Instrument Manual

Interface to Trimble Access

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Introduction

As modern surveying equipment and methods have evolved, LSS has also developed much more functionality in order to make the most of the techniques available. This is especially true when it comes to data acquisition, field coding and transfer from survey instruments. McCarthy Taylor Systems Ltd has strived to ensure that LSS surveyors are able to make the most of the options available.

This manual has been prepared to help with the configuration of both the survey instrument hardware and LSS software.

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Chapter 1

1.1 Install LSS & Testdata

Note: The LSS v10 install procedure provides most of the necessary installation files for the Trimble processes that it uses, but some of the Trimble installs (such as the Job Reader) may be required subsequently.

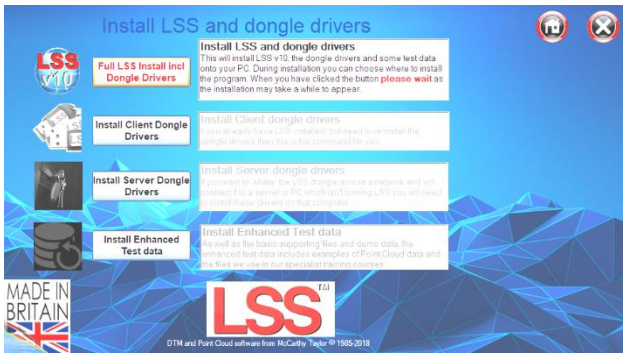
It is best to complete all installation steps in one go especially if administrator rights are required.

LSS will automatically initialise the registry when any of the Trimble options are invoked for the first time.

Select 'Install LSS & Test Data';

For a new install use

'Full LSS Install Incl Dongle Drivers'



Also choose
'Install Enhanced Test Data',
which includes examples of Point Cloud data and the files we use in our specialist training courses

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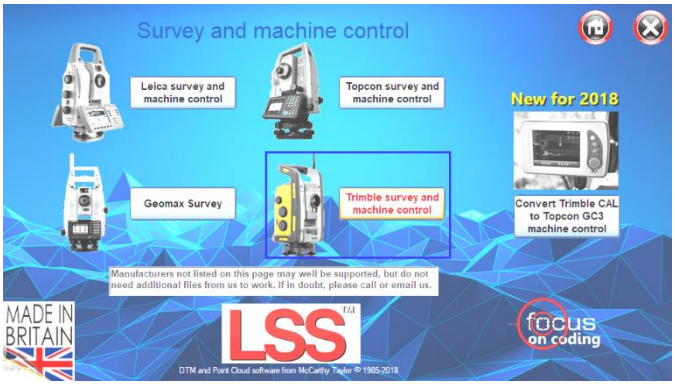
1.2 Survey Instrument and Machine Control Support Files

Return to the Install Home Page;

Select

'Survey & Machine Control',

and access the files/documents for your instrument type-



For Trimble instruments and loggers select

'Trimble survey and machine control'

There follows the Trimble page which gives access to the PDF manual, Trimble Feature Library and the zip file containing files for Trimble Access and Survey Controller devices;

There is also a link to 'Browse' the Support_files for the Trimble instruments and loggers.

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1.3 The Trimble Element of the LSS Install

The LSSv10 install procedure now automatically provides the software and files required to process Trimble Access data. This includes;

Trimble Job reader, including;

GPS for OSTN - the SGF files etc
Includes Trimble SC capability as well as Access

Export Points, Lines, DTM, and alignments including;

All of the above as LandXML
The DTM in TTM format
The Points as a Job file (now a legacy option)

Export Feature list as FXL Code Library - created in LSS from the LSS Prototype legend.

'LSS_with_Trimble_Access PDF' - This refers to the document which explains how to configure and use your Trimble instrument with LSS.

Included Trimble programs;

AsciiFileGenerator
Trimble Link Engine

During the first run of Trimble processing following a new install LSS will detect whether these programs are installed.

If not the user is prompted to exit LSS after which the install will happen automatically. Rerunning the processing should then be fine.

Coordinate Systems e.g. GPS processing

Both AsciiFileGenerator and Trimble Link Engine require access to the datum grid files, geoid model files and projection shift grid files that are referenced in the Job file. These files must exist on the PC in the Geodata folder for the process to complete. The path for this is held in the registry;

<LSS install Drive letter>:\ProgramData\Trimble\GeoData\

The following coordinate system files are then copied to the Geodata folder, which is also created if it does not exist. These files relate to the OS system for the UK only and are;

OSTN15.SGF, OSGM15.GGF
OSTN02.SGF, OSGM02.GGF
OSTN97.SGF

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OSGM91.GGF
OSU91A.GGF
OSi-NILA.DGF
OSi-NILO.DGF
OSi-OSNI.MRP

Trimble Link ©Trimble Navigation Ltd. All rights reserved.

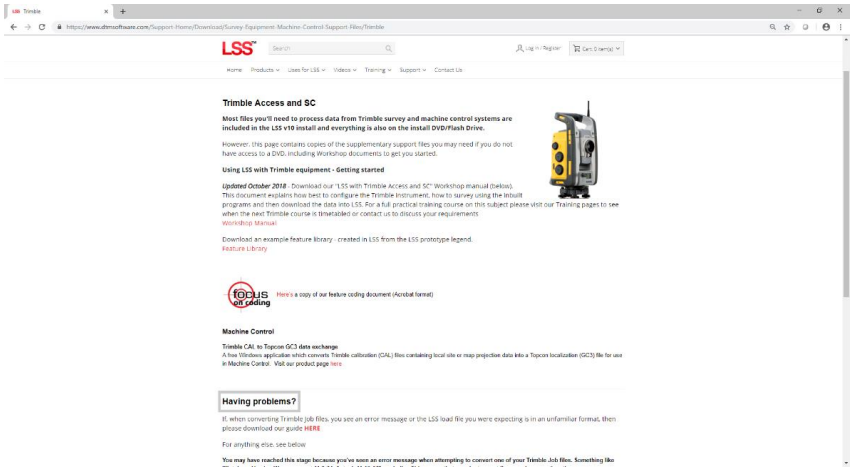
Note: The only element that should also be required is the **Update Office** install to update the firmware version of Access on your PC to match the version on the controller.
Update Office procedures are therefore also needed following a firmware upgrade.
If there is a mismatch between the firmware versions of controller to PC it will be typically indicated by Trimble error dialogs during processing (there is no generic error dialog because the problems encountered are dependent upon the upgrade content).
Examples of this are;

"Job reader could not complete reading the job".
"could not find converters"
''Database Version Wrong, Expect 11.0-74, Actual: 11.10-17''

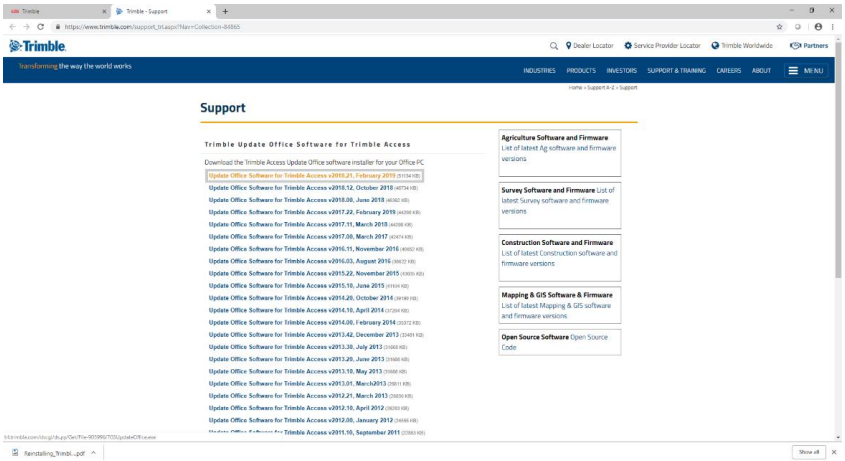
Update Office can be accessed via the LSS website;

http://www.dtmsoftware.com/Support-Home/Download/Survey-Equipment-Machine-Control-Support-Files/Trimble

Access Controller link under "Having problems?" which links to the Trimble website;



http://www.trimble.com/support_trl.aspx?Nav=Collection-84865



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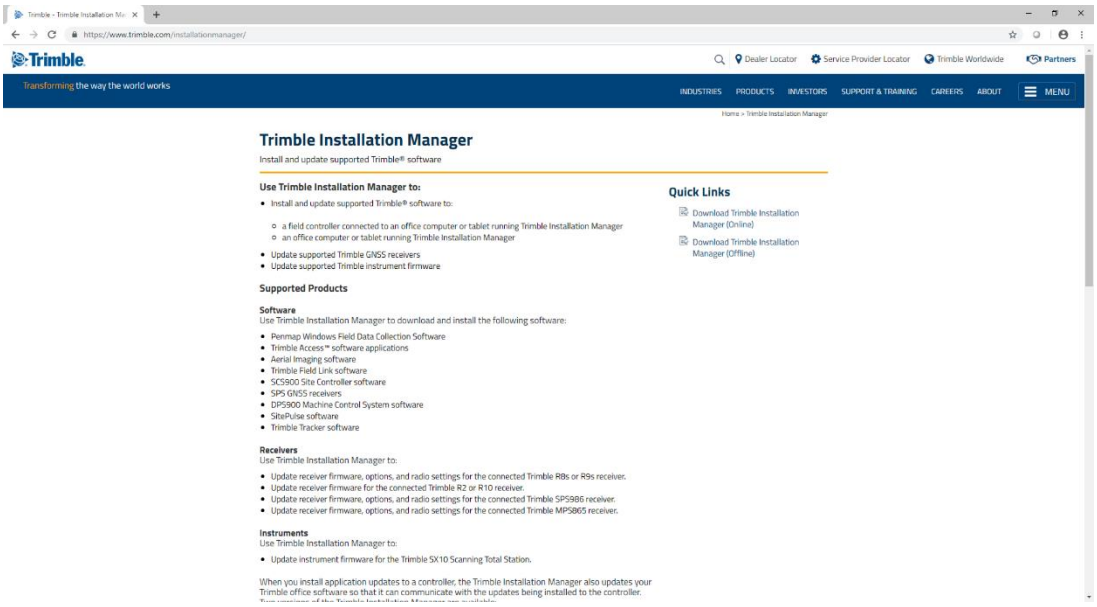
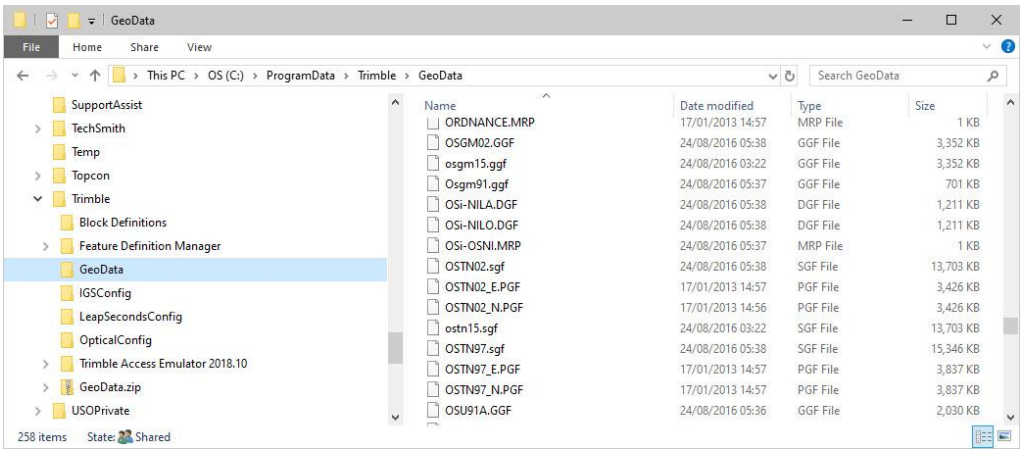
TIM website (Trimble Installation Manager) which, if you have sufficient administrator rights, can be used to update all your Trimble software (including the controller firmware) in one go.



