command may be given - typically another FILEIN command. Within any run of DTI2DTED subsequent FILEIN commands will always append manuscripts to the one previously written.

To exit the program, type EXIT or <CTRL/Z> in response to the prompt. (Any other method of exit will leave the tape lacking its final tapemark).

No checks are made that successive files on a tape are in valid latitude and longitude sequence.

STATISTICS AND INFORMATION PRESENTED BY DTI2DTED

DTI2DTED types out a summary of the specified DTI files and informs the user of where each manuscript is being output. Each UHL record written to the tape can be typed out (as it is in ASCII, this is reasonably comprehensible) together with, for each DTI file, the percentage of data converted so far, and the minimum and maximum Z values processed.

DTI2DTED commands

@

Take command input from the specified file.

FORMAT: @file-spec<CR>

Command parameters:

file-spec

The file to be opened and used for command input.

Any parts of the file-spec not supplied for the @ command will be taken from the default specification 'SYS$DISK:[].COM;0'.

DESCRIPTION:

DTI2DTED offers the facility of command input from an indirect command file. The '@' character preceding a file-spec will cause DTI2DTED to open and read commands from the specified file until:

1. a RETURN command is detected and command input is returned to SYS$COMMAND.

2. end-of-file is detected. This provokes an error message and command input is returned to SYS$COMMAND.

Nested command files are not supported (i.e. a command file containing an '@' command), although sequential '@' commands are supported when read from SYS$COMMAND.

As an aid to batch log interpretation, DTI2DTED will echo all commands read from an indirect command file.

Messages:

The following messages are specific to the @ command:

*** WARNING *** "@" must precede a file-spec

*** WARNING *** Unexpected end of indirect command file detected
RETURN command assumed - returning to terminal input

*** ERROR *** Can't open indirect command file 'file-spec'

Examples:

```
$ DTI2DTED<CR>
DTMCONVERT module DTI2DTED of 13:30:39 10-FEB-88
DTI2DTED> @PRESETS<CR>
DTI2DTED> ENABLE DIAGNOSTICS
DTI2DTED> RETURN
DTI2DTED>
```

!

Treat all text to the right of the '!' as a comment.

FORMAT: ! [comment text]

Command parameters:

comment text

text that is to be treated as a comment and which will be excluded from command interpretation.

DESCRIPTION:

An exclamation mark is the standard DTM package comment delimiter. All text (and numbers) which lie to the right of a '!' character are excluded from command interpretation. Comments are useful for annotating command procedures used in batch processing etc.

Messages: None.

Examples:

```
DTI2DTED> ! a comment for the sake of it<CR>
DTI2DTED>

$ TYPE PRESETS.COM<CR>
! This is an indirect command file to set up
! site specific defaults for DTI2DTED.
!
ENABLE DIAGNOSTICS
DEVICE MSA2:
RETURN
$
```

APPEND

Specifies that the magnetic tape is to be positioned at the end of existing data before writing the first file onto it. This allows new files to be appended to the end of the tape.

FORMAT: APPEND

Command parameters: None.

DESCRIPTION:

The APPEND command specifies that the magnetic tape is to be positioned at the end of existing data before writing the first file onto it. This allows new files to be appended to the end of the tape.

By default, when the first FILEIN command is given, DTI2DTED will rewind and initialise the magnetic tape. If this action is not required the APPEND command should be given prior to the first FILEIN command.

If the APPEND command is given the first FILEIN command will cause DTI2DTED to find (searching from the beginning of the tape) and then position the write head between the two tapemarks at the end of the tape. All DTI files supplied using FILEIN commands will be formatted and appended to the end of the tape.

Remember, unless the APPEND command is given, DTI2DTED will overwrite and destroy any data previously on the tape.

Messages: None.

Examples:

```
DTI2DTED> DEVICE MSA0:<CR>
DTI2DTED> APPEND<CR>
DTI2DTED>
```

DENSITY

Specifies the density at which to write the magnetic tape.

FORMAT: DENSITY integer

Command parameters:

integer

The density at which to write the magnetic tape. By default DTI2DTED will write at 1600bpi.

DESCRIPTION:

The DEVICE command enables the user to specify the density at which DTI2DTED will write the magnetic tape. The command must be given before any DEVICE, APPEND, or FILEIN commands.

By default DTI2DTED will write at 1600bpi.

The available densities are 800, 1600, and 6250. This command will only have any effect if the particular tape drive supports the given density, and allows the density to be set by software.

Messages:

The following messages are specific to the DENSITY command:

*** WARNING *** Density cannot be changed after tape has been initialised

*** WARNING *** Invalid density - 'integer'
Available DENSITY numbers are: 800 1600 6250

Examples:

DTI2DTED> **DENSITY 6250<CR>**

DEVICE

Specifies the type of magnetic tape drive that DTI2DTED is to write to.

FORMAT: DEVICE type

Command parameters:

type

The magnetic tape device type which DTI2DTED is to write to. By default DTI2DTED will attempt to write to MTA0:.

DESCRIPTION:

The DEVICE command enables the user to specify the type of magnetic tape drive that DTI2DTED is to write to.

By default DTI2DTED will attempt to write to MTA0:.

Whatever the device type, it should be allocated, and the tape should be physically loaded and mounted foreign before attempting to write to it using DTI2DTED.

Messages:

The following messages are specific to the DEVICE command:

*** WARNING *** You have already specified a magnetic tape device

*** WARNING *** You must specify a magnetic tape device type to the DEVICE command

*** ERROR *** 'type' is not a known magnetic tape device

*** ERROR *** when reading magnetic tape device name

*** ERROR *** Tape is not mounted as foreign

Examples:

```
$ ALLOCATE MSA0:<CR>
$ MOUNT/FOREIGN MSA0:<CR>
$ DTI2DTED<CR>
DTMCONVERT module DTI2DTED of 13:30:39 10-FEB-88
DTI2DTED> DEVICE MSA0:<CR>
DTI2DTED>
```

DISABLE DEBUG

Disables a previous ENABLE DEBUG command.

FORMAT: DISABLE DEBUG

Command parameters: None.

DESCRIPTION:

DISABLE DEBUG allows the user to disable a previous ENABLE DEBUG command.

The ENABLE DEBUG and DISABLE DEBUG commands are reserved for Laser-Scan use. The output produced by the ENABLE DEBUG command is used only for diagnostic purposes and should be invoked by LSL software personnel only.

Messages:

The following warning message is specific to the DISABLE DEBUG command:

*** WARNING *** You were not using DEBUG!

Examples:

DTI2DTED> **ENABLE DEBUG<CR>**
DTI2DTED> **DISABLE DEBUG<CR>**
DTI2DTED>

DISABLE DIAGNOSTICS

Disables a previous ENABLE DIAGNOSTICS command.

FORMAT: DISABLE DIAGNOSTICS

Command parameters: None.

DESCRIPTION:

DISABLE DIAGNOSTICS allows the user to disable a previous ENABLE DIAGNOSTICS command.

DISABLE DIAGNOSTICS is the default at program startup.

Messages: None.

Examples:

```
DTI2DTED> ENABLE DIAGNOSTICS<CR>
DTI2DTED> SHOW DIAGNOSTICS<CR>
Diagnostic printout selected
DTI2DTED> DISABLE DIAGNOSTICS<CR>
DTI2DTED> SHOW DIAGNOSTICS<CR>
Diagnostic printout suppressed
DTI2DTED>
```

DISABLE GRID

Disables a previous ENABLE GRID command.

FORMAT: DISABLE GRID

Command parameters: None.

DESCRIPTION:

DISABLE GRID allows the user to disable a previous ENABLE GRID command.

By default GRID is disabled, i.e. the matrix intervals in the manuscripts on the tape are considered to be in geographical units.

Messages: None.

Examples:

```
DTI2DTED> ENABLE GRID<CR>
DTI2DTED> SHOW GRID<CR>
GRID enabled - manuscripts expected in grid coordinates.
DTI2DTED> DISABLE GRID<CR>
DTI2DTED> SHOW GRID<CR>
GRID disabled - manuscripts expected in geographical coordinates.
DTI2DTED>
```

ENABLE DEBUG

ENABLE DEBUG enables diagnostic printing for debugging purposes.

FORMAT: ENABLE DEBUG

Command parameters: None.

DESCRIPTION:

The ENABLE DEBUG and DISABLE DEBUG commands are reserved for Laser-Scan use. The output produced by the ENABLE DEBUG command is used only for diagnostic purposes and should be invoked by LSL software personnel only.

Message:

The following warning message is specific to the ENABLE DEBUG command:

*** WARNING *** You are already using DEBUG!

Examples:

$ **DTI2DTED<CR>**
DTMCONVERT module DTI2DTED of 13:30:39 10-FEB-88
DTI2DTED> **ENABLE DEBUG<CR>**
DTI2DTED>

ENABLE DIAGNOSTICS

ENABLE DIAGNOSTICS allows the user to produce diagnostic printout.

FORMAT: ENABLE DIAGNOSTICS

Command parameters: None.

DESCRIPTION:

ENABLE DIAGNOSTICS allows the user to produce diagnostic printout.

By default DTI2DTED produces minimal printout. If however, the user wishes to receive indications of processing progress, and details of the DTI file processed, a diagnostic printout may be selected with the ENABLE DIAGNOSTICS command.

On a heavily loaded computer it may be reassuring to ENABLE DIAGNOSTICS for the conversion stage of DTI2DTED processing to indicate progress through the input data. Messages are issued indicating which input file is being read, the contents of all UHL1 type blocks, the percentage of the data currently processed, a summary of the DTI file, and the minimum and maximum Z values read.

Messages: None.

Examples:

DTI2DTED> **ENABLE DIAGNOSTICS<CR>**
DTI2DTED> **SHOW DIAGNOSTICS<CR>**
Diagnostic printout selected
DTI2DTED> **DISABLE DIAGNOSTICS<CR>**
DTI2DTED> **SHOW DIAGNOSTICS<CR>**
Diagnostic printout suppressed
DTI2DTED>

ENABLE GRID

The ENABLE GRID command causes UHL1 and LSLA (and the historical MIKE and ALVY) type DTI files to be translated into a GRID DTED tape file with zero-filled DSI and ACC blocks.

FORMAT: ENABLE GRID

Command parameters: None.

DESCRIPTION:

The ENABLE GRID command causes UHL1 and LSLA (and the historical MIKE and ALVY) type DTI files to be translated into a GRID DTED tape file with zero-filled DSI and ACC blocks.

ENABLE GRID specifies that future manuscripts on the tape are in grid coordinates rather than geographicals.

By default GRID is disabled, i.e. the matrix intervals in the manuscripts on the tape are considered to be in geographical units.

Messages: None.

Examples:

DTI2DTED> **ENABLE GRID<CR>**
DTI2DTED> **SHOW GRID<CR>**
GRID enabled - manuscripts will be written in grid coordinates.
DTI2DTED> **DISABLE GRID<CR>**
DTI2DTED> **SHOW GRID<CR>**
GRID disabled - manuscripts will be written in geographical coordinates.
DTI2DTED>

EXIT

EXIT from DTI2DTED.

FORMAT: EXIT

Command parameters: None.

Description:

The EXIT command causes DTI2DTED to close any open files and the program to terminate. If a file has already been written to tape, a second tape mark will be written after the file to indicate 'end of tape'.

<CTRL/Z> (pressing the Ctrl and Z keys together) may also be used to exit from DTI2DTED.

An EXIT command at the end of an indirect command file, in lieu of a RETURN command, will exit the program without returning to terminal command input.

Messages: None.

Examples:

```
DTI2DTED> EXIT<CR>
 ELAPSED:  00:00:20.04 CPU:  0:00:04.71 BUFIO:  281 DIRIO:  46 FAULTS:  263
$
```

FILEIN

Specifies a DTI file that is to be opened for read and transferred to the magnetic tape in DTED format.

FORMAT: FILEIN file-spec

COMMAND PARAMETERS:

file-spec

The specification of the DTI file to be opened for read and transferred to the magnetic tape in DTED format.

Any parts of the file-spec not supplied with the command will be taken from the default file specification 'LSL$DTI:DTI.DTI;0'.

DESCRIPTION:

The FILEIN command causes the specified DTI file to be opened and used for output to tape.

By default, when the first FILEIN command is given, DTI2DTED will rewind and initialise the magnetic tape. If this action is not required the APPEND command should be given prior to the first FILEIN command.

If the APPEND command is given the first FILEIN command will cause DTI2DTED to find and then position the write head between the two tapemarks at the end of the tape. All DTI files supplied using FILEIN commands will be formatted and appended to the end of the tape.

Remember, unless the APPEND command is given, DTI2DTED will overwrite and destroy any data previously on the tape.

After the first FILEIN command, unless the APPEND command was given, DTI2DTED will prompt for the reel 'number' to be inserted in the volume header label. The reel 'number' consists of up to 6 alphanumeric characters, and will be left justified and padded with spaces if less are given.

Unless the APPEND command was given the tape is now initialised.

DTI2DTED will now prompt for a 'file identifier' to be inserted in the HDR1 header label. The file identifier consists of up to 17 alpha characters, and will be left justified and padded with spaces if less are given. If no file identifier is supplied a default of 'UKMCETERRAIN' will be used.

If the DTI file is found to be of LSLA (MIKE or ALVY) type, then the program prompts for the longitude and latitude of the origin (SW corner) of the map. These must be typed in in the format in which they appear on the DTED tape i.e. DDDMMSSH where H is a hemisphere letter (W, E, S, N).

Second and subsequent DTI files supplied by FILEIN commands within a single run of DTI2DTED are formatted and written to the tape sequentially. They are automatically appended to the first new manuscript written.

Messages:

The following messages are specific to the FILEIN command:

*** WARNING *** You must specify a file-spec argument to the FILEIN command.

*** ERROR *** Unable to interpret output file-spec

Examples:

```
DTI2DTED> DEVICE MSA0:<CR>      !  select MSA0:  for output
DTI2DTED> APPEND<CR>    !  append to end of tape
DTI2DTED> FILEIN DUA3:[DEMONSTRATION.DTI]IDAHO<CR>
DTI file DUA3:[DEMONSTRATION.DTI]IDAHO.DTI;2 opened for reading
```

HELP

Give help on a subject

FORMAT: HELP subject

Command parameters:

subject

The subject on which help is required.

Description:

The HELP command looks the rest of the line up in the DTMCONVERT HELP library. This library contains a brief summary of the operation of each command.

The information is looked up in the DTI2DTED section of the DTMCONVERT help library, LSL$HELP:DTMCONVERT.HLB.

Messages:

Where required, warning messages are output via the VMS LBR$OUTPUT_HELP utility.

Examples:

DTI2DTED> **HELP ENABLE GRID<CR>**

DTI2DTED

ENABLE

GRID

ENABLE GRID specifies that future manuscripts on the tape are in grid coordinates rather than geographicals.

DTI2DTED>

RETURN

Restores command input from an indirect file to SYS$COMMAND.

FORMAT: RETURN

Command parameters: None.

DESCRIPTION:

Restores command input from an indirect file to SYS$COMMAND.

A typical application is to allow the user to use an indirect command file to set up those run time defaults which are constant within a flowline and then return to input from the terminal (or batch stream) for the run specific commands. To do this RETURN must be the last command in the indirect command file.

Messages:

The following messages are specific to the RETURN command:

RETURN command detected - returning to terminal input

RETURN command ignored - command input is already from terminal

---

Examples:

```
DTI2DTED> @FLOW2<CR>
DTI2DTED> ENABLE DIAGNOSTICS
DTI2DTED> RETURN
RETURN command detected - returning to terminal input
DTI2DTED>
```

SHOW

Shows current status of DTI2DTED defaults.

FORMAT: SHOW subject

Command parameters:

subject

The subject that is to be displayed, chosen from:

DEBUG DEFAULTS DEVICE DIAGNOSTICS

GRID FILEIN

DESCRIPTION:

SHOW enables the user to examine the current status of the DTI2DTED defaults. Defaults may be examined either singly by specifying the name of the item of interest (eg SHOW DIAGNOSTICS will give the current status of diagnostic printout) or collectively by using the SHOW DEFAULTS command.

Messages:

The following message is specific to the SHOW command:

*** WARNING *** Invalid qualifier

Available SHOW command qualifiers are:

DEBUG DEFAULTS DEVICE DIAGNOSTICS

GRID FILEIN

Examples:

```
   .
   .
DTED2DTI> SHOW DIAGNOSTICS
DIAGNOSTICS:
Diagnostic printout suppressed
DTED2DTI> ENABLE DIAGNOSTICS
DTED2DTI> SHOW DEFAULTS<CR>

Current defaults are:

DEBUG:
```

```
Debug printout selected

DEVICE:
Tapedeck MTA0: at 1600bpi selected for output of DTED data

DIAGNOSTICS:
Diagnostic printout selected

GRID:
GRID disabled - manuscripts will be written in geographical coordinates

FILEIN:
DTI file LSL$DTI:FRED.DTI;0 selected for input

DTED2DTI>
```

SPAWN

The SPAWN command enables you to create a subprocess while within DTI2DTED.

FORMAT: SPAWN command-line

Command parameters:

command-line

Specifies a DCL command string to be executed as if typed in response to a '$' prompt. When the command completes, the subprocess terminates and control is returned to DTI2DTED. The command string cannot exceed 80 characters.

DESCRIPTION:

The SPAWN command enables you to create a subprocess while within DTI2DTED. When the subprocess terminates control is returned to DTI2DTED.

Messages:

The following warning messages are specific to the SPAWN command:

*** WARNING *** SPAWN requires a valid DCL command line

*** ERROR *** Unable to spawn command, returning to DTI2DTED

Examples:

DTI2DTED> **SPAWN DIRECTORY *.DTI;*<CR>**

Directory DUA3:[DTMPROCESS.ACCEPTANCE_TESTS]

```
TEST1.DTI;1              8/8       10-FEB-1988 07:56  [LSL,TIM]
TEST2.DTI;2              7/8       10-FEB-1988 17:17  [LSL,TIM]
TEST2.DTI;1              7/8       10-FEB-1988 17:07  [LSL,TIM]
```

Total of 3 files, 22/24 blocks.

DTI2DTED>

DTI2DTED examples

EXAMPLES

```
$
$ ALLOCATE MUB0:
%DCL-I-ALLOC, $MUB0: allocated
$ MOUNT/FOREIGN MUB0:
%MOUNT-I-MOUNTED, A mounted on $MUB0:
$ RUN DTI2DTED
DTMCONVERT module DTI2DTED of 22:27:16  2-JUN-88
DTI2DTED> SHOW DEFAULTS


Current defaults are:

DEBUG:
Debug printout suppressed

DEVICE:
Tapedeck MTA0: at 1600bpi selected for output of DTED data

DIAGNOSTICS:
Diagnostic printout suppressed

FILEIN:
DTI input file not yet specified

GRID:
GRID disabled - manuscripts will be written in geographical coordinates

DTI2DTED> DEVICE MUB0:
Magnetic tape device MUB0: opened for writing
DTI2DTED> FILEIN FRANKTED440

File    :  LSL$DTI:FRANKTED440.DTI;0
Header  :  DTED  Data:  WORD

Units are Degrees, Minutes, Seconds

Matrix Origin       :  56 36 00N    5 15 00W
Matrix Coverage   SW:  56 36 00N    5 15 00W   NE:  56 36 39N    5 13 42W
Matrix Interval    E:          2                N:          1
Value Range         :   179   to    559

Reel number (6 characters): ABCDEF
Producing a change 4 DTED tape file
File ident (def:UKMCETERRAIN     ):
DTI2DTED> ENABLE DIAGNOSTICS
DTI2DTED> FILEIN FRANKUHL11

File    :  LSL$DTI:FRANKUHL11.DTI;0
Header  :  UHL1  Data:  WORD

Units are Degrees, Minutes, Seconds
```

```
Matrix Origin       :  52 00 00S   58 00 00W
Matrix Coverage   SW:  52 00 00S   58 00 00W   NE:  51 58 41S   57 57 22W
Matrix Interval    E:          2                N:          1
Value Range         :     0   to     61

Producing a change 2 DTED tape file
File ident (def:UKMCETERRAIN     ): TESTDATA
 WARNING   Invalid file identifier
File ident (def:UKMCETERRAIN     ): TESTDATA
UHL10580000W0520000S002000100000000            00800080
10 % complete
20 % complete
30 % complete
40 % complete
50 % complete
60 % complete
70 % complete
80 % complete
90 % complete
100 % complete
DTI2DTED> DEVICE MUB0:
 WARNING   You have already specified a magnetic tape device
DTI2DTED> EXIT
 ELAPSED:    0 00:05:36.97  CPU: 0:00:00.97  BUFIO: 100  DIRIO: 141  FAULTS: 100
$DISMOUNT MUB0:
$DEALLOCATE MUB0:
$
```

DTI2DTED messages

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

ATEOV, error advancing DTED magnetic tape

Explanation: DTI2DTED is unable to advance the DTED magnetic tape.

User action: The supplementary messages supplied with this message will enable the user to determine the cause of the problem. Check that the tape deck is online, and that the tape has not been wound off the take-up spool. If the problem persists notify your system manager.

CLDTI, error closing DTI file

Explanation: DTI2DTED is unable to close the input DTI file.

User action: The supplementary messages supplied with this message will enable the user to determine the cause of the problem. If the problem persists notify your system manager.

CLIND, error closing indirect command file

Explanation: DTI2DTED is unable to close the indirect command file.

User action: The supplementary messages supplied with this message will enable the user to determine the cause of the problem. If the problem persists notify your system manager.

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 3

MODULE DTED2DTI

MODULE DTED2DTI
UTILITY DTED2DTI

REPLACES MCE utility DTEDIN

FUNCTION

DTED2DTI

DTED2DTI is a program for translating the information on a DMA DLMS DTED tape (Defence Mapping Agency Digital Land Mass Simulation Digital Terrain Elevation Data) into a disc file containing a Laser-Scan DTI (Digital Terrain Image) matrix.

FORMAT

$ DTED2DTI

COMMAND QUALIFIERS

None, DTED2DTI is command driven.
Commands are entered as arguments to the program prompt DTED2DTI>

DTED2DTI command defaults.

