Laser-Scan Ltd.

Laser-Scan Automated Map Production System

LAMPS Software Environment Guide

Issue 2.4 - 31-Mar-1992

Science Park, Milton Road, Cambridge, England CB4 4FY tel: (0223) 420414

Document "LAMPS Software Environment Guide"

Document Issue 0.1	Paul Hardy	16-May-1986
Document Issue 1.0	Paul Hardy	22-Jul-1986
Document Issue 1.2	Paul Hardy	19-Dec-1986
Document Issue 2.0	Paul Hardy	27-Jul-1987
Document Issue 2.1	Paul Hardy	14-Jan-1988
Document Issue 2.2	Paul Hardy	05-Aug-1988
Document Issue 2.3	Paul Hardy	03-Aug-1990
Document Issue 2.4	Paul Hardy	31-Mar-1992

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PREFACE

Intended audience

This manual is intended for any user of the **L**aser-Scan **A**utomated **M**ap **P**roduction **S**ystem (LAMPS), and Laser-Scan **G**eographic **I**nformation **S**ystem (GIS) software who requires an overview of the system, and an understanding of the software environment.

In particular it is for the system manager who is responsible for software updates and the continued smooth running of the system. The guide will describe the components of the system, their usual locations in the filing system, and the environment necessary to run the programs.

It is assumed that the user is already familiar with general use of a DEC VAX series computer and of the VMS operating system. More details on VMS are available in the DEC VAX/VMS reference manuals. Readers are also referred to associated Laser-Scan references. See below for a list of associated manuals.

Structure of this document

This document is composed of 4 major sections.

- Firstly an overview of hardware and software components
- Secondly a description of the general software environment
- Thirdly a section on LAMPS system management.
- Fourthly a description of required environment by package.

Associated documents

Documentation for Laser-Scan LAMPS software is distributed in with each software package. The following documentation indicate manuals which may be particularly relevant to maintenance of the software environment for LAMPS. Latest versions of these documents are obtainable from Laser-Scan.

Package MAPPING
LSL LAMPS Software Installation Guide
IFF User Guide
IFFLIB Reference manual
FRT User Guide
FRTLIB Programmer Reference Manual
SRINORM User Guide
MAPPING Software Product Specification

Package IMP
IMP User Guide
IMP Reference Manual

IMP Software Product Specification

Package LITES2
LITES2 Reference Manual
LITES2 User's Guide
LITES2 Software Product Specification
LITES2 Workstation Guides for particular displays

Package PLOTTING
FPP Fast Plotting Program Reference Manual
FPP Software Product Specification
FPP User Guides for particular plotters

Optional Packages
See package documentation

Device Support Packages
The Laser-Scan HRD-1/Lasertrak Reference Manual
VAX LDLIB and HR Driver Technical Documentation and System Manager's Guide

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Conventions used in this document

Convention	Meaning
<CR>	The user should press the carriage return key on the terminal.
'colour'	Single quotes imply that the quoted object is to be substituted by a particular occurrence of the object, eg BLUE or RED for 'colour'.

---

1 Introduction

Laser-Scan LAMPS is a combination of hardware and software components which together allow use of modern high performance DEC VAX minicomputers and worksystems for digital cartography and automated map production.

Laser-Scan GIS software (HORIZON for Environmental systems and METROPOLIS for land information), uses the same LAMPS components with some extra software (XGIS) to provide facilities for geographic query and update. In the discussion which follows, both map production and GIS systems will often be referred to collectively as "LAMPS".

LAMPS and GIS systems may vary in size considerably. At the bottom end, there may be just a single editing workstation, running the "Basic LAMPS" software packages. At the top end it may be a a large system using multiple networked or clustered computers running many automated data capture, manual data capture, editing, processing, check plotting, conversion, update, final plotting, and query tasks on a variety of workstations and terminals.

Laser-Scan may provide a complete hardware/software turnkey system, together with continuing full system support, including VMS support. Alternatively, in some cases Laser-Scan provide just software to complement existing customer hardware.

In either case there will usually be someone on-site with responsibility for the smooth running of the LAMPS system, and the information in the rest of this document should help him or her achieve an overview of the system.

---

2 **Hardware Components**

The central hardware component of a LAMPS system will be one or more DEC VAX or MicroVAX series computers, with associated disk, magtape, communications and terminal peripherals. The other hardware components of the system will depend on the software options selected, but may include one or more of the following.

- A Lasertrak is a vector scanning digitiser which can also be used as a large screen display and 105mm diazo microfilm plotter. A Lasertrak is connected to the host computer via the UNIBUS, which is a fast parallel interface. There is an LSL-supplied device driver (HRDRIVER) for this device. In the case of a MicroVAX, a QBUS to UNIBUS converter is required. The Lasertrak console includes a colour graphics display (normally a Tektronix 4105) for use as both a VMS terminal, and closeup graphics display screen. This terminal is connected via a serial line to the host computer.

- A FASTRAK is an earlier version of the Lasertrak, having a different console incorporating a monochrome graphics storage tube display (Tektronix 4010) in place of the 4105.

- An HRD-1 is a simplified FASTRAK or Lasertrak without the scanning capabilities.

- A Laserplot is a microprocessor-controlled laser plotter designed for cartographic quality vector output on approximately A3 size film. It is connected to the host computer via a serial line.

- A Laser-Scan Digitising Table is a manual digitising table with a 16 button cursor and serial line controller. Currently this is likely to be an Altek table with either an AC90 or AC40 controller. It is connected to the host computer or workstation controller via a serial line. Other manufacturer's tables may be acceptable, possibly with reduced functionality.

- A Laser-Scan Vector Graphics display can be one of the following types:

  - A Laser-Scan GKS Segment Storage Display is a high resolution device capable of storage and display of vector (lines and symbols), text, and fill area data. A typical example would be a Sigmex 6164 which is a 1000 line colour display, and a member of the Sigmex 6000 series of GKS compatible graphics devices. It has a large internal segment store and can hence do local zoom and pan. It is connected to the host computer via a serial line.

  - A Laser-Scan Basic Vector Display is a medium to high resolution device capable of display of vector (lines, symbols and text) data, and having a limited refresh capability. A typical example would be a Tektronix 4014 DVST. It is connected to the host computer via a serial line.

- A Laser-Scan Raster Graphics Display is a high resolution (1000+ line) device capable of display of both vector (line) and raster (pixel) data. A typical example would be a Sigmex ARGS 7000 graphics system, which is connected to the host computer via a DR11-like 16bit parallel

interface on the UNIBUS, and requires an LSL-supplied device driver (IDDRIVER).

- A Laser-Scan MUART or WOSP workstation is a general purpose graphical editing station consisting of a Laser-Scan Vector Graphics display, possibly a small menu tablet, an Altek digitising table, and possibly a DEC alphanumeric VDU terminal. These devices are connected to a Laser-Scan MUART (TMU) intelligent graphics controller/multiplexer, which communicates with the host computer via a single serial line.

- A Laser-Scan Windowing Graphics Workstation is a high resolution (1000 line) device capable of display of both vector (line) and raster (pixel) data in multiple windows on a closely coupled bitmapped screen. The workstation has integral VAX processor, memory, disk, magtape, mouse etc. A typical example would be a DEC VAXstation 4000. It provides the functionality of the Laser-Scan Vector Graphics display, and some of the functionality of a Laser-Scan Raster Graphics display, together with a responsive interaction environment.