Further files from the LSS DVD or website.

Shift Grid and other transformation files.

These should be installed in the address **C:\ProgramData\Trimble\Geodata**, which may be hidden until made visible in Control Panel – Folder Options – View Show hidden files, folders and drives.



Note: it may be necessary to install via the Trimble Business Centre (TBC).

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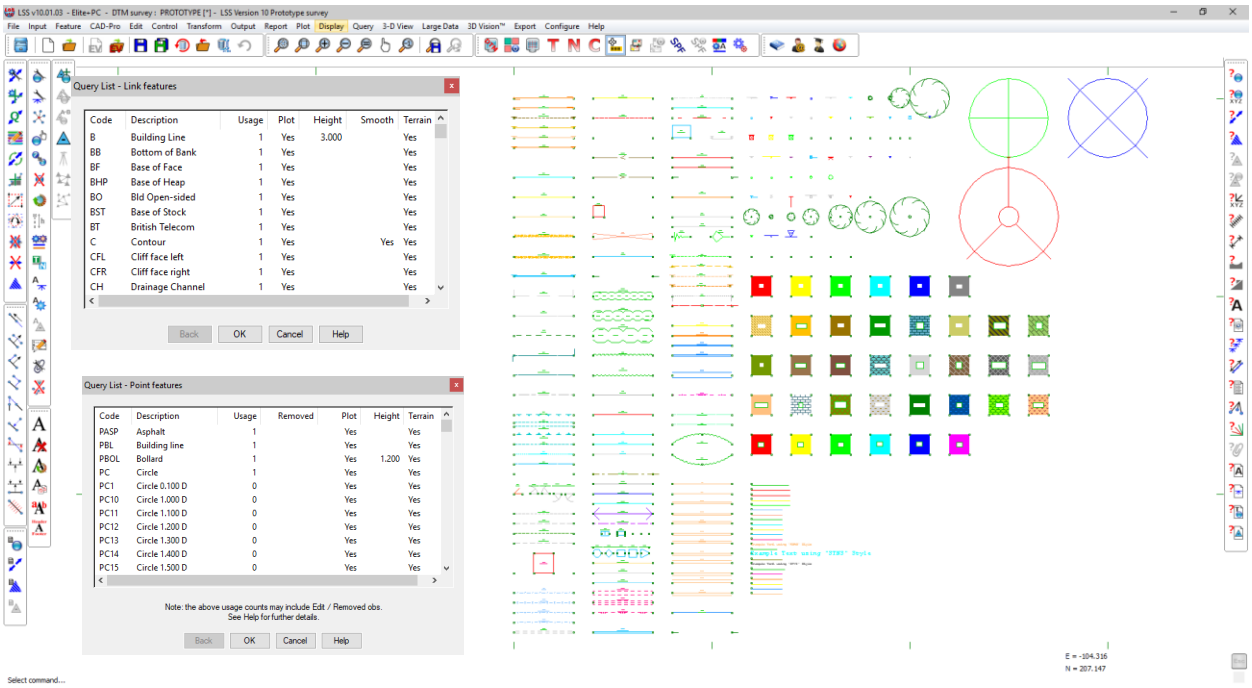
1.4 LSS Prototype and Feature Code Library

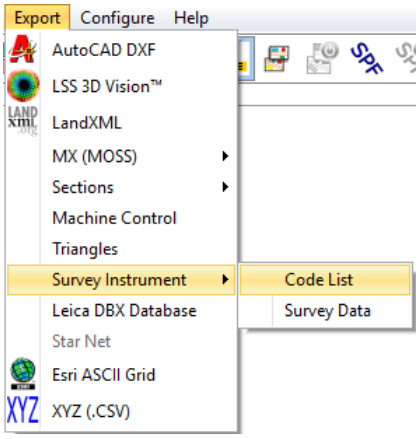
It is recommended that a feature library is copied to the instrument prior to carrying out any surveying tasks and code lists for many loggers have been created based on the standard LSS Prototype Survey File - PROTOTYPE.LSS ;



Query List as displayed can be used to list the legend entries.

The command

Export Survey Instrument – Code List



Note: There are already prepared LSS Feature Code Libraries for various survey instruments and data-loggers exported from this standard LSS Prototype Survey.

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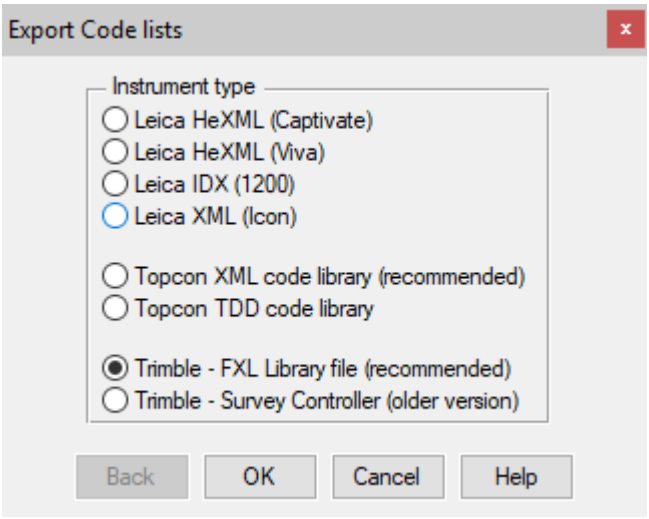
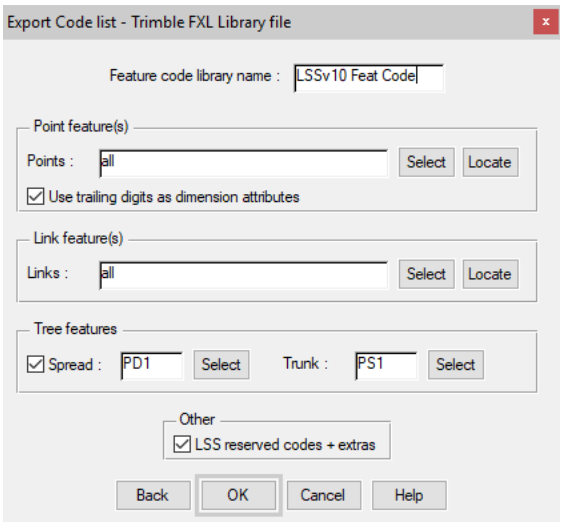
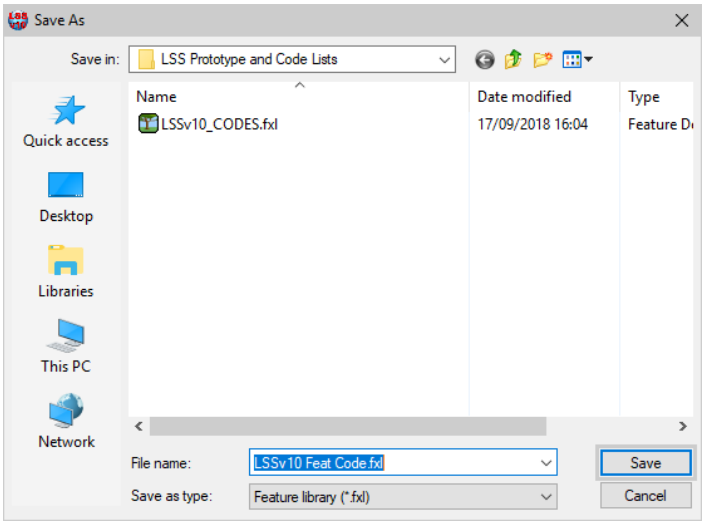


Allows

'Trimble – FXL Library file (recommended)

To be selected at the top of the list.





This export method has been used to create a code list for the latest LSS v10 Prototype – LSSv10_Access.fxl.

When starting a new job on the logger, it can be configured to include this code list.

The LSS Export command is covered later on in this workshop.

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1.5 Configuring Trimble Access

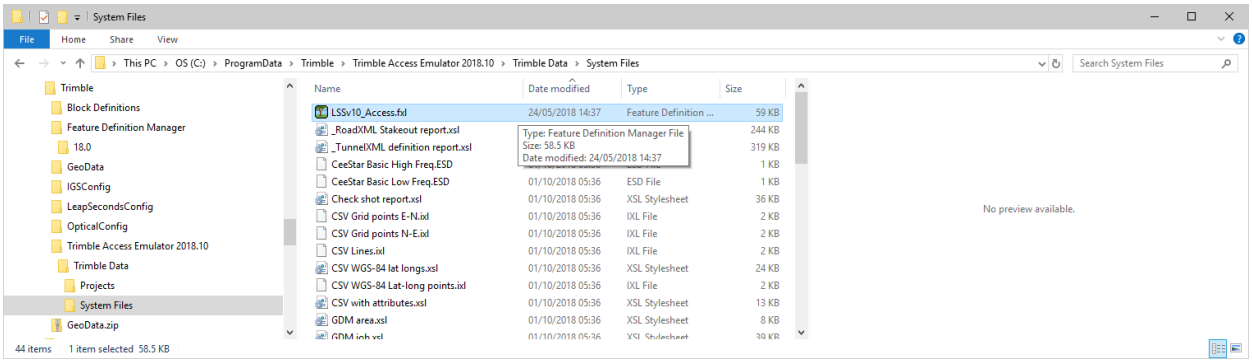
1.5.1 Feature Code Library

An .FXL Feature Code Library needs to be copied to the Trimble instrument:

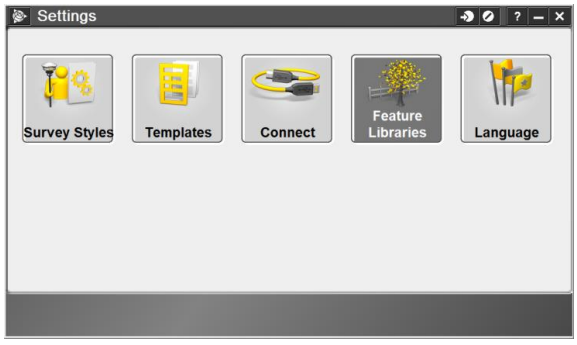
Either the LSS Prototype example LSSv10_Access.FXL (as described above)
Or a user created code library from their own LSS Prototype Survey created by **Export Survey Instrument – Code List**

We will start by simply copying the standard feature library file, LSSv10_Access.fxl onto the Access via Active Sync.

