Laser-Scan Ltd.

IMP - Acceptance Tests

Issue 2.6 (mod) 26-October-1992

"IMP Acceptance" Category: Acceptance Tests

Issue 1.0	A T Timms	15-Dec-1986
Issue 1.1	A T Timms	17-Dec-1986
Issue 1.2	C C Brunt	29-Jan-1987
Issue 1.3	A T Timms	6-Feb-1987
Issue 1.4	Paul Hardy	9-Aug-1987
Issue 2.0	Tim Hartnall	14-Jan-1988
Issue 2.1	Ron Russell	28-Mar-1988
Issue 2.2	P G Hardy	13-Jun-1988
Issue 2.3	M W S Reid	27-Oct-1988
Issue 2.4	A C Morris	21-Feb-1989
Issue 2.5	J Cadogan	1-Nov-1989
Issue 2.6	S Gupta	14-Jun-1991
Issue 2.6 (mod)	K M Sutherland	26-Oct-1992

CONTENTS

1 Introduction

This document describes the acceptance test procedure for the Laser-Scan IMP (IFF Map Processing package) which is part of the Laser-Scan LAMPS automated mapping system. It assumes that the user is familiar with digital cartography, with the IMP modules, with LAMPS, with the LITES2 map editor, and with the VMS operating system. See the "IMP User Guide", and the "IMP Reference Manual" for further information on IMP.

The relevant data files and command files for the acceptance tests are listed in Appendix A and are supplied by Laser-Scan on installation of the package.

Note that Laser-Scan reserve the right to make minor modifications to this acceptance procedure to match their policy of continued software development.

2 IMP Initialisation

2.1 Environment

Check that the Laser-Scan-supplied package initialisation command file LSL$COM:IMPINI.COM has been invoked. This has probably been done automatically on your behalf at login time. A good check is to use the DCL command:

```
$ SHOW SYMBOL IMERGE
```

to verify that the DCL symbol IMERGE exists and points to the program image file of the IMP module "LSL$EXE:IMERGE". If symbol IMERGE is not defined then invoke the package initialisation command file by giving the DCL command:

```
$ @LSL$COM:IMPINI Q
```

then repeat the check for the existence of DCL symbol IMERGE.

Pass [ ]/Fail [ ]

Repeat the invocation of the initialisation command file, this time without the Q (quiet) modifier by giving the DCL command:

```
$ @LSL$COM:IMPINI
```

and note the list of the available modules.

Pass [ ]/Fail [ ]

Ensure that logical name LSL$IF: points to the directory containing a working copy of the acceptance test IFF file 'filename'.IFF. (For a list of file specifications supplied see appendix A). This will usually involve copying the standard test file to a working directory with a command such as:

```
$ COPY LSL$PUBLIC_ROOT:[IMP.ACCEPT]IMPTEST.IFF LSL$IF:/LOG
```

2.2 Invoking The Package

Invoke the acceptance test command procedure by giving the DCL command "@LSL$COM:IMP_ACCEPT".

Give the customer name when prompted for it and the acceptance test IFF file. (For file specifications see appendix A). Any error in the file-spec will cause a warning message to be produced and a re-prompt for the file-spec.

Pass [ ]/Fail [ ]

3 Test Sequence

3.1 **IRENUMBER**

The first module to be used is IRENUMBER to create unique Feature Serial Numbers in the output file. Note the command line given is:

$ IRENUMBER/LOG filename.IFF filename.REN <CR>

The /LOG qualifier specified to send supplementary messages to the terminal. The defaults for the renumbering BASE, INCREMENT and UPPER_LIMIT and LOWER_LIMIT are taken. The input file is filename.IFF and the output file filename.REN.

Note the messages showing successful opening of the input and output files, the renumbering parameters being used, and a note of each layer as it is encountered. A message is also output as each FSN is renumbered and totals information when the end of file is detected. Note the timing statistics produced at program termination and that $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.2 **ICHECK**

ICHECK is used to check for digitised loops and for correspondence with the IMPTEST FRT (Feature Representation Table) file.

$ ICHECK/LOG/FRT = IMPTEST filename.REN <CR>

The /FRT qualifier is specified to check the characteristics of each feature within the file against its graphical type in the IMPTEST FRT file (expanded to LSL$FRT:IMPTEST.FRT). The /CROSS (to check for crossing segments) and /OUTPUT (to send messages to SYS$OUTPUT) qualifiers are taken by default. The input file is the renumbered file filename.REN.