3 Software Components

A LAMPS system consists of both hardware and software components. Software components are grouped by function into packages, which may be either single programs or collections of individual utilities. For a description of the contents of each package, and its hardware and software requirements, please refer to its Software Product Specification (SPS), available separately from Laser-Scan. The following is a list of major software components with their major hardware dependencies.

3.1 LAMPS Kernel Packages

- The Laser-Scan system software support package (LSLSYSTEM) is required by all LSL software components. It includes environment setup command files, supplementary system utilities, and utility programs needed by more than one package.

- The Laser-Scan Mapping Kernel Software package (MAPPING) is required by all other LAMPS software components. It includes the IFF file interface library (IFFLIB), the Feature Representation library (FRTLIB), as well as various central LAMPS initialisation and control procedures.

  - The IFF file format is central to all LAMPS components. All LAMPS software reads and writes digital cartographic information as IFF files. The IFFLIB library is supplied to allow user-written programs to access IFF files.

  - The FRT (Feature Representation Table) lookup system is used by several LAMPS components. Any LAMPS program requiring to know the graphic representation of an IFF feature will use FRTLIB to access information about feature type, colour, shape, size, etc. The FRTLIB library is supplied to allow user-written programs to access FRT files.

- Laser-Scan maintenance utilities package (LSLMAINT) includes various utilities and libraries needed by LSL for maintenance and development of software on-site. This package is not present in most turnkey LAMPS systems, and will not normally be used by customers.

3.2 LAMPS Basic Packages

- The IFF Map Processing package (IMP) is a central component, and allows creation, sorting, clipping, transformation, selection, combination, listing, etc of IFF files.

- The cartographic editor and display package (LITES2) will usually be part of any system. This allows map display, manual interactive digitising, correction of operator errors following automated or blind

digitising, and map update. LITES2 is available to run on a variety of graphics hardware, using various interaction peripherals. See the LITES2 Software Product Specification for details of suported hardware configurations.

- The fast plotter program FPP package (PLOTTING) will usually be part of a LAMPS system to allow plotting of IFF data to cartographic quality. FPP is available to run on a variety of graphics hardware. See the Software Product Specification for details of suported hardware configurations.

3.3 **LAMPS Optional Packages**

- The vector scanning and line following digitiser package (VTRAK) is an optional component giving the capability of semi-automated capture of cartographic data from raster-scanned documents at speed. It requires a Windowing Graphics Workstation, and an LSL-approved raster scanner, or offline source of raster scanned data.

- The vector scanning and line following digitiser package (LASERAID) is an optional component giving the capability of semi-automated capture of cartographic data at speed. It requires a Laser-Scan Lasertrak or FASTRAK digitiser, and has been largely superceded by the VTRAK package above. This package now includes the structured data (link-node) digitising capabilities which were formerly a separate package (JUNCTIONS). See also the STRUCTURE package below.

- The blind table digitising system package (DIGSYS) is an optional component for bulk entry of manually digitised geographic data. It requires use of Laser-Scan manual digitising tables with VDU screens, and a single dedicated hardcopy control terminal.

- The IFF data conversion package (CONVERT) is an optional component which allows conversion of IFF data to and from a variety of standard external formats. Note that this package is divided into modules for different formats, and only relevant modules need be supplied.

- The Flowline Control package (FLOWLINE) is an optional component which allows control of the tasks and data involved in managing a production flowline. It uses the DEC Rdb relational database to store flowline and status information.

- LSL-supplied customer-specific software (CUSTOMER) is often supplied as an integral part of a LAMPS system, eg to allow transfer of map data to a private external databank.

- The Structured IFF data package (STRUCTURE) is an optional component which allows the creation and manipulation of link-node structured (junction) IFF data files. The ILINK program which is a major element of this package will do extensive geometric "tidies" on vector data, eg extension, truncation, common alignment, etc.

- The Polygon IFF data package (POLYGONS) is an optional component which allows the creation and manipulation of Polygon IFF files. The STRUCTURE package is needed as a prerequisite.

3.4 **LAMPS Matrix Processing Packages**

- The matrix data kernel package (MATRIX) is required by all LAMPS matrix data handling software components below. It includes the DTI file interface library, and basic matrix viewing and manipulation utilities.

- The terrain model creation package (DTMCREATE) is an optional component which allows generation of Digital Terrain Model matrices (DTMs) from vector topographic data (eg contours and spot heights). It includes the Panacea surface modeller.

- The DTM preparation package (DTMPREPARE) is an optional extension to package DTMCREATE which allows checking and analysis of vector data to be used as input to terrain model generation. An example is the automated calculation of heights of river networks by intersection of rivers with contours.

- The DTM conversion package (DTMCONVERT) is an optional component which allows conversion of DTI matrix data to and from a variety of standard external formats. Note that this package is divided into modules for different formats, and only relevant modules need be supplied.

- The terrain validation and exploitation package (TVES) is an optional component which allows display, analysis, and exploitation of DTM matrix data. It requires use of a Laser-Scan Raster Graphics display eg Sigmex ARGS 7000.

- The Image processing package (IMAGEPROCESS) is an optional component which provides conversion to DTI file of remotely sensed (eg satellite imagery) data from external formats

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3.5 **LAMPS GIS Packages**

- The X-windows GIS package (XGIS) is needed as the basis of the GIS application packages METROPOLIS (for land information) and HORIZON (for environmental information). It requires a Laser-Scan Windowing Graphics workstation with DECwindows and OSF/MOTIF.

- The land information GIS (METROPOLIS) is a Geographic Information System aimed at the storage, retrieval, and analysis of information on human land usage. It is particularly relevent to local authorities, utilities, etc. It requires the XGIS support package.

- The Environmental GIS (HORIZON) is a Geographic Information System aimed at the storage, retrieval, and analysis of information on the environment. It has particular strengths in handling terrain and polygon information. It requires the XGIS support package.

3.6 **LAMPS Device Support Packages**

- The raster scanner data conversion package (SCANCONVERT) is needed if the VTRAK vectorisation package is in use, or if the Raster Backdrop option is purchased for the LITES2 package.

- The HRD device support package (HRD) is needed if the configuration includes a Laser-Scan HRD-1 display or a Lasertrak/FASTRAK digitiser. These devices can be used by the LASERAID and LITES2 packages. If the HRD option for high quality diazo film output is required, the HIACC package is needed to supply calibration utilities.

- The Laserplot device support package (LASERPLOT) is needed if the configuration includes a Laser-Scan Laserplot plotter. This device can be used for FPP plotting.

- The High Accuracy calibration support package (HIACC) is used when either a Lasertrak or Laserplot is used for cartographic quality plotting.

- The ARGS device support package (ARGS) is needed if the configuration includes a Sigmex ARGS 7000 series graphics display. This device can be used by LITES2, DTMCREATE, TVES.

- The Sigmex 6000 device support package (SIGMA) is needed if the configuration includes a Sigmex 6000 series graphics display. This device can be used by LITES2, DTMCREATE, and TVES

- The multi-UART workstation device support package (MUART) is needed if the configuration includes a Laser-Scan multi-UART workstation. This device can be used by LITES2, DTMCREATE, and TVES

- The digitising table device support package (TABLE) is needed if the configuration includes a manual digitising table. This will currently normally be an Altek table. Other manufacturer's tables may be acceptable to some programs, possibly with reduced functionality. Contact Laser-Scan for further information. This device can be used by LITES2, DIGSYS, TVES, DTMCREATE.