The Feature Code Library is found on the LSS DVD under **Support_files\Trimble\Access\Code** and needs to be copied to the **'Trimble data\System files'** folder on the instrument:



On the Access, the 'Settings' Tab allows 'Survey Styles, 'Templates', 'Connect', 'Feature Libraries' and 'Language' options to be accessed and amended.



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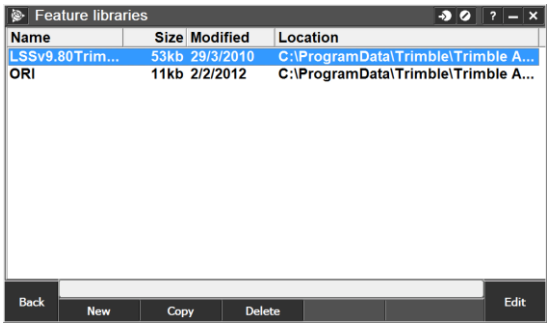
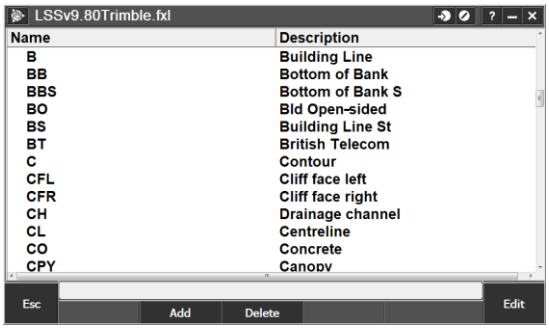
Select ‘Feature Libraries’.





We can specify a Template if required.

A Template is a file containing previously defined Job settings. A template can be specified by selecting “Settings” from the main Trimble Access menu, then “Templates”. If a template has not been defined, or not required, then leave as “Default”.

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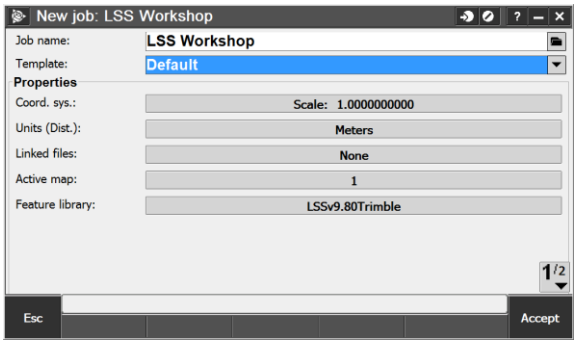
Chapter 2

2.1 Instrument Data Capture on Trimble Access

2.1.1 Creating a New Access Job

On the Trimble Access logger, select 'General Survey'

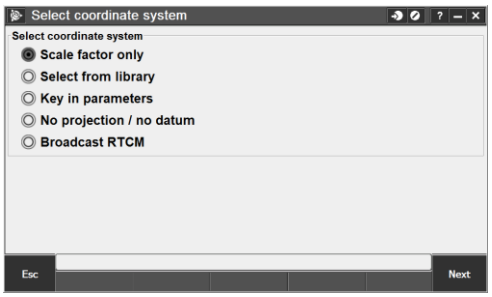
Click on "Jobs" then select 'New Job' from the list.

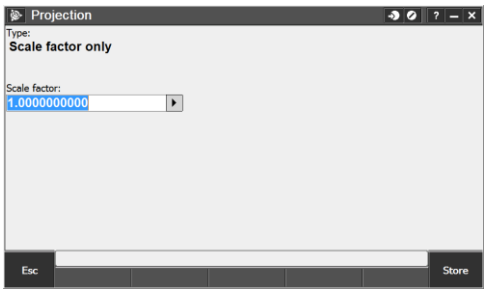


Enter an alphanumeric Job name.

Select the 'Template'

Click the 'Coord. sys.' button and, unless otherwise required, select 'Scale Factor Only' of value '1.0000'.





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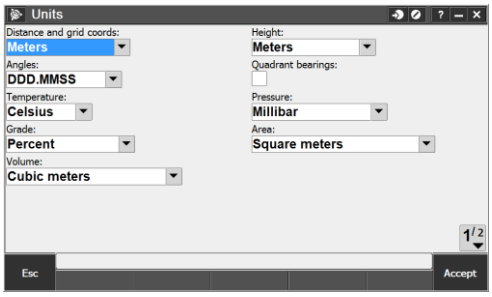
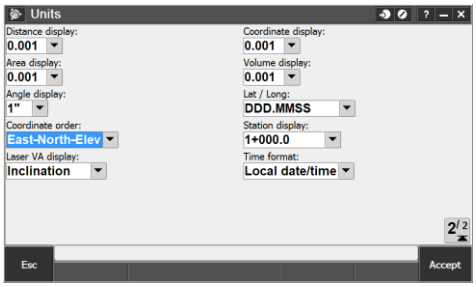
Click the 'Units (Dist.)' button and set the Eastings and Northings to the correct order and select metres.





If required, click the 'Linked files' button to select a CSV (Comma delimited), TXT (Text) or an existing SC Job files to over display data.

If required, click the 'Background files' button to select data for background display e.g. DXF.

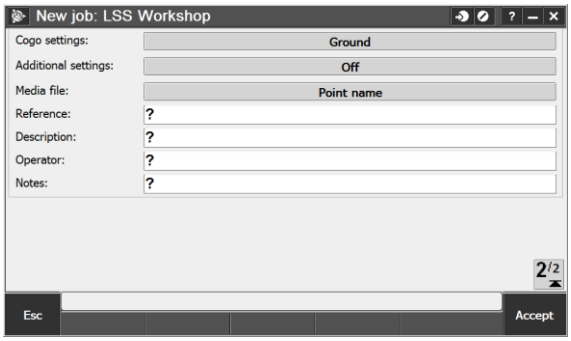
Note: To create a DXF file from LSS use 'Export - AutoCad DXF', type in the DXF file and select 'As per Configure/DTM Display…' and click 'OK'.

Then copy the DXF file to the 'Trimble data' folder on the Access.

Click the 'Feature library' button and select the LSSv10_Access.FXL file exported from LSS and copied earlier on to the instrument

The second page of 'New Job' allows

'Reference', 'Description', 'Operator' and 'Notes' details to be added.



Notes on other Properties

'Template' - contains previously defined Job settings and can be set using "Settings / Templates" from the main menu. If a template is not defined then leave as "Default".

'Linked files' - select a CSV (Comma delimited), TXT (Text) or an existing Trimble Job file to over-display data.

'Active Map' - select data for background display or setting-out e.g. DXF.

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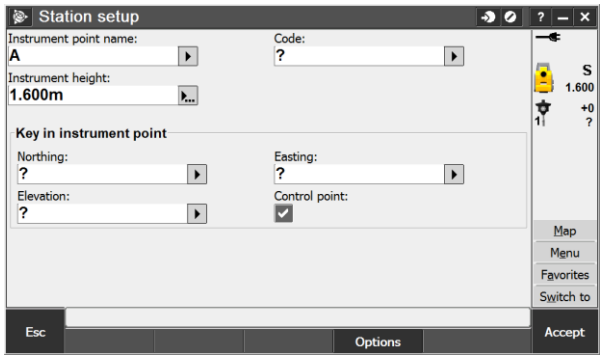
2.1.2 Station Set-Up in Access

Once a Job has been created, click 'Measure' and then select the Survey Style, *e*.g. LSS;

Then select 'Station setup'.

Note: There are 4 other set-up options;
Station Setup Plus will be rarely if ever be used,
Resection, Refline, and
Use Last which allows you to continue an existing setup within a Job.

Enter the Instrument point name (Set-on station). This can be either keyed in manually or selected from a 'List',



together with the instrument height and coordinates, if required.

There is no need to enter a code at this stage.

Click "Accept"

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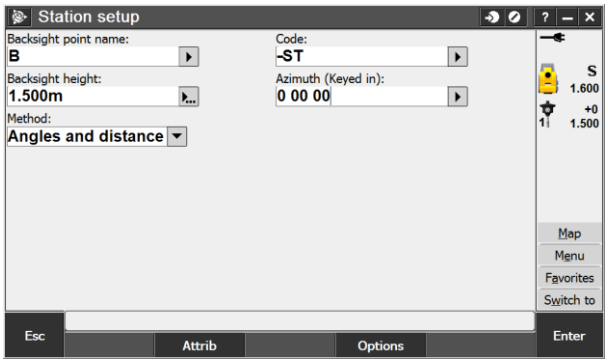
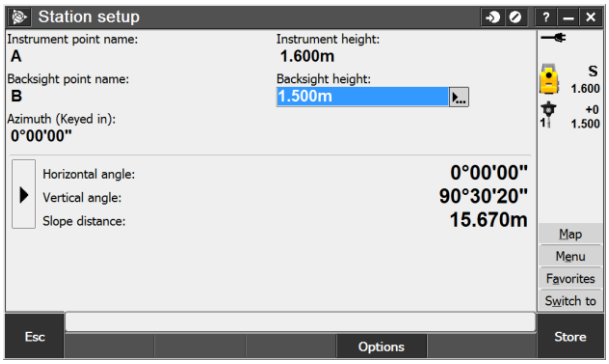
Enter the Backsight point name. Again this can either be selected from a list or typed in;

Type in the Backsight height (target height), then set the Azimuth.

Ensure that the Method is set to 'Angles and distances'.



Point the instrument at the backsight station and click 'Measure'.



Check your Measurement values and Enter or Store to proceed … or Redo if necessary.

Note: Checks to known points are always useful at any time during the Survey.

The instrument will display the measurement details.