Note the messages confirming the input file. A message is output as each layer is encountered. Error totals information is displayed when the end of file is detected. Note the timing statistics produced at program termination and that $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.3 **ITOTEXT**

ITOTEXT is the IMP module to create a text file from an IFF file. The input file is the renumbered IFF file produced by IRENUMBER and the output file filename.TXT. The /LOG qualifier sends supplementary messages to the terminal. The command line given is:

$ ITOTEXT/LOG filename.REN filename.TXT<CR>

Note the messages showing successful opening of the input IFF file and output text file and each layer as it is encountered. Timing statistics are produced at program termination and $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.4 **Editing The Text File Using EDT**

It is now possible to edit the TEXT file (filename.TXT) using the VMS text editor EDIT. The command procedure puts the user into the VMS EDITOR. If an asterisk prompt appears then give the command '**C**' (for CHANGE) to go to full screen display mode. The user can now change any of the IFF entries. It is recommended that the user change a few feature codes (the first integer after an FS entry), some text entries and some ACs. Note that alteration of NF numbers (the FSN) may destroy the unique sequence of FSN's created by IRENUMBER.

Give the command "<CTRL/Z>" (pressing the CTRL and Z keys together) and type "EXIT" to exit from EDT.

Pass [ ]/Fail [ ]

3.5 **IFROMTEXT**

IFROMTEXT is used to create an IFF file from a text file. The input text file is new version of filename.TXT created on exit from EDIT. The output file is filename.NEW. The /LOG qualifier is again specified to send supplementary messages to the terminal. The command line is:

$ IFROMTEXT/LOG filename.TXT filename.NEW<CR>

Note the messages showing successful opening of the input text file and output IFF file and each layer as it is written. Timing statistics are produced at program termination and $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.6 **IPATCH**

IPATCH is used to check the validity of IFF files and to examine individual entries in them. The command line specified is:

$ IPATCH filename.NEW<CR>

with the input file being filename.NEW (created by IFROMTEXT). If on a VT100 type terminal, note the STATUS block at the top of the terminal confirming the name of the input file. Use the IPATCH commands "NEXT" to step forward through the file, "PREVIOUS" to step backwards, "EXPLAIN" to examine an entry and "TYPE" to type an entry. Type "HELP" to get help on IPATCH and "HELP subcommand" to get help on IPATCH commands and IFF entries. Type "STATUS OFF" to switch off the status block and "STATUS ON" to switch it back on. Type "*" to rewind the file then type "PREV" and note the error message produced. (For full details of IPATCH commands see the IMP User Guide and the IMP Reference Manual).

Give the command "<CTRL/Z>" (pressing the CTRL and Z keys together) or type "EXIT" to exit from IPATCH. Note that $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion". If user has specified an invalid command then $STATUS will return as "%SYSTEM-E-ABORT, abort". Either of these codes indicate a successful exit.

Pass [ ]/Fail [ ]

3.7 **IDIFFERENCE**

IDIFFERENCE is now used to compare the renumbered IFF file filename.REN and the file created by IFROMTEXT filename.NEW. The command line given is:

$ IDIFFERENCE/LOG filename.REN filename.NEW<CR>

with the /LOG qualifier specified to send supplementary messages to the terminal.

Note the messages indicating successful opening of the two input files and the messages produced as each layer is encountered. Note how the default tolerance used by IDIFFERENCE affects the comparison of real numbers in the RA and AC entries. These differences occur in the seventh significant figure and may not necessarily appear obvious to the user. Note that the HI entry is missing from both files. The changes in the text file during the text editing session should be noted by the program, and a summary of the differences between the files output at program termination. Note that $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.8 **ISTART**

ISTART is used to create 'new' type template IFF files. The file to be created is called filename.SRT and the /LOG and /LEARNER qualifiers are specified on the command line to send supplementary messages to the terminal and give additional explanation about the information required by the program. The /SYMBOL qualifier causes corner symbols to be output to the file rather than corner ticks.

The command line given is:

$ ISTART/LOG/LEARNER/SYMBOL filename.SRT<CR>

The user is told that the output file opened successfully. The user is then given a brief description of ISTART and is asked whether he wants to continue. Type "YES". Then the user is prompted for the map scale. Type "2500" to represent a 1:2500 scale map.