On program startup, the following command defaults apply:

DEBUG - disabled.

DEVICE - MTA0:.

DIAGNOSTICS - disabled.

GRID - disabled.

PME - disabled.

FULL - disabled.

DESCRIPTION

General

DTED2DTI is a program for translating the information on a DMA DLMS DTED tape (Defence Mapping Agency Digital Land Mass Simulation Digital Terrain Elevation Data) into a disc file containing a Laser-Scan DTI (Digital Terrain Image) matrix.

DTED2DTI will translate both Change 2 and Change 3/4 DTED formats (the latter as documented in Chapter 4, Section 100 of Amendment 4.0 (March 1983) of the DMA Product Specifications for DLMS Data Base).

For Change 3/4 tapes, it will make use of the DSI and ACC blocks as appropriate.

The DTI file produced from a Change 2 tape will be of 'UHL1' type and contains a direct copy of the UHL record from the tape, while the file produced from a Change 3/4 tape will be of 'TED4' type. This does not preserve the UHL record, but contains copies of the DSI and ACC records from the tape. The GRID command may be used to indicate that the file is in grid units, rather than geographicals, and that DSI and ACC records should be discarded.

The program will cope with records which are offset from the SW corner, setting the posts in the area for which there is no data to null.

Preparing To Use DTED2DTI

Before running DTED2DTI, the tape to be read must be allocated and mounted foreign. Assuming that the tape is loaded on tape unit MSA0: -

```
$ ALLOCATE MSA0:<CR>
$ MOUNT/FOREIGN MSA0:<CR>
$ DTED2DTI<CR>
DTED2DTI> !  You are now ready to issue DTED2DTI commands.
```

See later for detailed examples of interaction with DTED2DTI.

Expected Format Of The Tape

DTED2DTI recognises 9 different sorts of block on the tape (not including tape mark).

The tape is expected to start with a VOLume header label. If it doesn't then a warning message is produced, but processing continues.

A manuscript is expected to consist of a File Header Label followed by a User Header Label, then a filemark. A Change 2 tape will then have the data, while for a Change 3/4 tape this is preceded by DSI and ACC records. After the data, there should be a filemark, an End of File record, and a User Trailer Label, followed by another filemark.

Checking Of Data

Block Consistency

DTED2DTI recalculates the checksums stored at the end of each data block as it processes the data, and checks that it derives the same value as on the tape. If the two values differ, a warning message is output, but processing continues.

DTED2DTI will tolerate some missing or bad blocks, and will produce a warning message in most cases. However certain blocks are essential for the correct processing of a manuscript. The UHL record must be correct since this is used to locate the manuscript and determine its size. A manuscript will be assumed to be Change 2 unless a DSI or ACC records are found. These are copied into the DTI file, and the SW corner of the bounding rectangle is extracted for checking. Once reading of data records commences, DTED2DTI must read the correct number of data records, each of which must have the correct length. Any error here will cause reading of the manuscript to be abandoned. Note that if the start of a record is offset, its length will be shorter than the standard record length.

In order that tapes produced on an ICL computer may be read, an initial ICL header block is ignored and all other blocks may have a length which is either their expected length or (if this is not a multiple of three) the next higher multiple of three. For a Change 2 tape, data records of any length greater than or equal to their expected length are accepted.

Production Of The DTI File

The DTI files created by DTED2DTI are by default created in the directory defined by logical name LSL$DTI. A new DTI file is created each time a manuscript is read from the tape.

For a description of DTI file layout and content, see the MATRIX Reference Manual.

STATISTICS AND INFORMATION PRESENTED BY DTED2DTI

DTED2DTI informs the user of where each manuscript is being output. Each UHL record found on the tape can be typed out (as it is in ASCII, this is reasonably comprehensible) together with, for each manuscript, the percentage of data converted so far, the minimum and maximum Z values, and a summary of the DTI file created.

DTED2DTI commands

@

Take command input from the specified file.

FORMAT: @file-spec<CR>

Command parameters:

file-spec

The file to be opened and used for command input.

Any parts of the file-spec not supplied for the @ command will be taken from the default specification 'SYS$DISK:[].COM;0'.

DESCRIPTION:

DTED2DTI offers the facility of command input from an indirect command file. The '@' character preceding a file-spec will cause DTED2DTI to open and read commands from the specified file until:

1. a RETURN command is detected and command input is returned to SYS$COMMAND.

2. end-of-file is detected. This provokes an error message and command input is returned to SYS$COMMAND.

Nested command files are not supported (i.e. a command file containing an '@' command), although sequential '@' commands are supported when read from SYS$COMMAND.

As an aid to batch log interpretation DTED2DTI will echo all commands read from an indirect command file.

Messages:

The following messages are specific to the @ command:

*** WARNING *** "@" must precede a file-spec

*** WARNING *** Unexpected end of indirect command file detected
RETURN command assumed - returning to terminal input

*** WARNING *** Indirect file error - returning to terminal input

*** ERROR *** Can't open indirect command file 'file-spec'

Examples:

```
$ DTED2DTI<CR>
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> @PRESETS<CR>
DTED2DTI> ENABLE DIAGNOSTICS
DTED2DTI> DEVICE MSA2:
DTED2DTI> RETURN
DTED2DTI>
```

!

Treat all text to the right of the '!' as a comment.

FORMAT: ! [comment text]

Command parameters:

comment text

text that is to be treated as a comment and which will be excluded from command interpretation.

DESCRIPTION:

An exclamation mark is the standard DTM package comment delimiter. All text (and numbers) which lie to the right of a '!' character are excluded from command interpretation. Comments are useful for annotating command procedures used in batch processing etc.

Messages: None.

Examples:

```
DTED2DTI> ! a comment for the sake of it<CR>
DTED2DTI>

$ TYPE PRESETS.COM<CR>
! This is an indirect command file to set up
! site specific defaults for DTED2DTI.
!
ENABLE DIAGNOSTICS
DEVICE MSA2:
RETURN
$
```

DEVICE

Specifies the type of magnetic tape drive that DTED2DTI is to read from.

FORMAT: DEVICE type

Command parameters:

type

The magnetic tape device type which DTED2DTI is to read from. By default DTED2DTI will attempt to read from MTA0:.

DESCRIPTION:

The DEVICE command enables the user to specify the type of magnetic tape drive that DTED2DTI is to read from. By default DTED2DTI will attempt to read from MTA0:.

Whatever the device type, it should be allocated to the user, the tape should be physically loaded and mounted foreign before attempting to read from it using DTED2DTI.

Messages:

The following messages are specific to the DEVICE command:

*** WARNING *** You have already specified a magnetic tape device

*** WARNING *** You must specify a magnetic tape device type to the DEVICE command

*** ERROR *** 'type' is not a known magnetic tape device

*** ERROR *** when reading magnetic tape device name

*** ERROR *** Tape is not mounted as foreign

Examples:

$ **ALLOCATE MSA0:<CR>**
$ **MOUNT/FOREIGN MSA0:<CR>**
$ **DTED2DTI<CR>**
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> **DEVICE MSA0:<CR>**
DTED2DTI>

DISABLE DEBUG

Disables a previous ENABLE DEBUG command.

FORMAT: DISABLE DEBUG

Command parameters: None.

DESCRIPTION:

DISABLE DEBUG allows the user to disable a previous ENABLE DEBUG command.

The ENABLE DEBUG and DISABLE DEBUG commands are reserved for Laser-Scan use. The output produced by the ENABLE DEBUG command is used only for program debugging purposes and should be invoked by LSL software personnel only.

DISABLE DEBUG is the default at program startup.

Messages:

The following warning message is specific to the DISABLE DEBUG command:

*** WARNING *** You were not using DEBUG!

Examples:

DTED2DTI> **ENABLE DEBUG<CR>**
DTED2DTI> **DISABLE DEBUG<CR>**
DTED2DTI>

DISABLE DIAGNOSTICS

Disables a previous ENABLE DIAGNOSTICS command.

FORMAT: DISABLE DIAGNOSTICS

Command parameters: None.

DESCRIPTION:

DISABLE DIAGNOSTICS allows the user to disable a previous ENABLE DIAGNOSTICS command.

DISABLE DIAGNOSTICS is the default at program startup.

Messages: None.

Examples:

```
DTED2DTI> ENABLE DIAGNOSTICS<CR>
DTED2DTI> SHOW DIAGNOSTICS<CR>
Diagnostic printout selected
DTED2DTI> DISABLE DIAGNOSTICS<CR>
DTED2DTI> SHOW DIAGNOSTICS<CR>
Diagnostic printout suppressed
DTED2DTI>
```

DISABLE GRID

Disables a previous ENABLE GRID command.

FORMAT: DISABLE GRID

Command parameters: None.

DESCRIPTION:

DISABLE GRID allows the user to disable a previous ENABLE GRID command.

By default GRID is disabled, i.e. the matrix intervals in the manuscripts on the tape are considered to be in geographical units.

Messages: None.

Examples:

```
DTED2DTI> ENABLE GRID<CR>
DTED2DTI> SHOW GRID<CR>
GRID enabled - manuscripts expected in grid coordinates.
DTED2DTI> DISABLE GRID<CR>
DTED2DTI> SHOW GRID<CR>
GRID disabled - manuscripts expected in geographical coordinates.
DTED2DTI>
```

DISABLE PME

Disables a previous ENABLE PME command.

FORMAT: DISABLE PME

Command parameters: None.

DESCRIPTION:

DISABLE PME allows the user to disable a previous ENABLE PME command.

DISABLE PME is the default at program startup.

Messages:

The following warning message is specific to the DISABLE PME command:

*** WARNING *** You were not using PME !

Examples:

DTED2DTI> **ENABLE PME<CR>**
DTED2DTI> **DISABLE PME<CR>**
DTED2DTI>

DISABLE FULL

Disables a previous ENABLE FULL command.

FORMAT: DISABLE FULL

Command parameters: None.

DESCRIPTION:

DISABLE FULL allows the user to disable a previous ENABLE FULL command.

By default FULL is disabled, i.e. geographical extents will be based on the MBR.

Messages: None.

Examples:

```
DTED2DTI> ENABLE FULL<CR>
DTED2DTI> SHOW FULL<CR>
FULL enabled - a full one degree square will be constructed
DTED2DTI> DISABLE FULL<CR>
DTED2DTI> SHOW FULL<CR>
FULL disabled - geographical extents will be based on the MBR.
DTED2DTI>
```

EASTING

Specifies DTED2DTI is to search for a manuscript on the tape by its origin and output it to DTI file when found.

FORMAT: EASTING grid-X

Command parameters:

grid-X

The integer X coordinate (grid units) of the manuscript origin.

DESCRIPTION:

The EASTING command causes DTED2DTI to search for a manuscript by its origin, and output it when it is found. The EASTING command may be issued on its own, or (on the same command line) in combination with the NORTHING command.

If the EASTING command is issued on its own (i.e. without an accompanying NORTHING command on the line) then the first manuscript found on the tape with a matching origin easting will be read and written to the DTI file opened with the FILEOUT command. The origin northing is thus treated as a wildcard.

The EASTING command requires the grid option to be enabled. As this is disabled by default on program startup, an ENABLE GRID command must be given before the EASTING command.

The default is to start searching with the next manuscript on the tape. Search is forwards, so to access a manuscript written on the tape earlier than the last one read, the REWIND command must be used.

The EASTING command will not be accepted until a successful FILEOUT command has been executed. The FILEOUT command causes a specified DTI file to be opened and used for output from DTED2DTI.

By default DTED2DTI will attempt to read from MTA0:, unless an alternative magnetic tape device has been specified using the DEVICE command.

After each EASTING command the DTI file opened with the FILEOUT command will be closed. A new FILEOUT command must be issued before another EASTING command will be accepted.

Note that if the MANUSCRIPT command is used on a command line, the EASTING and NORTHING commands may not be specified on that same command line.

Messages:

The following messages are specific to the EASTING command:

*** WARNING *** You must give a FILEOUT command for the next manuscript

*** WARNING *** You cannot use the EASTING command with GRID disabled

*** WARNING *** Manuscript with required easting not found

Examples:

```
$ ALLOCATE MSA0:<CR>
$ MOUNT/FOREIGN MSA0:<CR>
$ DTED2DTI<CR>
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> DEVICE MSA0:<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW12.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW12.DTI;2 opened for write
DTED2DTI> ENABLE GRID<CR>
DTED2DTI> EASTING 123<CR>
DTED2DTI> REWIND<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW15.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW15.DTI;1 opened for write
DTED2DTI> EASTING 345 NORTHING 765<CR>
DTED2DTI> EXIT<CR>
$
```

ENABLE DEBUG

ENABLE DEBUG enables diagnostic printing for debugging purposes.

FORMAT: ENABLE DEBUG

Command parameters: None.

DESCRIPTION:

The ENABLE DEBUG and DISABLE DEBUG commands are reserved for Laser-Scan use. The output produced by the ENABLE DEBUG command is used only for diagnostic purposes and should be invoked by LSL software personnel only.

Message:

The following warning message is specific to the ENABLE DEBUG command:

*** WARNING *** You are already using DEBUG!

Examples:

$ **DTED2DTI<CR>**
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> **ENABLE DEBUG<CR>**
DTED2DTI>

ENABLE DIAGNOSTICS

ENABLE DIAGNOSTICS allows the user to produce diagnostic printout.

FORMAT: ENABLE DIAGNOSTICS

Command parameters: None.

DESCRIPTION:

ENABLE DIAGNOSTICS allows the user to produce diagnostic printout.

By default DTED2DTI produces minimal printout. If however, the user wishes to receive indications of processing progress, and details of the DTI file produced, a diagnostic printout may be selected with the ENABLE DIAGNOSTICS command.

On a heavily loaded computer it may be reassuring to ENABLE DIAGNOSTICS for the conversion stage of DTED2DTI processing to indicate progress through the input data. Messages are issued indicating which input file is being read, the contents of all UHL1 type blocks, the percentage of the data currently processed, a summary of the DTI file, and the minimum and maximum Z values read.

Messages: None.

Examples:

DTED2DTI> **ENABLE DIAGNOSTICS<CR>**
DTED2DTI> **SHOW DIAGNOSTICS<CR>**
Diagnostic printout selected
DTED2DTI> **DISABLE DIAGNOSTICS<CR>**
DTED2DTI> **SHOW DIAGNOSTICS<CR>**
Diagnostic printout suppressed
DTED2DTI>

ENABLE GRID

ENABLE GRID specifies that future manuscripts on the tape are in grid coordinates rather than geographicals.

FORMAT: ENABLE GRID

Command parameters: None.

DESCRIPTION:

ENABLE GRID specifies that future manuscripts on the tape are in grid coordinates rather than geographicals.

The effects of this are that the matrix intervals from the tape are already in grid units, and are not converted. The origin in the tape UHL record is taken to be in grid units, as is the origin in EASTING or NORTHING commands. No attempt is made to read the SW corner of the bounding rectangle from the DSI record. A UHL1 format DTI file is produced, discarding any DSI and ACC records.

By default GRID is disabled, i.e. the matrix intervals in the manuscripts on the tape are considered to be in geographical units.

Messages: None.

Examples:

DTED2DTI> **ENABLE GRID<CR>**
DTED2DTI> **SHOW GRID<CR>**
GRID enabled - manuscripts expected in grid coordinates.
DTED2DTI> **DISABLE GRID<CR>**
DTED2DTI> **SHOW GRID<CR>**
GRID disabled - manuscripts expected in geographical coordinates.
DTED2DTI>

ENABLE PME

ENABLE PME enables the PME performance monitor.

FORMAT: ENABLE PME

Command parameters: None.

DESCRIPTION:

The ENABLE PME and DISABLE PME commands are reserved for Laser-Scan use. PME is a code optimisation tool and should be invoked by LSL software personnel only.

ENABLE PME causes the PME_INIT routine to be invoked.

Message:

The following warning message is specific to the ENABLE PME command:

*** WARNING *** You are already using PME!

Examples:

$ **DTED2DTI<CR>**
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> **ENABLE PME<CR>**

ENABLE FULL

ENABLE FULL enables construction of a 1 degree square.

FORMAT: ENABLE FULL

Command parameters: None.

DESCRIPTION:

ENABLE FULL forces construction of a 1 degree square. This helps makes it possible to process DTED manuscripts which have missing or truncated profiles.

By default FULL is disabled, i.e. geographical extents will be based on the MBR.

Message:

Examples:

```
DTED2DTI> ENABLE FULL<CR>
DTED2DTI> SHOW FULL<CR>
FULL enabled - a full one degree square will be constructed
DTED2DTI> DISABLE FULL<CR>
DTED2DTI> SHOW FULL<CR>
FULL disabled - geographical extents will be based on the MBR.
DTED2DTI>
```

EXIT

Exit from DTED2DTI.

FORMAT: EXIT

Command parameters: None.

Description:

The EXIT command causes DTED2DTI to close any open files and the program is terminated.

<CTRL/Z> (pressing the Ctrl and Z keys together) may also be used to exit from DTED2DTI.

An EXIT command at the end of an indirect command file, in lieu of a RETURN command, will exit the program without returning to terminal command input.

Messages: None.

Examples:

```
DTED2DTI> EXIT<CR>
 ELAPSED:  00:00:20.04 CPU:  0:00:04.71 BUFIO:  281 DIRIO:  46 FAULTS:  263
$
```

FILEOUT

Specifies a DTI file that is to be created and opened for data output.

FORMAT: FILEOUT file-spec

COMMAND PARAMETERS:

file-spec

The specification of the DTI file to be created and opened for data output from the next manuscript.

Any parts of the file-spec not supplied with the command will be taken from the default file specification 'LSL$DTI:DTI.DTI;0'.

DESCRIPTION:

The FILEOUT command causes the specified DTI file to be opened and used for output from DTED2DTI. A FILEOUT command must be issued before the MANUSCRIPT, LATITUDE or LONGITUDE, EASTING or NORTHING commands will be accepted.

After each MANUSCRIPT, LATITUDE or LONGITUDE, EASTING or NORTHING command the DTI file opened with the FILEOUT command will be closed. A new FILEOUT command must be issued before another MANUSCRIPT, LATITUDE or LONGITUDE, EASTING or NORTHING command will be accepted.

Messages:

The following messages are specific to the FILEOUT command:

*** WARNING *** You have already issued a FILEOUT command for the next manuscript

*** WARNING *** You must specify a file-spec argument to the FILEOUT command

*** ERROR *** Unable to interpret output file-spec

Examples:

DTED2DTI> **FILEOUT DUA3:[DEMONSTRATION.DTI]IDAHO<CR>**
DTI file DUA3:[DEMONSTRATION]IDAHO.DTI;1 opened for write
DTED2DTI> **MANUSCRIPT 3<CR>**
DTED2DTI>

HELP

Give help on a subject

FORMAT: HELP subject

Command parameters:

subject

The subject on which help is required.

Description:

The HELP command looks the rest of the line up in the DTMCONVERT HELP library. This library contains a brief summary of the operation of each command.

The information is looked up in the DTED2DTI section of the DTMCONVERT help library, LSL$HELP:DTMCONVERT.HLB.

Messages:

Where required, warning messages are output via the VMS LBR$OUTPUT_HELP utility.

Examples:

DTED2DTI> **HELP ENABLE PME<CR>**

DTED2DTI

ENABLE

PME

The ENABLE PME and DISABLE PME commands are reserved for Laser-Scan use. PME is a code optimisation tool and should be invoked by LSL software personnel only.

ENABLE PME causes the PME_INIT routine to be invoked.
DTED2DTI>

LATITUDE

Specifies DTED2DTI is to search for a manuscript on the tape by its origin and output it to the DTI file when found.

FORMAT: LATITUDE [D]D [MM] [SS] H

Command parameters:

[D]D [MM] [SS] H

The latitude of the desired manuscript, where:

D represents a digit for degrees
M represents a digit for minutes
S represents a digit for seconds
H represents a hemisphere, N for North, S for South.

DESCRIPTION:

The LATITUDE command causes DTED2DTI to search for a manuscript by its origin, and output it when it is found. The LATITUDE command may be issued on its own, or (on the same command line) in combination with the LONGITUDE command.

If the LATITUDE command is issued on its own (i.e. without an accompanying LONGITUDE command on the line) then the first manuscript found on the tape with a matching origin latitude will be read and written to the DTI file opened with the FILEOUT command. The origin longitude is thus treated as a wildcard.

The LATITUDE command can only be used if the GRID option has been disabled (the default on program startup). If the ENABLE GRID command has been given, then disable GRID with the DISABLE GRID command or use the EASTING and/or NORTHING commands if the manuscript origin is held in grid units.

The default is to start searching with the next manuscript on the tape. Search is forwards, so to access a manuscript written before the current reading position on the tape, the REWIND command must be used.

The LATITUDE command will not be accepted until a successful FILEOUT command has been executed. The FILEOUT command causes a specified DTI file to be opened and used for output from DTED2DTI.

By default DTED2DTI will attempt to read from MTA0:, unless an alternative magnetic tape device has been specified using the DEVICE command.

After each LATITUDE command the DTI file opened with the FILEOUT command will be closed. A new FILEOUT command must be issued before another LATITUDE command will be accepted.

Note that if the MANUSCRIPT command is used on a command line, the LATITUDE and LONGITUDE commands may not be specified on that same command line.

Messages:

The following messages are specific to the LATITUDE command:

*** WARNING *** You must give a FILEOUT command for the next manuscript

*** WARNING *** You cannot use a LATITUDE command with GRID enabled

*** WARNING *** Manuscript with required latitude not found

Examples:

```
$ ALLOCATE MSA0:<CR>
$ MOUNT/FOREIGN MSA0:<CR>
$ DTED2DTI<CR>
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> DEVICE MSA0:<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW12.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW12.DTI;2 opened for write
DTED2DTI> LATITUDE 334557N<CR>
DTED2DTI> REWIND<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW15.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW15.DTI;1 opened for write
DTED2DTI> LATITUDE 334527N LONGITUDE 1475930W<CR>
DTED2DTI> EXIT<CR>
$
```

LONGITUDE

Specifies DTED2DTI is to search for a manuscript on the tape by its origin and output it to DTI file when found.