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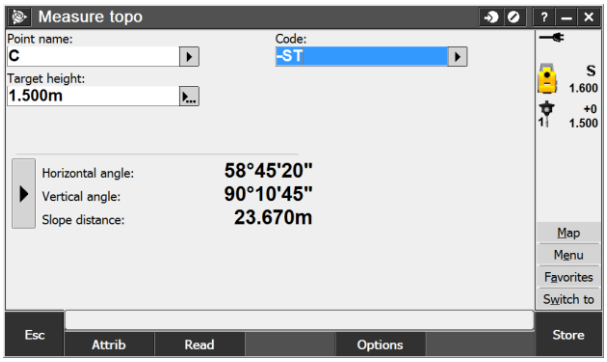
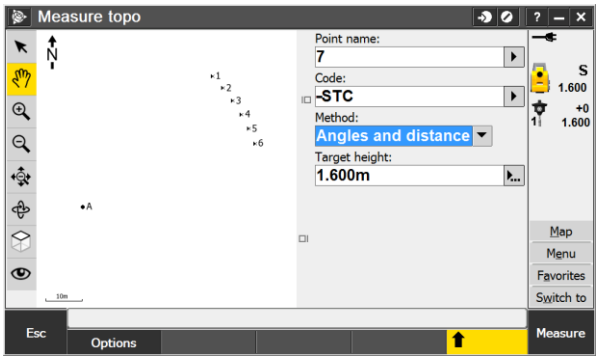
2.1.3 Measure Topo – Backsight Checks

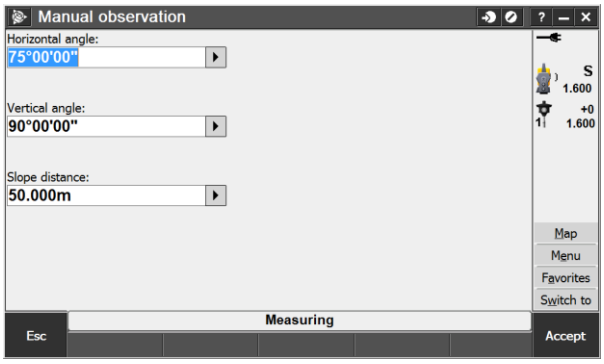
Once the Station Setup has been successfully completed select 'Measure - Measure Topo' to start collecting topographic detail or 'Measure - Stakeout' for setting-out

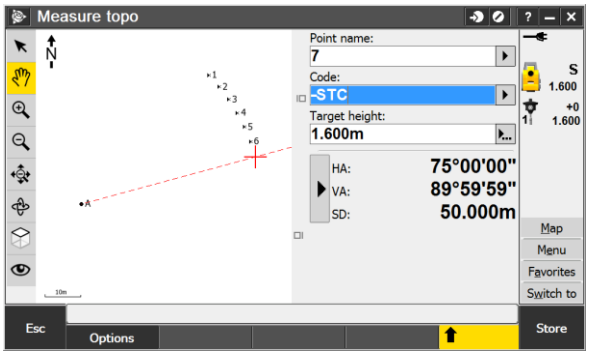
Control observations - during detailing use the '-ST' reserved code. The station name should be added as either:



The PointID,
or appended to the code i.e. station 'A' coded as '-STA'







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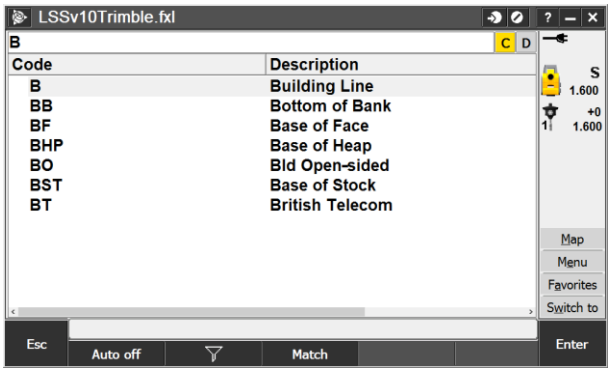
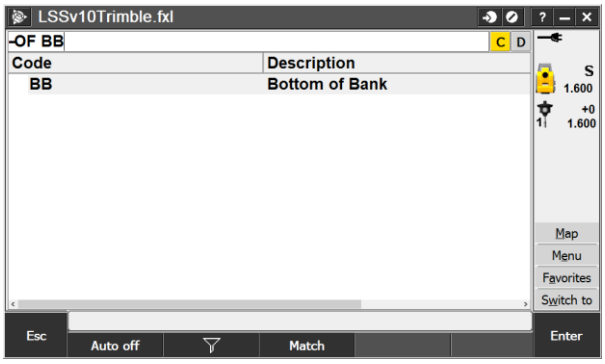
2.1.4 Measure Topo – Detail

We can type in the required code (as characters are added the code list display updates to show only those codes starting with the letters typed).



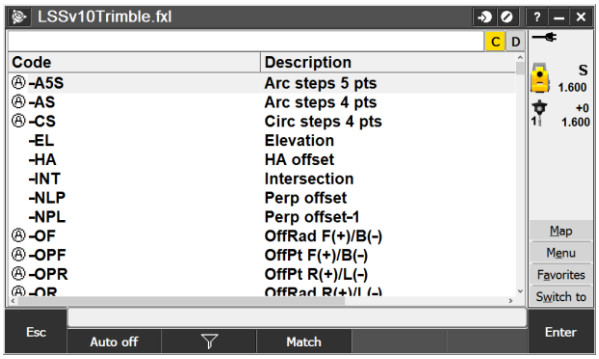


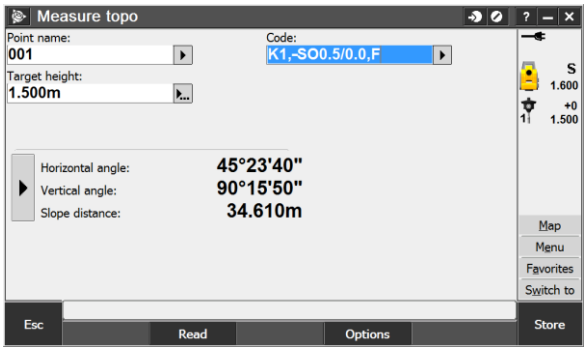
Note: The list can be clicked to accept a displayed code

Note: Multi-feature coding - A space can be used to separate codes

Especially as the LSS Reserved codes are readily available.

Type or click in the Code field to access the Code input window





2.1.5 Attributes

Attributes are data items attached to the code within the code list and are set as either an integer, a real number or character input.

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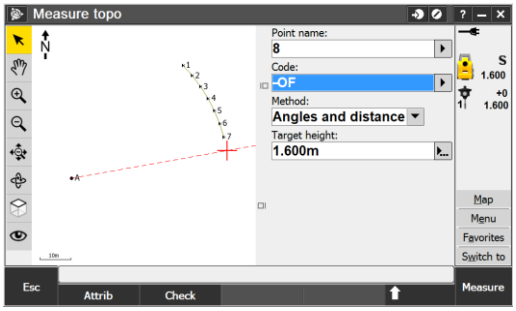
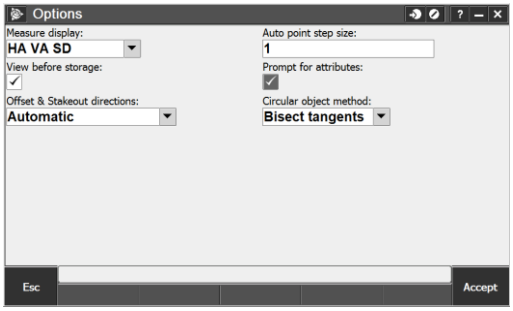
The use of attributes can greatly enhance the efficiency of the survey coding

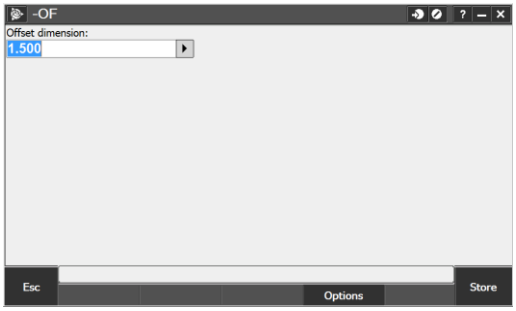
Automatic prompt - The way in which attributes can be actioned is set in Measure Topo.

Click on the 'up arrow' button and then 'Options' to turn on an automatic 'Prompt for attributes'. This will show the attributes input dialog when a point is stored and its code contains an attribute.





Or click on the Attrib button also on the Measure Topo screen to otherwise manually access the attributes.



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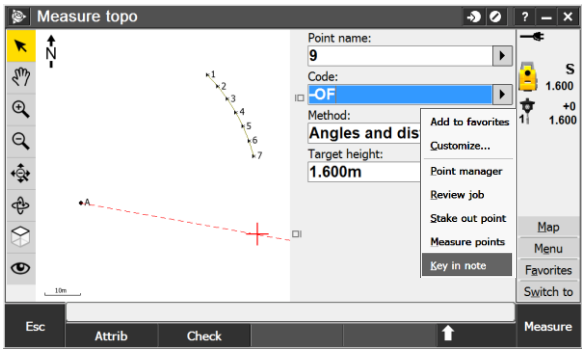
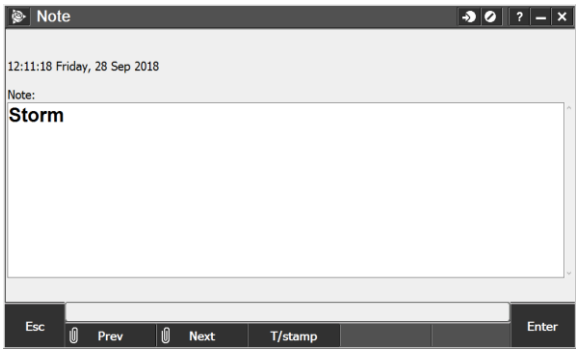
2.1.6 Adding Notes

To input a Note select 'Favorites' in the screen bottom right hand corner, and then 'Key in note' from the resulting menu.





Type in the required text and then either select;

'Next' to associate this text to the current observation that has yet to be stored.

'Prev' or 'Enter' to add the Note to the observation previously stored.

'T/stamp' to add a block of timestamp text to the end of the currently input Note (this option does not store the text).

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2.2 Instrument Data Capture on a Survey Controller

2.2.1 Create a New Trimble SC Job

Select <Files> / New job at the SC desktop menu.

Enter an alphanumeric Job name.
Note: Use the Alpha key, located just left of bottom Right, to switch between alpha and numeric.

Click the '**Coord. sys.**' button and, unless otherwise required, select 'Scale Factor Only' of value '1.0'.

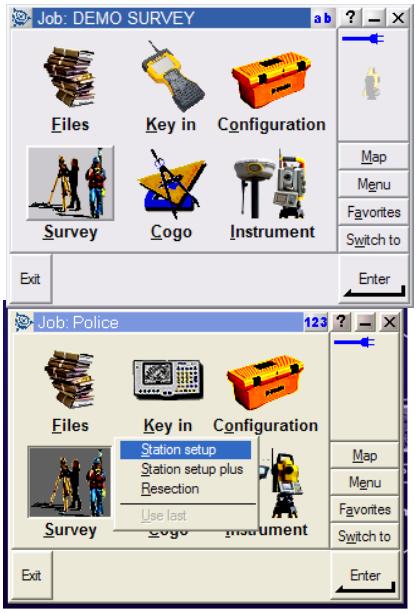
Click the 'Units (Dist.)' button and set the Eastings and Northings to the correct order and select metres.

Click the '**Linked files**' button to select a CSV (Comma delimited), TXT (Text) or an existing SC Job files to over display data.

Click the '**Feature library**' button and select the FXL file exported from LSS and copied to the instrument (see above).

Select '**Survey**' from the SC Desktop and the relevant LSS Survey Style.

Note: New styles can be added via 'Configuration / Survey styles' on the Trimble SC.

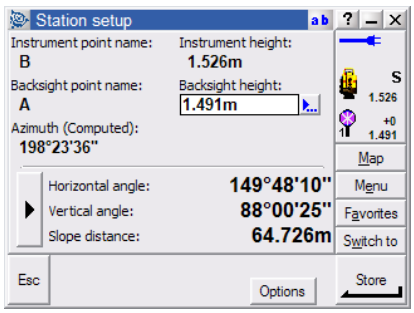


Select Station setup

Provide Corrections if requested. To ignore these, specify '?' for Pressure, Temperature and PPM and 'None' for Curvature and Refraction.

