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P1Tools

OPERATION MANUAL

DISCLAIMER
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TECHNICAL SUPPORT
Support for licensed users on any topics covered in this manual and for the use of the software described herein may be obtained from:

Email: support@fgps.com

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1 OVERVIEW

P1Tools is a Microsoft Windows based software program which provides two main sets of functions:

- Quality Control and analysis of navigation data recorded in the UKOOA P1/90 and IOGP P1/11 formats.
- A set of utilities applicable to data recorded in the UKOOA P1/90 and IOGP P1/11 formats.

When used in conjunction with the SeisPos processing package, it complements the QC tools available within SeisPos.

Note: P1 files must contain only one survey line with at least one record type other than receiver (R) records.

The installation and licensing of this program is documented separately from this manual.

1.1 Main Toolbar

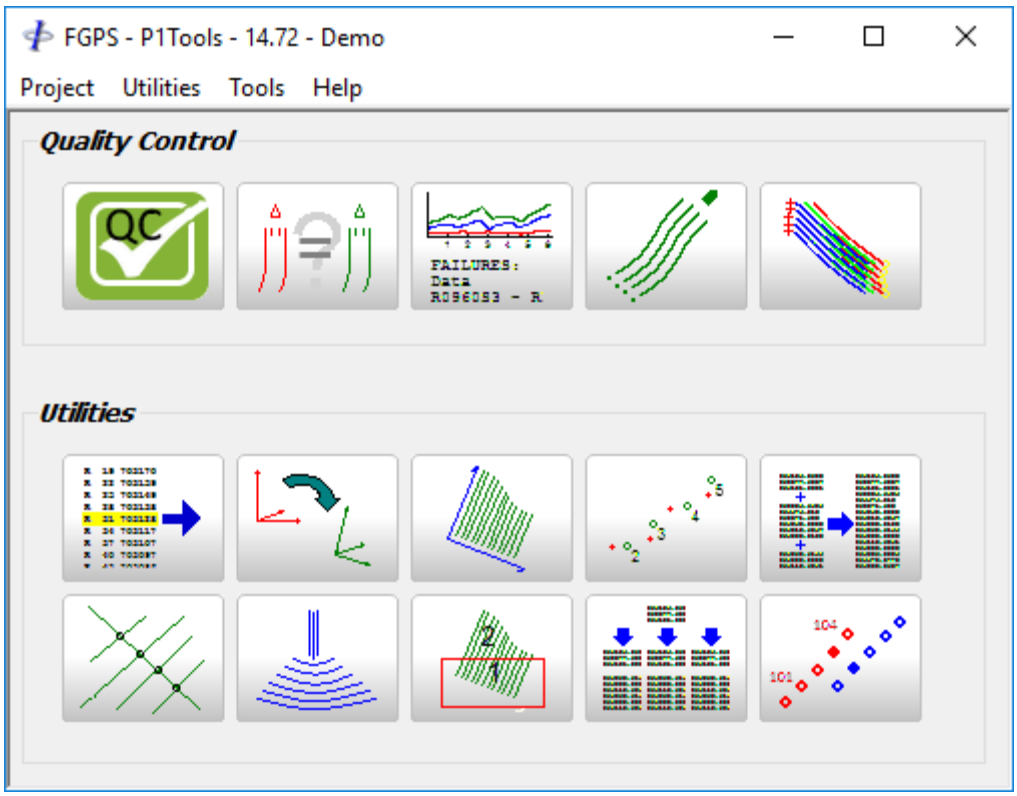
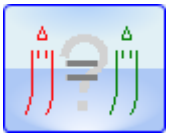


Figure 1-1 – Main Window

Quality Control

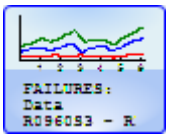
Batch processing for:

- Format and integrity checking
- Analysis of offset between Node pairs
- Analysis of shot-to-shot node movement
- Streamer depth QC, including broadseis
- Receiver interval analysis
- Feather analysis



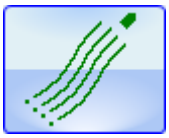
Compare

Comparison of node positions between two P1 files on a shot-by-shot basis. Graphical display and Numerical summary on-screen, csv file output.

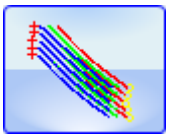


TASTE

Trend analysis and statistical testing.


Replay

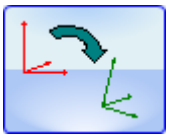
On screen Graphical replay of P1 file. Optionally overlay a second P1 file.


Streamer Shape

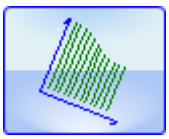
Plot streamer shapes.


Extract

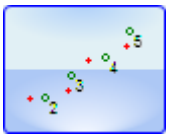
Decimation of P1 file, allowing output of selected items to a new P1, over a selected SP range.
Output of selected record attributes, to a delimited file, over a selected SP range.


Convert

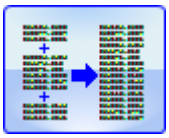
Convert P1 files from one Coordinate Reference System (CRS) to another.


Preplot

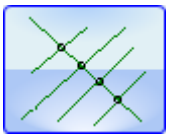
This module is discontinued and is superseded by a separate application, *SeisPlan*. Contact FGPS for information.


Postplot

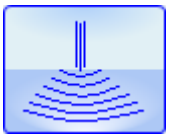
Plot selected P1 records to graphics file in DXF format.
Convert to ESRI Shapefile and KML file.


Concatenate

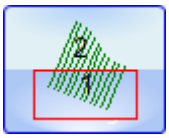
Concatenate P1 files.


Intersect

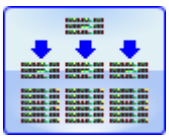
Compute line intersections.


Tide

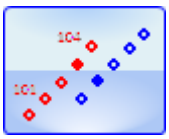
Apply tidal corrections from external data file, scale, datum.


Split Files

Split P1 and P2 files based on geographical location.


Update Headers

Replace headers with header from text file.


Merge

Merge lines into a single line.

1.2 Main Menu

1.2.1 File

Printer Setup: Invokes Windows Printer Setup dialogue.

Exit: Exit

1.2.2 Project

New Project:	Create a new project.
Open Project:	Open an existing project.
Edit Project:	Modify the current project parameters.
Save Project As:	Save the current project file as a different project file.
Recent Projects:	Open one of the last 10 most recently opened projects.
Open Project Output Folder:	Opens the project Output folder in Explorer.
Open Project Folder:	Opens the project folder in Explorer.
Open Project Reports Folder:	Opens the project Reports folder in Explorer.

1.2.3 Utilities

Text Editor:	Opens a P1 or other text file for viewing/editing.
View Header:	Opens just the header of a P1 file for viewing/editing.
Compare Headers:	Compares the headers between two P1 files.
Split by Line Name:	Splits a file containing multiple lines into separate files.
Convert WinFrog Files:	Convert WinFrog files to P1/90.

1.2.4 Tools

Options:

Check for Updates:	Set the frequency for which to check for program updates.

Databases Folder:	Set the folder for databases used through the application e.g. EPSG.
Run at Windows startup:	Automatically run the application when Windows starts.
Monitor hard disk usage:	Enable monitoring of hard disk available space.
Warning threshold (%):	Warn when hard disk available space is less than the specified percentage.
Launch QC module at application startup:	Automatically launch the QC module when P1Tools is started.
Assume P1/90 if format not recognised:	When checked, files with unrecognised format will be processed as P1/90.
Assume P1/90 if format not recognised:	Assume P1/90 if the file format not recognised.

1.2.5 Help

Manual:	Opens the user manual. Requires PDF file viewer.
CRS Manual:	Opens the CRS manual. Requires PDF file viewer.
Multiplot Manual:	Opens the Multiplot manual. Requires PDF file viewer.
Release Notes:	Opens the release notes. Requires PDF file viewer.
Licence:	Open the licensing dialog.
Check for Updates:	Check for the availability of a program update.

About:	Display the program version, licence number, support contact details and number of days remaining in the case of a time limited licence.

1.3 Projects

A project file contains the full set of parameters, of which most are file names, used in the program, for example the locations of the P1 files used in the various modules.

When P1Tools is first used a default project file, “Default.prj”, is created, and becomes the current project.

The current project name is displayed in the main title bar.

Each time the user exits from any P1Tools module, the current project file is automatically saved.

Each time P1Tools is started the current project is the same as the last one used.

1.3.1 Creating a New Project

To create a new project, select *File* | *New Project* from the main menu. The dialog appears with the following fields:

Project name:	This will be the name of the project parameter file. Only valid filename characters are allowed.
Project P1 Folder:	The folder where the project’s P1 files are located.
Configuration Folder:	The location of the configuration files used to store node selections.
Output Folder:	The location of the csv summary files produced by QC modules.
Database Folder:	The location where processed data is stored for subsequent plotting and/or trend analysis and statistical testing.
Report Folder:	The location of the integrity checking and statistical testing reports.

User recorded time of first shotpoint to establish line sequence:	Line sequences will be allocated according the date/time of the first record in the file. Used when no sequence number is recorded in the file or defined in the line name.
Seq.no. field…:	Specify where in the line name to find the sequence number by defining the position of the first character in the line name and the number of characters to use. See section 1.3.1.1.
Shot Count for Initialisation:	Specify the number of shots to search through to find all unique nodes that exist in the dataset. The default, and minimum value, is 10.
Allow short lines (UKOOA files):	Handle records less than 80 characters in length.
Allow waypoints within shot records (P1/11 files):	Scans the whole file for preplot records. File initialisation time may be significantly increased.
Generate SeisCloudQC configuration:	See section 1.3.1.2

1.3.1.1 Sequence Number

This section applies only to P1/90 format files.

The sequence number part of the line name is used primarily for indexing lines for performing trend analysis. It also appears in the plot listings for processed lines in the QC and comparison modules.