FORMAT: LONGITUDE [DD]D [MM] [SS] H

Command parameters:

[DD]D [MM] [SS] H

The longitude of the desired manuscript, where:

D represents a digit for degrees
M represents a digit for minutes
S represents a digit for seconds
H represents a hemisphere, E for East, W for West.

DESCRIPTION:

The LONGITUDE command causes DTED2DTI to search for a manuscript by its origin, and output it when it is found. The LONGITUDE command may be issued on its own, or (on the same command line) in combination with the LATITUDE command.

If the LONGITUDE command is issued on its own (i.e. without an accompanying LATITUDE command on the line) then the first manuscript found on the tape with a matching origin longitude will be read and written to the DTI file opened with the FILEOUT command. The origin latitude is thus treated as a wildcard.

The LONGITUDE command can only be used if the GRID option has been disabled (the default on program startup). If the ENABLE GRID command has been given, then disable GRID with the DISABLE GRID command or use the EASTING and/or NORTHING commands if the manuscript origin is held in grid units.

The default is to start searching with the next manuscript on the tape. Search is forwards, so to access a manuscript written before the current reading position on the tape, the REWIND command must be used.

The LONGITUDE command will not be accepted until a successful FILEOUT command has been executed. The FILEOUT command causes a specified DTI file to be opened and used for output from DTED2DTI.

By default DTED2DTI will attempt to read from MTA0:, unless an alternative magnetic tape device has been specified using the DEVICE command.

After each LONGITUDE command the DTI file opened with the FILEOUT command will be closed. A new FILEOUT command must be issued before another LONGITUDE command will be accepted.

Note that if the MANUSCRIPT command is used on a command line, the LATITUDE and LONGITUDE commands may not be specified on that same command line.

Messages:

The following messages are specific to the LONGITUDE command:

*** WARNING *** You must give a FILEOUT command for the next manuscript

*** WARNING *** You cannot use a LONGITUDE command with GRID enabled

*** WARNING *** Manuscript with required longitude not found

Examples:

```
$ ALLOCATE MSA0:<CR>
$ MOUNT/FOREIGN MSA0:<CR>
$ DTED2DTI<CR>
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> DEVICE MSA0:<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW12.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW12.DTI;2 opened for write
DTED2DTI> LONGITUDE 1475930W<CR>
DTED2DTI> REWIND<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW15.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW15.DTI;1 opened for write
DTED2DTI> LATITUDE 334527N LONGITUDE 1475930W<CR>
DTED2DTI> EXIT<CR>
$
```

MANUSCRIPT

Specifies which manuscript (file) on the tape DTED2DTI is to read from.

FORMAT: MANUSCRIPT [number]

Command parameters:

number

Identifies which manuscript (file) on the tape to read (where the first manuscript is numbered 1, etc). The default is always the next manuscript on the tape. Search is forwards, so to access a manuscript with a lower number than the last one read, the REWIND command must be used.

DESCRIPTION:

The MANUSCRIPT command enables the user to specify which manuscript (file) is to be read from the magnetic tape.

The optional MANUSCRIPT argument is a positive integer that identifies which manuscript (file) on the tape to read (where the first manuscript is numbered 1, etc). The default is always the next manuscript on the tape. Search is forwards, so to access a manuscript with a lower number than the last one read, the REWIND command must be used.

The MANUSCRIPT command will not be accepted until a successful FILEOUT command has been executed. The FILEOUT command causes a specified DTI file to be opened and used for output from DTED2DTI.

By default DTED2DTI will attempt to read from MTA0:, unless an alternative magnetic tape device has been specified using the DEVICE command.

After each MANUSCRIPT command the DTI file opened with the FILEOUT command will be closed. A new FILEOUT command must be issued before another MANUSCRIPT command will be accepted.

Note that if the MANUSCRIPT command is used on a command line, the LATITUDE, LONGITUDE, EASTING and NORTHING commands may not be specified on that same command line.

Messages:

The following messages are specific to the MANUSCRIPT command:

*** WARNING *** You must give a FILEOUT command for the next manuscript

*** WARNING *** Manuscript 'number' not found - only 'n' manuscripts on the tape

---

Examples:

```
$ ALLOCATE MSA0:<CR>
$ MOUNT/FOREIGN MSA0:<CR>
$ DTED2DTI<CR>
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> DEVICE MSA0:<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW12.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW12.DTI;2 opened for write
DTED2DTI> MANUSCRIPT 3<CR>
DTED2DTI> REWIND<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW15.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW15.DTI;1 opened for write
DTED2DTI> MANUSCRIPT 2<CR>
DTED2DTI> EXIT<CR>
$
```

NORTHING

Specifies DTED2DTI is to search for a manuscript on the tape by its origin and output it to DTI file when found.

FORMAT: NORTHING grid-Y

Command parameters:

grid-Y

The integer Y coordinate (grid units) of the manuscript origin.

DESCRIPTION:

The NORTHING command causes DTED2DTI to search for a manuscript by its origin, and output it when it is found. The NORTHING command may be issued on its own, or (on the same command line) in combination with the EASTING command.

If the NORTHING command is issued on its own (i.e. without an accompanying EASTING command on the line) then the first manuscript found on the tape with a matching origin northing will be read and written to the DTI file opened with the FILEOUT command. The origin easting is thus treated as a wildcard.

The NORTHING command requires the grid option to be enabled. As this is disabled by default on program startup, an ENABLE GRID command must be given before the NORTHING command.

The default is to start searching with the next manuscript on the tape. Search is forwards, so to access a manuscript written on the tape earlier than the last one read, the REWIND command must be used.

The NORTHING command will not be accepted until a successful FILEOUT command has been executed. The FILEOUT command causes a specified DTI file to be opened and used for output from DTED2DTI.

By default DTED2DTI will attempt to read from MTA0:, unless an alternative magnetic tape device has been specified using the DEVICE command.

After each NORTHING command the DTI file opened with the FILEOUT command will be closed. A new FILEOUT command must be issued before another NORTHING command will be accepted.

Note that if the MANUSCRIPT command is used on a command line, the NORTHING and EASTING commands may not be specified on that same command line.

Messages:

The following messages are specific to the NORTHING command:

*** WARNING *** You must give a FILEOUT command for the next manuscript

*** WARNING *** You cannot use a NORTHING command with GRID disabled

*** WARNING *** Manuscript with required northing not found

Examples:

```
$ ALLOCATE MSA0:<CR>
$ MOUNT/FOREIGN MSA0:<CR>
$ DTED2DTI<CR>
DTMCONVERT module DTED2DTI of 13:30:39 10-FEB-88
DTED2DTI> DEVICE MSA0:<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW12.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW12.DTI;2 opened for write
DTED2DTI> ENABLE GRID<CR>
DTED2DTI> NORTHING 123<CR>
DTED2DTI> REWIND<CR>
DTED2DTI> FILEOUT DUA3:[DEMONSTRATION]SW15.DTI<CR>
DTI file DUA3:[DEMONSTRATION]SW15.DTI;1 opened for write
DTED2DTI> EASTING 345 NORTHING 765<CR>
DTED2DTI> EXIT<CR>
$
```

RETURN

Restores command input from an indirect file to SYS$COMMAND.

FORMAT: RETURN

Command parameters: None.

DESCRIPTION:

Restores command input from an indirect file to SYS$COMMAND.

A typical application is to allow the user to use an indirect command file to set up those run time defaults which are constant within a flowline and then return to input from the terminal (or batch stream) for the run specific commands. To do this RETURN must be the last command in the indirect command file.

Messages:

The following messages are specific to the RETURN command:

RETURN command detected - returning to terminal input

RETURN command ignored - command input is already from terminal

---

Examples:

```
DTED2DTI> @FLOW2<CR>
DTED2DTI> ENABLE DIAGNOSTICS
DTED2DTI> RETURN
RETURN command detected - returning to terminal input
DTED2DTI>
```

REWIND

Rewinds the magnetic tape.

FORMAT: REWIND

Command parameters: None.

DESCRIPTION:

The REWIND command enables the user to rewind the tape to the BOT (Beginning Of Tape) marker. DTED2DTI is then ready to read manuscript 1 again.

Unless an appropriate DEVICE command has been issued earlier, by default DTED2DTI will attempt to rewind a tape on MTA0:.

The tape should be allocated, physically loaded and mounted foreign before attempting to rewind it using DTED2DTI.

Messages:

The following messages are specific to the REWIND command:

REWIND complete

*** ERROR *** whilst rewinding tape

Examples:

DTED2DTI> **DEVICE MSA0:<CR>**
DTED2DTI> **REWIND<CR>**
REWIND complete
DTED2DTI>

SHOW

Shows current status of DTED2DTI defaults.

FORMAT: SHOW subject

Command parameters:

subject

The subject that is to be displayed, chosen from:

DEBUG DEFAULTS DEVICE DIAGNOSTICS

GRID FILEOUT PME FULL

DESCRIPTION:

SHOW enables the user to examine the current status of the DTED2DTI defaults. Defaults may be examined either singly by specifying the name of the item of interest (eg SHOW DIAGNOSTICS will give the current status of diagnostic printout) or collectively by using the SHOW DEFAULTS command.

Messages:

The following message is specific to the SHOW command:

*** WARNING *** Invalid qualifier

Available SHOW command qualifiers are:

DEBUG DEFAULTS DEVICE DIAGNOSTICS

GRID FILEOUT PME FULL

Examples:

```
   .
   .
DTED2DTI> SHOW DIAGNOSTICS
DIAGNOSTICS:
Diagnostic printout suppressed
DTED2DTI> ENABLE DIAGNOSTICS
DTED2DTI> SHOW DEFAULTS<CR>

Current defaults are:

DEBUG:
```

```
Debug printout selected

DEVICE:
Tapedeck MTA0: selected for input of DTED data

DIAGNOSTICS:
Diagnostic printout selected

GRID:
GRID disabled - manuscripts expected in geographical coordinates

FILEOUT:
DTI file LSL$DTI:FRED.DTI;0 selected for output

PME:
PME not running

DTED2DTI>
```

SPAWN

The SPAWN command enables you to create a subprocess while within DTED2DTI.

FORMAT: SPAWN command-line

Command parameters:

command-line

Specifies a DCL command string to be executed as if typed in response to a '$' prompt. When the command completes, the subprocess terminates and control is returned to DTED2DTI. The command string cannot exceed 80 characters.

DESCRIPTION:

The SPAWN command enables you to create a subprocess while within DTED2DTI. When the subprocess terminates control is returned to DTED2DTI.

Messages:

The following warning messages are specific to the SPAWN command:

*** WARNING *** SPAWN requires a valid DCL command line

*** ERROR *** Unable to spawn command, returning to DTED2DTI

Examples:

DTED2DTI> **SPAWN DIRECTORY *.DTI;*<CR>**

Directory DUA3:[DTMPROCESS.ACCEPTANCE_TESTS]

TEST1.DTI;1 8/8 10-FEB-1988 07:56 [LSL,TIM]
TEST2.DTI;2 7/8 10-FEB-1988 17:17 [LSL,TIM]
TEST2.DTI;1 7/8 10-FEB-1988 17:07 [LSL,TIM]

Total of 3 files, 22/24 blocks.

DTED2DTI>

DTED2DTI examples

EXAMPLES

```
$
$ ALLOCATE MUB0:
%DCL-I-ALLOC, $MUB0: allocated
$ MOUNT/FOREIGN MUB0:
%MOUNT-I-MOUNTED, ABCDEF mounted on $MUB0:
$ RUN DTED2DTI
DTMCONVERT module DTED2DTI of 22:20:13  2-JUN-88
DTED2DTI> DEVICE MUB0:
DTED2DTI> MANUSCRIPT 1
 WARNING   You must give a FILEOUT command for the next manuscript
DTED2DTI> FILEOUT TESTDATA
DTED2DTI> MANUSCRIPT 1
Reading from magnetic tape device MUB0:
Change 3/4 manuscript found
Writing a TED4 type DTI file to LSL$DTI:TESTDATA.DTI;0
DTED2DTI> ENABLE DIAGNOSTICS
DTED2DTI> FILEOUT TESTDATA2
DTED2DTI> SHOW DEFAULTS


Current defaults are:

DEBUG:
Debug printout suppressed

DEVICE:
Tapedeck MUB0: selected for input of DTED data

DIAGNOSTICS:
Diagnostic printout selected

FILEOUT:
DTI file LSL$DTI:TESTDATA2.DTI;0 selected for output

GRID:
GRID disabled - manuscripts expected in geographical coordinates

PME:
PME not running

DTED2DTI> MANUSCRIPT
No manuscript number given - assuming manuscript 2 required
Reading from magnetic tape device MUB0:
UHL10580000W0520000S002000100000000            00800080
Change 2 manuscript found
Writing a UHL1 type DTI file to LSL$DTI:TESTDATA2.DTI;0
10 % complete
20 % complete
30 % complete
40 % complete
50 % complete
```

```
60 % complete
70 % complete
80 % complete
90 % complete
100 % complete

File    :  LSL$DTI:TESTDATA2.DTI;0
Header  :  UHL1  Data:  WORD

Units are Degrees, Minutes, Seconds

Matrix Origin       :  52 00 00S   58 00 00W
Matrix Coverage   SW:   0 00 00N    0 00 00E   NE:   0 00 00N    0 00 00E
Matrix Interval    E:          2                N:          1
Value Range         :-30134   to  22081

DTED2DTI> EXIT
 ELAPSED:    0 00:02:45.91  CPU: 0:00:01.05  BUFIO: 82  DIRIO: 152  FAULTS: 128
$DISMOUNT MUB0:
$DEALLOCATE MUB0:
$
```

DTED2DTI messages

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

CLDTI, error closing DTI file

Explanation: DTED2DTI is unable to close the output DTI file.

User action: The supplementary messages supplied with this message will enable the user to determine the cause of the problem. If the problem persists notify your system manager.

CLIND, error closing indirect command file

Explanation: DTED2DTI is unable to close the indirect command file.

User action: The supplementary messages supplied with this message will enable the user to determine the cause of the problem. If the problem persists notify your system manager.

NORWD, error rewinding DTED magnetic tape

Explanation: DTED2DTI is unable to rewind the DTED magnetic tape.

User action: The supplementary messages supplied with this message will enable the user to determine the cause of the problem. Check that the tape deck is online, and that the tape has not been wound off the take-up spool. If the problem persists notify your system manager.

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 4

MODULE NTF2DTI

UTILITY NTF2DTI

REPLACES NTF2DTI is a new utility.

FUNCTION

NTF2DTI is a utility to convert raster data written in the UK National Transfer Format (NTF) to a Laser-Scan Digital Terrain Image (DTI) file.

FORMAT

$ NTF2DTI Input NTF-file-spec [Output DTI-file-spec]

Command qualifiers	**Defaults**
/HEADER_TYPE	/HEADER_TYPE = LSLA
/[NO]LOG	/NOLOG
/[NO]OS	/OS
/[NO]OUTPUT = file-spec	/NOOUTPUT
/[NO]PROJECTION	see text
/SECTION = integer	/SECTION=0

PROMPTS

Input NTF-file: Input-NTF-file-spec

PARAMETERS

Input-NTF-file-spec

- This specifies the input NTF dataset. It is the first parameter specified on the DCL command line.
- The input NTF specification may be a file name or the name of a device.

Output-DTI-file-spec

- This is an optional parameter which specifies the output DTI file. It is not prompted for and is the second parameter on the DCL command line.

- If the parameter is present on the command line, then any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:DTI.DTI'.

- If the parameter is not present on the command line, then the output DTI file names will be taken from the section header records [SECHREC] in the input NTF dataset.

COMMAND QUALIFIERS

/HEADER_TYPE = header-type (default LSLA)

- Specifies the header format of the output DTI file. By default an LSLA free format header is created. Unless /NOPROJECTION is specified, the header will include a projection record.

  Valid keywords are UHL1, TED4, or LSLA. If a UHL1 format is selected, the header will be created with a blank UHL record. If a TED4 format is selected, the header will be created with blank DSI and ACC records. A projection record will only be written if output is to an LSLA DTI file.

/LOG
/NOLOG (default)

- /LOG Selects the output of informational messages derived from the NTF header. Unless the /OUTPUT qualifier is supplied, messages are written to SYS$OUTPUT.

/OS (default)
/NOOS

- Selects OS style data. This command tells the program to expect data in a level 4 format as used by OS to transfer raster data.

/OUTPUT = file-spec
/NOOUTPUT (default)

- Directs the output of informational messages to the specified file. This qualifier is used in conjunction with the /LOG qualifier.

/PROJECTION (default if a LSLA header is selected)
/NOPROJECTION (default)

- Selects the output of projection information derived from the NTF header records to a DTI projection record. This option is only valid if output is to a DTI file with a LSLA header record.

/SECTION = integer

- Enables the user to select which section of a multi-section NTF dataset is read. For example, /SECTION = 2 will select the second section encountered. By default, all sections of the NTF dataset are read.

  If /SECTION = 0 is specified then NTF2DTI will read all sections in the NTF dataset. A separate DTI file will be created for each section.

  If an output-DTI-file-spec was given, then all the files will be given the same name, but will have different version numbers.

  If no output-DTI-file-spec was given, then the output file names will be taken from the section header records in the NTF dataset.

DESCRIPTION

NTF2DTI is a utility to convert data written in UK National Transfer Format (NTF) Level 0 (Version 1.0 fixed length records), in a subset of Level 4 (Version 1.1 variable length records), or Level 5 (Version 2.0 variable length records) to a Laser-Scan Digital Terrain Image (DTI) file. The NTF data may exist on NTF format magnetic tape or disc file.

Handling multiple volume datasets

Datasets on NTF format magnetic tape may be datasets which span multiple volumes. When NTF2DTI reads the last record of a volume it will detect whether the dataset continues on to another volume. If so NTF2DTI will automatically dismount the tapedrive and prompt the user to load the next volume before pressing the RETURN key to continue. When the user has loaded the next volume and pressed RETURN, NTF2DTI automatically mounts the tapedrive and continues.

PLEASE NOTE that if the user presses RETURN more than once before the next volume is loaded the program will hang up and will need to be interrupted and restarted with the first volume in the dataset.

RESTRICTIONS

- /PROJECTION requires LSLA type header (default).
- Only NTF data at level 0 (NTF Version 1.0), at a small subsidiary of level 4 (NTF Version 1.1) and at level 5 (NTF Version 2.0 BS7567) may be read.
- If the data is in level 4 then the /OS qualifier must be used (set by default).
- The program expects to find data that conforms to the current intermediate version of NTF. The version 1.0 supported here is slightly different from version 1.0 as documented in the original standard, and the same as version 1.1 NTF. Data produced by OS(GB) is of all versions. The version number in the header is expected to be 1.0, 1.1 or .
- The program does not support vector data - only raster sections may be present on the tape.
- The data values must be in numeric form as specified by the INTERPRET field in the grid record. If this is not the case a warning will be issued and the program will attempt to continue assuming numeric data.
- The ORDER, COLINV, and ROWINV flags in the grid record must be unset. If this is not the case a warning will be issued and the program will attempt to continue.
- The data values are stored as GRIDVALS in the GRIDREC record. At level 0 the width of this field is defined as 10 and may not be modified. At levels 4 or 5 the width of this field may be defined by the use of a DATADESC record.
- At levels 4 and 5 NTF2DTI will interpret any DATADESC records it meets. If the GRIDVAL field is being redefined, NTF2DTI will extract the new width of this field and use it later when reading from the GRIDRECs.
- The program only decodes certain fields of the section header and GRIDHREC records.

EXAMPLES

```
 $ NTF2DTI /LOG MSA0: IOW <CR>


%NTF2DTI-I-NTFOPEN, NTF file MSA0: opened
%NTF2DTI-I-NTFDATA, NTF data at level 4, version  1.00
%NTF2DTI-I-DTIOPEN, DTI file "LSL$DTI:IOW.DTI" opened

File    :  LSL$DTI:IOW.DTI
Header  :  LSLA  Data:  WORD

Units are Metres

Matrix Coverage   SW:  440000.00   80000.00    NE:  460000.00  100000.00
Matrix Interval    E:      50.00                N:      50.00
Value Range         :     0   to    235

Spheroid      :   9 (Airy)
Projection    : 101 (UK national grid)

Units         :   2 (Metres)
Local Origin  :      440000.000 (Eastings)     80000.000 (Northings)
Sample values :          50.000 (Eastings)        50.000 (Northings)

%NTF2DTI-I-DTICLOSED, DTI file closed
 ELAPSED:    0 00:05:53.24  CPU: 0:02:36.93  BUFIO: 4  DIRIO: 501  FAULTS: 990
```

In this example the input NTF dataset is to be read from the device MSA0:. The output DTI file was given as IOW, this will be parsed and called LSL$DTI:IOW.DTI. The /LOG qualifier means that the additional information is printed on the screen. It is assumed that an LSLA header is required with a projection record and that the NTF data was supplied by the Ordnance Survey. The conversion is completed successfully.

```
 $ NTF2DTI /LOG IOWRELIEF  <CR>

%NTF2DTI-I-MISC, no output DTI file specified
%NTF2DTI-I-MISC, filenames will be taken from SECHREC
%NTF2DTI-I-NTFOPEN, NTF file IOWRELIEF.NTF opened
%NTF2DTI-I-NTFDATA, NTF data at level 4, version  1.00
%NTF2DTI-I-DTIOPEN, DTI file "LSL$DTI:TERRAIN.DTI" opened

File    :  LSL$DTI:TERRAIN.DTI
Header  :  LSLA  Data:  WORD

Units are Metres

Matrix Coverage   SW:  440000.00   80000.00    NE:  460000.00  100000.00
Matrix Interval    E:      50.00                N:      50.00
Value Range         :     0   to    235

Spheroid      :   9 (Airy)
Projection    : 101 (UK national grid)
```

```
Units         :   2 (Metres)
Local Origin  :      440000.000 (Eastings)     80000.000 (Northings)
Sample values :          50.000 (Eastings)        50.000 (Northings)

%NTF2DTI-I-DTICLOSED, DTI file closed
 ELAPSED:    0 00:05:53.24  CPU: 0:02:36.93  BUFIO: 4  DIRIO: 501  FAULTS: 990
```

In this example the input NTF dataset is to be read from the file IOW_RELIEF.NTF.The /LOG qualifier means that the additional information is printed on the screen. It is assumed that an LSLA header is required with a projection record and that the NTF data was supplied by the Ordnance Survey.