3.7 **LAMPS Superceded Packages**

- The IFF data manipulation package (DAMP) is a predecessor to IMP, and is now obsolescent as all its major functionality is replaced by IMP. It allows limited sorting, clipping, transformation, selection, combination, listing, etc of IFF files. In general its required environment may be assumed to be the same as that for package IMP.

- The LITES1 editor package (LITES) is a predecessor to LITES2, with reduced functionality and restricted graphics device support. Variants of this program were known as SOLADI, SOLMPS, SOLOS, IGES, IGEMPS and IGEOS. It is not described further in this document. Please refer to the LITES SPS, User Guide and Reference Manual for further details.

- The matrix data processing package (DTMPROCESS) was an optional component which allowed manipulation and processing of Digital Terrain Model matrices (DTMs) as produced by package DTMCREATE. It is now obsolete, and its functionality is now provided by elements of the other matrix packages, particularly MATRIX and TVES.

4 System Environment

4.1 Logical Names

Most programs read and/or write disk data files and terminals during their operation. For reasons of simplicity, flexibility, and economy, all Laser-Scan programs carry out these accesses via "logical names" rather than via embedded device names, or default or fixed directories. This means that the user need not be concerned with current default directory etc, and there is no need to copy or duplicate files. These logical names usually have the form LSL$name or LSL_name to avoid conflict with DEC or other manufacturer's products.

4.2 Files and Directories

The files involved in the LAMPS system can be divided firstly into program files and data files. Program files are supplied by Laser-Scan, while most data files are transient. A series of logical names is provided by Laser-Scan to allow easy access to LAMPS files and directories. These are described below.

There have been a variety of directory layouts on Laser-Scan systems in the past, but all future LAMPS systems should use the following conventions. All Laser-Scan files should now be contained on five (occasionally six) directory trees, as follows:

- LSL$PUBLIC_ROOT contains all LSL-distributed software.

  This tree is usually [LSLPUBLIC...], and contains the definitive versions of LSL-issued software. It may be write-protected on site, and need only be written to to install new releases of software. Example directories on it might include:

LSL$PUBLIC_ROOT:[LITES2.EXE]	executable images for LITES2
LSL$PUBLIC_ROOT:[LITES2.HELP]	help files for LITES2
LSL$PUBLIC_ROOT:[LITES2.COM]	command files for LITES2
LSL$PUBLIC_ROOT:[IMP.EXE]	executable images for IMP

- LSL$SITE_ROOT contains all site-dependent files.

  This tree is usually [LSLSITE...], and contains copies of standard files which need to change from site to site. This includes static data files, lookup files, and possible tailored copies of command procedures from the public tree. Example directories on it might include:

LSL$SITE_ROOT:[LSL.COM]	tailored command procedures
LSL$SITE_ROOT:[LITES2.CMD]	.LCM command files for LITES2
LSL$SITE_ROOT:[HRD.LOOKUP]	HRD system constants (LDSY21) files

- LSL$DATA_ROOT contains user data files.

  This tree is usually [LSLDATA...], and contains user data files such as

IFF files and DTI files. Example directories on it might include:

```
LSL$DATA_ROOT:[LSL.IFF]        IFF map data files
LSL$DATA_ROOT:[LSL.DTI]        DTI matrix data files
```

- LSL$USER_ROOT contains all user home directories .

  This tree is usually [LSLUSER...], and contains home directories and personal files for LAMPS users. Example directories on it might include:

  ```
  LSL$USER_ROOT:[LSLUSER]        home directory for template LAMPS user
  ```

  On sites which have pre-existing conventions for user home directories, this tree may be empty.

- LSL$LOCAL_ROOT contains all node-specific files.

  This tree is usually [LSLLOCAL...], and contains workspace files which should be local to a particular node of a VAXcluster. This includes LITES2 workspace and journal files. Example directories on it might include:

  ```
  LSL$LOCAL_ROOT:[LITES2.JNL]    journal files for LITES2
  LSL$DATA_ROOT:[LITES2.WORK]    workspace files for LITES2
  ```

- LSL$SOURCE_ROOT contains any Laser-Scan program sources

  This tree is not usually present on site, but if it exists, it is usually [LSLSOURCE...], and contains any Laser-Scan program sources. These are often only present for customer-specific programs.

The files can be further categorised as follows.

- Program executable image files. These are the definitive copies of the programs making up the LAMPS suite. All the Laser-Scan user programs are contained in a directory tree pointed at by LSL$PUBLIC_ROOT. The exact location of the program on the tree need not be known, as a logical name LSL$EXE is provided as a search list running through all the relevant branches of this "public tree".

- Command procedure files. These are DCL procedures for carrying out housekeeping functions, and running certain LAMPS programs. Like the image files, these are kept on the "public tree". The exact location of the command file on the tree need not be known as a logical name LSL$COM is provided as a search list running through all the relevant tree branches.

- Help files. These are files containing on-line help information for certain LAMPS programs. Like the image files, these are kept on the "public tree". The exact location of the help file on the tree need not be known as a logical name LSL$HELP is provided as a search list running through all the relevant tree branches.

- Program source files. These are the component parts of those programs which can be recompiled on site (if any), including standard libraries. These files are resident in a directory tree pointed at by LSL$SOURCE_ROOT.

- IFF map data files. These are the maps in digital form, created by digitising or input (eg from magnetic tape for editing). Depending on the application, they may be kept, or output from the system to a databank. These are usually resident on the LSL$DATA_ROOT directory tree and are pointed at by the logical name LSL$IF.

- DTI raster data files. These are eg terrain models in digital form, created by DTM modelling, or input eg from magtape for display and manipulation. Depending on the application, they may be kept, or output from the system to a databank. These are usually resident on the LSL$DATA_ROOT directory tree.

- Static data files. These are files containing subsidiary information necessary for the running of certain programs. An example would be the FRT files which determine the graphical representation of features according to their feature codes. These are usually resident on the LSL$SITE_ROOT directory tree, and are pointed at by logical names, eg LSL$FRT.

- Workspace files. These are files containing temporary copies of data while programs are running. They reside temporarily on the LSL$LOCAL_ROOT directory tree.

4.3 **Search Lists**

As described above, logical name search lists are provided to obviate the need for ordinary users to know the precise location on the public tree of program images, help files, command procedures etc. The main ones of these are LSLEXE, LSLCOM, LSL$HELP, and LSL$LOOKUP.

Taking LSL$EXE as an example, on a minimal LAMPS system with packages LSLSYSTEM, MAPPING, IMP, LITES2, PLOTTING, SIGMA and TABLE, the logical name LSL$EXE must translate to include the following directories

```
LSL$PUBLIC_ROOT:[LSLSYSTEM.EXE],
LSL$PUBLIC_ROOT:[MAPPING.EXE],
LSL$PUBLIC_ROOT:[IMP.EXE],
LSL$PUBLIC_ROOT:[LITES2.EXE],
LSL$PUBLIC_ROOT:[PLOTTING.EXE],
LSL$PUBLIC_ROOT:[SIGMA.EXE],
LSL$PUBLIC_ROOT:[TABLE.EXE]
```

It is recommended that it also include as the first translation the directory:

```
LSL$SITE_ROOT:[LSL.EXE]
```

in which testing or modified releases of software can be placed so that they get taken in preference to the public tree "standard" version.