From line name:
The sequence number field is specified by the character number within the line name field where the sequence number starts, and it length. In the following example of the first part of the V record of a P1 the location of sequence number 999 is specified by start position and length of 10 and 3 respectively:

```
Col in file:                1234567890123
Col in line name field:      123456789012
Record:                     VABC-1001P999...
```

It may be more convenient to specify the sequence number field from the right-hand side of the line name, i.e. column 13 of the P1. In the above example specifying a start position of 3, a length of 3 and checking the “From right” checkbox will achieve the same results. This option would be necessary if the line name length varies from line to line.

From acquisition date/time:
This option should be used if the sequence number is not recorded in the line name field.

The sequence is established according to the Julian Day and hour of acquisition of the first shotpoint found in the file. If the survey has been, or is likely to be, acquired over a New Year then the start date needs to be entered. The actual sequence number derived in this way is in hours from the start of survey.

1.3.1.2 SeisCloudQC Configuration

Website root path:	The path to the SeisCloudQC website.
Info file path:	The path to the file *project_info.html* on the project SeisCloudQC server.
Logo file path:	The location of the client logo file.
Title:	Project title.
Area:	Survey area.
Vessel:	Vessel name(s).

1.3.2 Opening a Project

To open an existing project, select *File* | *Open Project* from the main menu and select the project from the file list.

Note: although it is possible to work on more than one project within the same instance of the program it is advisable to start a new instance of P1Tools to avoid overwriting a project's parameters with those of another project when exiting from a module.

2 QC

This module performs multiple QC processes on multiple files.

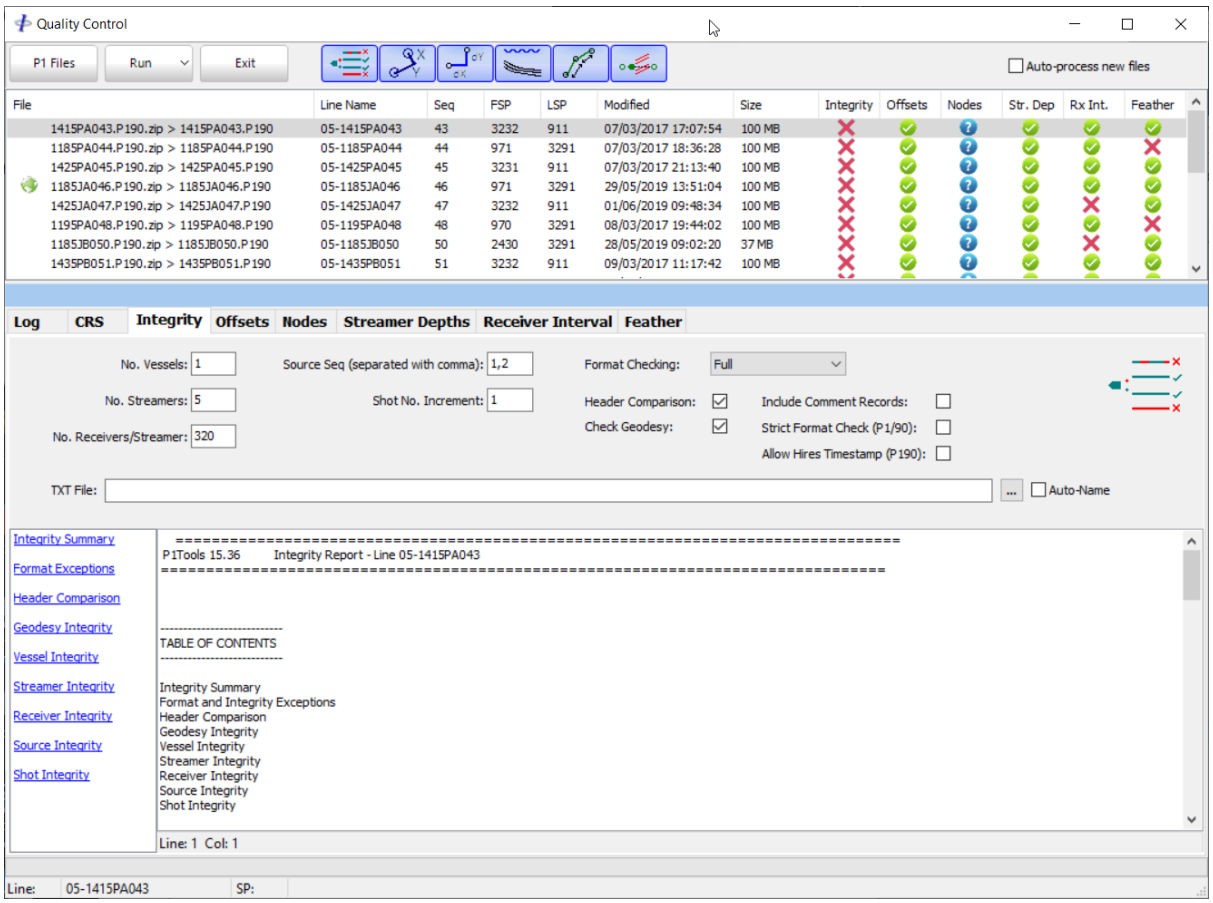


Figure 2-1 – QC

The QC module performs the following QC processes:

- Integrity
- Offset analysis
- Node movement analysis
- Streamer depth analysis
- Receiver interval analysis
- Feather calculation

Each of these sub-modules are described in details the following sections.

2.1 Line List

Click the *P1 Files* button to add files. Supported formats are:

- P1/90
- P1/11
- Archives in the .zip format containing a single P1/90 or P1/11 file.

Note: It is not recommended to mix P1/90 with P1/11 files.

Note: It is not recommended to mix files with different Coordinate Reference Systems (CRS).

The file list will be populated with the selected files.

To remove lines from the list select them then press <Del> or right click and select *Remove* from the popup menu.

To sort the lines in the list, click the appropriate column header. Click the same column header a second time to reverse the sort direction.

When the QC module is closed and reopened, the line list will be displayed without the need to re-import the file. If a file no longer resides in its original location on disk then the list entry will be pre-pended by a red symbol as can be seen for the third line in Figure 2-1. This line cannot be re-processed but any existing results, indicated by a green tick in the process column, will still be available.

2.1.1 SP Range

To optionally set a SP range for a line to be processed, select the line, right click, and from the popup menu select *Set FSP* or *Set LSP*.

2.2 Operation

The sub-module QC operations to be carried out are selected by clicking down (enable) or up (disable) the toolbar buttons as shown in Figure 2-2.

Figure 2-2 - QC Operation Toolbar Buttons

For each button in the down position a tab will appear below the line list. For some of these operations additional setup will be required as described in the individual operation sections below.

2.3 Run

2.3.1 Automatic

Check the *Auto-process new files* check box and keep the QC module running to implement automatic processing. When new files are detected in the *Project P1 folder* (See section 1.3.1), they will be automatically processed.

2.3.2 Interactive

Click the *Run* button to display the following run options:

Run QC on all lines:	The enabled QC operations will be carried out on all lines in the list.
Run QC on selected lines:	The enabled QC operations will be carried out on selected lines in the list. Lines in the list can be selected by using conventional key and or mouse click combinations: <Ctrl> + A; <Shift> + click; <Ctrl> + click.
Complete QC on all lines:	Lines for which some QC operations have not yet been completed will be processed.
Complete QC on selected lines:	Selected lines for which some QC operations have not yet been completed will be processed.
Run active QC module on all lines:	The active QC operation will be carried out on all lines in the list.
Run active QC module on selected lines:	The active QC operation will be carried out on selected lines in the list.

During processing, progress is indicated by progress bar at the bottom of the window, and the current line name and SP.

The following icon will appear in each operation column indicating the status:


Not yet processed.


Processed successfully with no failures.

Processed successfully but with failures.

Processing not complete due to error.

As soon as a line has been processed without errors its results are available whilst processing continues down the list.

2.4 Log

During processing all events, warnings and errors will be displayed in the *Log* page and saved to a file in the project *Reports* folder.

2.5 CRS

The CRS page displays the *CRS Inspector* for the first line in the list. This contains all the geodetic parameters to which all other lines in the list will be compared.

For details on Coordinate Reference Systems, including the *CRS Inspector* and the *CRS Manager* refer to the CRS manual.

A full hierarchical listing of geodetic parameters is written to the Reports folder in text, PDF and HTML formats.

2.6 Integrity

The following checks are carried out:

- Format Exceptions
- Header Integrity
- Geodesy Integrity - Check against EPSG Ref DB
- Geodesy Integrity - Check against first line
- Vessel Integrity
- Streamer Integrity
- Receiver Integrity
- Source Integrity
- Shot Integrity

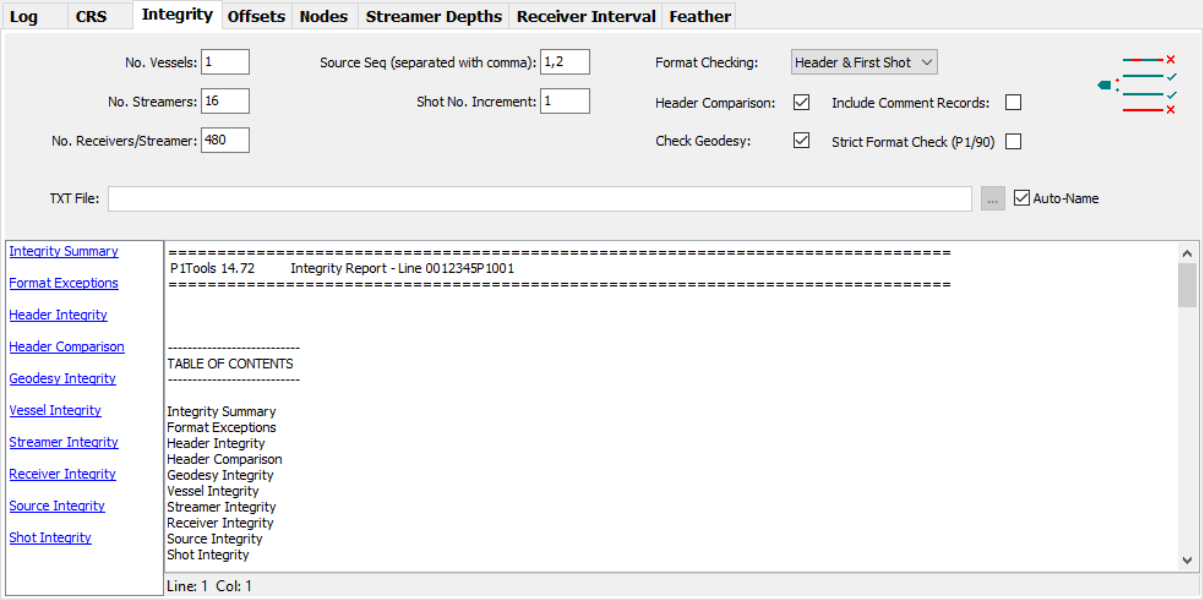


Figure 2-3 – QC Integrity

2.6.1 Setup

Set the parameters as shown in Figure 2-3.