Provide the set-on and backsight stations from the 'list' along with the instrument and backsight heights.

Note: The stations can be either;
Existing e.g. exported from LSS, in which case use the arrow to the right of the input boxes to select from the list, or
They can be defined as coordinates and azimuth during the set-up procedure itself.



Point the instrument and click 'Measure' for a distance to the backsight

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Check your Measurement values and Enter or Store to proceed … or Redo if necessary.

Note: Checks to known points are always useful at any time during the Survey

Once the Station Setup has been successfully completed select 'Survey / Measure Topo' to start collecting topographic detail or 'Survey / Stakeout' for setting-out.

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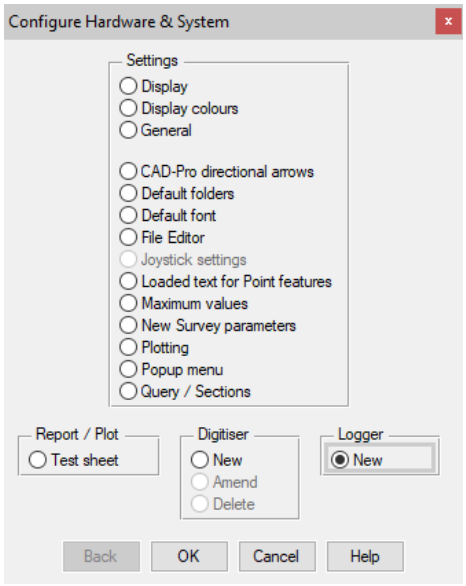
Chapter 3

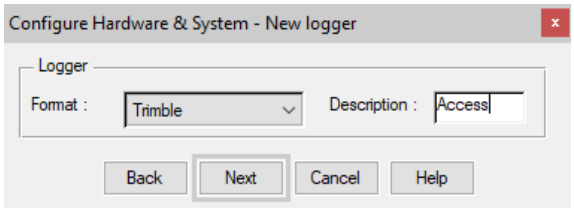
3.1 Configuring LSS for Trimble Survey Controller or Trimble Access

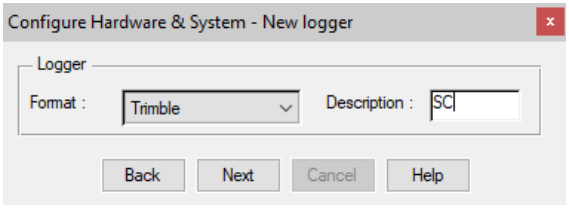
This is a once-only operation, for each type of instrument to be used, on every computer into which data is to be downloaded.



To configure the logger in LSS we select **Configure Hardware & System**, followed by 'Logger - New' (if there is already another logger configured then the option will be 'Logger - Change').

We need to choose the format of the data, Trimble from the drop down-list and either SC or ACCESS in the 'Description', as appropriate;



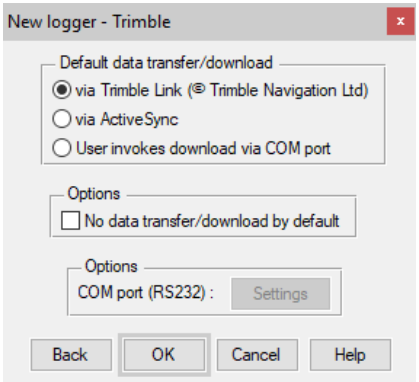


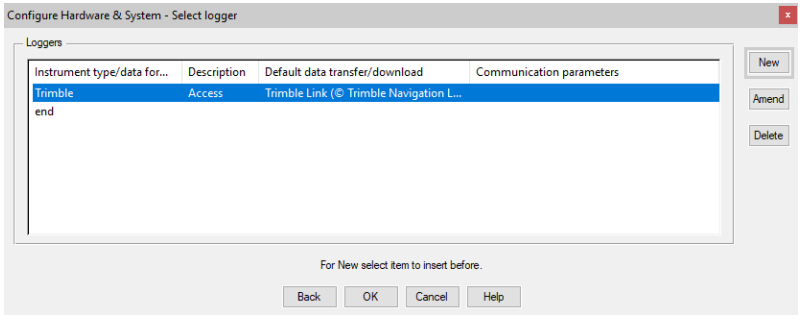
Next we choose the usual data transfer / download method.

Select the option 'via Trimble Link(©Trimble Navigation Ltd) allows the Trimble Job reader to read the job file.

Ignore 'User invokes download via COM port,

If the file already has been copied to the C: drive, we can tick 'No transfer/download by default'.





We can choose
Logger – Change to return to the logger window to select
'New' when we need to add another logger.

Back to top

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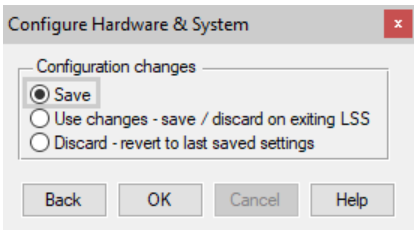
Hitting ‘OK’ will allow us to ‘Finish’ and ‘Save’ our logger settings.

Note: This must be repeated for all PCs likely to be processing Trimble SC data.



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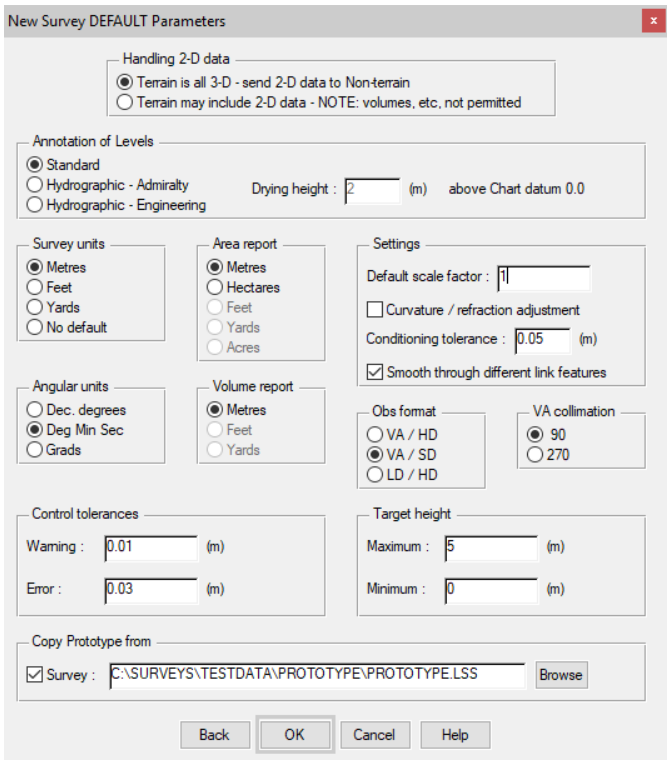
3.2 Configuring the New Survey Parameters in LSS

For each survey the following parameters are set during what is termed the "survey initialisation" process, which is the starting point for all surveys.

The command **Configure Hardware & System - New Survey Parameters** allows many of these options to be set in the following window:



Set the Handling of 2-D data,

Alter standard Annotation of Levels for hydrographic surveys.

The Drying height is the height above Chart Datum to be considered as 'tidal'.

Set Survey units for length, area and volume in the survey,

And other survey parameters:

Angular units, Obs format, Vertical angle collimation.

We set Control tolerances,

And maximum and minimum Target heights,

File and Obs numbers for Inserted observations.

'Default Scale factor' - this value does not affect any distance calculations directly but is used to provide a default scale factor to newly loaded or edited stations to relate radial survey observations to their grid coordinates.

The value is normally be set to '1.0', but, **Note:** GPS data (including stations) based on the **OSGB36 TN02 transformation** should have the *local scale factor* applied here.

'Curvature / refraction adjustment' - will apply a fixed correction to radial survey data. The difference in level between adjusted and non-adjusted observations amounts to 7mm in the first **1km**, rising to 7m at 10km, so is rarely of concern for most surveys.

Conditioning tolerance' - applies to arcs and circular steps - either surveyed or Co-Go generated - or when 'Output smoothed links' is used.

'Angles format' – all survey data is displayed in this format and can be changed.

Obs format' – cannot be changed once radial survey data have been processed. It is possible to have different formats contained in loadfile(s), but after being processed all survey data is displayed / reported in this format.

'VA Collimation' - sets the default Vertical Angle at horizontal- either 90° or 270°. LSS is able to process combined Face Right and Face Left station observations.

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'Control tolerances' – refer to the survey data processing of control observations. When a control (station) observation exceeds the warning or error values it is reported. However, when an error is issued the survey processing will be terminated as well.

It is the responsibility of the surveyor to be aware of these settings.

Note: It is possible to use negative target heights for when the detail pole is inverted, but exceeding the set values will also issue a warning.

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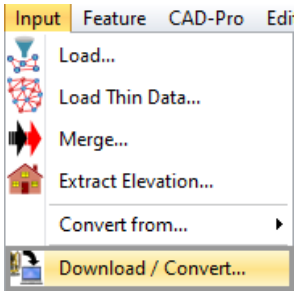
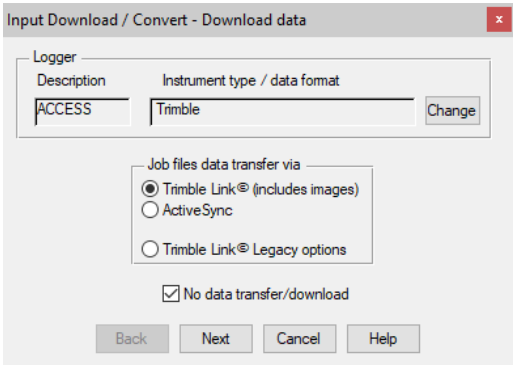
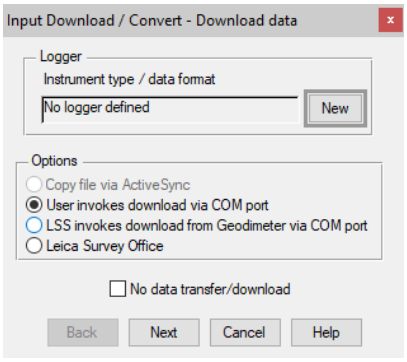
3.3 Data Processing in LSS – Converting Data



Selecting **Input Download / Convert** will invoke the Download data window, the variant shown on the right being displayed if we have not already configured a logger which prompts us to do so by clicking 'New' and following the dialog boxes:

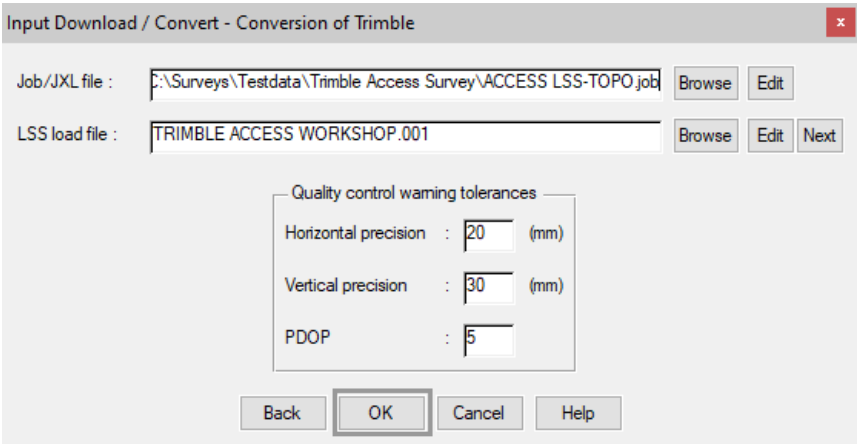




Either way we will need to save the logger configuration settings in the system registry.