Similarly LSLCOM, LSLHELP, and LSL$LOOKUP should pass first through directories [LSL.COM], [LSL.HELP] and [LSL.LOOKUP] on LSL$SITE_ROOT. These can then be used for modified command procedures, help files and lookup files to avoid changing the standard versions on the public tree.

At sites which have been installed using the LSLINSTALL automated installation procedure (see below), a file containing the definitions for these search lists will automatically have been generated using a procedure called LSLSEARCHLISTS_GENERATE.COM which is supplied as part of the LSLSYSTEM package. This procedure can be re-run while logged on as user SYSTEM to regenerate the file which will be called LSDEFNSSEARCHLISTS.COM and live in the SYS$MANAGER: directory.

4.4 **Users, Processes, and UICs**

Conventionally, each user of the system has their own username and password, so that a record is kept in the accounting system of resources used. All Laser-Scan programs may be run by any authorised user of the system, and do not require the use of any particular username. It is however conventional to have a captive user CONTROL to run the DCL procedure which administrates the DIGSYS control process, and a user VTRAK to run the VTRAK vector digitising package.

All users of the LAMPS system must be allocated User Identifier Codes (UICs) in the same group (usually 100) so that they have group privileges with respect to one another. This allows files created by one user to be edited by another, and allows inter-process synchronisation for eg DIGSYS via group-wide common event flags.

Note that in the production flowline situation, many users are involved in progressing a map through the various stages of digitising, editing, processing, plotting, validating etc. Hence it is particularly important that file protections do not interfere with this sharing of data.

It is normal to reserve UICs [100,1] to [100,10] inclusive for Laser-Scan use, particularly for hardware and software maintenance, and if so then the following usernames are also reserved.

- The LSLSOFT user is required to be the owner of all LAMPS programs, and will have been created using AUTHORIZE as follows:

  ```
  UIC=[100,2], username=LSLSOFT, owner="LSL Software",
         account=LSL, directory=[LSLSOFT], device=LSL$SITE_ROOT:,
         privileges=(GROUP,TMPMBX,NETMBX)
  ```

- If there is LSL-maintained hardware installed as part of the system it is conventional to have an LSL engineer's account as follows:

  ```
  UIC=[100,3], username=LSLENG, owner="LSL Service",
         account=LSL, directory=[LSLENG], device=LSL$SITE_ROOT:
         privileges=(GROUP,TMPMBX,NETMBX)
  ```

- Where there will be continued LSL consultancy support it is conventional to have an LSL liaison officer's account as follows:

  ```
  UIC=[100,4], username=LSLLIAISON, owner="LSL Consultancy",
         account=LSL, directory=[LSLLIAISON], device=LSL$SITE_ROOT:
         privileges=(GROUP,TMPMBX,NETMBX)
  ```

- A typical template LSL user account should also have been created as follows:

  ```
  UIC=[100,100], username=LSLUSER, owner="LSL LAMPS user",
         account=LSL, directory=[LSLUSER], device=LSL$USER_ROOT:
         privileges=(GROUP,TMPMBX,NETMBX)
  ```

- If any of the LAMPS Matrix packages (eg DTMCREATE), or the STRUCTURE or POLYGONS packages are to be used, then a user is needed with enhanced quotas to allow use of these programs. A template "big" user account should then be created as follows:

  ```
  UIC=[100,101], username=LSLBIG, owner="LSL LAMPS big user",
         account=LSL, directory=[LSLUSER], device=LSL$USER_ROOT:,
         privileges=(GROUP,TMPMBX,NETMBX),
         WSQUOTA=2048, WSEXTENT=8192, PGFLQUOTA=30000
  ```

5 System Management

5.1 Package Initialisation

All the symbols and logical names required to run LAMPS programs can be set up by a series of command procedures available on LSL$COM - a general Laser-Scan one, and one for each package. The default action of each package initialisation procedure is to set up all symbols, and all logical names in the process logical name table.

Some packages support definition of their logical names at VMS system startup (bootstrap) time. If an optional argument SYSTEM or GROUP is given to such a procedure, then it will only define the logical names, and will do it in the given logical name table (system or group). Note that while duplicated effort can be avoided by defining logical names system-wide at system startup time, symbols can only be defined on a per-process basis.

Generally, if logical names are already set up when a package initialisation procedure is invoked, they will not be overwritten.

The package initialisation procedure must be executed before running any of the programs of that package, and this is normally done in one of the following ways.

1. Explicit invocation of each package initialisation procedure as and when needed before use of the package. This method is rare, and only relevant when users only occasionally require LAMPS software.

2. Automatic invocation of relevant package initialisation procedures at login time by means of commands in each user's private LOGIN.COM file.

3. Automatic invocation of all package initialisation procedures at login time by means of commands in a central login command file using the DEC SYS$SYLOGIN mechanisms. This is the most usual approach.

4. Automatic invocation of all package initialisation procedures in SYSTEM mode at system startup time by means of commands in the Laser-Scan startup files which are called from the DEC system startup command file SYS$MANAGER:SYSTARTUP.COM. This can only set up logical names, not symbols, so is usually combined with (3) or (2) above.

5.2 **Software Installation Procedures**

LAMPS software is normally issued as DEC BACKUP savesets on either 1/2 inch 1600bpi industry standard magtape, or on DEC TK50 cartridge tape. Each package is a normally a single saveset with the saveset name the same as the package name. In some cases, there will be a second saveset for a package, with a name having "_2" appended to the package name, eg LITES2_2.

A command procedure LSLINSTALL.COM is provided as part of the basic LSL system support package LSLSYSTEM to carry out the main steps in LAMPS software installation. The procedure has built in help. However, as it is part of the software it is intended to install, some degree of manual bootstrapping is of course required.

There is a separate document, the "LSL LAMPS Software Installation Guide" which explains the installation procedure in some detail, and the reader is referred to this document for further information.

5.3 **Software Updates Procedures**

All DEC standard software including VMS should be kept up to date with new releases as issued by DEC, using the DEC-supplied procedures. See the "VMS Software Installation Guide" for details.

Laser-Scan will issue periodic new releases of software components to customers with software maintenance contracts. New releases of software may take the form of complete packages in the same form as for an initial installation (see above), or of particular package components. In either case, the usual distribution medium is BACKUP savesets on 1600bpi 1/2 inch magtape or on TK50 cartridge.

These new releases should be placed on the appropriate directories on the LSL$PUBLIC_ROOT public directory tree. There is a procedure LSLUPDATE.COM available on the LSL$COM search list which automates the steps in reading an update tape onto a temporary directory tree, reporting its contents, checking for conflicts, merging the temporary tree with the public tree, and clearing up afterwards. The LSLUPDATE procedure has an inbuilt help facility, and the steps involved are

- PREPARE -
  Prepare the update directory tree and set up the rooted logical name and empty directory tree used to hold the updating files prior to the merge stage. This command must be given before LOAD, MERGE, or TIDY. It will delete any existing files from a previous failed update.

- LOAD -
  Load the BACKUP savesets containing the software updates onto the temporary tree.

- DIRECTORY -
  Give a directory listing of the update files now on the temporary tree.

- CHECK-
  Check the update files now on the temporary tree to see if site-specific versions exist on LSL$SITE_ROOT. If so, give warning messages and advice about resolving any possible conflicts.

- MERGE -
  Merge the update files onto the main public tree. Before doing the merge, the procedure checks for any package-specific update procedures supplied as part of this release, and if any are found then it invokes them. It then creates any directories needed on LSL$PUBLIC_ROOT, and renames the files from the temporary tree into their permanent homes.