Optionally enter a name for the report .txt file. If none is specified (recommended) then this file will be saved in the project *Reports* folder.

2.6.2 Header Reference

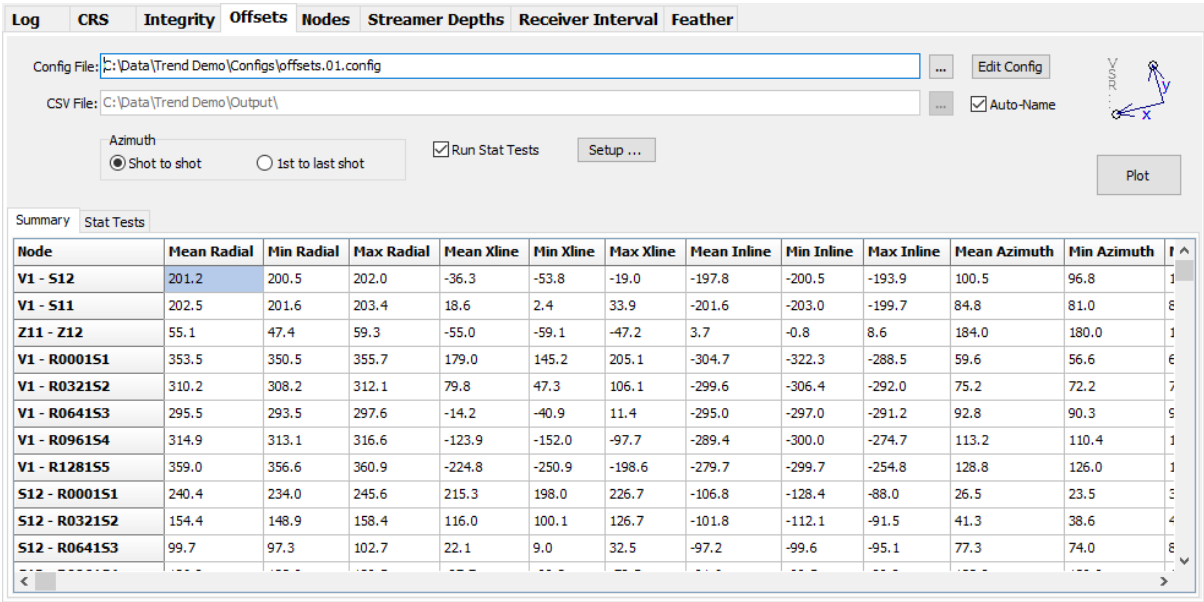
It is normally expected that all files in a dataset have the same header parameters. This is checked in the integrity QC by comparing each line against a reference line. The reference line is by default the first line imported into the line list. To change the reference line, right click on the line in the list and select *Set as header reference* from the popup menu. The reference line is marked with .

2.6.3 Results

On successful processing, the results for the selected line are displayed in the results panel and saved to the TXT file.

2.7 Offsets

The *Offsets* sub-module calculates offsets between specified node pairs.



Node	Mean Radial	Min Radial	Max Radial	Mean Xline	Min Xline	Max Xline	Mean Inline	Min Inline	Max Inline	Mean Azimuth	Min Azimuth
V1 - S12	201.2	200.5	202.0	-36.3	-53.8	-19.0	-197.8	-200.5	-193.9	100.5	96.8
V1 - S11	202.5	201.6	203.4	18.6	2.4	33.9	-201.6	-203.0	-199.7	84.8	81.0
Z11 - Z12	55.1	47.4	59.3	-55.0	-59.1	-47.2	3.7	-0.8	8.6	184.0	180.0
V1 - R0001S1	353.5	350.5	355.7	179.0	145.2	205.1	-304.7	-322.3	-288.5	59.6	56.6
V1 - R0321S2	310.2	308.2	312.1	79.8	47.3	106.1	-299.6	-306.4	-292.0	75.2	72.2
V1 - R0641S3	295.5	293.5	297.6	-14.2	-40.9	11.4	-295.0	-297.0	-291.2	92.8	90.3
V1 - R0961S4	314.9	313.1	316.6	-123.9	-152.0	-97.7	-289.4	-300.0	-274.7	113.2	110.4
V1 - R1281S5	359.0	356.6	360.9	-224.8	-250.9	-198.6	-279.7	-299.7	-254.8	128.8	126.0
S12 - R0001S1	240.4	234.0	245.6	215.3	198.0	226.7	-106.8	-128.4	-88.0	26.5	23.5
S12 - R0321S2	154.4	148.9	158.4	116.0	100.1	126.7	-101.8	-112.1	-91.5	41.3	38.6
S12 - R0641S3	99.7	97.3	102.7	22.1	9.0	32.5	-97.2	-99.6	-95.1	77.3	74.0

Figure 2-4 – QC Offsets

2.7.1 Setup

Config file: The initial config file is automatically assigned as *offsets.01.config*. To override this file name, enter an alternative file name (not recommended).

Edit config: Refer to section 2.7.2

CSV file: The default file name is automatically assigned. To override the file name, uncheck the *Auto-Name* checkbox and enter an alternative file name (not recommended).

Azimuth: This is the azimuth used to compute the across-line and along-line components of the offsets.

Shot to shot:

The azimuth is calculated from the previous to current shot position of the first record type recorded in the shot records.

1st to last shot:

The azimuth is calculated from the first and last shot positions of the first record type recorded in the shot records.

Run stat tests: Run statistical tests if these have been configured. Refer to section 4.2.

2.7.2 Node Configuration

Before the node configuration can be created at least one P1 file must be added to the list.

Click the *Edit Config* button to create a configuration of node pairs for which offsets will be calculated.

Select the required node pairs from the two lists on the left and add them to the configuration by clicking the > button. Multiple selections can be made.

To build the configuration automatically to include the pre-set node combinations select the required options from the *Auto-configure* checklist and then click the *Build* button. The selected items will replace the existing configuration.

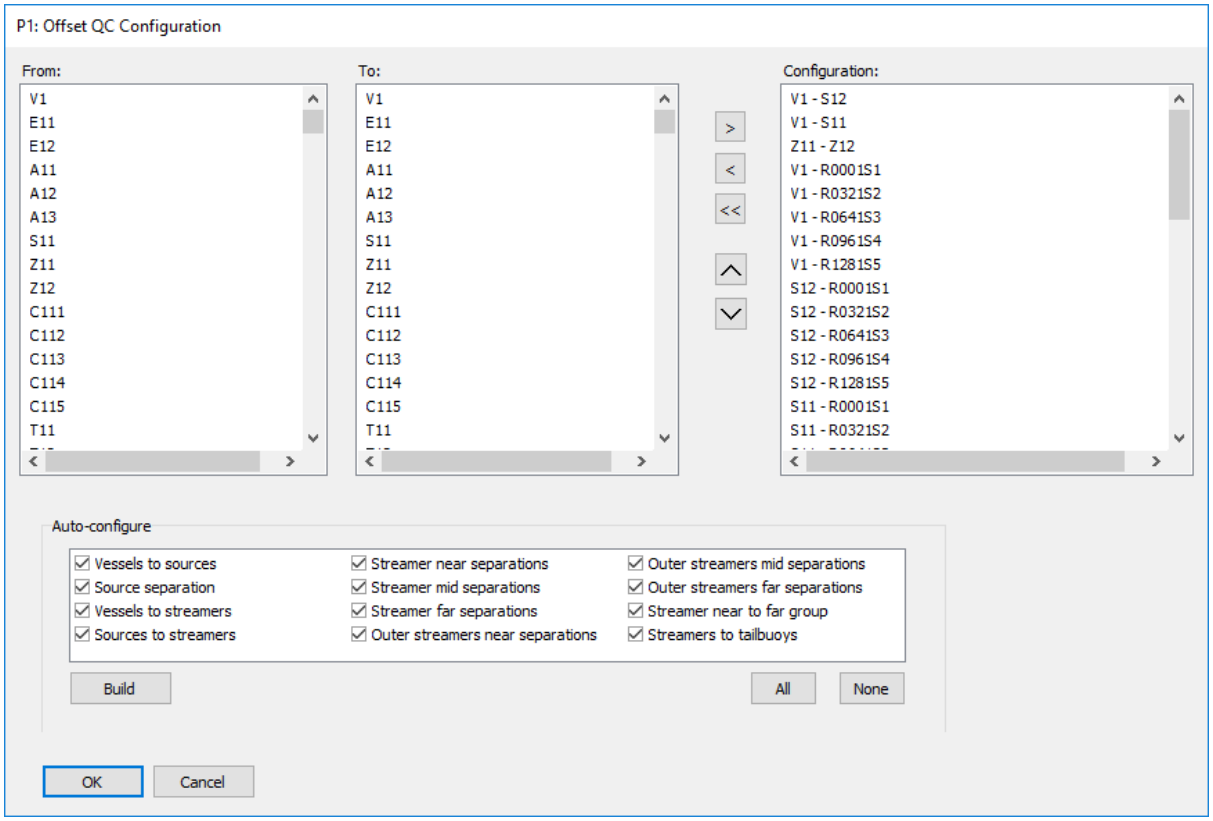


Figure 2-5 – QC Offsets: Node Configuration

2.7.3 Reports

Reports are available for the currently selected line in the line list.