Since no output DTI file was specified, appropriate messages inform the user that the output DTI filenames will be taken from the SECHREC records in the NTF dataset. The conversion is completed successfully.

$ **NTF2DTI /PROJECTION /HEADERTYPE=TED4 HERE:NTFFILE DTIFILE<CR>**

```
%NTF2DTI-E-NOTLSLA, Projection records with LSLA header only
 ELAPSED:    0 00:00:01.73  CPU: 0:00:00.22  BUFIO: 0  DIRIO: 0  FAULTS: 96
```

This is an incorrect command line. A TED4 style header was requested but the /PROJECTION qualifier was also given. As TED4 headers cannot have a projection record an error was flagged.

$ **NTF2DTI/OUTPUT=DTILIST/LOG/HEADER=TED4 MTA0: DUA0:[IAIN]DTIMAP <CR>**

```
%LSLLIB-I-LOGOPNOUT, log file DTILIST.LOG opened for write
%NTF2DTI-I-NTFOPEN, NTF file MTA0: opened
%NTF2DTI-I-NTFDATA, NTF data at level 4, version  1.00
%NTF2DTI-I-DTIOPEN, DTI file "DUA0:[IAIN]DTIMAP.DTI" opened

File    :  DUA0:[IAIN]DTIMAP.DTI
Header  :  TED4  Data:  WORD

Units are Metres

Matrix Coverage   SW:  440000.00   80000.00    NE:  460000.00  100000.00
Matrix Interval    E:      50.00                N:      50.00
Value Range         :     0   to    235

%NTF2DTI-I-DTICLOSED, DTI file closed
 ELAPSED:    0 00:07:53.20  CPU: 0:02:31.95  BUFIO: 9  DIRIO: 517  FAULTS: 1243
```

$ **TYPE DTILIST.LOG <CR>**

```
     LSL750$DUA0:[IAIN]DTILIST.LOG;1

     ========================== N T F 2 D T I ==============================

     NTF2DTI invoked by IAIN using terminal LTA155: at 26-APR-1988 11:12:41.47

     Command line:
```

```
NTF2DTI/OUTPUT=DTILIST/LOG/HEADER=TED4 MTA0: DUA0:[IAIN]DTIMAP

================================================================================

Volume header record:
   Data sent by     "ORDNANCESURVEY     "
   Data sent to     "LASERSCAN           "
   Date of transfer "19880330" (ie 30/03/1988)
   NTF level          4
   NTF version        1.00
Database header data:
   Database name          "GM440080            "
   Data dictionary        "OSDTMDDICT1.0    "
   Database date          "19870508" (ie 08/05/1987)
   Classification scheme  "                    "
   Classification date    "00000000" (ie 00/00/0000)
   Data quality report    "                    "
   Data quality date      "00000000" (ie 00/00/0000)
```

This command line also specifies a TED4 style header but does not request a projection record so none is written. The LOG option is used once more and in addition the log file option /OUTPUT is used. The output file DTILIST.LOG is shown above. This run was completed successfully.

MESSAGES (SUCCESS)

These messages are used to indicate that the program has succeeded in performing some action, and do not require any user action.

NORMAL, NTF2DTI function return was TRUE (ie success)

Explanation: This message is used internally by NTF2DTI to indicate whether a subroutine has completed succesfully or not.

User action: None.

MESSAGES (INFORMATIONAL)

These messages give information only, and require no immediate action by the user. They are used to provide information on the current state of the program, or to supply explanatory information in support of a warning or error message.

DTICLOSED, DTI file closed

Explanation: The DTI output file has been successfully closed.

User action: None.

DTIOPEN, DTI file 'file-name' opened

Explanation: The DTI output file has been successfully opened.

User action: None.

NTFDATA, NTF data at level 'integer', version 'real'

Explanation: This message is output to confirm the form of NTF being read if the user has specified the /LOG qualifier.

User action: None.

NTFFORMAT, NTF data has 'string' length records

Explanation: This message is output to confirm the format of NTF records being read if the user has specified the /LOG qualifier.

User action: None.

NTFOPEN, NTF file 'file-name' opened

Explanation: This message is output when NTF data is being read from a file on disk if the user has specified the /LOG qualifier.

User action: None.

RETRY, Attempting to read another record

Explanation: This message is output when an unrecognised record type has been read from the NTF dataset. NTF2DTI assumes that the record is invalid and attempts to read the next record from the dataset.

User action: None.

MESSAGES (WARNING)

These messages are output when an error has occurred that can be corrected immediately by the user or that the program will attempt to overcome.

COLINV, column inversion flag set

Explanation: The COLINV field in the GRIDREC indicates that the data columns are organised with a North-South orientation rather than the default of South-North. The data is still written using the default notation and any transformations should be carried out using the DTM packages.

User action: If required the file can be re-ordered using the DTM programs.

INTERPRET, data type set to "nominal" in grid record

Explanation: The INTERPRET field in the GRIDREC indicates that the data values are in a nominal form. The program can read only numeric data and will attempt to continue assuming the data is numeric.

User action: The output should be checked as it may be suspect. If there is a problem contact the donor of the data and/or Laser-Scan.

NOTRASTER, the data in section "'integer'" is not raster data

Explanation: The section header for the relevant section indicates that the section contains non-raster (possibly vector) data. This program does not translate non-raster data.

User action: Ensure that the data is actually raster suitable for translation to a DTI file.

ORDER, unsupported ORDER 'integer' given in GRID record

Explanation: The value found in the ORDER field in the GRIDREC record is not supported by this program. Order 1 is assumed.

User action: Use the DTM package to transpose the data.

ROWINV, row inversion flag set

Explanation: The ROWINV field in the GRIDREC indicates that the data rows are organised with a East-West orientation rather than the default of West-East. The data is still written using the default notation and any transformations should be carried out using the DTM packages.

User action: If required the file can be re-ordered using the DTM programs.

UNEXPREC, unexpected record type 'string', record 'integer'

Explanation: The specified record type is not expected in that position on the tape (for instance, finding a GRIDREC record before the first SECHREC). If this message follows an ERROR message, the program will exit, otherwise it will attempt to continue.

User action: Report the problem to the donor of the data.

UNKNOWN, unknown record type 'string', record 'integer'

Explanation: The specified record type is not one that the program recognises. If this message follows an ERROR message, the program will exit, otherwise it will attempt to continue.

User action: Report the problem to the donor of the data.

VOLHDCONT, unexpected continuation of VOLHDREC being ignored

Explanation: According to the NTF standard, the volume header record is not continuable. OS have proposed a modified form of the standard where a form of sheet index is output after the volume header. The program does not use this data, and will produce the VOLHDCONT warning message if such a continuation is found.

User action: None - the continuation is ignored.

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

ABORT, NTF2DTI function return was FALSE (ie. error)

Explanation: This message is used internally by NTF2DTI to indicate whether a subroutine has completed succesfully or not.

User action: None.

BADUNIT, unknown value for XY units

Explanation: The value found in the XY_UNIT unit field of the map descriptor entry was not known. The program will exit.

User action: Report the problem to Laser-Scan.

CLOSERR, error closing file 'file-name'

Explanation: Some form of error occurred in closing one of the input or output files. The program will exit.

User action: Depends upon the associated LSLLIB messages.

DTICLOSERR, error closing DTI file 'file-name'

Explanation: The program encountered an error while trying to close the DTI file.

User action: Depends upon the other error messages.

DTICOPYDATA, error writing data values to DTI file

Explanation: The program encountered an error while trying to write the data values to the DTI file.

User action: Depends upon the other error messages.

DTICREATE, error trying to open DTI file 'file-name'

Explanation: The program encountered an error while trying to open the named DTI file.

User action: Depends upon the other error messages.

ERRORRD, error reading the 'string' field

Explanation: This message is output to specify that the field that was incorrect, and follows a message identifying the record in which the error occurred. The contents of the offending field will be output on the next line. The program will exit.

User action: Depends upon the error, and upon the source of the data. It may be necessary to consult the donor of the data, giving details of the offending record and field.

FILOPEN, error opening file 'file-name'

Explanation: Some form of error occurred in opening one of the input or output files. The program will exit.

User action: Depends upon the associated LSLLIB messages.

GRIDHREC, error reading "'string'" from grid header record

Explanation: An error occurred in interpreting the contents of the given field in the grid header.

User action: See the following error message.

GRIDREC, error reading "'string'" from grid record

Explanation: An error occurred in interpreting the contents of the given field in the grid record.

User action: See the following error message.

HEADER, error reading the header from the DTI file 'file-name'

Explanation: An error occured when reading the header information from the DTI file to the screen.

User action: Depends on the associated messages.

MAGTAPE, error initialising magtape device 'device'

Explanation: An error occurred in initialising the magnetic tape drive for reading. The associated LSLLIB and system error messages should clarify the problem.

User action: Dependant upon the associated messages. One possible cause of problems is that the tape has not been mounted.

MINMAX, error writing MINMAX data to DTI file 'file-name'

Explanation: An error occured when writing the maximum and minimum data values to the DTI files header.

User action: Depends on the associated messages.

MULTIVOL, this program does not support multiple volume datasets

Explanation: Although the NTF standard allows datasets spread over several magnetic tapes, the NTF2DTI program does not currently support such datasets.

User action: The data should be supplied on several individual magnetic tapes, with no continuation from one tape to another.

NILXYMULT, XY_MULT is zero - using a value of 1.0 instead

Explanation: The planimetric coordinate multiplication factor (XY_MULT) read from the section header record is zero. All coordinates are multiplied by this value before being output. A value of 1.0 is substituted to allow at least some form of output. The program will attempt to continue.

User action: Contact the donor of the data to determine why the XYMULT value was zero.

NODEVICE, unknown device name 'device' given

Explanation: The device name given on the command line was not recognised. The program will exit.

User action: Specify a legal device or do not use the qualifier, the default is MTA0:.

NOTALL, only 'integer' data items found, 'integer' expected

Explanation: In a grid data record a record was not continued when more data was expected.

User action: Contact the donor of the data to determine why some data is missing (or why the amount of data was wrongly specified in the header).

NOTATLEVEL, entry type "'string'" is not supported at level 'integer'

Explanation: The specified NTF record descriptor belongs to a record that is not allowed at the level of NTF in this dataset. The program will exit.

User action: Contact the donor of the data to determine why the record is present, or why the level of the data is incorrectly flagged in the volume header record.

NOTCONTINUE, continuation record not found for 'string', record 'integer'

Explanation: The previous record contained a continuation flag, but this record is not a continuation record. The NTF data is thus corrupt, and the program will exit.

User action: Contact the donor of the data and report the problem.

NOTERMCR, no terminating carriage return at end of record

Explanation: The NTF standard requires that, when variable length records are used they must be terminated with a carriage return. The record specified in the previous record was not.

User action: Contact the donor of the data to determine why the data was not in the expected form.

NOTLSLA, projection records with LSLA header only

Explanation: A projection record was requested using the /PROJECTION qualifier but the header has been set to something other than a LSLA type. This is not allowed and the program will exit.

User action: Re-enter the command line, either not requesting a projection record or selecting an LSLA header (default) with the /HEADERTYPE qualifier.

NOTOS, unexpected level 4 data encountered

Explanation: The data in the NTF file is at level 4 but OS style recognition has been disabled with /NOOS.

User action: Re-enter the command line without the /NOOS qualifier.

NOVOLHDREC, first record of NTF must be volume header record

Explanation: The NTF standard specifies that the first record on the tape must be the VOLHDREC or volume header record. This error message is generated if this is not the case, and the program will exit.

User action: Contact the donor of the data and report the problem.

OUTOPEN, error opening /OUTPUT file 'file-name'

Explanation: An error has occurred in trying to open the log file specified with the /OUTPUT qualifier. The associated LSLLIB and system messages should clarify the problem.

User action: Dependant upon the associated messages.

PROJREC, error writing to the DTI projection record

Explanation: An error has occurred while copying data to the DTI projection record.

User action: Dependant upon the associated messages.

READBLK, error reading block 'integer' from magtape

Explanation: An error has occurred in obtaining the next block of data from the magnetic tape. The associated LSLLIB and system messages should clarify the problem.

User action: Dependant upon the associated messages.

READREC, error reading record 'integer' from NTF input file

Explanation: An error has occurred in obtaining the next record from the input file. The associated LSLLIB and system messages should clarify the problem.

User action: Dependant upon the associated messages.

SECHREC, error reading SECHREC record, in field "'string'", record 'integer'

Explanation: An error occurred in interpreting the contents of the specified field in the current section header record. The contents of the offending field will be output on the next line. If this error occurs in the OS specific part of the section header record, then the program will attempt to continue, otherwise it will exit.

User action: Depends upon the error. It may be necessary to contact the donor of the data, and report the problem.

SECTION, error reading SECTION 'integer'

Explanation: An error occurred while reading the current section in the NTF dataset. This error will always be preceeded by a more detailed error message.

User action: Depends upon the error. It may be necessary to contact the donor of the data, and report the problem.

SHORTBLK, block 'integer' is only 'integer' characters long

Explanation: The program has succesfully read the next block from the magnetic tape, but its size is wrong. Since the NTF standard specifies that blocks must be 2000 bytes long, this is a serious error. The program will exit.

User action: Report the problem to the donor of the data.

SHORTREC, record 'integer' is only 'integer' characters long

Explanation: The program has succesfully read the next record from the input file, but its length is wrong. Since the NTF standard specifies that all records must be 80 characters long if fixed format (ie. version 1.0), this is a serious error. The program will exit.

User action: Report the problem to the donor of the data.

SHORTSECH, not enough continuation lines for SECHREC record

Explanation: The NTF standard specifies that the section header record is at least three records long (ie. one record with two continuations). This message is output if the section header is shorter than the standard requires. The program will exit.

User action: Report the problem to the donor of the data.

TESTFOR, error testing whether device 'device' is mounted /FOREIGN

Explanation: In order to read NTF data from a tape, the tape must be mounted foreign. The program encountered an error while testing for this.

User action: Depends upon the associated error messages. Ensure the tape is mounted /FOREIGN

VOLHDREC, error reading VOLHDREC record, in field "'string'"

Explanation: An error occurred in interpreting the contents of the specified field in the volume header record. The contents of the offending field will be output on the next line. The program will exit.

User action: Depends upon the error. It may be necessary to contact the donor of the data, and report the problem.

WRONGLEVEL, this program cannot read data at NTF level 'integer'

Explanation: The program only recognises NTF level 0 and a subsidary of level 4. Data at any other level (as indicated in the volume header record) will produce this message, and cause the program to exit.

User action: Do not attempt to read data at levels other than 0 or 4.

WRONGVERSION, this program cannot read data of NTF version 'real'

Explanation: The program currently only recognises data as specified in version 1.0 or 1.1 of the NTF standard. Data from any other version of the standard (as indicated in the volume header record) will produce this message, and cause the program to exit.

User action: Do not attempt to read data that is specified by a version of the NTF standard not supported by the program. Use of the /OS qualifier (default) allows the OS's updated version to be used

---

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 5

MODULE DTEDIFF

UTILITY DTEDIFF

REPLACES MCE module DTEDIFF.

FUNCTION

DTEDIFF is a utility to transfer DSI (DataSet Identification) and ACC (Accuracy) record data from the header of a DTED DTI format file, to an IFF file, and vice versa.

FORMAT

$ DTEDIFF DTI-file-spec IFF-file-spec

Command qualifiers	**Defaults**
/[NO]LOG	/NOLOG
/[NO]MERGE	/MERGE

PROMPTS

DTI-filename: DTI-file-spec

IFF-filename: IFF-file-spec

PARAMETERS

DTI-file-spec

- The file specification of the DTI file. This file must have a TED4 header structure. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:DTI.DTI'.

IFF-file-spec

- The file specification of the IFF file. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$IF:IFF.IFF'.

COMMAND QUALIFIERS

/LOG
/LOG (default)

- If specified then details on the data values being transferred between the records of the DTI and IFF files will be displayed on the terminal.

/MERGE (default)
/NOMERGE

- If /MERGE is specified, then information recorded in the MCE Map Header, and accuracy region data in layer 0 of the IFF file, will be transferred to the DSI and ACC header records of the DTI file. Any existing DSI and ACC information in the DTI file will be overwritten by this operation.

- If /NOMERGE is specified, then information from the DSI and ACC records of the DTI file, will be transferred to the IFF file. A new IFF file will be created. the DSI data will be held in a MCE Map Header entry, while the ACC data will be held as a number of separate features in layer 0 of the file.

DESCRIPTION

DTEDIFF is a utility to transfer DSI (DataSet Identification) and ACC (Accuracy) record data from the header of a Laser-Scan DTED DTI (Digital Terrain Image) format file to an IFF (Internal Feature Format) file, and vice versa. The header data is held in the IFF file in a MCE Map Header entry, while accuracy sub-region data is held as a series of features in layer 0 of the file.

The direction of data transfer is controlled by the /MERGE qualifier. If /MERGE is specified, header information is transferred from the IFF file to the DTI file. Any information already present in the DTI DSI and ACC records will be overwritten as part of this operation. If /NOMERGE is specified, information is transferred from the DTI file to the IFF file. The default action of DTEDIFF (ie. if no qualifier is supplied on the command line) is to copy data from the IFF file to the DTI file.

The DTI file specification must be that of a file with a TED4 header structure ie. a file with DSI and ACC records.

The DSI record of a TED4 DTI file contains information relating to the generation of the dataset by the producing agency, including the compilation date, mode of data capture and level of processing. In addition the DSI holds information on the latitude and longitude origin of the dataset, the matrix grid intervals, and the latitude and longitude of the dataset bounding rectangle.

The DSI information is held in the IFF file in a MCE type Map Header.

The ACC record of a TED4 DTI file contains information on the vertical and horizontal accuracy of the dataset. Accuracy values for the whole of the data area, and possibly for up to 9 sub-regions may be defined. The coordinates defining the sub-regions are contained within the record - an area may be defined by up to 14 coordinate pairs.

In the IFF file, data for each accuracy sub-region is held as a feature in layer 0.

The DTILIB Reference Manual in Package MATRIX contains details on the structure of a TED4 DTI header.

The purpose of DTEDIFF is to allow DSI and ACC information to be edited using Laser-Scan utilities such as MCEHED and LITES2. A typical sequence of operations will be to create a DTI file by reading a dataset from a DTED format magnetic tape using DTED2DTI; to transfer header data from the DTI file to an IFF Map Header using the /NOMERGE qualifier in DTEDIFF; to edit the IFF Map Header using MCEHED; to merge the edited data back into the DTI file using DTEDIFF with the /MERGE qualifier, and finally to convert the DTI file to a DTED format magnetic tape using DTI2DTED.

EXAMPLES

$ DTEDIFF/LOG/MERGE DAVECTED4.DTI DFAD1.IFF<CR>
Merging IFF file LSL$IF:DFAD1.IFF;0
into DTI file LSL$DTI:DAVECTED4.DTI;0

Security code descriptor	R
Security handling descriptor	LASER-SCAN EYES ONLY
Series designator - task	DFAD
Series designator - level	1
Unique reference code	UK SQUARE 79
Data edition number	00
Match/merge version	A
Maintenance date	0 0
Match/merge date	0 0
Maintenance description code	0000
Producer code	UKMODMCE
Product spec stock number	SPECXDLMS
Product spec change number	00
Product spec date	77 7
Vertical datum	
Horizontal datum	WGS72
Digitising collection system	FREESCAN
Compilation date	7810
Manuscript origin (lat)	5759 0.0N
Manuscript origin (long)	5 1 0.0W
South west corner (lat)	58 0 0N
South west corner (long)	5 0 0W
North west corner (lat)	59 0 0N
North west corner (long)	5 0 0W
North east corner (lat)	59 0 0N
North east corner (long)	4 0 0W
South east corner (lat)	58 0 0N
South east corner (long)	4 0 0W
Clockwise orientation of data	0 0 0.0
Latitude interval	0000
Longitude interval	0000
Number of latitude lines	0000
Number of longitude lines	0000
Partial cell indicator	00
Absolute horizontal accuracy	0050
Absolute vertical accuracy	0000
Relative horizontal accuracy	0025
Relative vertical accuracy	0000
Number of accuracy subregions	02

ELAPSED: 0 00:00:05.12 CPU: 0:00:01.14 BUFIO: 49 DIRIO: 14 FAULTS: 155

In this example, /MERGE is specified so that Map Header and accuracy region data from layer 0 of the IFF file is transferred to the DSI and ACC records of the DTED DTI file. The /LOG qualifier is used to output header information to the terminal.

```
$ DTEDIFF/LOG/NOMER DAVECTED4.DTI DAVEC.IFF<CR>
Creating IFF file LSL$IF:DAVEC.IFF
    from DTI file LSL$DTI:DAVECTED4.DTI;0

%LSLLIB-I-IFFOPENED, DUA0:[MCE.IFF]DAVEC.IFF;17 opened for write
Security code descriptor                          R
Security/release control
Security handling descriptor                      LASER-SCAN EYES ONLY
Series designator - task                          DFAD
Series designator - level                         1
Unique reference code                             UK SQUARE 79
Data edition number                               0
Match/merge version                               A
Maintenance date                                  unset
Match/merge date                                  unset
Maintenance description code                      0000
Producer code                                     UKMODMCE
Product spec stock number                         SPECXDLMS
Product spec change number                        0
Product spec date                                  1-Jul-1977
Vertical datum
Horizontal datum                                  WGS72
Digitising collection system                      FREESCAN
Compilation date                                   1-Oct-1978
Manuscript origin (lat)                             57 59  0.0
Manuscript origin (long)                            -5  1  0.0
South west corner (lat)                             58  0  0.0
South west corner (long)                            -5  0  0.0
North west corner (lat)                             59  0  0.0
North west corner (long)                            -5  0  0.0
North east corner (lat)                             59  0  0.0
North east corner (long)                            -4  0  0.0
South east corner (lat)                             58  0  0.0
South east corner (long)                            -4  0  0.0
Clockwise orientation of data                        0  0  0.0
Latitude interval                                 0
Longitude interval                                0
Number of latitude lines                          0
Number of longitude lines                         0
Partial cell indicator                            0

Absolute horizontal accuracy                      50
Absolute vertical accuracy                        0
Relative horizontal accuracy                      25
Relative vertical accuracy                        0
Number of accuracy subregions                     2
Reading polygon 1
Angle 1(2) of region 1   58  0  0.0
 offset      600
Angle 1(1) of region 1   -5  0  0.0
 offset      600
Angle 2(2) of region 1   58  0  0.0
 offset      600
Angle 2(1) of region 1   -4 30  0.0
 offset    18600
Angle 3(2) of region 1   59  0  0.0
```

```
 offset    36600
Angle 3(1) of region 1   -4 30  0.0
 offset    18600
Angle 4(2) of region 1   59  0  0.0
 offset    36600
Angle 4(1) of region 1   -5  0  0.0
 offset      600
absh  50 absv   0 relh  25 relv   0
Reading polygon 2
Angle 1(2) of region 2   58  0  0.0
 offset      600
Angle 1(1) of region 2   -4 30  0.0
 offset    18600
Angle 2(2) of region 2   58  0  0.0
 offset      600
Angle 2(1) of region 2   -4  0  0.0
 offset    36600
Angle 3(2) of region 2   59  0  0.0
 offset    36600
Angle 3(1) of region 2   -4  0  0.0
 offset    36600
Angle 4(2) of region 2   59  0  0.0
 offset    36600
Angle 4(1) of region 2   -4 30  0.0
 offset    18600
absh  40 absv   0 relh  20 relv   0
```

In this example, /NOMERGE is specified so data read from the DSI and ACC records of a DTI file, are transferred to a MCE Map Header and to layer 0, of a created IFF file. The /LOG qualifier is used to output header information to the terminal.