- TIDY -
  Tidy up after update, eg by purging the public tree. Note that if any LSL images are installed, INSTALL/REPLACE should be used or the system must be rebooted before the tidy phase.

If you have an update to install, and (for some strange reason) have not yet got the LSLUPDATE procedure currently on your public tree, then you can bootstrap it from the release tape as follows:

Logon as LSLSOFT, and mount the distribution tape (assumed below to be a TK50 cartridge MUA0:) as /FOREIGN. Then use BACKUP to read the LSLUPDATE file from the tape using lines such as:

```
$ MOUNT MUA0:/FOREIGN
$ BACKUP MUA0:/REWIND/SELECT=LSLUPDATE.COM LSL$PUBLIC_ROOT:[*...]/LOG
$ DISMOUNT MUA0:/NOUNLOAD
```

NOTES

1. If LSLUPDATE is used to install a Laser-Scan software package which is not currently installed on this computer, then it will be necessary to edit the system startup file which sets up the logical name definitions to include the newly created package directories. These definitions may be in files LSDEFNS.COM or LSDEFNS_SEARCHLISTS.COM in the SYS$MANAGER directory. If the existing definitions are in LSDEFNS_SEARCHLISTS.COM, then see the section above on "Search Lists" for how to automatically regenerate this file.

2. If a new package is being installed, it will also be necessary to edit the Laser-Scan login definitions file (LSLOGIN.COM) to invoke the appropriate package initialisation file eg LSL$COM:STRUCTUREINI.COM.

3. If LSLUPDATE is used to install changed or new programs which require environment additions such as new logical names, then it will again be necessary to edit the system startup files.

4. These changes are not necessary in the normal case where LSLUPDATE is being used to install minor updates to an existing package.

---

6 **Environment for LAMPS Kernel Packages**

The following sections detail the required LAMPS software environment by package. It should be noted that package LSLSYSTEM and package MAPPING are prerequisites for all other LAMPS packages, and therefore, their environments are assumed to be present and are not fully described again for each subsequent package.

6.1 **LSLSYSTEM - Laser-Scan System Support Software**

The Laser-Scan system software support package (LSLSYSTEM) is required by all LSL software components. It includes environment setup command files, supplementary system utilities, and utility programs needed by more than one package. Its environment requirements are also needed for all LAMPS packages, and are described below.

- SYS$OUTPUT points to the terminal to be used for message output.
- SYS$INPUT points to the terminal to be used for command input.
- LSL$PUBLIC_ROOT points to the disk and directory which is the root for the public tree of Laser-Scan standard software. This will usually be 'lsldisk':[LSLPUBLIC.], where 'lsldisk' is the device containing the Laser-Scan public and site directory trees, eg DUA0:.
- LSL$SITE_ROOT points to the disk and directory which is the root for the tree of all site-dependent files. This will usually be 'lsldisk':[LSLSITE.]
- LSL$DATA_ROOT points to the disk and directory which is the root for the tree of user data files. This will usually be 'lsldatadisk':[LSLDATA.] where 'lsldatadisk' is the device containing the Laser-Scan data directory trees eg DUA1:.
- LSL$EXE is a search list running through LSL$SITE_ROOT:[LSL.EXE], then through all public tree .EXE directories.
- LSL$COM is a search list running through LSL$SITE_ROOT:[LSL.COM], then through all public tree .COM directories.
- LSL$HELP is a search list running through LSL$SITE_ROOT:[LSL.HELP], then through all public tree .HELP directories.
- LSL$LIBRARY is a search list running through LSL$SITE_ROOT:[LSL.LIB], then through all public tree .LIB directories.
- LSL$LOOKUP is a search list running through LSL$SITE_ROOT:[LSL.LOOKUP], then through all public tree .LOOKUP directories.
- LSL$LSLSHR points to the file containing a shared image of LSLLIB routines used by most LAMPS programs. This will usually be LSL$LIBRARY:LSLSHR.EXE.

6.2 **MAPPING - Laser-Scan Mapping Kernel Software**

The Laser-Scan Mapping Kernel Software package (MAPPING) is required by all other LAMPS software components. It includes the IFF file interface library (IFFLIB), the Feature Representation library (FRTLIB), as well as various central LAMPS initialisation and control procedures.

Its environment requirements are also needed for all LAMPS packages, and are described below.

- LSL$IF points to the disk and directory to contain the IFF map data files to be processed. This may for example be LSL$DATA_ROOT:[LSL.IFF]. Note that a utility SI is provided to allow easy reassignment of the LSL$IF: logical name. SI will also upkeep a second logical name IF which is supplied for compatibility with earlier PDP11/RSX systems.

- LSL$FRT points to a directory in which FRTLIB expects to find FRT, SRI, and TRI files (feature representation files). This will usually be LSL$SITE_ROOT:[LSL.FRT]

- LSL$IFFSHR points to the file containing a shared image of IFFLIB routines used by most LAMPS programs. This will usually be LSL$LIBRARY:IFFSHR.EXE.

7 Environment for LAMPS Basic Packages

7.1 IMP - IFF Map Processing

These are programs which create, modify or examine IFF map data files in various ways. This package is an enhanced replacement for package DAMP. Examples of IMP programs are -

IMERGE - Merge IFF. Used to combine IFF files or extract features by layer.
ISORT - Sort IFF. Used to restore features into FSN order.
ITOTEXT - IFF convertor to printable (ASCII) text format.

Their required environment is usually little more than that for the kernel packages (LSLSYSTEM and MAPPING), but note the following:

- LSLIF, LSLFRT, LSLEXE, LSLCOM etc are obviously required.
- LSL$LOOKUP search list must include the disk and directory containing a valid AC skeleton definitions file if utility ISELAC is to be used.
- LSL$HELP points to a directory in which IMP expects to find its online help file (IMP.HLB). This will normally be a search list passing through LSL$PUBLIC_ROOT:[IMP.HELP]. The same help file may also be set up as a supplementary DCL help file using the VMS HLP$LIBRARY_'n' mechanisms. This allows access to IMP help information from the DCL level. See the VMS documentation for details of help libraries.
- LSL$LITES2CMD points to the disk and directory that will receive the LITES2 guidance command file produced by some IMP programs.

7.2 LITES2 - Cartographic Editing

LITES2 is the current version of the Laser-Scan Cartographic Editing System. It has a moderately complex environment, described below, and users are referred to the "LITES2 Reference Manual", and the appropriate "LITES2 Workstation Guide" for more information.

- The environment of the kernel packages LSLSYSTEM and MAPPING is assumed to be present, including LSLIF, LSLFRT, LSL$HELP.
- If the optional facilities of LITES2 to display raster background data are to be used, then the environment of the kernel package MATRIX is assumed to be present, including LSL$DTI.
- LSL$LITES2LOCK points to the full file specification of a file containing a valid LSL-supplied LITES2 site licence, eg LSL$PUBLIC_ROOT:[LITES2.EXE]LSLBUREAU.LIC. If this file is not present, then LITES2 will not run at all.

- LSL$LITES2ROUTINES points to the full file specification of a shareable image containing the LITES2 user routines. This will usually be LSL$PUBLIC_ROOT:[LITES2.EXE]LITES2ROUTINES.EXE. See the LITES2 Reference Manual for details of user routines

- LSL$LITES2WORK points to a directory in which LITES2 is to put IFF workspace and dump files, usually LSL$LOCAL_ROOT:[LITES2.WORK].