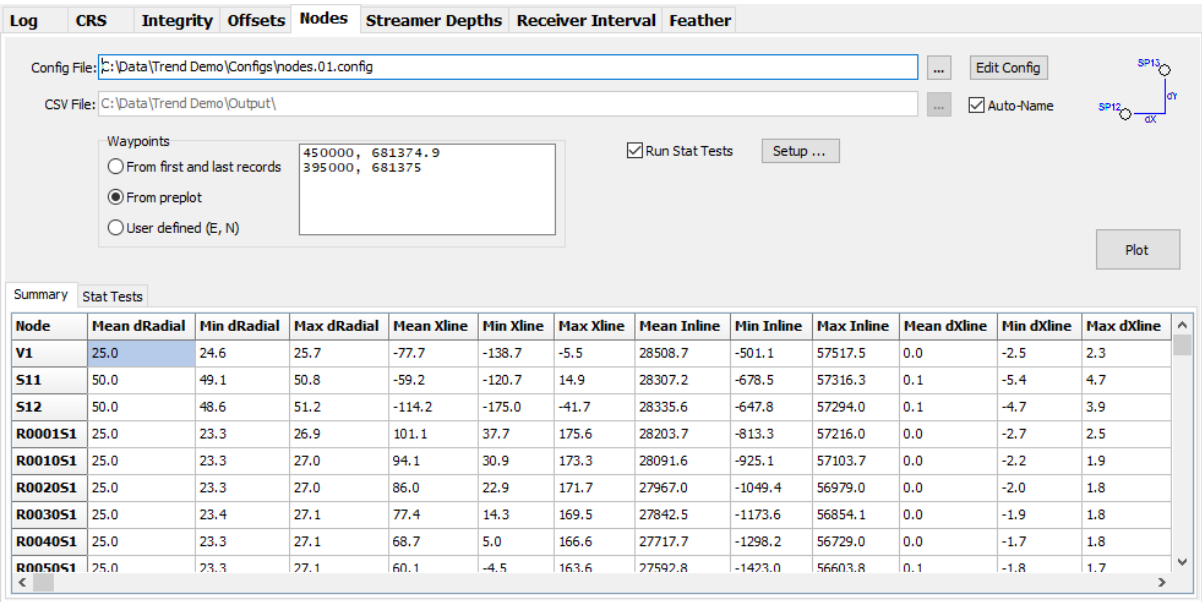
If the QC has been run then the summary is displayed in the *Summary* panel and saved to the specified CSV file.

If statistical tests have been run then the report will be displayed in the *Stat Tests* panel.

Click the *Plot* button to display the interactive plots. Refer to the MultiPlot manual.

2.8 Nodes

The *Nodes* sub-module calculates the node movement relative to a defined set of waypoints, and the shot-to-shot differences.



Node	Mean dRadial	Min dRadial	Max dRadial	Mean Xline	Min Xline	Max Xline	Mean Inline	Min Inline	Max Inline	Mean dXline	Min dXline	Max dXline
V1	25.0	24.6	25.7	-77.7	-138.7	-5.5	28508.7	-501.1	57517.5	0.0	-2.5	2.3
S11	50.0	49.1	50.8	-59.2	-120.7	14.9	28307.2	-678.5	57316.3	0.1	-5.4	4.7
S12	50.0	48.6	51.2	-114.2	-175.0	-41.7	28335.6	-647.8	57294.0	0.1	-4.7	3.9
R0001S1	25.0	23.3	26.9	101.1	37.7	175.6	28203.7	-813.3	57216.0	0.0	-2.7	2.5
R0010S1	25.0	23.3	27.0	94.1	30.9	173.3	28091.6	-925.1	57103.7	0.0	-2.2	1.9
R0020S1	25.0	23.3	27.0	86.0	22.9	171.7	27967.0	-1049.4	56979.0	0.0	-2.0	1.8
R0030S1	25.0	23.4	27.1	77.4	14.3	169.5	27842.5	-1173.6	56854.1	0.0	-1.9	1.8
R0040S1	25.0	23.3	27.1	68.7	5.0	166.6	27717.7	-1298.2	56729.0	0.0	-1.7	1.8
R0050S1	25.0	23.3	27.1	60.1	-4.5	163.6	27592.8	-1423.0	56603.8	0.1	-1.8	1.7

Figure 2-6 – QC Nodes

2.8.1 Setup

Config file: The initial config file is automatically assigned as *nodes.01.config*. To override this file name, enter an alternative file name (not recommended).

Edit config: Refer to section 2.8.2

CSV file: The default file name is automatically assigned. To override the file name, uncheck the *Auto-Name* checkbox and enter an alternative file name (not recommended).

Waypoints: From first and last records:

The first and last shot positions for the first record type recorded are used.

From preplot:

The preplot coordinates will be used. For a P1 output by SeisPos these are stored in comment records in the header. For P1/11 these are recorded in the N records.

User defined:

Enter the waypoints, as comma separated easting and northing tuples.

Run stat tests: Run statistical tests if these have been configured. Refer to section 4.2.

2.8.2 Node Configuration

Before the node configuration can be created at least one P1 file must be added to the list.

Click the *Edit Config* button to create a configuration of node pairs for which offsets will be calculated.

Select the required nodes from the list on the left and add them to the configuration by clicking the > button. Multiple selections can be made.

Optionally select multiple receivers on each streamer by entering the receiver interval and clicking the > button.

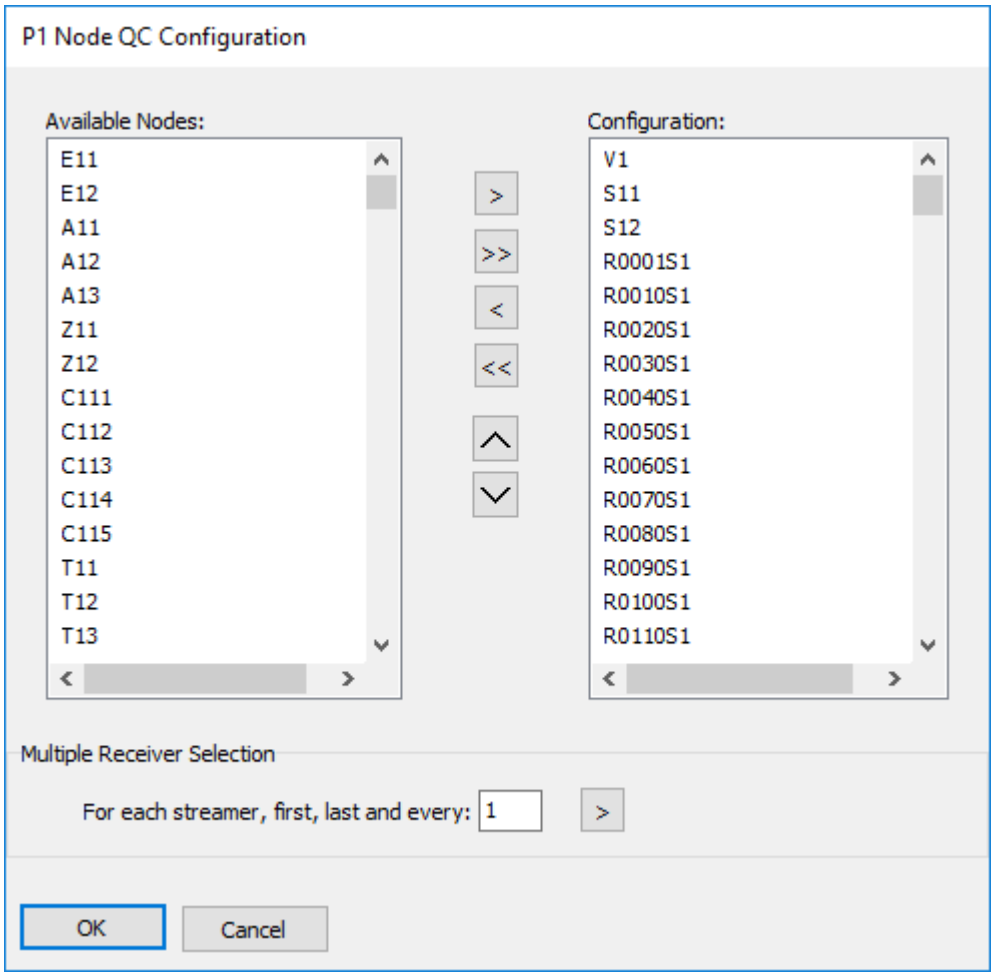


Figure 2-7 – QC Nodes: Node Configuration

2.8.3 Reports

Reports are available for the currently selected line in the line list.

If the QC has been run then the summary is displayed in the *Summary* panel and saved to the specified CSV file.