The next prompt is:

Specify coordinates for the top left control point (X then Y) :

Type "0 1000" to represent a control point of 0 in X and 1000 in Y. Type "0 0" when prompted for the bottom left control point. Type "1000" when prompted for the bottom right control point and note the prompt for the Y ordinate. Type "0" in response to this. Type <RETURN> when prompted for the top right control point and note the re-prompt for the coordinates. Type "1000 1000" in response to this.

Note the message verifying the control point values before program termination, and that $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.9 **IMERGE**

IMERGE is used to merge the 'new' type IFF file created by ISTART and the (modified) original file created by IFROMTEXT. The input files therefore are filename.SRT and filename.NEW. The 'new' type file is specified first in the command line to preserve the HIstory entry and type 2 Map Descriptor (MD) in the output file (filename.MER). The /LOG qualifier is again used to send supplementary messages to the terminal.

The command line given is:

$ IMERGE/LOG filename.SRT,filename.NEW filename.MER<CR>

Note the messages confirming the opening of the input files and the output file and the message that the second input file has no HIstory entry. Messages are also output as each layer is encountered. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.10 **IINFO**

IINFO is used to check the contents of an IFF file. In this case the file is the merged file filename.MER.

The command line specified is:

$ IINFO filename.MER<CR>

Note the History entry gives information about the creation of the file (by IMERGE), the control points are those from the file created by ISTART (filename.SRT) and that information is output about each layer encountered and each feature code found. A summary of totals information is also output. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.11 **ISELECT**

ISELECT is used to select features on the basis of feature code. Features with feature codes 1 to 10 and 200 to 210 are selected by the /FC=(1:10,200:210) qualifier. The features that are selected from the input merged file (filename.MER) are output to filename.SEL, and the /LOG qualifier outputs supplementary messages to the terminal.

The command line specified is:

$ ISELECT/LOG/FC=(1:10,200:210) filename.MER filename.SEL<CR>

Note the messages indicating successful opening of the input and output files and the messages as each layer is encountered. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.12 **IREPORT**

IREPORT is now used to report on the contents of the file. The /LOG qualifier is specified to send supplementary messages to the terminal. The /LAYER qualifier is used to report on the layers present and /NF reports on each NF (Feature Serial Number and Internal Sequence Number) as it is encountered. The input file is the selected file filename.SEL.

The command line specified is:

$ IREPORT/LOG/NF/LAYER filename.SEL<CR>

Note the message output as the input file is opened and the report on each feature as it is encountered. The Feature Serial Number (FSN), Internal Sequence Number (ISN) and the feature code of each feature is reported, and a message output as each layer is encountered.

Note that all feature codes are between 1 and 10 and 200 and 210. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.13 **IRECODE**

IRECODE is used to change specified feature codes. The input file is the selected file filename.SEL and the output file is a recoded file called filename.REC. The /FC qualifier specifies that feature codes will be changed and the values after the qualifier specify that features having feature code 3 will be changed to 6. The /LOG qualifier is used to send supplementary messages to the terminal.

The command line specified is:

$ IRECODE/LOG/FC=(3>6) filename.SEL filename.REC<CR>

Note the messages indicating successful opening of the input and output files and the messages as each layer is encountered. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.14 **IINFO**

IINFO is again used to check the contents of the IFF file. In this case the file is the recoded file filename.REC.

The command line specified is:

$ IINFO filename.REC<CR>

Note the History entry gives information about the creation of the file (by IMERGE), and the subsequent modifications made to the file. The control points are those from the file created by ISTART (filename.SRT). Information is again output about each layer encountered and each feature code found. Note that there are no longer any features with feature code 3 but now there are many more with feature code 6. A summary of totals information is also output. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.15 **IWINDOW**

IWINDOW is used to clip the data. The input IFF file is the recoded file filename.REC and the output IFF file is filename.CLP. The /LOG qualifier is specified to send supplementary messages to the terminal and the /NORTH, /SOUTH, /EAST and /WEST qualifiers with their respective values give the clipping boundaries.

The command line specified is:

$ IWINDOW/LOG/NORTH=350/SOUTH=0/WEST=0/EAST=500 filename.REC filename.CLP<CR>

Note the messages confirming the opening of the files and confirming the clipping boundaries. Note also the messages warning that the supplied SOUTH and WEST boundary values are outside the range of coordinates in the file, and hence have no effect during the clipping process. Messages are produced which indicate each layer as it is encountered and features that are deleted or clipped. Note especially the summary information at the end of each layer and at program termination. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.16 **ISORT**

ISORT is used to sort the file on the basis of feature serial number. The input file is the clipped file filename.CLP and the output file is a sorted file filename.SOR. The /OUTPUT qualifier is specified to output supplementary messages to the default output device SYS$OUTPUT.