- LSL$LITES2CMD points to a directory in which LITES2 expects to find command files (default extension .LCM). This will usually be LSL$SITE_ROOT:[LITES2.CMD]. In particular this directory will normally contain the system-wide and terminal dependent LITES2 initialisation files.

  On later systems, LSL$LITES2CMD is a search list, running through LSL$SITE_ROOT:[LITES2.CMD], then through all [.CMD] directories on the public tree.

- LSL$LITES2JNL points to a directory into which LITES2 writes a journal file of commands given during a session (extension .LJN). This will usually be LSL$LOCAL_ROOT:[LITES2.JNL]. It is advisable either to regularly purge this directory, or to set a version limit on it (using the DCL command SET DIRECTORY/VERSION_LIMIT='number'), so that journal files do not build up without limit.

- LSL$LITES2SETUP points to a directory in which LITES2 preserves table setup parameters for use in future sessions (file extension .SET). It is often convenient to use the same directory as LSL$LITES2JNL for this.

- LSL$LITES2TERMINAL if set to a string, means that this string is used as the terminal name when naming device dependent files. If LSL$LITES2TERMINAL is not assigned then the logical translation of SYS$COMMAND is used as the terminal name.

- LSL$LITES2INI may be set to point to a file of LITES2 commands which will be obeyed automatically every time LITES2 is started up.

- If a serial interface Laser-Scan Vector Graphics Display is to be used for graphics output, eg a Sigmex 6164, then LSL$TK points to the serial line to be used for communication with it eg TXB6:.

- If a parallel interface Laser-Scan Raster Graphics Display is to be used for graphics output, eg Sigmex ARGS 7000, then LSL$VS points to the parallel interface port to be used for communication with it eg IDA0:.

- LSL$SIGMA_COLOUR, LSL$TEK_COLOUR, LSL$VAX_COLOUR LSL$DECW_COLOUR point to the colour table definition file for the appropriate display type (Sigmex 6000, Tek 4100, or VWS VAXstation, or DECwindows VAXstation).

7.3 **PLOTTING - Cartographic Plotting (FPP)**

The core of package PLOTTING is FPP which is the Laser-Scan Fast Plotter program. Variants of FPP are available for a variety of plotting devices. FPP takes features from nominated IFF files and displays them according to feature representations extracted from a set of FRT, SRI, and TRI files. Its required environment is described below.

- The environment of the kernel packages LSLSYSTEM and MAPPING is assumed to be present, including LSLIF, LSLFRT, LSL$HELP.

- LSL$FPPINI is optional, and may point to a file containing FPP initialisation commands. This may be for example LSL$SITE_ROOT:[PLOTTING.CMD]CAL1044INI.FPP

- LSL$CALCOMP points to the Calcomp plotter to be used for graphics output (if present) eg TXB6:. For other program versions there may be other logical names pointing to the required graphics device, eg LSL$BENSON, LSL$FERRANTI.

8 Environment for LAMPS Optional Packages

8.1 VTRAK - Vector Digitising

The vector scanning and line following digitiser package (VTRAK) has a very complex and largely self-contained environment, which is described in the package documentation for the VTRAK package. It requires a the SCANCONVERT package and a source of raster scanned map data.

8.2 LASERAID - Automatic Digitising

Laseraid is the Laser-Scan vector scanning and line-following automatic digitiser program. It uses a FASTRAK or Lasertrak digitiser. See also packages HRD and HIACC for details of the device support required. Its required environment is described below.

- The environment of the kernel packages LSLSYSTEM and MAPPING is assumed to be present, particularly LSL$IF.
- TT points to the terminal for interactive input and output. Note that this is used rather than SYS$INPUT and SYS$OUTPUT.
- LSL$LK points to the disk and directory containing the patch file (Laseraid parameter file) to be used to initialise the parameter values which control the line following and other digitising algorithms. This will normally be LSL$SITE_ROOT:[LASERAID.PATCH].
- As package LASERAID requires a Lasertrak (or FASTRAK) digitiser, the environment of the HRD package is therefore required. Note particularly that SYS$HRD points to the Lasertrak, and SYS$LDSY21 points to the system constants file for digitising, usually LDSY21.R'nn' , where 'nn' is the Lasertrak number.
- LSL$GU points to the disk and directory containing the guidance IFF file that will be used to guide the digitising operation. This file is only used if the guidance mode of operation is selected. It will usually be the same place as LSL$IF.
- LSL$FLFHLP points to the help file containing the explanatory texts available online. This will normally be LSL$HELP:LASERAID.HLB

8.3 DIGSYS - Manual Digitising

The DIGSYS on-line digitising system has a complex environment which is documented more fully in the "DIGSYS Reference Manual". Note that DIGSYS is usually invoked via a captive CONTROL user. A summary of the required environment is given below.

- LSL$DIG'n' where n=1,2,..., should point to the device names of the terminal ports to which the digitising tables are attached. Note that earlier versions of DIGSYS used the logical names SYS$DIG'n' instead.

- MCE$MODE should translate, system-wide, to the security status of the computer system - either OPEN or SECURE.

- MCE$SECTERM should point to a secure (/HARDCOPY) terminal for use by the CONTROL process during SECURE operation. It may be omitted if SECURE operation is never required.

- LSL$EXE search list should point through the disk and directory where the digitising system's CONTROL and TABLE executable images used by the system are held. This is usually LSL$PUBLIC_ROOT:[DIGSYS.EXE].

- LSL$MGMT should point to the disk and directory where the digitising management files are held. This will usually be LSL$SITE_ROOT:[LSL.MGMT]

- LSL$CPF should point to the disk and directory where the control point files are held. It may be omitted if the control point file facility is not used. It is usual for this directory to be the same as LSL$MGMT.

- LSL$MENU should point to the disk and directory where the menu and puck definition files are held. It is usual for this directory to be the same as LSL$MGMT.

- LSL$'task name' is the general form of a series of logical names that are set up at group level in the CONTROL user's login file, and which define default disk and directory names for the IFF files relating to particular tasks.

- LSL$DIGMBTERM is a logical name created by the digitising system itself and translating, group-wide, to the mailbox used by the CONTROL process for receiving notification of the termination of digitising TABLE processes. Note that earlier versions of DIGSYS used the logical names DIGMBTERM instead.

- LSL$DIG_OPTIONS should point to the options file which defines how the DIGSYS system will behave.

- LSL_DIGCEFC'table' are the names of the common event flag clusters created by DIGSYS, where 'table' identifies the TABLE process which will use the cluster to communicate with the CONTROL process.

- LSL_CONGBLSEC is the name of the control global section created by DIGSYS.

- LSL_MENGBL'table' are the names of the multiple menu global sections created by DIGSYS, where 'table' identifies the TABLE process whose puck and menu definitions are contained within the section.

8.4 **CONVERT - IFF Data Conversion**

The IFF data conversion package (CONVERT) is an optional component which allows conversion of IFF data to and from a variety of standard external formats. The package is divided into modules, and each customer will normally receive only those modules which are relevant. The required environment may vary between options, but is basically the same as for the IMP package.

8.5 **FLOWLINE - Flowline Control**

The Flowline Control package (FLOWLINE) is an optional component which allows control of the tasks and data involved in managing a production flowline. It uses the DEC Rdb relational database to store flowline and status information. The main program involved is called LAMPSCONTROL. The required environment is quite complex and is described fully in the Reference Manual of the FLOWLINE package.