Note: The 'No data transfer/download tick box is selected if the survey data has already been copied across to the hard drive of the computer.

Clicking 'Next':



On the conversion dialog we 'Browse' for the Trimble Workshop file in the folder – it may be in a subfolder.

LSS will convert the Trimble job file into a new LSS 'Load file',

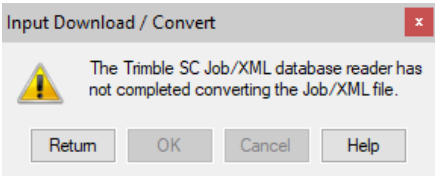
'Next' (optional) for the next available load file for this survey

We can accept the standard Quality control warning tolerances for GPS Data.

A note in the message prompt area informs us the Job reader is reading the job file, before the **Input Load** window informs us the load file has been created. Click 'OK'

The **Input Load** command should automatically be invoked.

Note: If the load file name is for a survey that does not exist then the **Input Load** option will prompt **File New** to create a new survey prior to loading the data.



Note: if there are any issues we may see a message, As in the example;

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3.4 Data Processing in LSS – Inputting Data

The 'LSS Load Input file' is the format by which all external data is processed into LSS e.g. data from a survey instrument has to first be converted to a load file via the **Input Download & Convert** option.

3.4.1 Loading Data into a Survey Model

The **Input Load** Window appears where there is a load file available to load into the current survey:

The first radial buttons are for choosing where to send a load report - to a printer, to Adobe Acrobat file, or (more usually) a file. A load report file is generated for each load.

We can choose a Conversion file here,

Normally we would 'Report pauses on' 'Errors' and 'Control warnings'

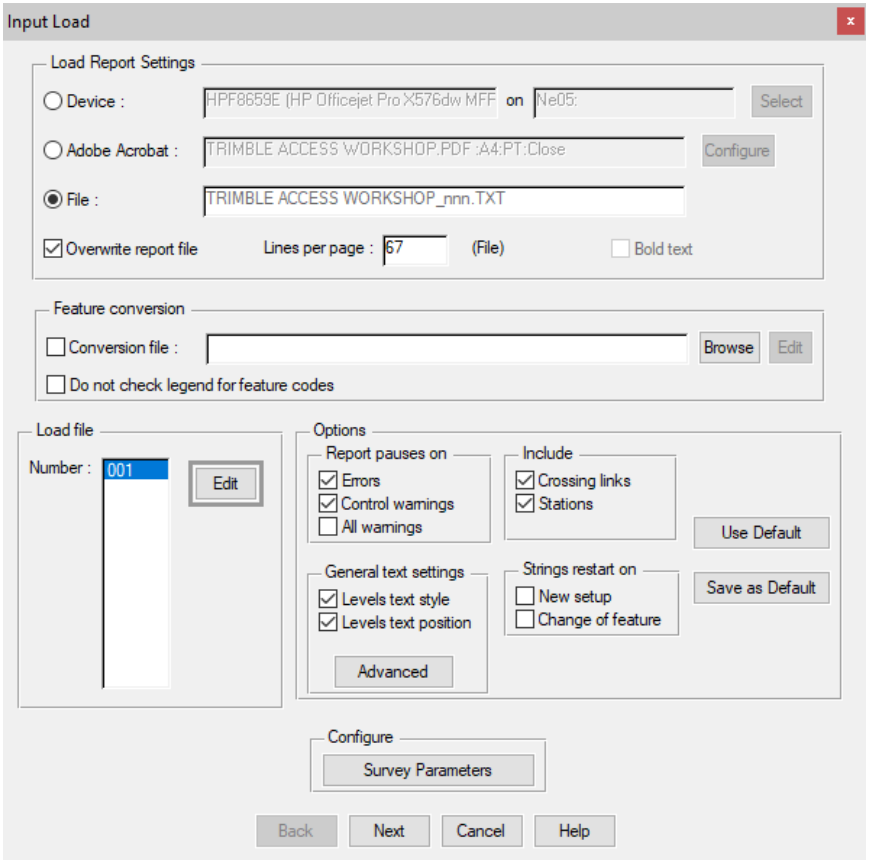
We could also select 'All warnings'.

'Include' options are:

'Crossing Links'

'Stations'

Simply unticking will prevent any *crossing links* or *stations* from being created.



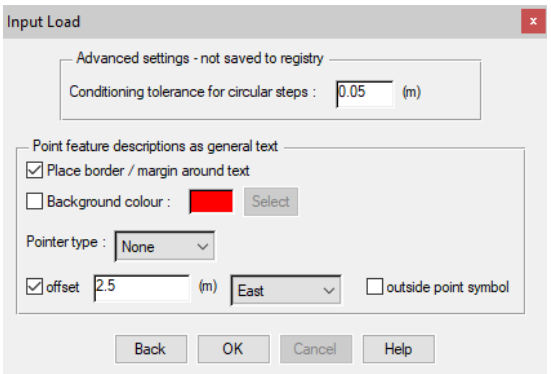
'General text settings' relate to annotations brought in typically from dataloggers, and the method allows particular text styles and positions to be set for specified link features.

'Strings restart on' will start new strings as the tick boxes are defined – for each 'New Setup' and / or 'Change of feature' (on the logger).

If we choose any of the 'Pause' options, we will need to select 'Continue' during the processing when any of the errors or warnings are triggered. This will become clearer as LSS processes the survey data.

Clicking the 'Advanced' button will give the user access to 'Advanced settings' for redefining the 'Conditioning tolerance' for inputting arcs and circles.

It is also possible to reset the 'Point feature descriptions as general text' if required.
Leave the options as per default and click
The 'Configure Survey Parameters will revisit those settings in that window covered earlier. Click 'Edit'.



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3.4.2 An Explanation of the LSS Load File Format

Radial and coordinate record types

0 = Comment line containing information that will not be processed by LSS, such as the surveyors name, date and time of the survey.

1 = Parameters record containing e.g. survey units and angular settings.

2 = Station coordinate record.

20 = Station coordinate control observation used as a check and commonly encountered with GPS survey equipment to verify a survey station position.

6 = An item of general annotation (normally text entered on a survey instrument or logger as a comment or note). Such annotation will be shown in the LSS survey centred on the previously surveyed point.

9 = End of file marker. It is not necessary to have one of these at the end of the file.

Radial only record types

3 = An instrument setup record with set-on station, followed by backsight station, backsight angle, instrument height, vertical angle collimation and station scale factor.

Some of the fields may be blank as in this load file as LSS will be getting information from lines which follow.

4 = A control observation where the final field is the station name. If there is a 4 record following a setup record, this will provide any missing information in the setup record. This is identical to a '5,' record with a '-ST' code.

5 = A 'detail' record which contains an observation to a surveyed point with the feature code appearing in the last field. Multiple features may be specified and separated by either a comma or a forward slash.

This record type may also be a control observation, where '-ST' is the code, with the station name either following this or being taken from the observation number field.

We may also use the special or Reserved codes, described in detail in the next session.

Coordinate only record types (not shown in this example)

21 = A coordinate record. Instead of collecting radial data it is possible to collect and convert coordinates, e.g. for GPS survey data. These survey data can also use Reserved codes.

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3.5 Photos and Trimble Access

When an image is recorded, Trimble Access will prompt the user as to how the image will be attached. The options are:

Job
Previous point
Next point
Point Name

Regardless of when you record an image on the controller, Trimble Access will dynamically sort the data in the job file.

Photos recorded as an Attribute will also be output in the 8, record. (This is only relevant to users who have created a Photo attribute in their code library using TBCs Feature Definition Manager). There is currently no facility in LSS Export Code list to allow for a photo attribute.

The photos for a Job can be transferred to the PC for viewing with the LSS model in the following ways:

Copy the images manually via Active Sync or a memory device to the sub-folder 'Images' in the survey folder at the same time as copying the Job file.
Use the 'Trimble Link' Trimble DC for EDM option to transfer the DC file. The DC file itself need not be used but this option also copies the images (which need to be moved to the sub-folder 'Images') and the Job file (into the sub-folder 'jobs').

Following this use the option 'Trimble Job (EDM and GPS) via Active Sync' with the 'No data transfer/download' option ticked then browse the Job file and process.

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3.6 GPS Survey Instrument Issues

GPS data can be read directly from the Trimble SC or Access as long as the GPS coordinate system has been fixed.

Both AsciiFileGenerator and Trimble Link Engine require access to the datum grid files, transformation, geoid model files and projection shift grid files that are referenced in the Job file. These files must exist on the PC in the Geodata folder for the process to complete. The path for this is held in the registry. <LSS install Drive letter>:\ProgramData\Trimble\GeoData\

During the LSS install the registry entry is created and populated with the Trimble default if it does not already exist. Both AsciiFileGenerator and Trimble Link are 32bit programs and therefore use the 32bit registry entry.

An OS. Grid 'OSTN02(GB).CSC' and 'OSGM02GB.gem'. The Trimble also supports the use of OSGM02NT.gem and OSGM02RI.gem files for Ireland.

Note: During the Input Download / Convert process LSS will report if a job is using CSCS or GEM files on the job list.

The following coordinate system files are then copied to the Geodata folder, which is also created if it does not exist.

These files relate to the OS system for the UK only and are;

OSTN15.SGF, OSGM15.GGF
OSTN02.SGF, OSGM02.GGF
OSTN97.SGF
OSGM91.GGF
OSU91A.GGF
OSi-NILA.DGF
OSi-NILO.DGF

OSi-OSNI.MRP

Or as a local grid via a coordinate transformation or a fixed base station and the levels relate to Ortho-heights.

3.6.1 Scale factor

If the GPS coordinate system contains a scale factor then LSS can combine this GPS data with radial (EDM) data in the same LSS model.

Do this by setting the "TPS corrections / GeomPPM / Calc Scale" to Automatically in the configuration set. This enables LSS to read the scale factor at each station coordinate and hence process the radial data with the correct scale factor.

There is an LSS Transform-Scale by E/N command that applies/removes the scale factor in an LSS survey as long as all the raw observations have been first transformed to their calculated XYZ coordinates first (in this case use Transform - Observations to XYZ first).