DTEDIFF messages

MESSAGES (SUCCESS)

These messages are used to indicate that the program has succeeded in performing some action, and do not require any user action.

NORMAL, DTEDIFF normal successful completion

Explanation: The utility completed successfully

User action: None

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

ACCBADAC, ACC Region with an invalid AC field entry

Explanation: The ACC region has an invalid relative or absolute horizontal or vertical accuracy entry.

User action: Check the structure of the accuracy region

ACCBADCOORD, ACC Region with an invalid coordinate point

Explanation: An invalid latitude or longitude coordinate point has been found for an accuracy region. The coordinate is either too small or too large

User action: Check the structure of the accuracy region

ACCBADFORMAT, ACC Region with an invalid field entry

Explanation: The accuracy region defined in the ACC record has an invalid format

User action: Check the structure of the DTI ACC record

ACCBADREGION, ACC Region is not valid

Explanation: The ACC accuracy region does not conform to the DLMS specification for an accuracy region

User action: Check the structure of the accuracy region

ACCNOAC, ACC Region without an AC entry

Explanation: The ACC region has no AC entry, and therefore the relative or absolute horizontal or vertical accuracy cannot be read.

User action: Check the structure of the accuracy region

ACCNOST, ACC Region without an ST entry

Explanation: The ACC region has no ST entry, and therefore the coordinates of the accuracy region cannot be determined

User action: Check the structure of the accuracy region

ACCNOTNF, Layer 0 contains no NF entry

Explanation: No NF entry was found in layer 0 of the IFF file. DTEDIFF is therefore unable to read an accuracy data

User action: Check the structure of the accuracy region

ACCTOOFEWPTS, ACC Region with too few coordinate points

Explanation: The ACC accuracy region is defined with too few coordinate points. An accuracy region should have at least 3 points

User action: Check the structure of the accuracy region

ACCTOOMNYPTS, ACC Region with too many coordinate points

Explanation: The ACC accuracy region is defined with too many coordinate points. An accuracy region should have no more than 14 points

User action: Check the structure of the accuracy region

ACCTOOMNYREGS, Too many accuracy regions

Explanation: Too many accuracy regions have been found. The file should contain do more than 9 accuracy regions

User action: Check the structure of IFF or DTI file

BADACCFIELD, Invalid ACC record field value

Explanation: An invalid ACC record field value has been detected in the input DTI file. DTEDIFF is unable to proceed.

User action: Check the structure of the ACC record in the DTI file

BADACCREGVAL, Invalid ACC region value

Explanation: An invalid accuracy region value has been detected in the input IFF file. DTEDIFF is unable to proceed.

User action: Check the structure of the input IFF file

BADACCSENT, Invalid ACC sentinel

Explanation: An invalid ACC record sentinel has been detected in the input DTI file. The sentinel should be ACC. DTEDIFF is unable to proceed.

User action: Check the structure of the ACC record in the DTI file

BADDSIFIELD, Invalid DSI record field value

Explanation: An invalid DSI record field value has been detected in the input DTI file. DTEDIFF is unable to proceed.

User action: Check the structure of the DSI record in the DTI file

BADDSISENT, Invalid DSI sentinel

Explanation: An invalid DSI record sentinel has been detected in the input DTI file. The sentinel should be DSI. DTEDIFF is unable to proceed.

User action: Check the structure of the DSI record in the DTI file

BADFACORDER, Layer 0 features not in ascending FAC order

Explanation: The accuracy features in layer 0 of the IFF file should be in ascending FAC (FSN) order.

User action: Use the IMP utility ISORT to sort the features into FSN order

BADMHSIZE, The IFF Map Header has an incorrect length

Explanation: The Map Header in the input IFF file is corrupt. The length should be 174 bytes

User action: Check the utility that was used to create the IFF file

BADMHTYPE, The IFF Map Header is not a MCE type header

Explanation: The Map Header in the input IFF file is not a MCE type header (type 1). DTEDIFF will only read information from a MCE header

User action: Check that the correct file has been submitted to DTEDIFF.

BADTRANSFER, Data transfer has been abandoned

Explanation: DTEDIFF is unable to transfer data between the DTI and IFF files. The message preceeding this message will indicate the reason for abandoning data transfer

User action: As for the preceeding message

DTINOTTED4, DTI file does not have a TED4 header structure

Explanation: The input DTI file is not a DTED file with a TED4 header structure. DTEDIFF can only read DSI and ACC information from a TED4 file

User action: Check that the correct file has been submitted to DTEDIFF.

DUPLAYZERO, More than 1 layer 0 present in the IFF file

Explanation: The input IFF file contains more than 1 layer 0. This is an invalid IFF structure

User action: Check the utility that was used to create the IFF file

IFFREAD, Unable to read IFF entry

Explanation: An error has occurred whilst reading an entry in the input IFF file. This indicates that the file has an incorrect structure

User action: Check the structure of the input IFF file

MISSINGEF, No EF entry found

Explanation: No EF entry terminating an accuracy region was found in layer 0 of the input IFF file. The structure of the IFF file is therefore incorrect.

User action: Check the structure of the input IFF file

MISSINGEO, No EO entry found

Explanation: No EO entry terminating layer 0 was found in the input IFF file. The structure of the IFF file is therefore incorrect.

User action: Check the structure of the input IFF file

NOLAYZERO, No Layer 0 found

Explanation: The input IFF file did not contain a layer 0. DTEDIFF is therefore unable to transfer accuracy region data to the DTI file

User action: Check the structure of the input IFF file

NOMH, No Map Header (MH) entry found

Explanation: The input IFF file did not contain a MH entry. DTEDIFF is therefore unable to transfer header data to the DTI file

User action: Check the structure of the input IFF file

NOTFEATONE, Accuracy feature with FSN 1 not found in layer 0

Explanation: The first accuracy feature found in layer 0 should be FSN 1

User action: Check the structure of the input IFF file

UNEXPEOF, End of IFF file unexpectedly encountered

Explanation: The end of the input IFF file was unexpectedly encountered. This indicates that the file has an incorrect structure, and may be missing certain IFF entries.

User action: Check the structure of the input IFF file

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 6

MODULE IIS2DTI

UTILITY IIS2DTI

REPLACES IIS2DTI is a new utility.

FUNCTION

IIS2DTI is a utility to convert raster data in International Imaging System's (IIS) system 500 format to a Laser-Scan Digital Terrain Image (DTI) file. The normal form of the conversion reads data arranged in 512 byte swaths throughout the dataset, in 512 byte fixed length records on disc.

It also converts data in an extension of the normal 500 format where the data is arranged in scan lines across the input file in fixed length disc records with the number of bytes per record being the number of columns in the input dataset (ie. one single swath across the dataset).

FORMAT

$ IIS2DTI infile-spec outfile-spec columns rows

Command qualifiers	**Defaults**
/BYTE	/BYTE
/HEADER	/HEADER = 1
/SHORT	no /SHORT
/LONG	no /LONG
/WIDTH	no /WIDTH

PROMPTS

Input IIS-file:	Input-IIS-file-spec
Output DTI-file:	Output-DTI-file-spec
Number of rows:	Number of rows in IIS file
Number of columns:	Number of columns in IIS file

PARAMETERS

Input-IIS-file-spec

- specifies the input IIS file. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:IIS.IIS'.

Output-DTI-file-spec

- specifies the output DTI file. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:DTI.DTI'.

rows

- specifies the number of rows in the IIS file which are to be converted into DTI format.

columns

- specifies the number of columns in the IIS file which are to be converted into DTI format.

COMMAND QUALIFIERS

/BYTE

- Specifies that the data to be read and written is in BYTE format (the default).

/HEADER

- Specifies how many 512 byte header blocks to expect in the IIS file before the actual data. The default number is one.

/LONG

- Specifies that the data to be read and written is in INTEGER*4 format.

/SHORT

- Specifies that the data to be read and written is in INTEGER*2 format.

/WIDTH

- Specifies the block size for the 500 format extension (with one swath covering the whole input file). The /WIDTH qualifier specifies that the record block size is different from the default of 512, in which case the data is expected to represent one single swath, and the width must be the same as the number of columns in the dataset. Parameter 4 is therefore not required with the /WIDTH qualifier.

DESCRIPTION

IIS2DTI is a utility to convert raster data in International Imaging System's (IIS) system 500 format to a Laser-Scan Digital Terrain Image (DTI) file. System 500 data files are composed of swaths, each 512 bytes in width. These swaths run from the top of the image to the bottom. The data order within the file is the top row of the first swath followed consecutively by the rest of the swath. This is then repeated for each swath in turn until the whole width of the image is covered. It should be remembered that the number of actual values per swath width will depend upon the data type in the file, (i.e. 512 BYTE values, 256 INTEGER*2 values and 128 INTEGER*4 values). The data is stored in 512 byte fixed length records on disc.

The program also converts data in an extension of the normal 500 format where the data is arranged in scan lines across the input file in fixed length disc records, with the number of bytes per record being equal to the number of columns in the input dataset (ie. one single swath down the dataset). This extension is only usable for byte data (the default datatype), and is obtained by using the /WIDTH = record_length qualifier.

RESTRICTIONS

- The only data types which can currently be converted are BYTE, INTEGER*2 and INTEGER*4. Real values are not transferable.
- IIS system 600 is not currently supported. There are resident IIS functions (diskenter and disktransfer) to convert between system 600 and system 500.

EXAMPLES

$ **IIS2DTI COVERMAP COVERMAP 420 401 /SHORT**

```
%I2D-I-NUMCOLSWA, 100 Columns of swath 1 written successfully
%I2D-I-NUMCOLSWA, 200 Columns of swath 1 written successfully
%I2D-I-NUMCOLSWA, 300 Columns of swath 1 written successfully
%I2D-I-NUMCOLSWA, 400 Columns of swath 1 written successfully
%I2D-I-NUMCOLSWA, 100 Columns of swath 2 written successfully
%I2D-I-NUMCOLSWA, 200 Columns of swath 2 written successfully
%I2D-I-NUMCOLSWA, 300 Columns of swath 2 written successfully
%I2D-I-NUMCOLSWA, 400 Columns of swath 2 written successfully

 ELAPSED:    0 00:01:53.24  CPU: 0:0:36.93  BUFIO: 4  DIRIO: 501
FAULTS: 990
```

In this example the input IIS file is 420 rows by 401 columns. Each data value is a short integer. The DTI file created as output will also be 420 rows by 401 columns of short integers. The informational messages provide continual reassurance of the extent of the conversion. It can be seen that the DTI file is written out one IIS swath at a time. As the data in this example is INTEGER*2 the swath width is 256 values wide (512 bytes) and so two swaths are needed to cover the data area.

MESSAGES (SUCCESS)

These messages are used to indicate that the program has succeeded in performing some action, and do not require any user action.

NORMAL, Normal successful completion.

Explanation: Indicates that the routine has completed without encountering any fatal errors.

User action: None.

MESSAGES (INFORMATIONAL)

These messages give information only, and require no immediate action by the user. They are used to provide information on the current state of the program, or to supply explanatory information in support of a warning or error message.

NUMCOLSWA, 'integer' columns of swath 'integer' written successfully

Explanation: A multiple of a hundred rows has been written to the selected DTI file.

User action: None.

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

READIISERR, Unable to read from IIS file

Explanation: An attempt to read from the specified IIS file has failed.

User action: None.

UNACLODTI, Unable to close DTI file

Explanation: The specified DTI file has been written to, but cannot be closed.

User action: None.

UNACLOIIS, Unable to close IIS file

Explanation: The specified IIS file has been read from, but cannot be closed.

User action: None.

UNAOPNDTI, Unable to open DTI file

Explanation: The DTI file specifed by the user could not be opened.

User action: None.

UNAOPNIIS, Unable to open IIS file

Explanation: The IIS file specified by the user could not be opened.

User action: None.

UNAPCHDTI, Unable to patch DTI range

Explanation: The calculation of the minimum and maximum values in the DTI file and their subsequent writing to the DTI header was unsuccessful.

User action: None.

UNAWRIDTI, Unable to write to DTI file

Explanation: An attempt to write to the specified DTI file has failed.

User action: None.

USPDATTYP, Unsupported data type

Explanation: The user has replied in the negative to all of the possible data types, therefore there has been a mistake or the data type is unsupported.

User action: Run the program again and choose one of the available types.

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 7

MODULE DTI2IIS

UTILITY DTI2IIS

REPLACES DTI2IIS is a new utility.

FUNCTION

DTI2IIS is a utility to convert raster data in a Laser Scan Digital Terrain Image (DTI) file to International Imaging System's (IIS) system 500 format.

FORMAT

$DTI2IIS infile-spec outfile-spec

Command qualifiers	**Defaults**
/BYTE	/BYTE
/HEADER	/HEADER = 1
/SHORT	not /SHORT
LONG	not /LONG

PROMPTS

Input-DTI-file:	Input-DTI-file-spec
Output-IIS-file:	Output-IIS-file-spec

PARAMETERS

Input-DTI-file-spec

- specifies the input DTI file. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:DTI.DTI'.

Output-IIS-file-spec

- specifies the output IIS file. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:IIS.IIS'.

COMMAND QUALIFIERS

/BYTE

- Specifies that the data to be read and written is in BYTE format (the default).

/HEADER

- Specifies how many 512 byte header blocks (empty) to write to the IIS file before the actual data. The default number is one.

/LONG

- Specifies that the data to be read and written is in INTEGER*4 format.

/SHORT

- Specifies that the data to be read and written is in INTEGER*2 format.

DESCRIPTION

DTI2IIS is a utility to convert raster data in a Laser Scan Digital Terrain Image (DTI) file to International Imaging System's (IIS) system 500 format. System 500 data files are composed of swaths, each 512 bytes in width. These swaths run from the top of the image to the bottom. The data order within the file is the top row of the first swath followed consecutively by the rest of the swath. This is then repeated for each swath in turn until the whole width of the image is covered. It should be remembered that the number of actual values per swath width will depend upon the data type in the file, (i.e. 512 BYTE values, 256 INTEGER*2 values and 128 INTEGER*4 values).

RESTRICTIONS

- The only data types which can currently be converted are BYTE, INTEGER*2 and INTEGER*4. Real values are not currently transferable.

- IIS system 600 is not currently supported. There are resident IIS functions (diskenter and disktransfer) to readily convert between system 600 and system 500.

EXAMPLES

```
$ DTI2IIS COVERMAP COVERMAP /SHORT


        %I2D-I-NUMCOLSWA, 100 Columns of swath 1 written successfully
        %I2D-I-NUMCOLSWA, 200 Columns of swath 1 written successfully
        %I2D-I-NUMCOLSWA, 300 Columns of swath 1 written successfully
        %I2D-I-NUMCOLSWA, 400 Columns of swath 1 written successfully
        %I2D-I-NUMCOLSWA, 100 Columns of swath 2 written successfully
        %I2D-I-NUMCOLSWA, 200 Columns of swath 2 written successfully
        %I2D-I-NUMCOLSWA, 300 Columns of swath 2 written successfully
        %I2D-I-NUMCOLSWA, 400 Columns of swath 2 written successfully

         ELAPSED:    0 00:01:53.24  CPU: 0:0:36.93  BUFIO: 4  DIRIO: 501
        FAULTS: 990
```

In this example, a data value in the IIS file is held and converted as a short integer. A DTI file containing word data will be created. The informational messages provide continual reassurance of the extent of the conversion. It can be seen that the IIS file is written out one swath at a time. As the data in this example is INTEGER*2 the swath width is 256 values wide (512 bytes) and so two swaths are needed to cover the data area.

MESSAGES (SUCCESS)

These messages are used to indicate that the program has succeeded in performing some action, and do not require any user action.

NORMAL, Normal successful completion

Explanation: Indicates that the routine has completed without encountering any fatal errors.

User action: None.

MESSAGES (INFORMATIONAL)

These messages give information only, and require no immediate action by the user. They are used to provide information on the current state of the program, or to supply explanatory information in support of a warning or error message.

EXTENT, The DTI file is 'integer' columns by 'integer' rows.

Explanation: This is the actual extent of the DTI file.

User action: None.

HEIGHT, Height range of the DTI file is 'integer' to 'integer'

Explanation: This is the range of minimum and maximum height values in the file.

User action: None.

NUMCOLSWA, 'integer' columns of swath 'integer' written successfully

Explanation: A multiple of a hundred rows has been written to the selected DTI file.

User action: None.

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

DTIREADERR, Unable to read from DTI file

Explanation: An attempt to read from the specified DTI file has failed.

User action: Check that the DTI file is not corrupt.

ERRREAHEA, Error reading DTI header.

Explanation: An error occured whilst reading from the DTI header. This possibly suggests that the file is corrupt.

User action: Try to ascertain the nature of the corruption and remedy it. Alternatively recreate the DTI file if this is possible.

UNACLODTI, Unable to close DTI file

Explanation: The specified DTI file has been read from, but cannot be closed.

User action: None.

UNACLOIIS, Unable to close IIS file

Explanation: The specified IIS file has been writen to, but cannot be closed.

User action: None.

UNAOPNDTI, Unable to open DTI file

Explanation: The DTI file specifed by the user could not be opened.

User action: Check the file specification - remember the default is LSL$DTI:DTI.DTI.

UNAOPNIIS, Unable to open IIS file

Explanation: The IIS file specified by the user could not be opened.

User action: Check the file specification - remember the default is LSL$DTI:IIS.IIS.

UNAWRIIIS, Unable to write to IIS file

Explanation: An attempt to write to the specified IIS file has failed.

User action: Check file specification and protection applied to the specified file.

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 8

MODULE DEM2DTI

UTILITY DEM2DTI

REPLACES DEM2DTI is a new utility.

FUNCTION

DEM2DTI is a utility to convert a USGS DEM (U.S Geological Survey, Digital Elevation Model) data file held on tape or disk into a Laser-Scan DTI (Digital Terrain Image) disk file.

FORMAT

$ DEM2DTI DEM-file-spec DTI-file-spec

Command qualifiers	**Defaults**
/[NO]LOG	/NOLOG
/[NO]VALIDATE	/NOVALIDATE
/[NO]HEADER	/NOHEADER
/BLOCKSIZE = integer	/BLOCKSIZE = 4096

PROMPTS

Input DEM-file:	Input-DEM-file-spec
Output DTI-file:	Output-DTI-file-spec

PARAMETERS

Input-DEM-file-spec

- specifies the input DEM file. If a magtape device name is given (e.g. MUA0:) the DEM is read from the tape mounted on that device. Otherwise the file specification is assumed to be a disk file and any part of the specification which is not supplied will be taken from the default: 'SYS$DISK:.DEM;0'.

Output-DTI-file-spec

- specifies the output DTI file. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:.DTI;0'.

COMMAND QUALIFIERS

/LOG
/NOLOG (default)

- /LOG selects the output of informational messages derived from the DEM and DTI headers. Messages are written to SYS$OUTPUT.

/VALIDATE
/NOVALIDATE (default)

- Performs a validation check on the elevation data written to the DTI file. If a datum is encountered which is not within the range read from the DEM type A header record then a warning message is output followed by an informational message giving the value of the bad datum.

/HEADER
/NOHEADER (default)

- If /HEADER is specified then DEM2DTI expects to find a tape header terminated by an end-of-file before the start of the DEM. The default is to read the DEM from the beginning of the tape.

/BLOCKSIZE = integer (default = 4096)

- Specifies the size of the physical blocks on the DEM tape. The value must be in the range 1024 - 8192 in steps of 1024 bytes. The default is 4096 byte blocks.

DESCRIPTION

DEM2DTI is a utility to convert data from a Digital Elevation Model (DEM) supplied either as a tape (distributed by the U.S. Geological Survey) or as a disk file to a Laser-Scan Digital Terrain Image (DTI) file. Both 7.5-minute and 1-degree coverage DEM's are supported.

The output DTI file is written with an LSLA type header and a projection record which contain detailed information about the Digital Elevation Model. The elevation units of the DTI file are always in metres whereas the ground units depend on the type of DEM being read. For a 7.5-minute DEM (1:24000 scale) the units are normally in metres and the coordinate system is either Universal Transverse Mercator or State Plane. For a 1-degree DEM (1:250000 scale) the units are arc-seconds in the geographic (Latitude-Longitude) coordinate system.