8.6 **CUSTOMER - Customer-Specific Software**

Many LAMPS customers have a need for customer-specific software to tailor the LAMPS system for their precise application, eg to transfer map data to an external databank in a particular format. Such utilities usually require a limited environment similar to that of IMP (qv). Any customer-specific Laser-Scan logical names should take the form LSL$'customer'_'purpose'. eg LSL$OS_CODES for customer OS (Ordnance Survey), code lookup file.

8.7 **STRUCTURE - Structured IFF Processing**

The Structured IFF data package (STRUCTURE) is an optional component which allows the creation and manipulation of link-node structured (junction) IFF data files. The ILINK program which is a major element of this package will do extensive geometric "tidies" on vector data, eg extension, truncation, common alignment, etc. The required environment is described below.

- The environment of the kernel packages LSLSYSTEM and MAPPING is assumed to be present, including LSLIF, LSLFRT, LSL$HELP.
- LSL$IF points to the disk and directory to contain the IFF map data file(s) to be processed. This may for example be LSL$DATA_ROOT:[LSL.IFF]. The same directory will receive the output structured IFF data file (IFJ file).
- LSL$LITES2CMD points to the disk and directory that will receive the LITES2 guidance command file produced by program RELHT in case of coding ambiguity.
- The current default directory of SYS$DISK:[] is used for reading an optional file containing feature code pairs (FCP file). The same directory is used to create a saved statistics file (ILINKSTAT.DAT). file

---

8.8 **POLYGONS - Polygon IFF Processing**

The Polygon IFF data package (POLYGONS) is an optional component which allows the creation and manipulation of Polygon IFF files. The STRUCTURE package is needed as a prerequisite. The required environment is described below.

- The environment of the kernel packages LSLSYSTEM and MAPPING is assumed to be present, including LSLIF, LSLFRT, LSL$HELP.

- LSL$IF points to the disk and directory containing the IFF and IFJ map data file(s) to be processed. This may for example be LSL$DATA_ROOT:[LSL.IFF]. The same directory will receive the output polygon IFF data file.

- LSL$LITES2CMD points to the disk and directory that will receive the LITES2 guidance command file produced by program IPOLYGON in case of problems.

- LSL$LOOKUP points to a disk and directory containing an optional selections definitions file.

9 Environment for Matrix Processing Packages

9.1 MATRIX - Matrix Data Handling

The MATRIX package allows basic viewing and manipulation of matrix data. It is a prerequisite for packages DTMCREATE, DTMCONVERT, TVES and IMAGEPROCESS. Its environment is assumed to be available for those packages, and is described below.

- The environment of the kernel packages LSLSYSTEM and MAPPING is assumed to be present, including LSLIF, LSLFRT, LSL$HELP, LSL$LOOKUP.
- LSL$DTI points to the disk and directory to contain the DTI matrix data file to be read and/or modified. This may for example be LSL$DATA_ROOT:[LSL.DTI].
- If a serial interface Laser-Scan Vector Graphics Display is to be used for graphics output, eg a Sigmex 6164, then LSL$TK points to the serial line to be used for communication with it eg TXB6:.
- If a parallel interface Laser-Scan Raster Graphics Display is to be used for graphics output, eg Sigmex ARGS 7000, then LSL$VS points to the parallel interface port to be used for communication with it eg IDA0:.
- If a Sigmex ARGS 7000 is to be used, then LSL$LOOKUP and LSL$IDSYDIR both point to the disk and directory containing Sigmex ARGS 7000 colour lookup tables (LUTs).
- LSL$SIGMA_COLOUR, LSL$TEK_COLOUR, LSL$VAX_COLOUR point to the colour table definition file for the appropriate display type (Sigmex 6000, Tek 4100, or VAXstation).

9.2 DTMCREATE - Terrain Model Creation

The DTMCREATE package allows generation of terrain models from IFF map data. Its required environment is described below.

- The environment of the kernel packages LSLSYSTEM, MAPPING, MATRIX is assumed to be present, including LSLIF, LSLDTI, LSL$HELP, LSL$FRT.
- The environment of the requisite device support package (ARGS, SIGMA etc) is assumed to be present if graphics output is required. This includes LSLVS, LSLTK, LSL$LOOKUP.
- LSL$LOOKUP search list must also include a disk and directory containing the Panacea lookup files used to determine default hardware characteristics. This will usually be LSL$SITE_ROOT:[LSL.LOOKUP]

- LSL$PANLOOKUP points to the same place as LSL$LOOKUP.

9.3 **DTMPREPARE - Preparation for Terrain Modelling**

The DTMPREPARE package is an optional extension to package DTMCREATE which allows checking and analysis of vector data to be used as input to terrain model generation. An example is the automated heighting of river networks by intersection with contours. Its required environment is described below.

- The environment of the kernel packages LSLSYSTEM, MAPPING, MATRIX is assumed to be present, including LSLIF, LSLDTI, LSL$HELP, LSL$FRT.

9.4 **DTMCONVERT - DTI Matrix Data Conversion**

The DTM conversion package (DTMCONVERT) is an optional component which allows conversion of DTI matrix data to and from a variety of standard external formats. Note that this package is divided into modules for different formats, and only relevant modules need be supplied. Its required environment may vary according to module, but is likely to be as described below.

- The environment of the kernel packages LSLSYSTEM, MAPPING, MATRIX is assumed to be present, including LSLDTI, LSLHELP, LSL$IF.

9.5 **TVES - Terrain Validation and Exploitation**

The TVES package allows display and analysis of terrain model data. Its required environment is described below.

- The environment of the kernel packages LSLSYSTEM, MAPPING, MATRIX is assumed to be present, including LSLIF, LSLDTI, LSL$HELP, LSL$FRT.
- The environment of the requisite device support package (ARGS, SIGMA etc) is assumed to be present if graphics output is required. This includes LSLVS, LSLTK, LSL$LOOKUP.

9.6 **IMAGEPROCESS - Remote Sensed Image Processing**

The Image processing package (IMAGEPROCESS) is an optional component which provides conversion to DTI file of remotely sensed (eg satellite imagery) data from external formats Its required environment is described below.

- The environment of the kernel packages LSLSYSTEM, MATRIX is assumed to be present, including LSLDTI, LSLHELP.

10 Environment for LAMPS GIS Packages

10.1 LAMPS GIS Packages

- The X-windows GIS package (XGIS) is needed as the basis of the GIS application packages METROPOLIS (for land information) and HORIZON (for environmental information). It requires DECwindows and OSF/MOTIF. It provides a user-friendly menu interaction environment, using the UILMENUS facilities of the LITES2 package.

  It has a complex environment, described in the documentation for the XGIS package. It is structured into 3 layers of software: XGIS core, product (eg HORIZON), and customer-specific.

- The land information GIS (METROPOLIS) is a Geographic Information System aimed at the storage, retrieval, and analysis of information on human land usage. Its environment is determined by the XGIS support package.

- The Environmental GIS (HORIZON) is a Geographic Information System aimed at the storage, retrieval, and analysis of information on the environment. Its environment is determined by the XGIS support package.

11 Environment for LAMPS Device Support Packages

11.1 HRD - HRD-1 device support

This package includes device driver and interface library for the HRD-1 high resolution display/plotter, and also for the Lasertrak and FASTRAK digitisers. Note that this package is also used outside the LAMPS environment to support use of HRD-1 displays for other applications, and that it may need the HIACC package if high accuracy plotting is to be achieved.