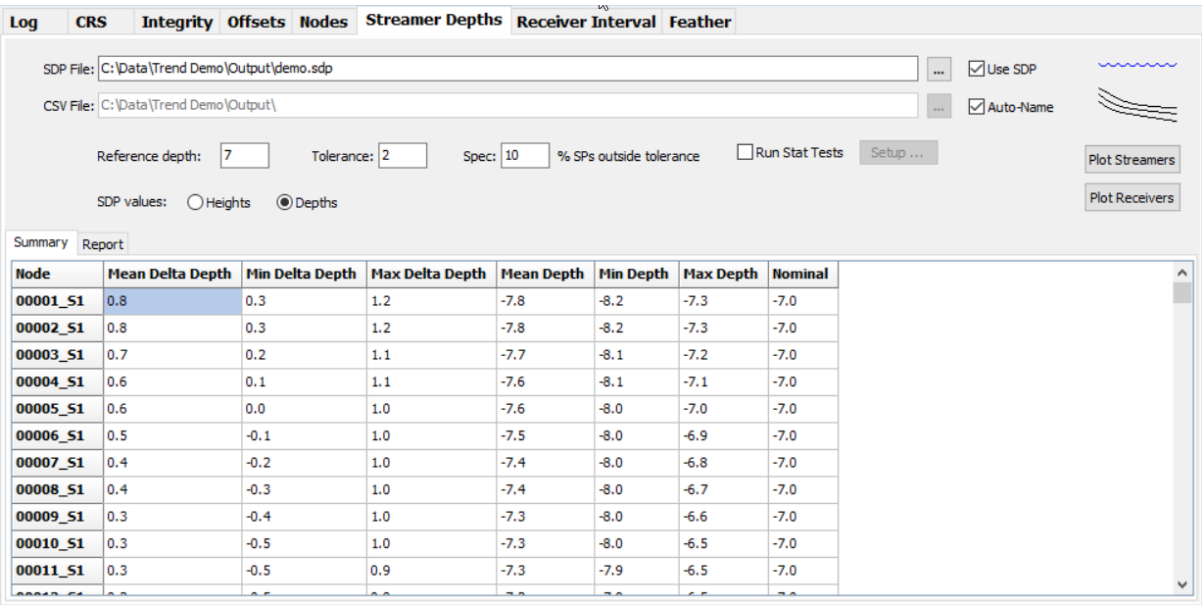
If statistical tests have been run then the report will be displayed in the *Stat Tests* panel.

Click the *Plot* button to display the interactive plots. Refer to the MultiPlot manual.

2.9 Streamer Depths

The *Streamer Depths* sub-module provides the means to QC streamer depths for both

horizontal streamer and sloping streamer (Broadseis) surveys.



Node	Mean Delta Depth	Min Delta Depth	Max Delta Depth	Mean Depth	Min Depth	Max Depth	Nominal
00001_S1	0.8	0.3	1.2	-7.8	-8.2	-7.3	-7.0
00002_S1	0.8	0.3	1.2	-7.8	-8.2	-7.3	-7.0
00003_S1	0.7	0.2	1.1	-7.7	-8.1	-7.2	-7.0
00004_S1	0.6	0.1	1.1	-7.6	-8.1	-7.1	-7.0
00005_S1	0.6	0.0	1.0	-7.6	-8.0	-7.0	-7.0
00006_S1	0.5	-0.1	1.0	-7.5	-8.0	-6.9	-7.0
00007_S1	0.4	-0.2	1.0	-7.4	-8.0	-6.8	-7.0
00008_S1	0.4	-0.3	1.0	-7.4	-8.0	-6.7	-7.0
00009_S1	0.3	-0.4	1.0	-7.3	-8.0	-6.6	-7.0
00010_S1	0.3	-0.5	1.0	-7.3	-8.0	-6.5	-7.0
00011_S1	0.3	-0.5	0.9	-7.3	-7.9	-6.5	-7.0

Figure 2-8 – QC Streamer Depths

2.9.1 Setup

SDP file: Optionally specify a Streamer Depth Profile (SDP) file which specifies individual receiver depths along the streamer. See section 2.9.2 for the SDP file format.

Use SDP: When checked, the specified SDP file will be used.

When not checked then the depths will be compared against the specified nominal CNG depth (see below).

CSV file: The default file name is automatically assigned. To override the file name, uncheck the *Auto-Name* checkbox and enter an alternative file name (not recommended).

Reference depth: Enter the depth (positive number) to which depths in the SDP file are referenced. Conventionally this is the depth of the near receiver group.

Tolerance:	Specify the delta depth tolerance in depth units. The default is 1.
Spec:	Specify the percentage of receivers in a streamer than are allowed to be outside of the tolerance. Exceptions will be reported.
Run stat tests:	Run statistical tests if these have been configured. Refer to section 4.2.
SDP values:	Specify what the SDP values represent. Select from: • Heights • Depths

2.9.2 SDP File Format

The SDP file format is not formally recognised nor documented. However, the generally accepted format is represented by the following record example. (The first two lines here are column numbers for clarity, and not part of the format).

```
1111111112222222222333333333344444444445555555555566666666667777777778888888888
12345678901234567890123456789012345678901234567890123456789012345678901234567890
R0001    7.0 0002    7.0 0003    7.1 0004    7.1 0005    7.2 0006    7.2       1
```

There is no consistency amongst files from different contractors as regards:

- Depth reference: some are absolute, most are relative to the first receiver. This can be ascertained by looking at the file contents. The above example is absolute.
- Sign: some are depths below sea level (positive) and some are heights above sea level (negative). P1Tools will rectify negative values before processing.

A simple text format is also supported. The text file is assumed to have a single value per line

For both formats, a file may contain depths for a single streamer, in which case they are expected to be the same for each streamer, or it may contain depths for every streamer.

Depths must be written starting from the front of the streamer.

2.9.3 Reports

Reports are available for the currently selected line in the line list.

If the QC has been run then the summary is displayed in the *Summary* panel and saved to

the specified CSV file.

If statistical tests have been run then the report will be displayed in the *Stat Tests* panel.

Click the *Plot* Streamers button to display the interactive plots for whole streamers.

Click the *Plot Receivers* button to display the interactive plots for individual receivers.

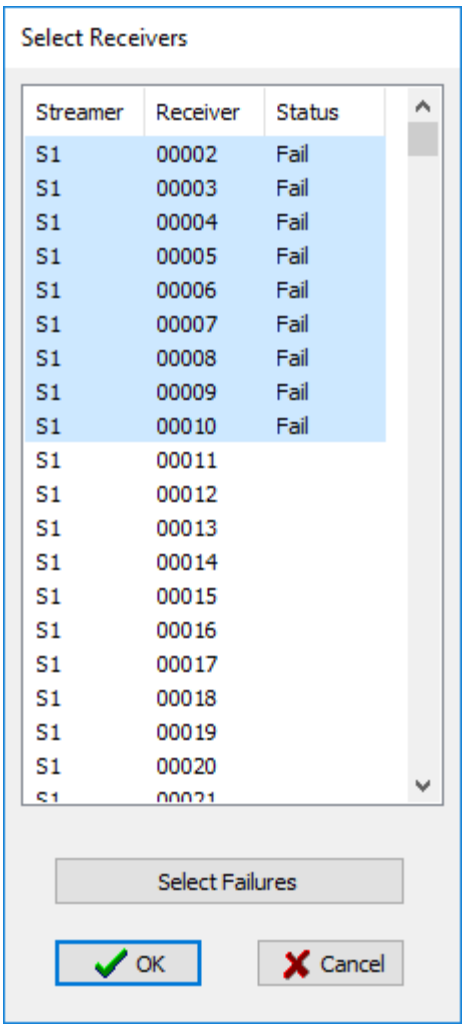


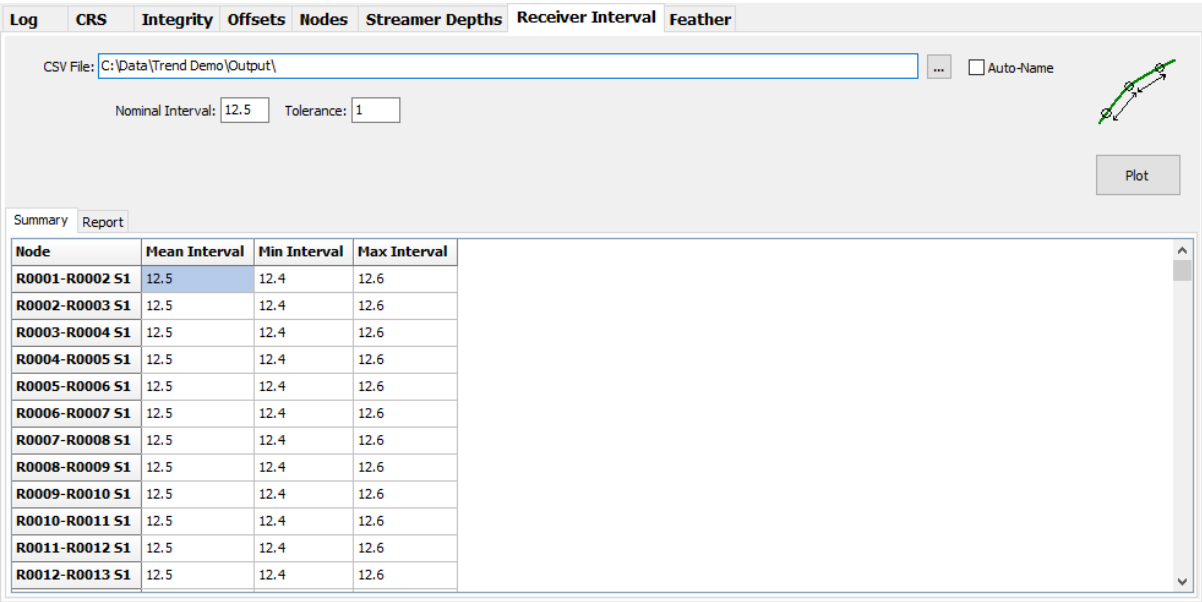
Figure 2-9 – QC Receiver Depths: Receiver Plot

Click the *Select Failures* button (see Figure 2-9) to display plots only for receivers which are out of spec.

Refer to the MultiPlot manual.

2.10 Receiver Interval

The *Receiver Interval* sub-module performs QC for receiver interval.



Node	Mean Interval	Min Interval	Max Interval
R0001-R0002 S1	12.5	12.4	12.6
R0002-R0003 S1	12.5	12.4	12.6
R0003-R0004 S1	12.5	12.4	12.6
R0004-R0005 S1	12.5	12.4	12.6
R0005-R0006 S1	12.5	12.4	12.6
R0006-R0007 S1	12.5	12.4	12.6
R0007-R0008 S1	12.5	12.4	12.6
R0008-R0009 S1	12.5	12.4	12.6
R0009-R0010 S1	12.5	12.4	12.6
R0010-R0011 S1	12.5	12.4	12.6
R0011-R0012 S1	12.5	12.4	12.6
R0012-R0013 S1	12.5	12.4	12.6

Figure 2-10 – QC Receiver Interval

2.10.1 Setup

2.10.2 Reports

Reports are available for the currently selected line in the line list.