No user input is necessary to determine the type of DEM as all information required is contained in the DEM type A and B header records. If reading from tape then the size of the physical blocks and the presence of a tape volume header record must be known. The /BLOCKSIZE and /HEADER qualifiers are provided to override the defaults.

RESTRICTIONS

- The DEM must conform to the specification as laid down by USGS in the Digital Elevation Models Data Users Guide 5 (1987).
- Multivolume datasets are not supported - all of the data being input must fit onto one magnetic tape.
- Only DTI files with an LSLA type header and a projection record are written.

EXAMPLES

$ **DEM2DTI/LOG/BLOCKSIZE=1024 MUB1: HOQUIAM <CR>**

```
Initializing tape for read - Please wait.
Scanning DEM file to determine size of map
Reading type A record from DEM file
%DEM2DTI-I-DEMFILNAM, DEM map name is "HOQUIAM - E                    WA,OR
        NL10-05E"
%DEM2DTI-I-DEMLVLCODE, DEM level code is 1
-DEM2DTI-I-ONEDEGDEM, 1-minute DEM
Creating DTI file LSL$DTI:HOQUIAM.DTI;0 with LSLA type header
%DEM2DTI-I-DTICRMAT, DTI file created with matrix x:1201, y:1201
%DEM2DTI-I-DTIOPEN, DTI file "LSL$DTI:HOQUIAM.DTI;0" opened

File    :  LSL$DTI:HOQUIAM.DTI;0
Header  :  LSLA  Data:  WORD

Units are DTI matrix values

Matrix Coverage   SW:     1     1  NE:  1201  1201
Matrix Interval    E:     1         N:     1
Value Range         :     7   to   2544

SW corner - Latitude:  46 00 00.000N, Longitude: 123 00 00.000W

Spheroid      :   5 (World Geodetic System 72 (WGS 72))
Projection    : 100 (Geographic  (ie Lat and Long))

Units         :   3 (seconds of arc)
Local origin  :      165600.000 (Latitude)     -442800.000 (Longitude)
Sample values :           3.000 (Latitude)           3.000 (Longitude)
Rewinding tape - Please wait.
Initialising DTI data area
Reading DEM file for transfer to DTI file
Reading type A record from DEM file
Reading type B records from DEM file
Writing profile #50 at coordinate x:-442656.0, y:165600.0
Writing profile #100 at coordinate x:-442506.0, y:165600.0
Writing profile #150 at coordinate x:-442356.0, y:165600.0
Writing profile #200 at coordinate x:-442206.0, y:165600.0
Writing profile #250 at coordinate x:-442056.0, y:165600.0
Writing profile #300 at coordinate x:-441905.96875, y:165600.0
Writing profile #350 at coordinate x:-441756.0, y:165600.0
Writing profile #400 at coordinate x:-441606.0, y:165600.0
Writing profile #450 at coordinate x:-441456.0, y:165600.0
Writing profile #500 at coordinate x:-441306.0, y:165600.0
Writing profile #550 at coordinate x:-441156.0, y:165600.0
Writing profile #600 at coordinate x:-441006.0, y:165600.0
Writing profile #650 at coordinate x:-440856.0, y:165600.0
Writing profile #700 at coordinate x:-440705.96875, y:165600.0
Writing profile #750 at coordinate x:-440556.0, y:165600.0
Writing profile #800 at coordinate x:-440405.96875, y:165600.0
Writing profile #850 at coordinate x:-440256.0, y:165600.0
```

```
Writing profile #900 at coordinate x:-440106.0, y:165600.0
Writing profile #950 at coordinate x:-439956.0, y:165600.0
Writing profile #1000 at coordinate x:-439806.0, y:165600.0
Writing profile #1050 at coordinate x:-439656.0, y:165600.0
Writing profile #1100 at coordinate x:-439506.0, y:165600.0
Writing profile #1150 at coordinate x:-439356.0, y:165600.0
Writing profile #1200 at coordinate x:-439205.96875, y:165600.0
%DEM2DTI-I-DTICLOSED, DTI file closed
 ELAPSED:    0 00:17:30.92  CPU: 0:12:24.83  BUFIO: 12  DIRIO: 9694  FAULTS:
10815
```

This example reads a 1-degree DEM from a tape which has a blocksize of 1024 bytes and is mounted (/FOREIGN) on the tape drive MUB1:. The /LOG qualifier displays detailed information about the DEM and the output DTI file. The output is written to the default directory LSL$DTI.

```
 $ DEM2DTI/LOG/BLOCKSIZE=8192 MUB1: VONORE <CR>


Initializing tape for read - Please wait.
Scanning DEM file to determine size of map
Reading type A record from DEM file
%DEM2DTI-I-DEMFILNAM, DEM map name is "VONORE"
%DEM2DTI-I-DEMLVLCODE, DEM level code is 1
-DEM2DTI-I-SVNMINDEM, 7.5-minute DEM
Reading type B records from DEM file
..record #50
..record #100
..record #150
..record #200
..record #250
..record #300
..record #350
Creating DTI file LSL$DTI:VONORE.DTI;0 with LSLA type header
%DEM2DTI-I-DTICRMAT, DTI file created with matrix x: 391, y: 474
%DEM2DTI-I-DTIOPEN, DTI file "LSL$DTI:VONORE.DTI;0" opened

File    :  LSL$DTI:VONORE.DTI;0
Header  :  LSLA  Data:  WORD

Units are metres

Matrix Coverage   SW:  749070.00 3931800.00    NE:  760770.00 3945990.00
Matrix Interval    E:      30.00                 N:      30.00
Value Range         :   238   to    421


Spheroid      :   0 (Clarke 1866)
Projection    :   1 (Universal Transverse Mercator)

   Zone                                        :   16

Units         :   2 (metres)
Local origin  :      749070.000 (Eastings)     3931800.000 (Northings)
```

```
Sample values :          30.000 (Eastings)          30.000 (Northings)
Rewinding tape - Please wait.
Initialising DTI data area
Reading DEM file for transfer to DTI file
Reading type A record from DEM file
Reading type B records from DEM file
Writing profile #50 at coordinate x:750540.0, y:3931830.0
Writing profile #100 at coordinate x:752040.0, y:3931860.0
Writing profile #150 at coordinate x:753540.0, y:3931890.0
Writing profile #200 at coordinate x:755040.0, y:3931950.0
Writing profile #250 at coordinate x:756540.0, y:3931980.0
Writing profile #300 at coordinate x:758040.0, y:3932040.0
Writing profile #350 at coordinate x:759540.0, y:3932070.0
%DEM2DTI-I-DTICLOSED, DTI file closed
 ELAPSED:    0 00:03:36.06  CPU: 0:02:30.94  BUFIO: 12  DIRIO: 311  FAULTS: 1278
```

The input spec in this case is the same as previously but a different tape is read with a blocksize of 8192 bytes. The DEM is a 7.5-minute, 1:24000 map and the output DTI file is written to the default LSL$DTI directory. The /LOG qualifier again displays detailed information contained in the DEM and in the output DTI file header.

$ **DEM2DTI/LOG ZYCOR ZYCOR <CR>**

```
%DEM2DTI-I-DEMOPEN, DEM file "SYS$DISK:ZYCOR.DEM;0" opened
Scanning DEM file to determine size of map
Reading type A record from DEM file
%DEM2DTI-I-DEMFILNAM, DEM map name is "ZYCOR"
%DEM2DTI-I-DEMLVLCODE, DEM level code is 1
-DEM2DTI-I-SVNMINDEM, 7.5-minute DEM
Reading type B records from DEM file
..record #50
..record #100
..record #150
..record #200
..record #250
..record #300
Creating DTI file SYS$DISK:ZYCOR.DTI;0 with LSLA type header
%DEM2DTI-I-DTICRMAT, DTI file created with matrix x: 335, y: 464
%DEM2DTI-I-DTIOPEN, DTI file "SYS$DISK:ZYCOR.DTI;0" opened

File    :  SYS$DISK:ZYCOR.DTI;0
Header  :  LSLA  Data:  WORD

Units are metres

Matrix Coverage   SW:  529890.00 4899510.00    NE:  539910.00 4913400.00
Matrix Interval    E:      30.00                 N:      30.00
Value Range         :  1460   to   2686


Spheroid      :   0 (Clarke 1866)
Projection    :   1 (Universal Transverse Mercator)
```

```
   Zone                                          :   18

Units         :   2 (metres)
Local origin  :      529890.000 (Eastings)     4899510.000 (Northings)
Sample values :          30.000 (Eastings)         30.000 (Northings)
Initialising DTI data area
Reading DEM file for transfer to DTI file
Reading type A record from DEM file
Reading type B records from DEM file
Writing profile #50 at coordinate x:531360.0, y:4899510.0
Writing profile #100 at coordinate x:532860.0, y:4899510.0
Writing profile #150 at coordinate x:534360.0, y:4899540.0
Writing profile #200 at coordinate x:535860.0, y:4899540.0
Writing profile #250 at coordinate x:537360.0, y:4899540.0
Writing profile #300 at coordinate x:538860.0, y:4899540.0
%DEM2DTI-I-DEMCLOSED, DEM file closed
%DEM2DTI-I-DTICLOSED, DTI file closed
 ELAPSED:    0 00:04:45.78  CPU: 0:02:17.40  BUFIO: 10  DIRIO: 516  FAULTS: 893
```

This example reads a DEM from a disk file, the input file-spec being parsed against the default SYS$DISK:.DEM. The output is to LSL$DTI. Information on the DEM and DTI file is given via the /LOG qualifier.

$ **DEM2DTI ZYCOR ZYCOR <CR>**

```
Scanning DEM file to determine size of map
Reading type A record from DEM file
Reading type B records from DEM file
Creating DTI file LSL$DTI:ZYCOR.DTI;0 with LSLA type header
Initialising DTI data area
Reading DEM file for transfer to DTI file
Reading type A record from DEM file
Reading type B records from DEM file
 ELAPSED:    0 00:03:09.30  CPU: 0:02:08.38  BUFIO: 10  DIRIO: 275  FAULTS: 855
```

This example is identical to the previous case except the /LOG qualifier is missing and hence the default of /NOLOG is used. Brief information is output to reassure the user.

MESSAGES (SUCCESS)

These messages are used to indicate that the program has succeeded in performing some action, and do not require any user action.

NORMAL, DEM2DTI function return was TRUE (ie success)

Explanation: This message is used internally by DEM2DTI to indicate whether a subroutine has completed succesfully or not.

User action: None.

MESSAGES (INFORMATIONAL)

These messages give information only, and require no immediate action by the user. They are used to provide information on the current state of the program, or to supply explanatory information in support of a warning or error message.

DEMCLOSED, DEM file closed

Explanation: This message is output when the DEM output file has been successfully closed.

User action: None.

DEMDSKFIL, DEM specification "'file-spec'" is a disk file

Explanation: This message is output if the specified DEM file is a disk file not a magtape device name.

User action: None.

DEMELEVAL, Elevation datum value is 'integer'

Explanation: Additional message following an OUTOFRNG warning to inform the user of the elevation datum value which was found to be out of range

User action: None.

DEMFILNAM, DEM map name is "'string'"

Explanation: If /LOG is specified on the command line the program responds with the name of the DEM file read from the type A record.

User action: None.

DEMLVLCODE, DEM level code is 'integer'

Explanation: If /LOG is specified the DEM level code from the type A record is output.

User action: None.

DEMOPEN, DEM file "'file-spec'" opened

Explanation: This message is output when the DEM output file has been successfully opened.

User action: None.

DTICLOSED, DTI file closed

Explanation: This message is output when the DTI output file has been successfully closed.

User action: None.

DTICRMAT, DTI file created with matrix x:'integer', y:'integer'

Explanation: Informational message if /LOG is specified on the command line telling the user the size of the DTI matrix which has been created

User action: None.

DTIOPEN, DTI file "'file-spec'" opened

Explanation: This message is output when the DTI output file has been successfully opened.

User action: None.

ONEDEGDEM, 1-minute DEM

Explanation: Further information to the DEM level code. Code 3 corresponds to a 1-minute DEM.

User action: None.

SVNMINDEM, 7.5-minute DEM

Explanation: Further information to the DEM level code. Codes 1 and 2 correspond to a 7.5-minute DEM.

User action: None.

MESSAGES (WARNING)

These messages are output when an error has occurred that can be corrected immediately by the user or that the program will attempt to overcome.

BADBLKSIZ, Illegal blocksize; using default of 'integer' bytes

Explanation: An invalid tape blocksize was specified on the command line. The default of 4096 bytes is used.

User action: None.

OUTOFRNG, Datum at row:'integer', column:'integer' out of range

Explanation: Warning message if /VALIDATION is specified on the command line indicating that an elevation datum is out of the range read in the DEM header.

User action: This message means either a bad elevation datum or a bad A header record was read from the DEM. Check the data and consult the donor of the DEM if necessary.

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

ABORT, DEM2DTI function return was FALSE (ie error)

Explanation: This message is used internally by DEM2DTI to indicate whether a subroutine has completed succesfully or not.

User action: None.

CLOSERR, error closing file "'file-spec'"

Explanation: Some form of error occurred in closing one of the input or output files. The program will exit.

User action: Depends upon the associated LSLLIB messages.

DTICLOSE, error closeing DTI file "'file-spec'"

Explanation: The program encountered an error while trying to close the DTI file

User action: Depends upon the error.

DTICOPYDATA, error writing data values to DTI file

Explanation: The program encountered an error while trying to write the data values to the DTI file

User action: Depends upon the error.

DTICREATE, error trying to open DTI file "'file-spec'"

Explanation: The program encountered an error while trying to open the named DTI file

User action: Depends upon the error.

ERRORRD, error reading the "'string'" field

Explanation: This message is output to specify the field that was incorrect, and follows a message identifying the record in which the error occurred. The contents of the offending field will be output on the next line. The program will exit.

User action: Depends upon the error, and upon the source of the data. It may be necessary to consult the donor of the data, giving details of the offending record and field.

ERRRDRECA, error reading the A record of DEM file

Explanation: An error occurred in reading the A header record in the input DEM file. A message follows giving more detail.

User action: Depends on the type of error encountered. The DEM file can be checked using a standard text editor.

ERRRDRECB, error reading B record number 'integer' in DEM file

Explanation: An error occurred in reading a B record in the input DEM file. A message follows giving more detail.

User action: Depends on the type of error encountered. The DEM file can be checked using a standard text editor.

FILOPEN, error opening file "'file-spec'"

Explanation: Some form of error occurred in opening one of the input or output files. The program will exit.

User action: Depends upon the associated LSLLIB messages.

INVFILNAM, invalid filename "'file-spec'"

Explanation: The DEM input file specification is not valid. The specified filename will not parse against the given skeleton: SYS$DISK:.DEM;0.

User action: Specify a correct filename including device name if necessary.

MAGTAPE, error initialising magtape device "'device-name'"

Explanation: An error occurred in initialising the magnetic tape drive for reading. The associated LSLLIB and system error messages should clarify the problem.

User action: Dependant upon the associated messages. One possible cause of problems is that the tape has not been mounted.

NODEVICE, unknown device name "'device'" given

Explanation: The device name given on the command line was not recognised. The program will exit.

User action: Specify a legal device or do not use the qualifier, the default is MTA0:.

NOFILNAM, no filename in DEM file specification "'file-spec'"

Explanation: The specified DEM input file-spec is a valid device name but the filename has not been specified.

User action: Rerun DEM2DTI with the correct DEM filename and device specification.

NOTMNTFOR, magtape device "'device'" must be mounted foreign

Explanation: The specified DEM input file-spec has been parsed as a magtape device but the tape is not mounted foreign.

User action: Mount the tape with the MOUNT/FOREIGN command and rerun DEM2DTI.

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 9

MODULE DTI2DEM

UTILITY DTI2DEM

REPLACES DTI2DEM is a new utility (updated from USBUREAU/DTI2DEM).

FUNCTION

DTI2DEM is a utility to convert data from a Laserscan Digital Terrain Image (DTI) file to a United States Geological Survey (USGS) Digital Elevation Model (DEM) of the same area.

FORMAT

$ DTI2DEM DTI-file-spec [DEM-file-spec]

Command qualifiers	**Defaults**
/[NO]REWIND	/NOREWIND
/HEIGHT = unit	/HEIGHT = METRES
/PLAN = unit	/PLAN = METRES
/BLOCK = integer	/BLOCK = 4096

PROMPTS

```
_From:                  Input-DTI-file-spec
Eastings  Northings:     Origin of DTI file (in PLAN units)
Latitude  Longitude:     SW corner of DEM map sheet
Enter header for DEM file ('default'):       Map name for DEM
```

PARAMETERS

Input-DTI-file-spec

- specifies the input DTI file. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:.DTI;0'.

Output-DEM-file-spec

- is optional and specifies the output DEM file. If a disk file is specified it will be parsed against the default name: SYS$DISK:'file-spec'.DEM;0. If a tape device name is given output will be to that device which must have a tape mounted (/FOREIGN) on it. If missing the default is to write to the tape drive specified by the logical name MT:.

COMMAND QUALIFIERS

/REWIND
/NOREWIND (default)

- If a tape drive is specified for the output DEM then the tape is rewound if this switch is specified. The default is to leave the tape at the current position

/HEIGHT = unit (default = METRES)

- Specifies the units for the elevation data in the DTI file. The choices are metres (the default), meters or feet.

/PLAN = unit (default = METRES)

- Defines the units of the ground coordinates in the DTI file. The choices are metres (the default), meters or feet.

/BLOCK = integer (default = 4096)

- Specifies the size of the physical blocks on the DEM tape. The value must be in the range 1024 - 8192 in steps of 1024 bytes. The default is 4096 byte blocks.

ADDITIONAL INPUTS

When the command line has been processed, the input file has been opened and the output file opened or tape initialised then the user is prompted for more information. The three pieces of information that are required are:-

1. The origin of the DTI file, in UTM coordinates.

   The input DTI file may not contain any information about its origin (if a projection record is not present) and therefore the user is asked to input the Eastings and Northings of the origin.

   These may either be entered on separate lines, in response to the "Eastings Northings:" and "Northings:" prompts, or they may both be entered on the same line in response to the "Eastings Northings:" prompt.

   The origin of the DTI file must lie on a 30 metre UTM grid intersection. If the header type is LSLA and a projection record is present then the user may respond with a carriage return and the origin is taken from the DTI header.

2. The latitude and longitude of the SW corner of the map.

   The DEM is bounded by the neat line of a 7.5-minute 1:24000 map sheet, and it is the SW corner of this sheet that must be entered in response to this prompt.

   Both the latitude and longitude must be entered on the same line, but the order in which they occur is immaterial.

   The format for each is d[m[s]]H

   where "d" are integer degrees, "m" integer minutes , "s" integer seconds and "H" is a letter distinguishing the hemisphere (either S or N for latitude or E or W for longitude)

   The values entered must correspond to a 7.5-minute graticule intersection.

   If the area covered by the DTI file does not include the area required by the DEM area, then a warning message is output, and the program prompts for a new DTI origin.

3. The header for the A record of the DEM.

   This prompt allows the user to specify the header for the DEM (up to 144 ASCII characters).

   If the operator responds with a carriage return, then the default of the DTI file name is used.

DESCRIPTION

DTI2DEM is a utility to convert a Laser-Scan Digital Terrain Image (DTI) file to the United States Geological Survey (USGS) Digital Elevation Model (DEM) format.

The coverage of the DEM is 7.5-minutes (1:24000 scale). 1-degree coverage DEM's are not currently supported.

The input DTI file can have any header type currently supported by DTILIB. The recommended header type is LSLA.

Output is either to an ASCII sequential disk file, with a record length of 1024 characters, or to an unlabelled magnetic tape, written at a density of 1600 bpi, with a record size of 1024 characters and a block size that can be selected by the user (default 4096 characters).

RESTRICTIONS

- Only 7.5-minute (1:24000 scale) are supported at present.
- Multivolume datasets are not supported - all of the data being output must fit onto one magnetic tape.