Its required environment is described below. See the "VAX LDLIB and HR: Driver Technical Documentation and System Manager's Guide" for a more detailed description.

- SYS$HRD points to the HRD/Lasertrak/FASTRAK to be used, eg HRA0:.
- SYS$LDSY21 points to the system constants file containing the machine-specific calibrations to be used. An example would be LSL$LDSYDIR:LDSY21.B22 for blue refresh on machine 122.
- LSL$LDSYDIR points to the disk and directory containing all system constants files. This is usually LSL$SITE_ROOT:[HRD.LOOKUP].
- HRD$EXE points to the disk and directory containing the engineer's diagnostics, exerciser, and calibration utilities. This is usually LSL$PUBLIC_ROOT:[HRD.LIB].
- LSL$HRDSYSDRV points to the disk and directory containing the device driver. Provided that LSL$PUBLIC_ROOT is resident on the system disk (SYS$SYSDEVICE:), then this can be LSL$PUBLIC_ROOT:[HRD.DRIVER]. If the public tree is on some other disk, then a copy of the driver (HRDRIVER.EXE, or HRQDRIVER.EXE) must be placed on the system disk in a directory pointed at by LSL$HRDSYSDRV. This is because it is referenced at bootstrap (system startup) time from SYCONFIG.COM before the other disks have been mounted in SYSTARTUP.COM.
- LSL$LIBRARY is usually a search list pointing through the disk and directory containing the LDLIB interface library. This is usually LSL$PUBLIC_ROOT:[HRD.LIB]
- LSL$CMNLDL points to the disk and directory containing FORTRAN common block declarations for interfacing to LDLIB. This will normally be LSL$PUBLIC_ROOT:[HRD.COMMON.LDLIB].
- LSL$COM is usually a search list pointing through the disk and directory containing calibration command procedures. This is usually LSL$PUBLIC_ROOT:[HRD.COM]

11.2 **LASERPLOT - Laserplot/MLP1 device support**

This package includes utilities and interface library for the Laserplot and MLP-1 microprocessor controlled laser plotters. Its required environment is described below.

- LSL$LASERPLOT should be a search list pointing through the public tree directories containing relevant command files and executable images. This will normally be LSL$PUBLIC_ROOT:[LASERPLOT.EXE], and LSL$PUBLIC_ROOT:[LASERPLOT.COM].

- LD0 points to the serial line to the plotter to be used.

- LSL$LIBRARY is usually a search list pointing through the directory containing LPLIB.OLB, the interface library. This will normally be LSL$PUBLIC_ROOT:[LASERPLOT.LIB]

- LSL$CMNLPL points to the disk and directory containing FORTRAN common block declarations for interfacing to LPLIB. This will normally be LSL$PUBLIC_ROOT:[LASERPLOT.COMMON.LPLIB].

11.3 **HIACC - Laserplot/HRD High Accuracy support**

This package is needed when either a Lasertrak or Laserplot is used for cartographic quality plotting. It includes utilities and command procedures for carrying out calibrations. Its required environment is described below.

- LSL$TK points to the serial line for the workstation to be used for digitising the grid, if a MUART workstation is used.

- GRIDIN points to the serial line to the digitising table to be used for digitising the grid, if a MUART workstation is not used.

- LSL$IF points to the disk and directory to contain the IFF residuals data file to be created. This may for example be LSL$DATA_ROOT:[LSL.IFF].

11.4 **ARGS - Sigmex ARGS 7000 device support**

This package includes utilities and interface library for the Sigmex ARGS 7000 colour raster display. Its required environment is described below.

- LSL$VS points to the Sigmex ARGS 7000 to be used for graphics output eg IDA0:.

- LSL$LIBRARY is usually a search list pointing through the directory containing VSLIB.OLB, the interface library. This will normally be LSL$PUBLIC_ROOT:[ARGS.LIB]

- LSL$IDSYDIR points to the disk and directory containing the Sigmex ARGS7000 system constants files (colour lookup files). Eg LSL$SITE_ROOT:[LSL.LOOKUP]

- LSL$LOOKUP search list includes the same directory as LSL$IDSYDIR.

- LSL$IDSY02 points to the disk, directory and file containing the default Sigmex ARGS7000 system constants file (colour lookup file). Eg LSL$IDSYDIR:COLOUR8.DAT

11.5 **SIGMA - Sigmex 6000 device support**

This package includes command procedures and unsupported interface library for the Sigmex 6000 series colour raster displays. Its required environment is described below.

- LSL$TK points to the serial line for the Sigmex 6000 series display to be used for graphics output eg TXA3:.

- LSL$SIGMA_COLOUR points to the disk, directory, and file containing the colour definition table for the display, eg LSL$SITE_ROOT:[LSL.LOOKUP]SIGMA.COL.

11.6 **MUART - Multi UART workstation device support**

This package includes utilities and command procedures for a Laser-Scan MUART multiplexing workstation. Its required environment is described below.

- LSL$TK points to the serial line for the workstation to be used for graphics output eg TXA3:.

- LSL$WOSP points to the directory containing MUART microprocessor load command files and utilities. This will normally be LSL$PUBLIC_ROOT:[MUART.EXE]

11.7 **SCANCONVERT - Raster Scanner Input support**

The raster scanner data conversion package (SCANCONVERT) includes support utilities for use of a raster scanner or offline magtape input of raster scanned map data. It is needed if the VTRAK vectorisation package is in use, or if the Raster Backdrop option is purchased for the LITES2 package.

Its environment is dependent on whether its output is destined for LITES2 or VTRAK, and is covered by the description of those packages.

11.8 **TABLE - Altek digitising table device support**

This package includes device support utilities for use of an Altek digitising table, and an interface library for use of a manual digitising table via the Laser-Scan Table Monitor. The Table Monitor is a detached process which runs at elevated priority and receives digitising events from the table. It then communicates these events to an applications process (such as LITES2 or TVES), using common event flags (CEFs) and a shared global section. See the "Table Monitor Reference Manual" for details.

Tables supplied by Laser-Scan are currently likely to be Altek tables with AC40 controllers. Other manufacturer's tables may be acceptable to some programs, possibly with reduced functionality. Contact Laser-Scan for further information. The TABLE package required environment is described below.

- LSL$MONITOR_TABLE points to the serial line for the table to be used for digitising if there is more than one table on the system, or if a named Table Monitor process is to be used.

- LSL$EXE points through the directory containing the Table Monitor image (TABMON) to allow the detached process starter image (STARTMON) to be used. STARTMON must either be installed with ALTPRI privilege, or be invoked by a privileged process (eg system startup).

- LSL$LIBRARY is usually a search list pointing through the directory containing TABLIB.OLB, the interface library. This will normally be LSL$PUBLIC_ROOT:[TABLE.LIB]

- LSL$CMNTAB points to the disk and directory containing FORTRAN common block declarations for interfacing to TABLIB. This will normally be LSL$PUBLIC_ROOT:[TABLE.COMMON.TABLIB].

- LSL$MGMT points to the disk and directory to contain the shared global section files, and the error files, used to communicate between the Table Monitor and the applications program (eg LITES2).

- LSL$TABMON_ROUTINE_'ddcu' if defined, points to a shared image containing a decode routine to handle the format of a table event for a non-standard table which is on serial port 'ddcu':, eg TXA6:.

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