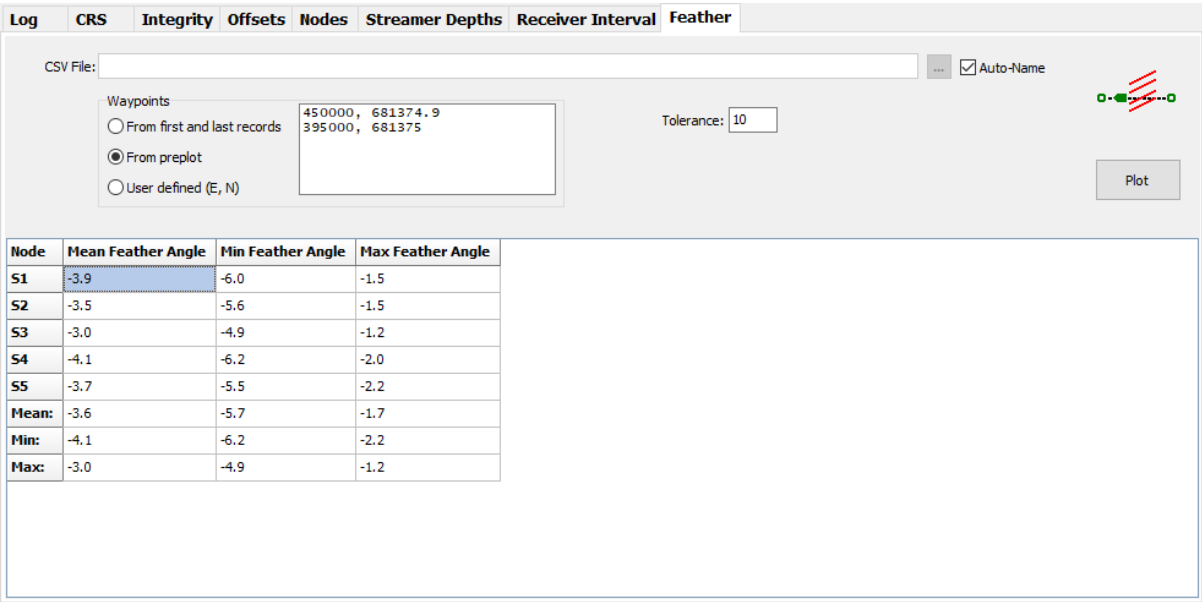
If the QC has been run then the summary is displayed in the *Summary* panel and saved to the specified CSV file.

Click the *Plot* button to display the interactive plots.

Refer to the MultiPlot manual.

2.11 Feather

The *Feather* sub-module performs QC for streamer feather.



Node	Mean Feather Angle	Min Feather Angle	Max Feather Angle
S1	-3.9	-6.0	-1.5
S2	-3.5	-5.6	-1.5
S3	-3.0	-4.9	-1.2
S4	-4.1	-6.2	-2.0
S5	-3.7	-5.5	-2.2
Mean:	-3.6	-5.7	-1.7
Min:	-4.1	-6.2	-2.2
Max:	-3.0	-4.9	-1.2

Figure 2-11 – QC Feather

2.11.1 Setup

Waypoints:

From first and last records:

The first and last shot positions for the first record type recorded are used.

From preplot:

The preplot coordinates will be used. For a P1 output by SeisPos these are stored in comment records in the header. For P1/11 these are recorded in the N records.

User defined:

Enter the waypoints, as comma separated easting and northing tuples.

2.11.2 Reports

Reports are available for the currently selected line in the line list.

If the QC has been run then the summary is displayed in the *Summary* panel and saved to the specified CSV file.

Click the *Plot* button to display the interactive plots. A series selection dialog will be displayed to allow selection of which series to be plotted.

Refer to the MultiPlot manual.

3 COMPARE

This module allows comparison of node positions between two batches of P1 files of the same format on a shot-by-shot basis.

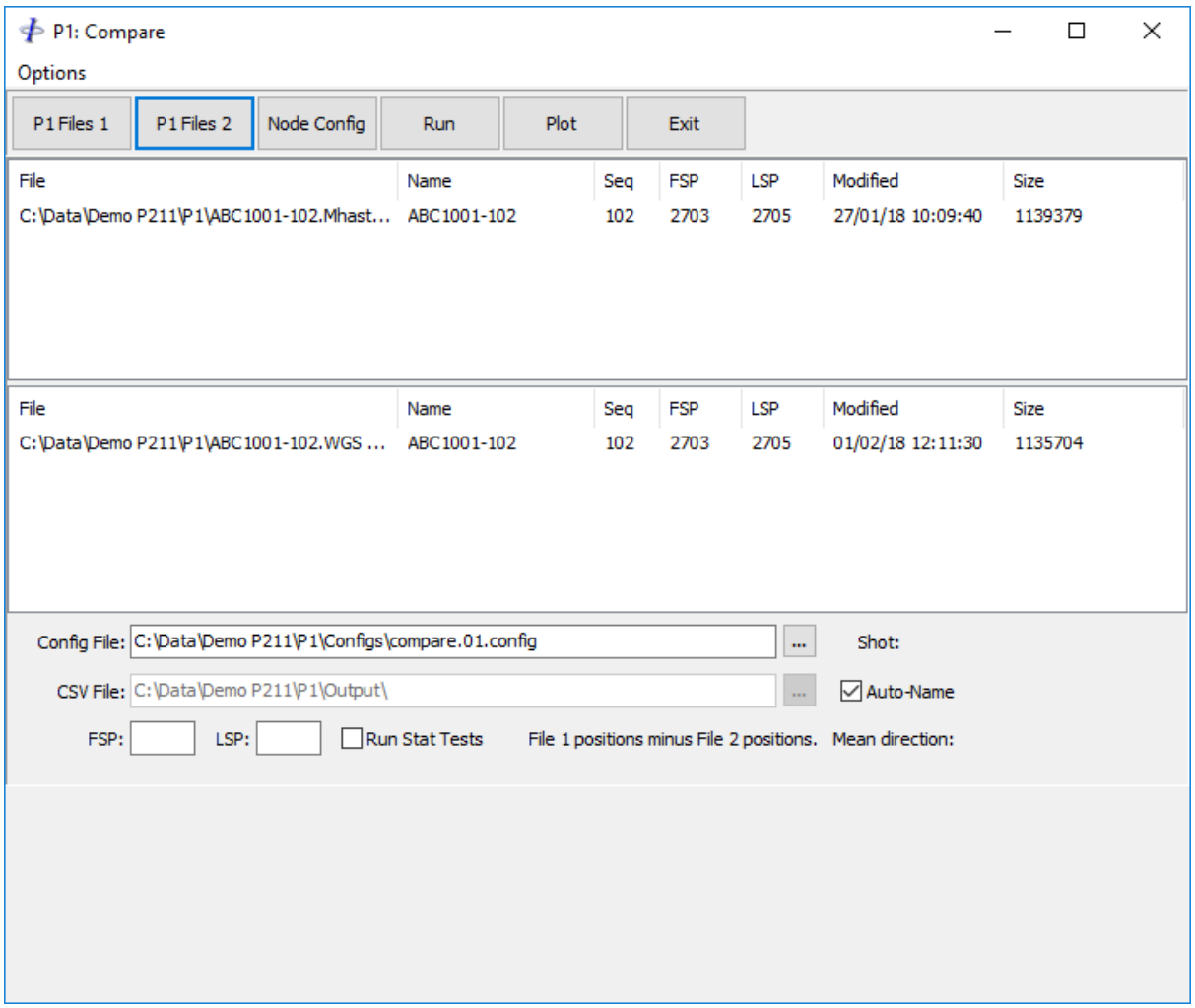


Figure 3-1 – Compare

3.1 Setup

P1 Files 1: Click the *P1 Files 1* button and select the P1 files. Right click on the file list for menu options.

P1 Files 2: Click the *P1 Files 2* button and select the P1 files. Right click on the file list for menu options.

Node Config: Name of the configuration file to be used with this utility. Either type in the full path name or use the *Browse* button to select the file.

For first time use in a project only the path will be displayed. Click on the *Node Config* button to automatically create the config file.

CSV File: Optional - numerical summary data in csv format will be written to this file.

Auto-Name: Check this checkbox to automatically name the CSV file using the P1 filename.

3.1.1 Shot Range

FSP: Enter the first shotpoint number to be processed or leave blank to start from the first shotpoint found in the file.

LSP: Enter the last shotpoint number to be processed or leave blank to continue to the last shotpoint found in the file.

3.1.2 Run Stat Tests

Check if it is required to run statistical testing. Refer to section 4 for details.

3.2 Edit Configuration

Allows customisation of current or new configuration file. If the file does not exist the user will be prompted before it is created. The records in Available list are all those found in the first two shots of P1 File 1 and are listed alphabetically. A previously configured selection may contain nodes which do not exist in the current P1 files.