The command line specified is:

$ ISORT/OUTPUT filename.CLP filename.SOR<CR>

Note the input and output files are specified and the command line also output. For each layer a sort summary is also output. Note layer 1 is now empty. Note the messages output before program termination which summarise the sorting done. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.17 **IFIXAREA**

IFIXAREA is used to check area features. The input IFF file is the sorted file filename.SOR and the output IFF file is a fixed file filename.FIX. The /OUTPUT qualifier is specified to send supplementary messages to SYS$OUTPUT and the /LAYER qualifier is used to limit the checking to the specified layer 10. The /CLOSE and /REVERSE qualifiers specify the checking to take place.

The command line specified is:

$ IFIXAREA/OUTPUT/LAYER=10/CLOSE/REVERSE filename.SOR filename.FIX<CR>

Note that the input and output files are specified and the command line output. A message is output as each layer is encountered. Layers other than 10 are copied and layer 10 is processed. On program termination a summary of features processed, closed and reversed is output. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.18 **ISELAC**

ISELAC is used to select features on the basis of AC (Ancillary) code. The input file is the fixed file filename.FIX and the output IFF file is filename.SAC. Note that there are NO command qualifiers.

The command line specified is:

$ ISELAC<CR>

Note the message confirming the opening of the default AC skeleton file LSL$LOOKUP:ACSKEL.DAT. The user is then prompted with the "ISELAC>" prompt. Type "FROM filename.FIX" and note the message confirming the file has been opened. Type "TO filename.SAC" and note the message confirming the file has been opened. Type "HELP" for help on ISELAC and "HELP sub-command" for help on a particular sub-command. Type "HELP AC" and note a list of the valid AC types for the default skeleton file. Type "RCONTOUR -10.1:11.1" to select real contour heights (type 3 ACs) between -10.1 and +11.1 units. Type "SHOW" to confirm the selections and type "GO" to start the selection process. Note the messages produced as each layer is processed and the summary of features selected and rejected. Type "EXIT" to exit from ISELAC. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.19 **IREPORT**

IREPORT is now used to report on the contents of the file. The /LOG qualifier is specified to send supplementary messages to the terminal and /NF reports on each NF (Feature Serial Number and Internal Sequence Number) as it is encountered. The /AC qualifier reports on the presence of ACs. The input file is the selected file from ISELAC filename.SAC.

The command line specified is:

$ IREPORT/LOG/NF/AC/LAYER filename.SAC<CR>

Note the message output as the input file is opened and the report on each feature as it is encountered. The Feature Serial Number (FSN), Internal Sequence Number (ISN), the feature code and any AC codes for each feature are reported, and a message output as each layer is encountered.

Note that all feature codes are between 1 and 10 and 200 and 210, that the FSNs are sorted within each layer, and that all ACs have a height value between -10 and 11. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.20 **ILAYFC**

ILAYFC is used to change feature codes in specified layers. The input IFF file is the output from ISELAC filename.SAC and the output file is filename.LAY. The /LOG qualifier is specified to send supplementary messages to the terminal and the /CODES qualifier is used to specify the feature code (201) that all features in the specified layer (7) will be changed to.

The command line specified is:

$ ILAYFC/LOG/CODES=(7>201) filename.SAC filename.LAY<CR>

Note the messages indicating successful opening of input and output files and the messages confirming the skipping of layers, and the processing of all features in layer 7. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.21 **ITRANS**

ITRANS is used to transform data from one projection to another. The input file is the output from ILAYFC filename.LAY and the output filename.TRA (a transformed file). The /LOG and /LEARNER qualifiers are supplied to output supplementary messages to the terminal and give additional information about the data required. In this case the transformation is between UK national grid metres and geographicals (Latitude and Longitude) in seconds of arc.