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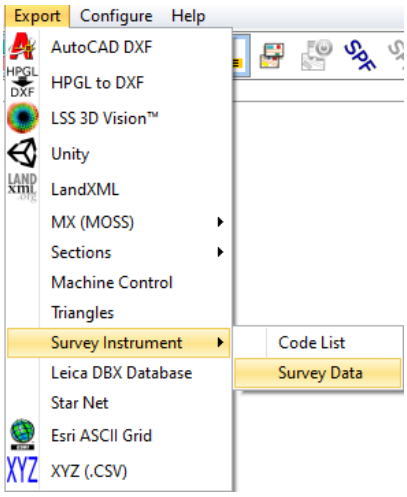
Chapter 4

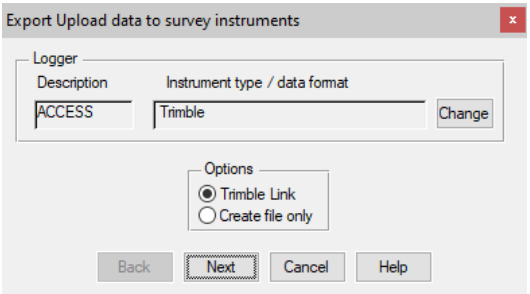
4.1 Exporting Data to Trimble Access Loggers for Setting Out

The Export of data to survey instruments and loggers falls broadly into four categories:
Points
Lines
Triangles
Alignments

The LSS Export commands are used to export data to most types of survey instruments using the same logger configuration as used during Input - Download / Convert.



From the main menu, select Export Survey Instrument-Survey Data

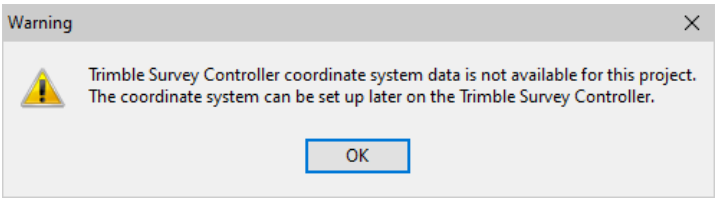


The Logger defaults to current / Top of the list;

Note: The logger parameters can be altered by clicking 'Change' or by using Configure Hardware & System / Logger.

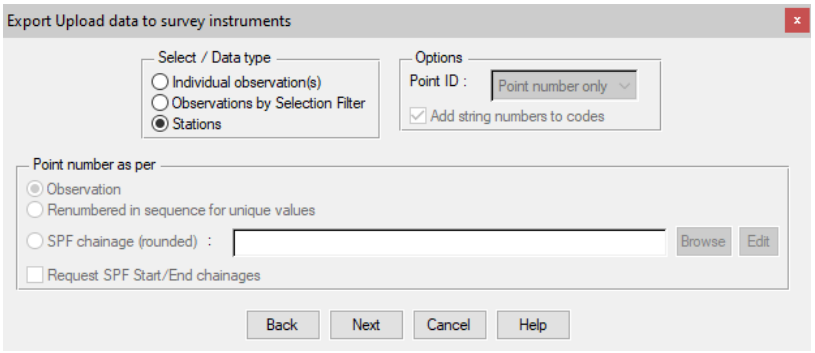
Leave the default option 'Trimble Link' selected and click 'Next'.

Trimble Link will show a warning dialog that the resultant job file created by this option on the SC will not have a coordinate system.



'OK'.

The next dialog allows the selection of observation or station data;



For example, we may wish to include

'Stations' in the exported data file;

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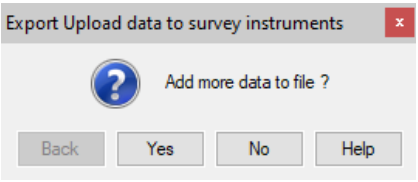
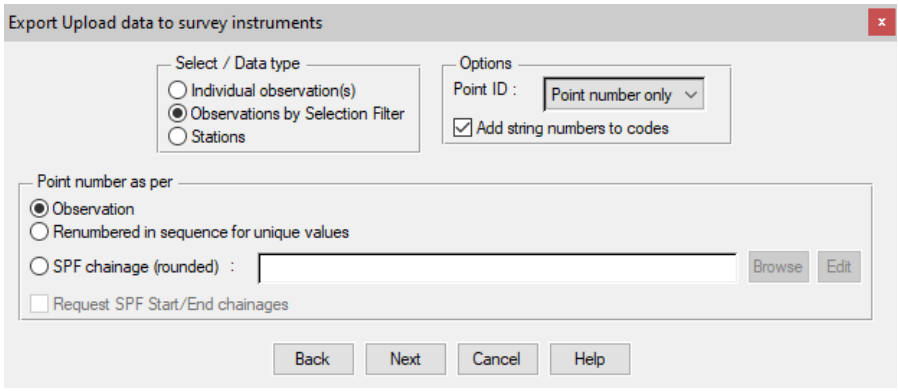


When the option to 'Add more data to file chosen

Select 'Yes' for this example to include some observations.

The defaults assume that the 'Observations' will be exported using the Selection filter.

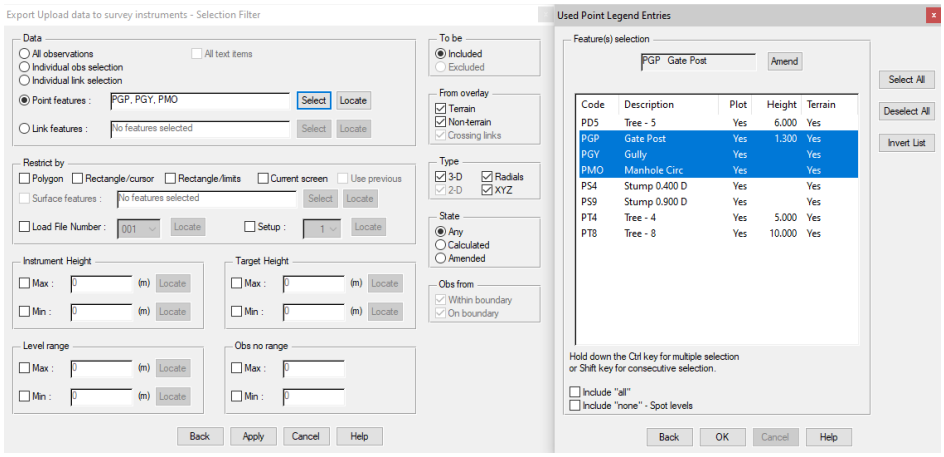


Note: The observations can have the code added to the point number, which can also be related to the SPF chainage.

Click 'Next'.

If chosen the Selection filter dialog will offer the opportunity of multiple observation

selection criteria. Here we have selected some Point Features;



Hit 'Apply' to make selections on the screen – there can be many.

As soon as there are observations selected then the

'Cancel' button is replaced by 'Finish'- click once all required data is highlighted.

Note: The data selected by the Selection filter is grouped in the export set first as complete strings and then as individual points related to their loaded order.

To export the observations in the order they were located use 'Individual observations' from the previous dialog.

There is the possibility of repeating several selection criteria to the same data set, prompted by this dialog.

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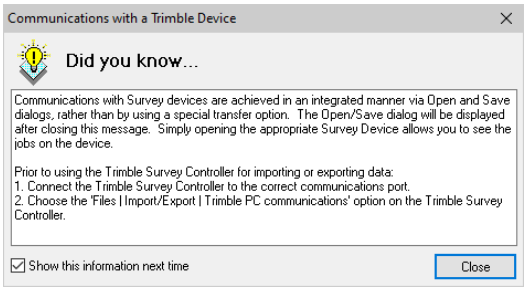
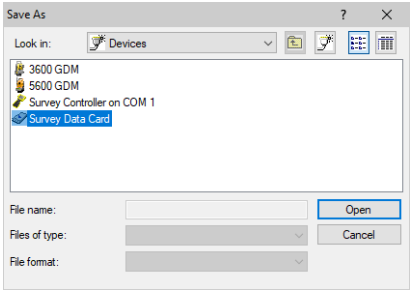


A Trimble tip appears

Choose the connected device to Export to – Survey Data Card for Survey Controller and Access 2012 for Trimble Access and click 'Open';



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4.2 Exporting to LandXML

This export option allows for Points, Lines, (Links) and Triangles.

Similar to DTM Stakeout, including the Triangles in the exported file is particularly useful for analysing 'existing' against a 'design' model in 'real time' i.e. the instrument will display the height difference to the 'design' model whilst surveying

We need to key in the name of the file:

Select the Output criteria:

And tick to select the various items to be exported from;

'Triangles'

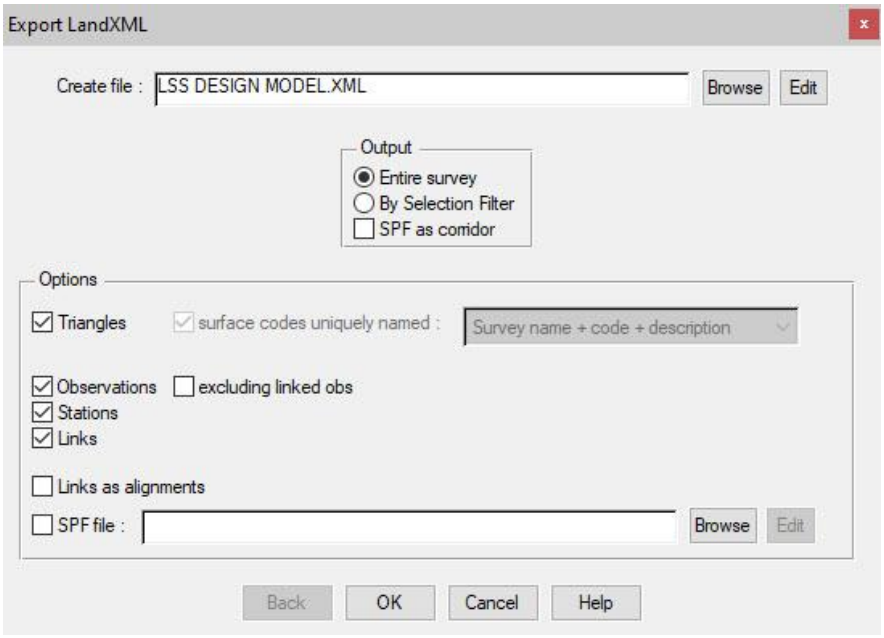
'Observations'

'Stations'

'Links'

'Links as alignments'

'SPF'



Technical Notes

The Output can be for the 'Entire Survey' or a part defined by 'Selection Filter' which will include the option to make use of surfaces.
'SPF as corridor' (Section Position File) will use the offsets from the SPF to define the corridor dimensions.
'Surface codes uniquely named' becomes available where we have a surface in the LSS DTM.
'Links as alignments' will recognise links and create alignments from them.
'SPF file' is the normal method of uploading a section reference line as an alignment in the LandXML file.

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4.2.1 Procedure

Copy the LandXML file to the controller 'Trimble data' folder and use Map/Options/Layers to pick relevant data sets to be used from within the LandXML data.