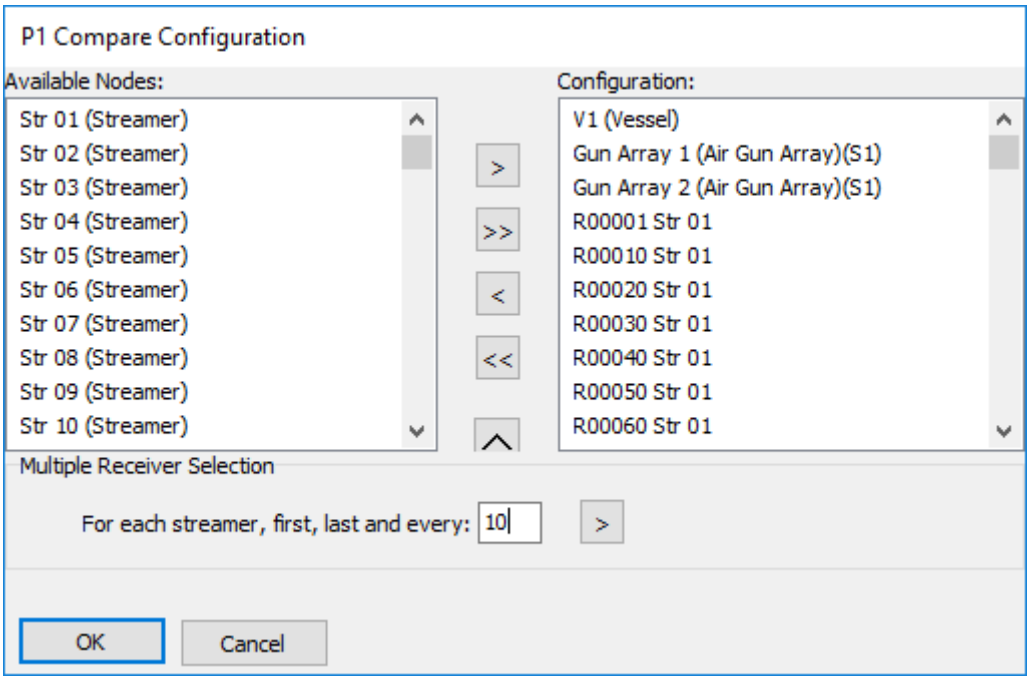


Figure 3-2 – Compare: node selection

>	Add the selected nodes to the configuration.
>>	Add all nodes to the configuration.
<	Remove selected nodes from the configuration.
<<	Clear the configuration.
∧	Move the selected items up.
∨	Move the selected items down.
OK	Accept the configuration and close the dialogue.
Cancel	Cancel all changes to the configuration and close the dialogue.

3.2.1 Multiple Receiver Selection

To automatically select multiple receivers on each streamer, enter the required receiver interval (n) and click the > button. The first, every nth, and last receiver on each streamer will be added to the existing configuration.

3.2.2 Line Name Parsing

There may be situations whereby the line names for corresponding lines in both lists are not identical but do contain a common series of characters/digits. E.g. the compare dataset may have a line name prefix or suffix. Because lines in each list are matched according to the line name in the file, if these names are not identical then the name may be parsed by selecting from the menu *Options* | *Parse Line Name*. Enter the column number of the first character to be used, and the number of characters to be used. The example shown in Figure 3-3 will use characters 4 to 15 of the line name.

When the *Ok* button is clicked, the menu item will be checked. To remove line name parsing click the menu item to uncheck it.

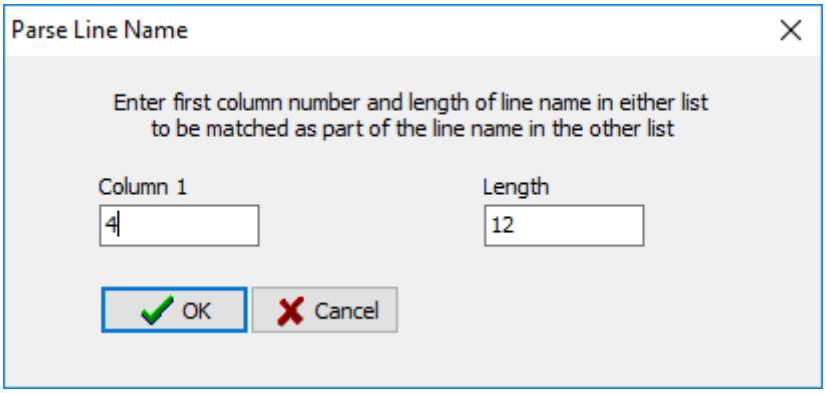


Figure 3-3 – Compare: line name parsing

3.3 Run

Click on the *Run* button to start processing. The *Run* button changes to a *Stop* button which can be used to stop processing before the end of file is reached.

The line names and shotpoint number as appear in the files are displayed.

For each file listed in the top file list, the bottom file list is searched and any file in which the full line name in the bottom file partially matches the line name in the top file, or vice versa, a comparison is computed.

It is not necessary for both files to contain the same shotpoint ranges. Comparison of the configured nodes is performed only on shotpoints that have the same SP number in both files.

The azimuth used to compute the along line and across line components of the node position differences is the vessel course made good. Once processing is complete the mean value is displayed as *Direction*.

3.4 Results

Once processing has completed or been stopped a tabulated results panel shows the Mean, Min and Max differences between the two P1 files in position and depth for each of the selected nodes. If the node configuration contains records not found in both files the corresponding row will be blank.

The final three rows contain the mean, minimum and maximum respectively of each column in the report matrix.

If an output csv file has been selected, these results will have been written to the file.

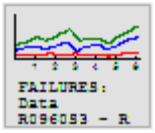
Click on the Plot button to display these results using interactive time series plots.

3.4.1 Time Series Plots

To inspect the time series plots of the comparisons, click the *Plot* button and select the line from the list.

The plotting module and its functions are described in *the MultiPlot manual.*

4 TREND ANALYSIS AND STATISTICAL TESTING (TASTE)



Trend analysis and statistical testing are linked to the following modules:

- QC Offsets
- QC Nodes
- QC Streamer Depths
- Compare

These modules are hereafter referred to as the *QC Modules*. Their configurations are referred to as the *QC Module Configurations*. The data they generate are referred to as the *Data Types*.

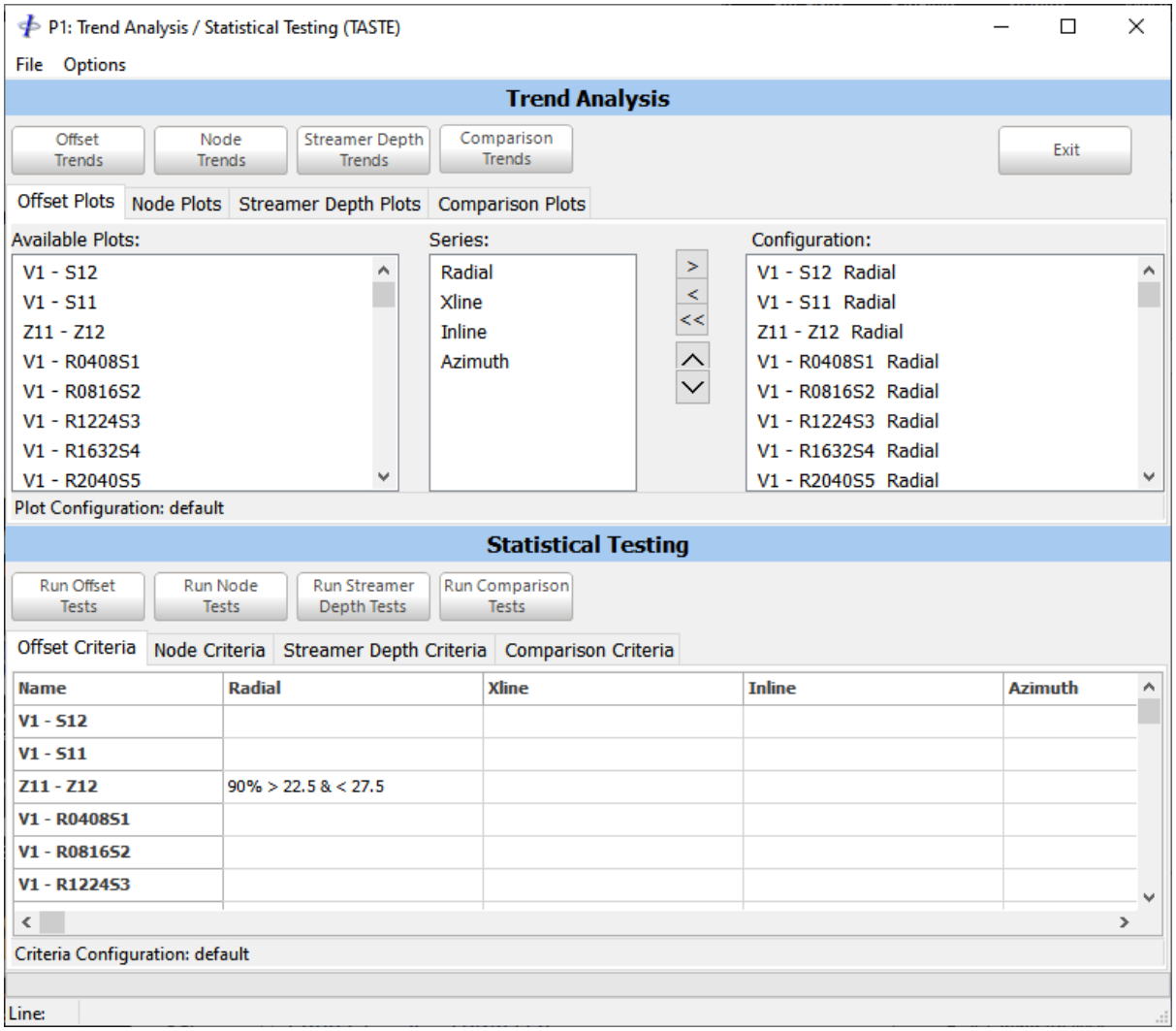


Figure 4-1 – TASTE

4.1 Trend Analysis

Trend analysis involves the plotting of the summary statistics computed in the *QC Modules*. The plots are presented as time series, using the sequence number along the X-axis. For this reason, it is important that the sequence number position in the line name has been correctly specified under the project parameters when performing QC on P1/90 datasets. Refer to section 1.3.1.1 for details.

The *Data Types* are processed and presented in an identical manner.