EXAMPLES

User input is represented in bolface

```
 $ DTI2DEM LSL$SOURCE_ROOT:[USBUR.DTI2DEM]ZYCOR ZYCOR  <CR>


%DTI2DEM-I-DTIHDRTYP, Input DTI file has header type MIKE

File    :  LSL$SOURCE_ROOT:[USBUR.DTI2DEM]ZYCOR.DTI;
Header  :  MIKE  Data:  WORD

Units are metres

Matrix Coverage   SW:       0.00       0.00    NE:   10020.00   13890.00
Matrix Interval    E:      30.00                N:      30.00
Value Range         :-32767   to   2686

Define origin of the DTI (in UTM coordinates) (default: 0.0 0.0)
Eastings   Northings: 529890 4899510
Enter lat and long of SW corner of map (eg 39 07 30N  77 22 30W)
Latitude   Longitude: 44 15N 74 37 30W
Enter header for DEM file (ZYCOR):

Scanning DTI file ZYCOR for max and min values

Outputting DEM file to SYS$DISK:ZYCOR.DEM

..record #50
..record #100
..record #150
..record #200
..record #250
..record #300
 ELAPSED:    0 00:02:39.62  CPU: 0:01:21.66  BUFIO: 68  DIRIO: 292  FAULTS: 694
```

This example reads a DTI file with a MIKE type header and writes the output DEM to a disk file in the current default directory. The contents of the DTI header record are displayed before the user is prompted to input the origin of the DTI and the SW corner of the DEM. The default of the DTI filename is used as the DEM header by responding to the "Enter header for DEM file" prompt with a carriage return.

```
 $ DTI2DEM VONORE VONORE <CR>


%DTI2DEM-I-DTIHDRTYP, Input DTI file has header type LSLA

File    :  LSL$DTI:VONORE.DTI;
Header  :  LSLA  Data:  WORD

Units are metres
```

```
Matrix Coverage   SW:  749070.00 3931800.00    NE:  760770.00 3945990.00
Matrix Interval    E:      30.00                N:      30.00
Value Range         :   238   to    421

-DTI2DEM-I-PRJREC, Projection record found

Spheroid      :   0 (Clarke 1866)
Projection    :   1 (Universal Transverse Mercator)

   Zone                                        :   16

Units         :   2 (metres)
Local origin  :      749070.000 (Eastings)     3931800.000 (Northings)
Sample values :          30.000 (Eastings)          30.000 (Northings)
Define origin of the DTI (in UTM coordinates) (default: 749070.0 3931800.0)
Eastings   Northings:
Enter lat and long of SW corner of map (eg 39 07 30N  77 22 30W)
Latitude   Longitude: 35 30N 84 15W
Enter header for DEM file (VONORE):

Scanning DTI file VONORE for max and min values

Outputting DEM file to SYS$DISK:VONORE.DEM

..record #50
..record #100
..record #150
..record #200
..record #250
..record #300
..record #350
 ELAPSED:    0 00:02:56.76  CPU: 0:01:32.71  BUFIO: 76  DIRIO: 472  FAULTS: 917
```

This example reads a DTI file with a LSLA type header and writes the output DEM to a disk file in the current default directory. The contents of the DTI header record and projection record are displayed before the user is prompted to input the origin of the DTI and the SW corner of the DEM. The origin of the DTI is taken from the DTI header by responding to the Eastings Northings prompt with a carriage return. The default of the DTI filename is used as the DEM header by responding to the "Enter header for DEM file" prompt with a carriage return.

```
 $ DTI2DEM/REWIND/BLOCK=8192 VONORE MUB1: <CR>


%DTI2DEM-I-DTIHDRTYP, Input DTI file has header type LSLA

File    :  LSL$DTI:VONORE.DTI;
Header  :  LSLA  Data:  WORD

Units are metres

Matrix Coverage   SW:  749070.00 3931800.00    NE:  760770.00 3945990.00
Matrix Interval    E:      30.00                N:      30.00
Value Range         :   238   to    421
```

```
-DTI2DEM-I-PRJREC, Projection record found

Spheroid      :   0 (Clarke 1866)
Projection    :   1 (Universal Transverse Mercator)

   Zone                                        :   16

Units         :   2 (metres)
Local origin  :      749070.000 (Eastings)     3931800.000 (Northings)
Sample values :          30.000 (Eastings)          30.000 (Northings)
Define origin of the DTI (in UTM coordinates) (default: 749070.0 3931800.0)
Eastings   Northings:
Enter lat and long of SW corner of map (eg 39 07 30N  77 22 30W)
Latitude   Longitude: 84 15W 35 30N
Enter header for DEM file (VONORE):VONORE TENNESSEE TN- 84 15 W 35 30N (DTI2DEM
1-Nov-1989)

Scanning DTI file VONORE for max and min values

Outputting DEM file to LSLM3A$MUB1:

..record #50
..record #100
..record #150
..record #200
..record #250
..record #300
..record #350
 ELAPSED:    0 00:05:57.93  CPU: 0:01:36.08  BUFIO: 17  DIRIO: 409  FAULTS: 399
```

This has the same input file as the previous example but the output is directed to the tape on drive MUB1:. The DTI origin is taken from the DTI header. A descriptive DEM header is entered which describes the map and how it was produced.

MESSAGES (SUCCESS)

These messages are used to indicate that the program has succeeded in performing some action, and do not require any user action.

NORMAL, DTI2DEM function return was TRUE (ie success)

Explanation: This message is used internally by DTI2DEM to indicate whether a subroutine has completed succesfully or not.

User action: None.

MESSAGES (INFORMATIONAL)

These messages give information only, and require no immediate action by the user. They are used to provide information on the current state of the program, or to supply explanatory information in support of a warning or error message.

DEMGRD, DEM grid must be x:'real',y:'real'

Explanation: Additional informational message following an incorrect DTI grid error.

User action: None.

DTIHDRTYP, Input DTI file has header type 'string'

Explanation: Report on the type of header found in the DTI input file.

User action: None.

NOTEOF, Tape was not at end of file - rewinding

Explanation: The tape was not at an end of file marker.

User action: Wait for the tape to rewind to an EOF marker.

PRJREC, Projection record found

Explanation: The DTI file has a LSLA type header with a projection record.

User action: None.

MESSAGES (WARNING)

These messages are output when an error has occurred that can be corrected immediately by the user or that the program will attempt to overcome.

BADAREA, Area of map does not lie entirely within DTI

Explanation: The area of the map specified does not lie completely within the DTI matrix region.

User action: Respecify the map origin.

BADCONV, Error 'integer' transforming from geographicals to UTM

Explanation: An error occurred in the conversion from geographical coordinates to UTM coordinates. The error number is returned from GCTPLIB.

User action: Consult the GCTPLIB documentation for an explanation of the error.

BADLL, Bad latitude and longitude format

Explanation: An incorrectly specified latitude and longitude was read for the SW corner of the map.

User action: Retype with the correct values.

BADMAPORG, Not the origin of a 1:24000 map sheet

Explanation: The specified latitude and longitude for the SW corner of the map does not coincide with the origin of a 1:24000 map sheet.

User action: Respecify the SW corner latitude and longitude values.

ERRDNUM, Error reading number

Explanation: An incorrect number was typed in response to the prompt.

User action: Retype the number correctly.

MISSLL, Latitude or longitude missing

Explanation: The input for the SW corner of the map did not contain both a latitude and a longitude.

User action: Retype with valid latitude and longitude.

NOTGRID, 'real' is not a DTI grid intersection

Explanation: The origin requested does not fall on a grid intersection of the DTI matrix.

User action: Input a valid origin.

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

BADBLKSIZ, Illegal blocksize; using default of 'integer'

Explanation: The blocksize specified on the command line was invalid so the default value is used.

User action: None.

BADDEV, Error enquiring about device 'device-name'

Explanation: An error occurred in enquiring about the device name specified as the output filename.

User action: Check that the device name specified is a valid magtape unit.

BADHDR, Error reading header

Explanation: An error occurred reading the header string from the terminal.

User action: Consult the accompanying system error message and act accordingly.

BADORG, Error reading DTI origin

Explanation: An error occurred reading the DTI origin from the terminal.

User action: Depends on the error.

ERCLSDEM, Error closing DEM file 'file-spec'

Explanation: An error occurred in closing the DEM output file. Further information follows in a system message.

User action: Depends on the error.

ERCLSDTI, Error closing DTI file

Explanation: An error occurred in trying to close the DTI input file. Further information follows in a system error message.

User action: Depends on the system error encountered.

ERRMKEOT, Error writing EOT marker on 'device-name'

Explanation: An error occurred in writing the End Of Tape marker. The following system message explains the problem.

User action: Depends on the error encountered.

ERROPNDTI, Error opening DTI file "'file-spec'"

Explanation: An error occurred in trying to open the specified DTI input file. Further information is given in a subsequent system message.

User action: Check the input file specification and retype.

ERRWRTREC, Error writing record to DEM file

Explanation: An error occurred in writing a DEM record to the disk file. A system error message follows.

User action: Depends on the system message.

ERRWRTTB, Error writing block to tape on 'device-name'

Explanation: An error occurred in writing a block to the tape. A system error message follows.

User action: Depends on the system error.

FILOPEN, Error opening output file 'file-spec'

Explanation: An error occurred in trying to open the disk file specified for output. Further information is given in subsequent messages.

User action: Check the syntax of the output file specification or consult your system manager if the problem is not obvious.

INCGRDSPC, DTI has incorrect grid spacings, x:'real',y:'real'

Explanation: The input DTI file has the wrong grid spacing for a 7.5-minute DEM.

User action: The DTI must be modified to have the correct grid spacing. The following informational message details the grid required.

MTOPEN, Error initialising tape unit 'device-name'

Explanation: An error occurred in trying to initialise the tape unit. An additional error message is output if it is a system error.

User action: Dependant on the type of error.

MESSAGES (FATAL)

These messages indicate a severe error in processing, or some form of system failure, which has caused the program to terminate.

ABORT, DTI2DEM function return was FALSE (ie error)

Explanation: This message is used internally by DTI2DEM to indicate whether a subroutine has completed succesfully or not.

User action: None.

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 10

MODULE MNT2DTI

UTILITY MNT2DTI

REPLACES MNT2DTI is a new utility.

FUNCTION

MNT2DTI is a utility to convert an IGN France (Institut Geographique National) MNT data file held on tape or disk into a Laser-Scan DTI (Digital Terrain Image) disk file.

FORMAT

$ MNT2DTI MNT-file-spec DTI-file-spec

Command qualifiers	**Defaults**
/[NO]LOG	/NOLOG
/[NO]VALIDATE	/NOVALIDATE
/[NO]HEADER	/NOHEADER
/BLOCKSIZE = integer	/BLOCKSIZE = 4096
/SELECT = (integer[,...])	Select all sheets

PROMPTS

Input MNT-file:	Input-MNT-file-spec
Output DTI-file:	Output-DTI-file-spec

PARAMETERS

Input-MNT-file-spec

- specifies the input MNT file. If a magtape device name is given (e.g. MUA0:) the MNT files are read from the tape mounted on that device. Otherwise the file specification is assumed to be a disk file and any part of the specification which is not supplied will be taken from the default: 'SYS$DISK:.MNT;0'.

Output-DTI-file-spec

- specifies the output DTI file. Any part of the file specification which is not supplied will be taken from the default specification: 'LSL$DTI:.DTI;0'.

COMMAND QUALIFIERS

/LOG
/NOLOG (default)

- /LOG selects the output of informational messages derived from the MNT and DTI headers. Messages are written to SYS$OUTPUT. The default /NOLOG will produce brief information to reassure the user.

/VALIDATE
/NOVALIDATE (default)

- Performs a validation check on the elevation data written to the DTI file. If a datum is encountered which is not within the range read from the MNT header record then a warning message is output followed by an informational message giving the value of the bad datum.

/HEADER
/NOHEADER (default)

- If /HEADER is specified then MNT2DTI expects to find a tape header terminated by an end-of-file before the start of the MNT. The default is to read the MNT from the beginning of the tape.

/BLOCKSIZE = integer (default = 4096)

- Specifies the size of the physical blocks on the MNT tape. It applies to all the files within the list specified using /SELECT. Hence a tape which contains files of varying blocksizes must be read once for each block size. The default size is 4096 byte blocks.

/SELECT=(integer[,...])

- This qualifier is used to select a list of files to be read from the input magtape device. The default is to read all files when magtape input is used.

  The list may be a single number, or a list of sheets surrounded by parentheses. The list of sheets is made up of numbers and ranges, separated by commas, where a range is two numbers separated by a colon.

For instance,

```
/SELECT=3          will output file 3 only
/SELECT=(1,4,5)    will output files 1, 4 and 5
/SELECT=(1,3,5:7) will output files 1, 3, 5, 6 and 7
/SELECT=(2:4,1)    will output files 1, 2, 3 and 4 (in that order)
```

The /SELECT qualifier is ignored when input is from disk and a message will relate this to the user.

DESCRIPTION

MNT2DTI is a utility to convert data from an MNT file supplied either as a tape or a disk file to a Laser-Scan Digital Terrain Image (DTI) file.

The output DTI file is written with an LSLA type header which contains detailed information about the digital elevation model.

No user input is necessary to determine the type of MNT as all information required is contained in the MNT header and data records. If reading from tape then the size of the physical blocks and the presence of a tape volume header record must be known. In the case of disk, just the blocksize is required. The /BLOCKSIZE and /HEADER qualifiers are provided to override the defaults values.

Each of a sequence of files, specified using /SELECT, to be processed from tape will have a filename of that specified on the command line appended with the position number of the file on the tape.

For example,

'LSL$DTI:TAPEFILE_4.DTI;0'

is the name of the 4th file on the tape where 'TAPEFILE' was the output DTI filename specified on the command line. The default part of the specification was taken from 'LSL$DTI:.DTI;0'.

The processing of an MNT file consists of the file being opened and its header record being read. This information is used to create a DTI file of sufficient size to hold the profile data. Thus the MNT file header must accurately reflect the profile information in terms of the number of profiles, the number of points in each profile and the maximum and minimum heights within the file.

The DTI area is then initialized to contain null values and the reading of the profiles begins. One profile at a time is read from the MNT file and written to the DTI output file. The /LOG qualifier will output a message every 50th profile. When all the profiles have been successfully written, both the MNT and DTI files are closed.

If input is from magtape, the /LOG qualifier will output an informational message informing the user that a valid tape mark was found and its position. The TAPEMARK message provides this information.

RESTRICTIONS

- Multivolume datasets are not supported - all of the data forming a single MNT file being input must fit onto one magnetic tape.
- Only DTI files with an LSLA type header and a projection record are written.
- The value of the /BLOCKSIZE qualifier applies to all of the MNT files on a tape or those specified with the /SELECT switch.
- At present, only MNT data files with an orientation of zero are supported.
- If /HEADER or /SELECT are used with disk input, a message will be given and they will be ignored. They should only be used as qualifiers for magtape input.

EXAMPLES

$ **MNT2DTI/LOG/BLOCKSIZE=416 LN LN <CR>**

```
%MNT2DTI-I-MNTOPEN, MNT file "SYS$DISK:LN.MNT;0" opened
Reading header record from MNT file
%MNT2DTI-I-MNTFILNAM, MNT map name is "M.N.T. REGION DE LILLE NORD"
Creating DTI file LSL$DTI:LN.DTI;0 with LSLA type header
%MNT2DTI-I-DTICRMAT, DTI file created with matrix x: 467, y: 144
%MNT2DTI-I-DTIOPEN, DTI file "LSL$DTI:LN.DTI;0" opened

File    :  LSL$DTI:LN.DTI;0
Header  :  LSLA  Data:  WORD

Units are metres

Matrix Coverage   SW:  485000.00 5617300.00    NE:  519950.00 5628025.00
Matrix Interval    E:      75.00                 N:      75.00
Value Range         :    10   to    131

Initialising DTI data area
Reading data records from MNT file
Writing profile #50 at coordinate x:485000.0, y:5624349.5
Writing profile #100 at coordinate x:485000.0, y:5620599.5
%MNT2DTI-I-MNTCLOSED, MNT file closed
%MNT2DTI-I-DTICLOSED, DTI file closed
 ELAPSED:    0 00:02:35.09  CPU: 0:00:34.17  BUFIO: 10  DIRIO: 47  FAULTS: 453
```

This example reads an MNT from a disk file, the input file-spec being parsed against the default SYS$DISK:.MNT. The /LOG qualifier displays detailed information about the MNT and the output DTI file. The output file is written to the default directory LSL$DTI.

$ **MNT2DTI/LOG/BLOCKSIZE=1000/SELECT=(2:3) MUB1: CORSICA <CR>**

```
Initializing tape for read - Please wait.
Skipping MNT file 1
%MNT2DTI-I-TAPEMARK, Tape mark found at block number 2004
%MNT2DTI-I-TAPEMARK, Tape mark found at block number 2005
Reading header record from MNT file
%MNT2DTI-I-MNTFILNAM, MNT map name is "M.N.T. CORSE"
Creating DTI file LSL$DTI:CORSICA_2.DTI;0  with LSLA type header
%MNT2DTI-I-DTICRMAT, DTI file created with matrix x: 201, y: 421
%MNT2DTI-I-DTIOPEN, DTI file "LSL$DTI:CORSICA_2.DTI;0 " opened

File    :  LSL$DTI:CORSICA_2.DTI;0
Header  :  LSLA  Data:  WORD

Units are metres

Matrix Coverage   SW: 1100000.00 1600000.00    NE: 1200000.00 1810000.00
Matrix Interval    E:     500.00                 N:     500.00
```

```
Value Range         :     0   to   2582

Initialising DTI data area
Reading data records from MNT file
Writing profile #50 at coordinate x:1100000.0, y:1624500.0
Writing profile #100 at coordinate x:1100000.0, y:1649500.0
Writing profile #150 at coordinate x:1100000.0, y:1674500.0
Writing profile #200 at coordinate x:1100000.0, y:1699500.0
Writing profile #250 at coordinate x:1100000.0, y:1724500.0
Writing profile #300 at coordinate x:1100000.0, y:1749500.0
Writing profile #350 at coordinate x:1100000.0, y:1774500.0
Writing profile #400 at coordinate x:1100000.0, y:1799500.0
%MNT2DTI-I-DTICLOSED, DTI file closed
%MNT2DTI-I-TAPEMARK, Tape mark found at block number 2429
%MNT2DTI-I-TAPEMARK, Tape mark found at block number 2430
%MNT2DTI-E-ENDOFTAPE, end of tape encountered. DTI file already produced are
unaffected
 ELAPSED:    0 00:10:34.06  CPU: 0:00:42.29  BUFIO: 2015  DIRIO: 440  FAULTS:
447
```

This example reads the second MNT from tape which has a blocksize of 1000 bytes and is mounted (/FOREIGN) on the tape drive MUB1:. The /SELECT qualifier is used to select the tape files required. The /LOG qualifier again displays detailed information contained in the MNT and in the output DTI file header. The example also shows an attempt to read a selected MNT (the 3rd) that does not exist from a tape containing only two files and this is reported by the ENDOFTAPE message. The existing files that were closed are not affected by this.

```
$ MNT2DTI/LOG/BLOCKSIZE=8000 MUB1: IGN <CR>

Initializing tape for read - Please wait.
Reading header record from MNT file
%MNT2DTI-I-MNTFILNAM, MNT map name is "M.N.T. FRANCE"
Creating DTI file LSL$DTI:IGN_1.DTI;0 with LSLA type header
%MNT2DTI-I-DTICRMAT, DTI file created with matrix x:1997, y:2001
%MNT2DTI-I-DTIOPEN, DTI file "LSL$DTI:IGN_1.DTI;0" opened

File    :  LSL$DTI:IGN_1.DTI;0
Header  :  LSLA  Data:  WORD

Units are metres

Matrix Coverage   SW:   40000.00 1700000.00    NE: 1038000.00 2700000.00
Matrix Interval    E:     500.00                 N:     500.00
Value Range         :     0   to   4706

Initialising DTI data area
Reading data records from MNT file
Writing profile #50 at coordinate x:40000.0, y:1724500.0
Writing profile #100 at coordinate x:40000.0, y:1749500.0
Writing profile #150 at coordinate x:40000.0, y:1774500.0
Writing profile #200 at coordinate x:40000.0, y:1799500.0
```

```
Writing profile #250 at coordinate x:40000.0, y:1824500.0
Writing profile #300 at coordinate x:40000.0, y:1849500.0
Writing profile #350 at coordinate x:40000.0, y:1874500.0
Writing profile #400 at coordinate x:40000.0, y:1899500.0
Writing profile #450 at coordinate x:40000.0, y:1924500.0
Writing profile #500 at coordinate x:40000.0, y:1949500.0
Writing profile #550 at coordinate x:40000.0, y:1974500.0
Writing profile #600 at coordinate x:40000.0, y:1999500.0
Writing profile #650 at coordinate x:40000.0, y:2024500.0
Writing profile #700 at coordinate x:40000.0, y:2049500.0
Writing profile #750 at coordinate x:40000.0, y:2074500.0
Writing profile #800 at coordinate x:40000.0, y:2099500.0
Writing profile #850 at coordinate x:40000.0, y:2124500.0
Writing profile #900 at coordinate x:40000.0, y:2149500.0
Writing profile #950 at coordinate x:40000.0, y:2174500.0
Writing profile #1000 at coordinate x:40000.0, y:2199500.0
Writing profile #1050 at coordinate x:40000.0, y:2224500.0
Writing profile #1100 at coordinate x:40000.0, y:2249500.0
Writing profile #1150 at coordinate x:40000.0, y:2274500.0
Writing profile #1200 at coordinate x:40000.0, y:2299500.0
Writing profile #1250 at coordinate x:40000.0, y:2324500.0
Writing profile #1300 at coordinate x:40000.0, y:2349500.0
Writing profile #1350 at coordinate x:40000.0, y:2374500.0
Writing profile #1400 at coordinate x:40000.0, y:2399500.0
Writing profile #1450 at coordinate x:40000.0, y:2424500.0
Writing profile #1500 at coordinate x:40000.0, y:2449500.0
Writing profile #1550 at coordinate x:40000.0, y:2474500.0
Writing profile #1600 at coordinate x:40000.0, y:2499500.0
Writing profile #1650 at coordinate x:40000.0, y:2524500.0
Writing profile #1700 at coordinate x:40000.0, y:2549500.0
Writing profile #1750 at coordinate x:40000.0, y:2574500.0
Writing profile #1800 at coordinate x:40000.0, y:2599500.0
Writing profile #1850 at coordinate x:40000.0, y:2624500.0
Writing profile #1900 at coordinate x:40000.0, y:2649500.0
Writing profile #1950 at coordinate x:40000.0, y:2674500.0
Writing profile #2000 at coordinate x:40000.0, y:2699500.0
%MNT2DTI-I-DTICLOSED, DTI file closed
%MNT2DTI-I-TAPEMARK, Tape mark found at block number 2429
%MNT2DTI-I-TAPEMARK, Tape mark found at block number 2430
Reading header record from MNT file
%MNT2DTI-I-MNTFILNAM, MNT map name is "M.N.T. CORSE"
Creating DTI file LSL$DTI:IGN_2.DTI;0 with LSLA type header
%MNT2DTI-I-DTICRMAT, DTI file created with matrix x: 201, y: 421
%MNT2DTI-I-DTIOPEN, DTI file "LSL$DTI:IGN_2.DTI;0" opened

File    :  LSL$DTI:IGN_2.DTI;0
Header  :  LSLA  Data:  WORD

Units are metres

Matrix Coverage   SW: 1100000.00 1600000.00    NE: 1200000.00 1810000.00
Matrix Interval    E:     500.00                 N:     500.00
Value Range         :     0   to   2582

Initialising DTI data area
Reading data records from MNT file
```

```
Writing profile #50 at coordinate x:1100000.0, y:1624500.0
Writing profile #100 at coordinate x:1100000.0, y:1649500.0
Writing profile #150 at coordinate x:1100000.0, y:1674500.0
Writing profile #200 at coordinate x:1100000.0, y:1699500.0
Writing profile #250 at coordinate x:1100000.0, y:1724500.0
Writing profile #300 at coordinate x:1100000.0, y:1749500.0
Writing profile #350 at coordinate x:1100000.0, y:1774500.0
Writing profile #400 at coordinate x:1100000.0, y:1799500.0
%MNT2DTI-I-DTICLOSED, DTI file closed
%MNT2DTI-I-TAPEMARK, Tape mark found at block number 2429
%MNT2DTI-I-TAPEMARK, Tape mark found at block number 2430
%MNT2DTI-E-ENDOFTAPE, end of tape encountered
 ELAPSED:    0 00:31:39.05  CPU: 0:18:41.47  BUFIO: 13  DIRIO: 2475  FAULTS:
16672
```

This example reads all MNT files on the tape drive MUB1:. The output filenames will be appended with the position number of the file on the tape. The value of /BLOCKSIZE must apply to all the MNT files on the tape or to those specified using /SELECT.