To set this up graphically with a Job
In main General Survey click on Map
Click on the 'Up Arrow' icon
Choose 'Layers'
Click the '+' icon next to the LandXML file to view the 'DTM surface name', 'Lines' and 'Points'. Click twice on the LandXML file to set the box and then tick on all three items. This allows the data to be both viewed and selected

To amend the graphical view select the 'Up Arrow/Options'. Here settings like Display labels 'By Name' will show the Point numbers etc

Links – the string numbers are accepted as supplied in the LandXML (Trimble does not actually need these because features with the same name are treated as unique).

If the strings return to a duplicate coordinate i.e. are looped, then Trimble Access automatically shows a shaded area (known as polygons). These areas are hatched by default within the Map/Layer/options.

Points – the observation numbers are properly recognised.

Triangles – this is automatically imported and displays height banding based on DTM

Alignments – have to be Defined in Roads as "name".RXL. Please note that if the road section templates are required then use the Export MX option instead because the Export LandXML only supports the alignment reference line itself.

Export MX
Create an SPF for each road alignment - this can be either a geometry SPF or a normal SPF.
Export MX using the Survey option plus the SPF
The LSS exports MX data using a '.GEN' suffix which will need to be changed to '.CRD' to be 'seen' by the Access importer

Export LandXML
Choose the relevant string as the Road name then click on Edit and then Store keeping the same name.
This alignment is then seen on the Map/Options/Layers file list as an RXL

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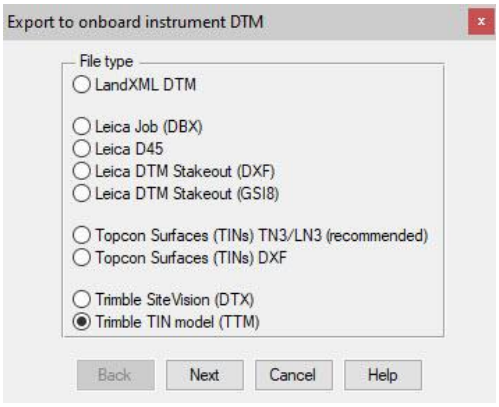
4.3 Exporting to Trimble Access

DTM Stakeout is particularly useful for analysing 'existing' against a 'design' model in 'real time' i.e. the instrument will display the height difference to the 'design' model whilst surveying. It can also be used in the same mode during an update survey to inform the surveyor when moving away from the area of change.

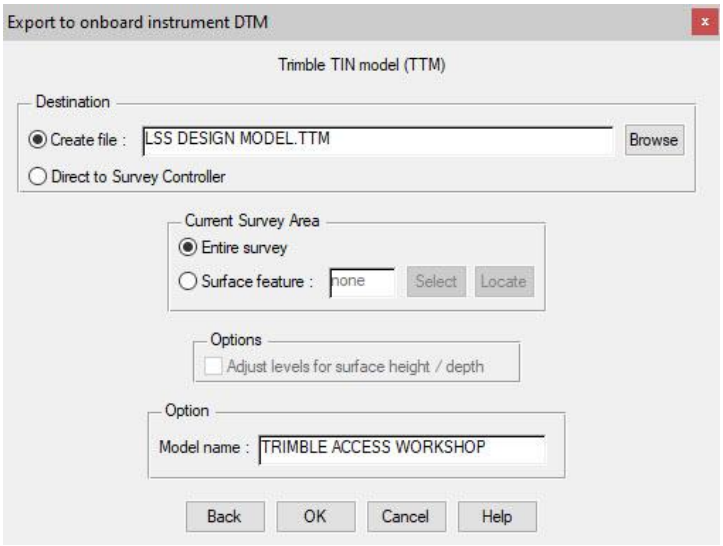
Before exporting a surface make sure that you have edited the data, the links especially, to create the correct set of triangles and breaklines.

It is now found in the command **Export Machine Control** and will export the survey triangulation as a DTM, which can be uploaded to the Trimble SC / Access for setting out of the surface.



Two formats are currently available:
Trimble Site Vision (DTX) and Trimble TIN Model (TTM) :

4.3.1 Trimble TIN Model (TTM)



Select Create File and enter a filename and a Model name for the TTM.

Click OK and the TTM file will be created.

The resultant file can be used with the DTM stakeout on Trimble SC and Access.

Note: If base /top of surfaces is required and for models that have multiple surface height / depth values then make sure that the model has been prepared correctly using the steps:

Output Surface Boundaries to create a small offset within each surface boundary.
Output Survey and tick the box 'Adjust levels for Surface height / depth' option

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Please see the Tutorial for Output Surface Boundaries option for a run through of how to create a correct formation model.

The new DTM generated by load will represent the required Formation model.

4.3.2 Export Job via Trimble Link

The Export Job option has been superceded by the Export LandXML option and is now a legacy LSS option because;
it only supports points (the Linework can be additionally supplied via DXF and the DTM via the TTM format).
The Job does not contain a "coord sys". When opening the job on the instrument there will be a warning. This generally just requires the scale factor SF set to 1.0 (LSS cannot currently support a calibration set which this would require)
Based on the above it is possible to replace the Export Job option with Export CSV using Trimble Link.
When using Trimble Link / Trimble Data Transfer
"General Survey" refers to Access
"Survey" refers to SC

DXF has colours – but although it has the string labels it does not have
the user observation number
If the link is complex and is exported as a block then it also imports the insertion point as a node which can be seen as an obs – this may cause duplication issues when LandXML obs are imported

The TTM also needs to be exported as the DTM - To set this up graphically with the Job
Click on Map
Click on the 'Up Arrow' icon
Choose 'Layers'
Select TTM

Copy Job, DXF and TTM to the Trimble data folder

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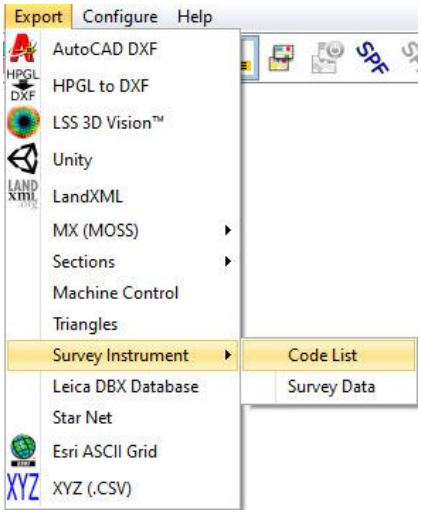
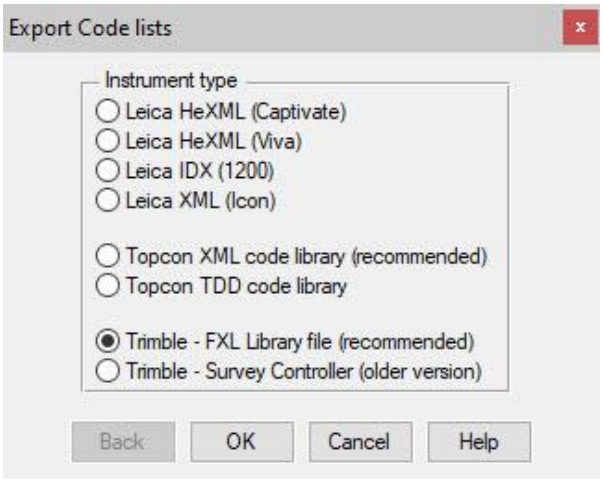
4.4 Exporting an LSS Code Library to Trimble Access

Open a survey containing the legend you wish to create as a code library.



The LSS option

Export Survey Instrument -Code List will produce a Trimble – FXL Library File, which is the recommended file type to use for both the Survey Controller and Access:



'Trimble – FXL Library file (recommended)'

Provide the feature code library name;

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'Select' the required

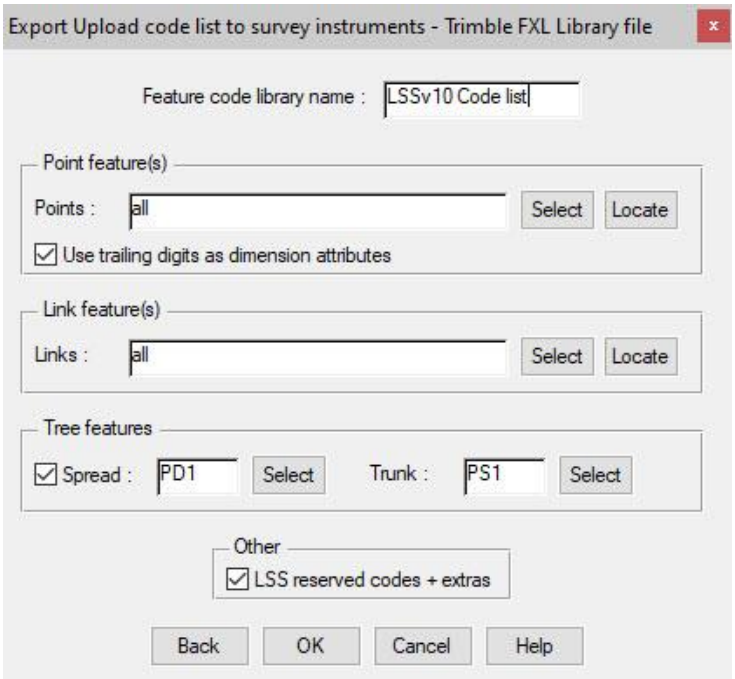
'Point' (features) and tick the box

'Use trailing digits as dimension attributes'.

'Select' the required 'Links' (features).

Tick the 'Tree features' tick box and enter one of each of the spread and trunk features e.g. PD1 and PS1 as per the LSS prototype.

Please see notes on next page.
Click 'OK'.



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With dimension features e.g. the trees PD1, PD2 etc, LSS requires that the legend also contains the stub such as PD but that this is NOT selected for export. This will produce one feature PD with a dimension attribute.

As per the above note the feature stubs are also required in the LSS legend, but in this case deselect all references to PD and PS from the Points selection.

Leave the 'Extra LSS codes' box ticked to include all the Reserved codes etc.

This option will also export the 'String codes' used by the Trimble logger:

'.A' - 'Add new string', '.P' - 'Loop to first point', '.T' - 'Terminate string'.

'.J' - 'Join to previous' is still used but is now a point feature.

The created FXL file is copied to the 'Trimble data' folder on the SC.

Then set this feature library by 'Files / New job' or 'Files / Properties of current job' and select the 'Feature library' (see Create a New Trimble SC job above).

Some of the entries exported by 'Extra LSS codes' have dimension attributes

e.g. –SO (string offset), currently recognised by Trimble as integer values, will need amending in the Trimble feature library to 3 decimal places.

To avoid this use the example LSS feature library on the LSS disc (which contains the amendment) as the base and export just the new point and link features that you require and cut and paste them from this temporary feature library into the base.

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Conclusion

Using this manual, we hope that you will be in a position to start making the most of the survey instrument.

We strive to cover and support as much of the capabilities as possible but there are always new methods and developments, so do keep in contact by visiting the LSS Help and other on-line resources or call our support line.

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