The command line specified is:

$ ITRANS/LOG/LEARNER filename.LAY filename.TRA<CR>

Note that information is given on the valid spheroid codes, projection codes and units. In response to the prompt for spheroid code for the input file the user should type "9" for the AIRY spheroid. The projection code prompt should be given the value "101" (for UK national grid). Press <RETURN> when prompted for the scale of the map. Note that this results in acceptance of the default scale specified to ISTART. The default unit code 2 (metres) should be taken by typing <RETURN> in response to the prompt. Type "590000 450000" when prompted for the local origin eastings and northings for the input file. Type "?" when prompted for projection code in the output file and note that the valid projection codes are displayed. Type "100" in response to this prompt (for Geographical projection). Type <RETURN> to the prompt for the scale of map, to accept the scale specified in ISTART. Type "3" in response to the prompt for unit code to make the output units seconds of arc. Take the defaults by pressing <RETURN> in response to the prompt for local origin (as latitude and longitude).

Note the messages indicating successful opening of the output files and that $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.22 **IFILTER**

IFILTER is used to filter and smooth files. The input file is the transformed file filename.TRA and the output file is a thinned file filename.THN. The /LOG qualifier is specified to send supplementary messages to the terminal. The /DP qualifier causes the data to be filtered using the Douglas-Peucker filter with the specified lateral tolerance of 0.15.

The command line specified is:

$ IFILTER/LOG/DP=LAT:0.15 filename.TRA filename.THN<CR>

Note the messages indicating opening of the files and each layer as it is encountered. Features not filtered are noted with informational messages. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

3.23 **IINFO**

IINFO is again used to check the contents of the IFF file. In this case the file is the thinned file filename.THN. The /TIMINGS qualifier is specified to summarise the timings in the HI (HIstory entries). The /MAP_DESCRIPTOR qualifier is specified to give information about the Map Descriptor entry.

The command line specified is:

$ IINFO/MAP_DESCRIPTOR/TIMINGS filename.THN<CR>

Note the History entry gives information about the creation of the file (by IMERGE), and the subsequent modifications made to the file. Note that the projection information has changed and that the map units are now seconds of arc with an origin offset. $STATUS is returned as "%SYSTEM-S-NORMAL, normal successful completion".

Pass [ ]/Fail [ ]

4 Final Verification

This is the end of the formal IMP acceptance test command procedure. The following files have been created from the original IFF file: filename.IFF

UTILITY	FILE CHARACTERISTIC	FILE
IRENUMBER	renumbered file	filename.REN
ITOTEXT	text file	filename.TXT
IFROMTEXT	regenerated IFF file	filename.NEW
IMERGE	merged file	filename.MER
ISELECT	selected file	filename.SEL
IRECODE	recoded file	filename.REC
IWINDOW	clipped file	filename.CLP
IFIXAREA	fixed file	filename.FIX
ISELAC	selected file	filename.SAC
ILAYFC	recoded file	filename.LAY
ISORT	sorted file	filename.SOR
ITRANS	transformed file	filename.TRA
IFILTER	thinned file	filename.THN
ISTART	'new' type IFF file	filename.SRT

ICHECK, IINFO, IPATCH and IREPORT have also been used to check the validity of the various IMP modules and IDIFFERENCE to compare two IFF files.

These files are available in the directory pointed to by logical name LSL$IF: for further verification, if required.

5 Conclusions

This completes the acceptance tests for the Laser-Scan IMP software package.

Overall Pass [ ]/Fail [ ]

Comments:

Customer Representative: **Date:**

Laser-Scan Representative: **Date:**

APPENDIX A

FILE-SPECIFICATIONS

Original IFF filename: **LSL$IF:IMPTEST.IFF**

(which hold a standard IFF file of map data)

The following files are produced by the acceptance test

A renumbered file	IMPTEST.REN
A text file	IMPTEST.TXT
A regenerated IFF file	IMPTEST.NEW
A merged file	IMPTEST.MER
A selected file	IMPTEST.SEL
A recoded file	IMPTEST.REC
A clipped file	IMPTEST.CLP
A fixed file	IMPTEST.FIX
A selected file	IMPTEST.SAC
A recoded file	IMPTEST.LAY
A sorted file	IMPTEST.SOR
A transformed file	IMPTEST.TRA
A thinned file	IMPTEST.THN
A 'new' type IFF file	IMPTEST.SRT

The following files can be used to view the output of the acceptance test using LITES2. The can be found in the directory pointed to by the logical name LSL$FRT:.

FRT	(feature representation table)	IMPTEST.FRT
SRI	(feature representation IFF file)	IMPTEST.SRI
TRI	(text representation IFF file)	IMPTEST.TRI