MESSAGES (SUCCESS)

These messages are used to indicate that the program has succeeded in performing some action, and do not require any user action.

NORMAL, MNT2DTI function return was TRUE (ie success)

Explanation: This message is used internally by MNT2DTI to indicate whether a subroutine has completed succesfully or not. It is intended for use by LSL for debugging purposes only and should not appear to the user.

User action: None.

MESSAGES (INFORMATIONAL)

These messages give information only, and require no immediate action by the user. They are used to provide information on the current state of the program, or to supply explanatory information in support of a warning or error message.

DTICLOSED, DTI file closed

Explanation: This message is output when the DTI output file has been successfully closed.

User action: None.

DTICRMAT, DTI file created with matrix x:'integer', y:'integer'

Explanation: Informational message if /LOG is specified on the command line telling the user the size of the DTI matrix which has been created

User action: None.

DTIOPEN, DTI file "'file-spec'" opened

Explanation: This message is output when the DTI output file has been successfully opened.

User action: None.

IGNOREDQUAL, Qualifier not associated with disk input was ignored

Explanation: Informational message given when the /SELECT or /HEADER were used in combination with input from disk.

User action: None.

MNTCLOSED, MNT file closed

Explanation: This message is output when the MNT output file has been successfully closed.

User action: None.

MNTELEVAL, Elevation datum value is 'integer'

Explanation: Additional message following an OUTOFRNG warning to inform the user of the elevation datum value which was found to be out of range

User action: None.

MNTFILNAM, MNT map name is "'string'"

Explanation: If /LOG is specified on the command line the program responds with the name of the MNT file read from the header record.

User action: None.

MNTOPEN, MNT file "'file-spec'" opened

Explanation: This message is output when the MNT output file has been successfully opened.

User action: None.

TAPEMARK, Tape mark found at block number 'integer'

Explanation: Informational message if /LOG is specified on the command line telling the user the position at which a tape mark was found on the tape.

User action: None.

MESSAGES (WARNING)

These messages are output when an error has occurred that can be corrected immediately by the user or that the program will attempt to overcome.

OUTOFRNG, Datum at row:'integer', column:'integer' out of range

Explanation: Warning message if /VALIDATION is specified on the command line indicating that an elevation datum is out of the range read in the MNT header.

User action: This message means either a bad elevation datum or a bad header record was read from the MNT. Check the data and consult the donor of the MNT if necessary.

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

ABORT, MNT2DTI function return was FALSE (ie error)

Explanation: This message is used internally by MNT2DTI to indicate whether a subroutine has completed succesfully or not. It is intended for use by LSL for debugging purposes only and should not appear to the user.

User action: None.

CLOSERR, error closing file "'file-spec'"

Explanation: Some form of error occurred in closing one of the input or output files. The program will exit.

User action: Depends upon the associated LSLLIB messages.

DTICLOSE, error closing DTI file "'file-spec'"

Explanation: The program encountered an error while trying to close the DTI file

User action: Depends upon the error.

ENDOFTAPE, end of tape encountered. DTI file already produced are unaffected

Explanation: An attempt was made to process an MNT file beyond the end of the tape. Any DTI file already produced are unaffected by this error.

User action: Ensure that the tape contains the correct number of files or use the appropriate /SELECT qualifier values.

ERRRDDATA, error reading data record number 'integer' in MNT file

Explanation: An error occurred in reading a data record in the input MNT file. A message follows giving more detail.

User action: Depends on the type of error encountered. The MNT file can be checked using a standard text editor. If the data is corrupt, contact the supplier.

ERRRDHEAD, error reading the header record of MNT file

Explanation: An error occurred in reading the header record in the input MNT file. A message follows giving more detail.

User action: Depends on the type of error encountered. The MNT file can be checked using a standard text editor. If the data is corrupt, contact the supplier.

FILOPEN, error opening file "'file-spec'"

Explanation: Some form of error occurred in opening one of the input or output files.

User action: Depends upon the associated LSLLIB messages.

INVFILNAM, invalid filename "'file-spec'"

Explanation: The MNT input file specification is not valid. The specified filename will not parse against the given skeleton: SYS$DISK:.MNT;0.

User action: Specify a correct filename including device name if necessary.

MAGTAPE, error initialising magtape device "'device-name'"

Explanation: An error occurred in initialising the magnetic tape drive for reading. The associated LSLLIB and system error messages should clarify the problem.

User action: Dependant upon the associated messages. One possible cause of problems is that the tape has not been mounted. Contact your system manager if you are unable to resolve this problem.

NODEVICE, unknown device name "'device'" given

Explanation: The device name given on the command line was not recognised. The program will exit.

User action: Specify a legal device or do not use the qualifier; the default is MTA0:.

NOFILNAM, no filename in MNT file specification "'file-spec'"

Explanation: The specified MNT input file-spec is a valid device name but the filename has not been specified.

User action: Rerun MNT2DTI with the correct MNT filename and device specification.

NOTMNTFOR, magtape device "'device'" must be mounted foreign

Explanation: The specified MNT input file-spec has been parsed as a magtape device but the tape is not mounted foreign.

User action: Mount the tape with the VMS MOUNT/FOREIGN command and then rerun MNT2DTI.

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

CHAPTER 11

MODULE DTI2NTF

UTILITY DTI2NTF

REPLACES DTI2NTF is a new utility.

FUNCTION

DTI2NTF is a utility to convert raster data in Laser-Scan Digital Terrain Image (DTI) files to the UK National Transfer Format (NTF) release 1.0 or 2.0.

FORMAT

$ DTI2NTF [input-DTI-file-spec(s)] output-NTF-file-spec /qualifiers

Command qualifiers	**Defaults**
/[NO]DBNAME	/NODBNAME
/[NO]DDNAME	/DDNAME="DEFAULT_02.00"
/[NO]DDATE	/NODDATE
/DENSITY	/DENSITY=1600
/[NO]DONOR	/DONOR="Laser Scan: DTI2NTF"
/FIELDWIDTH	/FIELDWIDTH=10
/[NO]INPUT	/NOINPUT
/LEVEL	/LEVEL=5
/[NO]LOG	/NOLOG
/[NO]RECIPIENT	/NORECIPIENT
/SERIAL	/SERIAL=0
/VERSION	/VERSION=2.0

PROMPTS

Input DTI-file(s):	Input-DTI-spec
Output NTF-file:	Output-NTF-spec

PARAMETERS

Input-DTI-spec

- This specifies the input DTI file name(s). It is the first parameter specified on the command line.

- The input DTI specification may be a file name or a list of file names.

- Any part of the file specification(s) which is not supplied will be taken from the default specification: 'LSL$DTI:DTI.DTI'.

This parameter is not required if the /INPUT qualifier is given containing a list of input DTI files.

Output-NTF-spec

- This specifies the destination of the generated NTF dataset. It is the second parameter on the command line.

- The output-NTF-spec may be a filename or the name of a foreign mounted magnetic tape device.

COMMAND QUALIFIERS

/DBNAME=<string>
/NODBNAME (default)

- Specifies the name of the database from where the data is coming.

- Note: only the first 20 characters of the name will be used.

/DDNAME=<string>
/DDNAME="DEFAULT_02.00" (default)

- Specifies the Data Dictionary name.

- Note: only the first 20 characters of the name will be used.

/DDATE=<date>
/NODDATE (default)

- Specifies the release date of the data dictionary in the form yyyymmdd.

/DENSITY=<number>
/DENSITY=1600 (default)

- If the output NTF dataset is being written to a magnetic tape device, /DENSITY selects the tape density to use. The specified number must be 800, 1600 or 6250, with a default value of 1600 bpi.

/DONOR=<string>
/DONOR="Laser-Scan: DTI2NTF" (default)

- Specifies the name of the person/organisation sending the data.

- Note: only the first 20 characters of the name will be used.

/INPUT=filename
/NOINPUT (default)

- /INPUT specifies a filename containing a list of DTI files to be used to create the NTF dataset. The qualifier can be used instead of specifying the DTI filenames on the command line, and is especially useful when the NTF dataset is to be created from a large number of DTI files which would be impractical to type at the command line.

- Note: If DTI files are specified on the command line, and the /INPUT qualifier is used, DTI2NTF will assume that the intention was only to use the /INPUT qualifier.

/FIELDWIDTH=<number>
/FIELDWIDTH=10 (default)

- Specifies the field width in characters to use to store each data element in the NTF dataset from the DTI file.

- Note: the FIELDWIDTH is defined as 10 at level 0 and cannot be modified. At level 4 or 5, the field width will be calculated from the DTI maximum or minimum data values. If the value supplied with the /FIELDWIDTH is smaller than that needed to store the data elements, DTI2NTF will warn the user and attempt to continue.

/LEVEL=<number>
/LEVEL=5 (default)

- Selects the NTF level at which the NTF dataset is to be produced. The number specified must be either 0, 4 or 5.

- Note: The NTF raster formats as defined in NTF release 1.0 or 2.0 are the only versions supported by DTI2NTF, at level 0 or 4 for Version 1.0 and at level 5 for Version 2.0.

/LOG
/NOLOG (default)

- /LOG Enables the display of informational messages. Unless the /OUTPUT qualifier is supplied, messages are written to SYS$OUTPUT.

- Note: When the /LOG qualifier is used, if SYS$OUTPUT is found to be a terminal device, then in addition to the informational messages being output, DTI2NTF will display a percentage running total showing how much of the DTI file it has processed.

/RECIPIENT=<string>
/NORECIPIENT (default)

- Specifies the name of the person/organisation receiving the data.

- Note: only the first 20 characters of the name will be used.

/SERIAL=<number>
/SERIAL=0 (default)

- Specifies the serial number of the dataset. This is especially useful if the NTF dataset is part of a group of datasets.

/VERSION=<number>
/VERSION=2.0 (default)

- Selects the NTF version at which the NTF dataset is to be produced. The number specified must be either 1.0 or 2.0.

- Note: The NTF raster formats as defined in NTF release 1.0 or 2.0 are the only versions supported by DTI2NTF, at level 0 or 4 for Version 1.0 and at level 5 for Version 2.0.

DESCRIPTION

DTI2NTF is a utility to convert data in Laser-Scan Digital Terrain Image (DTI) file(s) to the UK National Transfer Format (NTF) Level 0 or in a subset of Level 4 used by the Ordnance Survey of the UK for distributing terrain models. It is defined by the OS data-dictionary: "OSDTMDDICT1.0" of 8th May 1987. It also converts to NTF Version 2.0 level 5 (BS 7567).

The NTF dataset may be written to a disk file or a magnetic tape.

RESTRICTIONS

- DTI2NTF only produces data as specified by the NTF release 1.0 and release 2.0 documentation.
- At level 0, the field-width is defined as 10 characters and cannot be modified. At level 4 and above, the GRIDVAL field of the GRIDHREC can be redefined to any suitable value.
- By default, DTI2NTF produces NTF output at NTF Version 2.0 level 5.
- The /FIELDWIDTH qualifier cannot be used when data is being output at NTF level 0. DTI2NTF will complain if this is attempted. At NTF levels 4 and 5 DTI2NTF will always calculate the minimum field width that it needs. If the /FIELDWIDTH qualifier is used, DTI2NTF will attempt to use this value, warning the user if it is less than 4.
- The program only sets values for a subset of the full fields in the section header and GRIDHREC records.

EXAMPLES

$ **DTI2NTF /LOG INPUT1,INPUT2,INPUT3 OUTPUT<CR>**

```
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT1.DTI for read
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT2.DTI for read
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT3.DTI for read
%DTI2NTF-W-MISC, FIELDWIDTH =      0 is too small
-DTI2NTF-I-MISC, Using calculated width      8
%DTI2NTF-I-NTFOPEN, NTF file OUTPUT.NTF opened for output
%DTI2NTF-I-MISC, Header written to NTF dataset
%DTI2NTF-I-MISC, NTF dataset will be version 1.00, level 4



%DTI2NTF-I-MISC, Processing file "1" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT1.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, Processing DTI matrix

100.00% Complete

%DTI2NTF-I-MISC, Processing file "2" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT2.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, Processing DTI matrix

100.00% Complete

%DTI2NTF-I-MISC, Processing file "3" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT3.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, processing DTI matrix

100.00% Complete
 ELAPSED:    0 00:00:07.06  CPU: 0:00:01.15  BUFIO: 16  DIRIO: 10  FAULTS: 110
```

In this example the input DTI files were given as INPUT1,INPUT2 and INPUT3. These are parsed and any part of the filenames that were missing are taken from LSL$DTI:DTI.DTI. The NTF dataset is to be written to "OUTPUT" which will be parsed and called OUTPUT.NTF.

The input DTI files are opened and DTI2NTF calculates the minimum "field-width" that will be needed for the data to be output correctly. Since the field-width was not specified in the command line, it was set at zero. The program detects that the field width is not sufficient and sets it to the value it calculated. A volume header is written to the NTF dataset and processing of the input DTI files is begun.

Each file is opened and a corresponding header entry is written to the NTF dataset. The program then processes the DTI matrix and writes the information to the NTF dataset. If the program is run on a terminal, a running total of how much of the input DTI file has been processed, is displayed at the bottom of the

screen. When the counter reaches 100.00% the program has completed processing of the current DTI file.

The creation of the NTF dataset is completed successfully.

```
 $ DTI2NTF /LOG  /LEV=0  INPUT1,INPUT2,INPUT3  OUTPUT<CR>

%DTI2NTF-I-NTFOPEN, NTF File OUTPUT.NTF opened for output
%DTI2NTF-I-MISC, Header written to NTF dataset
%DTI2NTF-I-MISC, NTF dataset will be version 1.00, level 0


%DTI2NTF-I-MISC, Processing file "1" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT1.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, Processing DTI matrix

100.00% Complete

%DTI2NTF-I-MISC, Processing file "2" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT2.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, Processing DTI matrix

100.00% Complete

%DTI2NTF-I-MISC, Processing file "3" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT3.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, Processing DTI matrix
100.00% Complete
 ELAPSED:    0 00:00:07.06  CPU: 0:00:01.15  BUFIO: 16  DIRIO: 10  FAULTS: 110
```

In this instance the output dataset is to be written at level 0. Since the field width for the data cannot be redefined, the program does not attempt to calculate the minimum field width required. The remainder of the conversion is similar to the example defined above. The conversion is a success.

```
$ TYPE INPUT.LIS
  INPUT1
  INPUT2.DTI
  INPUT3.DTM
$ DTI2NTF /LOG /INPUT=input.lis /LEV=0 OUTPUT  <CR>

%DTI2NTF-I-INFILOPN, Opening file INPUT.LIS for read
%DTI2NTF-I-NTFOPEN, NTF File "OUTPUT.NTF" opened for output
%DTI2NTF-I-MISC, Header written to NTF dataset
%DTI2NTF-I-MISC, NTF dataset will be version 1.00, level 0


%DTI2NTF-I-MISC, Processing file "1" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT1.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, processing DTI matrix

100.00% Complete

%DTI2NTF-I-MISC, Processing file "2" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT2.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, processing DTI matrix

100.00% Complete

%DTI2NTF-I-MISC, Processing file "3" of "3"
%DTI2NTF-I-INFILOPN, Opening file LSL$DTI:INPUT3.DTI for read
%DTI2NTF-I-MISC, GridHeader record written
%DTI2NTF-I-MISC, processing DTI matrix
100.00% Complete
 ELAPSED:    0 00:00:07.06  CPU: 0:00:01.15  BUFIO: 16  DIRIO: 10  FAULTS: 110
```

In this example the names for the input DTI files were taken from the file INPUT.LIS which was specified with the /INPUT qualifier. The DTI files are processed in the same way as in the above examples and the conversion is a success.

MESSAGES (INFORMATIONAL)

These messages give information only, and require no immediate action by the user. They are used to provide information on the current state of the program, or to supply explanatory information in support of a warning or error message.

INFILOPN, Opening DTI file 'file-name' for read

Explanation: The specified file is to be opened for read.

User action: None.

IMISC, Miscellaneous

Explanation: Miscellaneous informational messages giving more detailed information and generally following a warning or error message.

User action: None.

LOGFILOPN, File 'file-name' opened for log messages

Explanation: The specified file has been successfully opened for writing supplementary messages.

User action: None.

NTFOPEN, NTF file 'file-name' opened for output

Explanation: The specified file has been successfully opened for output.

User action: None.

MESSAGES (WARNING)

These messages are output when an error has occurred that can be corrected immediately by the user or that the program will attempt to overcome.

IGNINFILES, ignoring input files specified on the command line

Explanation: The input DTI files that DTI2NTF is to process can be either specified on the command line or be contained in the file specified by the /INPUT qualifier. In this case the program has detected both forms of specification and ignores the files specified on the command line.

User action: If the user intended to read DTI file names from the file specified with the /INPUT qualifier, then the program should be stopped and the command line respecified correctly.

LONGMSG, Data string for qualifier is longer than maximum length of 'integer'

Explanation: The data part of the qualifier has exceeded the permitted maximum length. DTI2NTF will truncate excess characters.

User action: None.

WMISC, Miscellaneous

Explanation: Miscellaneous warning messages.

User action: This depends on the content of the message.

MESSAGES (ERROR)

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

BADDTITYPE, DTI file has unsupported data type

Explanation: The specified file has an unsupported data type (eg. BIT).

User action: Check that the DTI file contains only BYTE, WORD, LONG or REAL data.

BADINFIL, File 'file-name' is not in expected format

Explanation: The specified file was taken from the /INPUT qualifier. This file should contain a list of filenames to be used to generate the NTF file. The program has detected some error in the structure of data in this file.

User action: Check that this file contains only a text list of DTI filenames. It may be necessary to retype this file.

BADLEV, invalid NTF level 'integer' given

Explanation: If the /LEVEL qualifier is used to select an output NTF level other than 0, 4 or 5 this message is output.

User action: Do not try to output at a level other than 0, 4 or 5 (the default) as the program does not support them.

BADVER, invalid NTF version 'real' given

Explanation: If the /VERSION qualifier is used to select an output NTF version other than 1.0 or 2.0 this message is output.

User action: Do not try to output at a version other than 1.0 or 2.0 (the default) as the program does not support them.

BADVERLEV, invalid NTF version 'real' and level 'integer' combination given

Explanation: This message is output if the /VERSION qualifier and the /LEVEL qualifier are used to select an output NTF version and level combination that is invalid. The only valid combinations that are allowed are levels 0 or 4 for Version 1.0 or level 5 for Version 2.0 (the default).

User action: Do not try to output at level and version combinations other than the above as the program does not support them.

CLOSERR, Error while closing file 'file-name'

Explanation: An error occurred while attempting to close the specified file. There may be other system error messages which will give more information.

User action: It is possible that a disk or device error has occurred. Check other system error messages and attempt to determine the cause of the problem. If the problem persists please contact Laser-Scan.

EMISC, Miscellaneous

Explanation: Miscellaneous error messages.

User action: This depends on the content of the message.

INITERR, Unable to initialise magnetic tape 'tape-name'

Explanation: Before DTI2NTF can write the NTF dataset to the specified tape, the tape must be initialised to conform with the NTF standard. An error has occurred while doing this.

User action: Check that the tape has been loaded correctly and is on-line, check that the tape is write enabled and try again.

MAXINFILE, Too many files, maximum 'integer'

Explanation: The number of files specified has exceeded the maximum number of files the program will accept.

User action: If you feel that the maximum limit is not reasonable, submit an SPR to Laser-Scan so that appropriate changes can be made to the program. Alternatively reduce the number of input DTI files used to create each NTF dataset.

NODENS, Value for /Density qualifier is bad or missing (must be 800 or 1600)

Explanation: The /DENSITY qualifier was specified, but either the value was not supplied or the value supplied was not a density supported by DTI2NTF.

User action: Ensure that the value for the /DENSITY qualifier was specified and it was either 800 or 1600.

NODTIIN, No input DTI files specified

Explanation: The input DTI files that DTI2NTF is to process can be either specified on the command line or be contained in the file specified by the /INPUT qualifier. In this case neither form of specification has been found.

User action: Re-specify the command line and specify the input DTI files.

OPENDTIERR, Unable to open DTI file 'file-name'

Explanation: The specified DTI input file does not exist or is corrupt. There may be other system error messages which will give more information.

User action: Check to see whether the specified file exists and that it is not corrupt.

OPENERR, Unable to open specified file 'file-name'

Explanation: The specified file either does not exist or may be corrupt. There may be other system error messages which will give more information.

User action: Check that the specified file exists and is not corrupt.

OPENNTFERR, Unable to open specified NTF file 'file-name'

Explanation: The specified file could not be created. There may be other system error messages which will give more information.

User action: Check the specified file specification.

TESTFOR, Device 'device-name' is not mounted foreign

Explanation: The way NTF datasets are stored on tape is incompatible with the VMS tape structures. In order to read or write from the tape, the device on which the tape is loaded must be mounted /FOREIGN.

User action: Mount the device with the /FOREIGN qualifier and re-specify the command line.

VOLTERM, Unable to write VOLTERM record

Explanation: NTF datasets are terminated by a volume termination record [VOLTERM]. The program was unable to write this record to the output NTF file. This is likely to cause problems when reading the dataset back via an NTF reading package.

User action: It is possible that the device the NTF file is being written to is full.

MESSAGES (OTHER)

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the DTILIB library and by the Laser-Scan I/O library, LSLLIB. DTILIB library messages are introduced by '%DTILIB' and are documented in the MATRIX package reference manual. In most cases DTI errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.

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