4.1.1 Configuration

The configuration for each *Data Type* is displayed in the plot configuration pages. The plot configuration comprises a list of plot items with series in the right hand (Configuration) panel which are taken from a list of data items – nodes or, in the case of QC Offsets node pairs, in the left hand (*Available*) panel, along with a specified Series selected in the centre panel.

Every time the TASTE module is started the program reads the configuration file which has been specified in the relevant *QC Module,* if one exists, and displays it in the left panel. The right-hand panel will contain the last loaded or saved plot configuration. If no plot configuration has yet been built and saved the right-hand panel will be empty.

To delete plot series from the configuration select them then press the <*Del*> key or right click in the right-hand panel select *Delete* from the popup menu.

To move plot series within the list, select the items to move then use the up and down arrow buttons.

4.1.1.1 Changing the List of Available Items

The list of available plot items on the left always defaults to the list in the respective *QC Module* configuration. To select a different *QC Module* configuration right click in the left-hand panel. The top menu item in the popup menu will be *Read Offset List from File* or *Read Node List from File*, depending on the *Data Type*. Select this menu item, then select the required *QC Configuration* file.

Note: The QC Nodes and Comparison configurations are mutually compatible.

This does not alter the plot configuration (right hand panel), but simply makes the new plot items available to add to the configuration.

4.1.1.2 Saving and Loading a Configuration

To save the configuration as appears in the right-hand panel right click in the right-hand panel, from the popup menu select *Save Plot Configuration*, and enter an appropriate name.

To load a configuration from file right click in the right-hand panel, from the popup menu select *Load Plot Configuration*, and select the configuration to load.

Important: Only load a configuration file with the filename extension that appears in the filename filter.

Once saved or loaded the name of the configuration appears in the status bar at the bottom of the window. The next time the TASTE module is started the configuration will default to the last one either saved or loaded.

4.1.2 Crossline Plots

It is generally more useful to present plots of crossline distances as absolute values. In this case use the *Options* | *Absolute Values* option.

4.1.3 CSV Summary File

When the *Plot* button is clicked, in addition to creating the plots, a CSV summary file is created in the Output folder as specified in the project setup.

This file contains the mean, minimum and maximum value for each series of each category that is specified in the configuration file.

4.1.4 Plotting

To display the trend plots, click the appropriate plot button in the toolbar. The plots are displayed in the Multiplot module. Refer to the MultiPlot manual.

The plot series as configured are plotted against line sequence number, as shown in Figure 4-2.

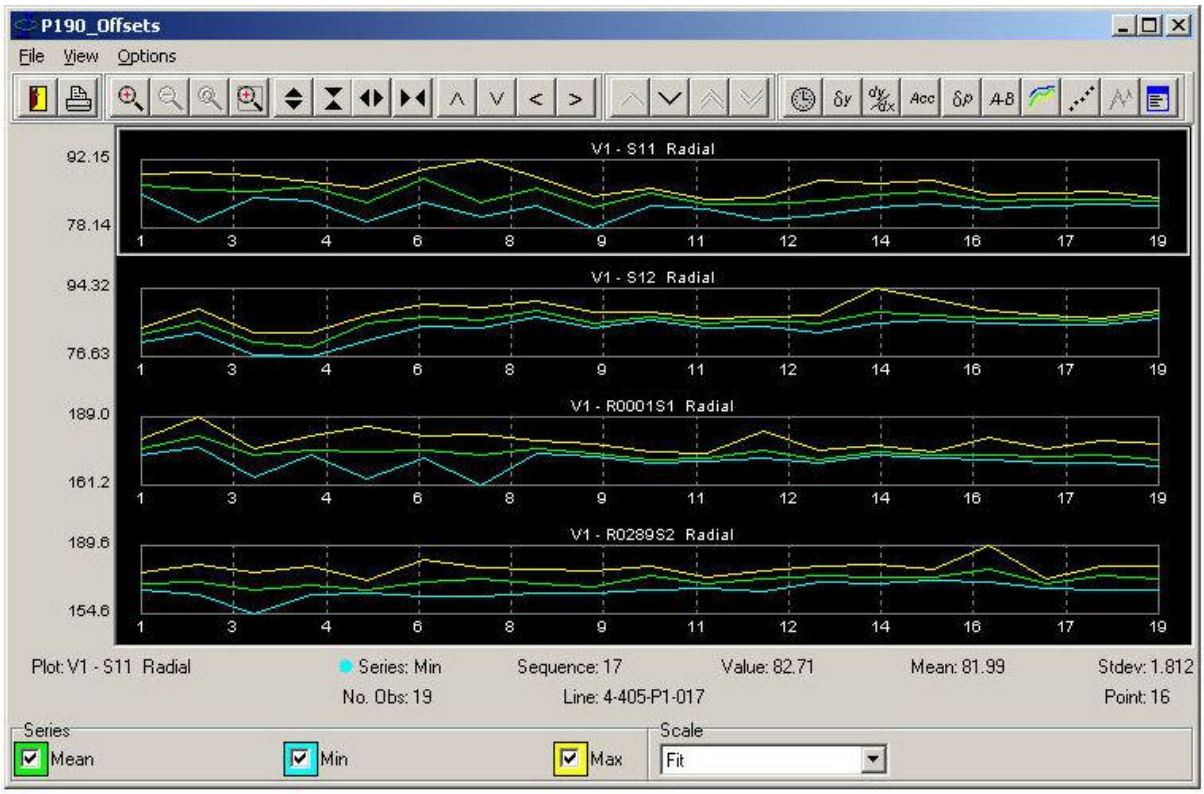


Figure 4-2 – TASTE: trend analysis plots

4.2 Statistical Testing

Statistical testing involves the application of a set of criteria, hereafter referred to as *Test Criteria* to a set of homogenous data-sets, i.e. of all the same *Data Type*, and reporting any failures.

The four *Data Types* are processed and presented in an identical manner.

4.2.1 Configuration

The configuration for each *Data Type* is displayed in the *Test Criteria* table and comprises a list of data items – nodes or node pairs (in the case of QC Offsets) – and a table of test criteria for all data series. An example of the *Offset Test Criteria* table is shown in Figure 4-3.

When the TASTE module is used for the first time in a new project, before any configuration has been saved, the program reads the configuration file which has been specified in the relevant *QC Module,* if one exists, and displays this list in the left-hand column, with the remainder of the table blank.

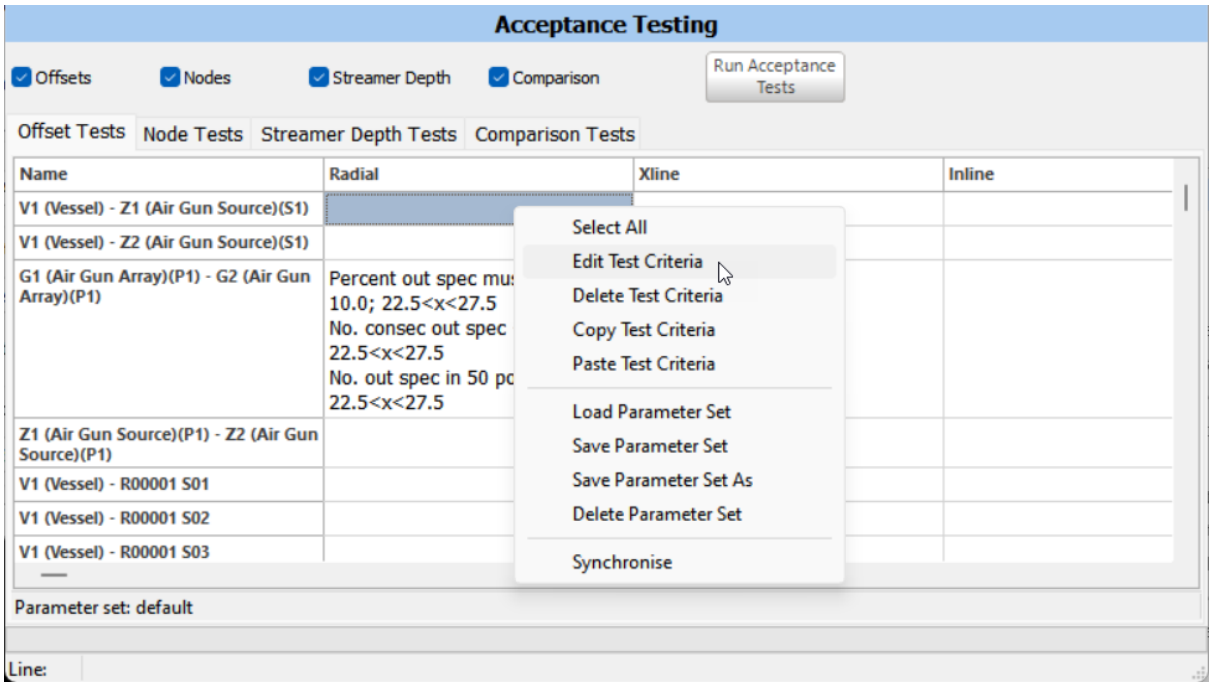


Figure 4-3 – TASTE: statistical testing

4.2.1.1 Defining Test Criteria

To add test criteria, or edit or delete existing test criteria, first select with the mouse the range of cells which represent the data items, then right click with the mouse and from the popup menu select *Edit Test Criteria*. The *Edit Test Criterion* dialog, as shown in Figure 4-4, appears.

Test types and parameters are described below:

QC Types	**Parameters**
Offsets,	Minimum value
Nodes	Maximum value
Streamer Depths	
Comparison	Any value outside the range specified is counted as *Out of Spec*.

Test Type	**Parameters**
Total out of spec for whole line:	Maximum number

Percent out of spec for whole line:	Maximum percentage
Number of Consecutive out of spec:	Maximum number
Number out of spec in specified number of points:	Maximum number Number of points
Number out of spec over specified distance:	Maximum number Distance in grid units
Absolute average out of spec in specified number of points:	Number of points
Absolute average out of spec over specified distance:	Distance in grid units.
Average out of spec for whole line:	None.

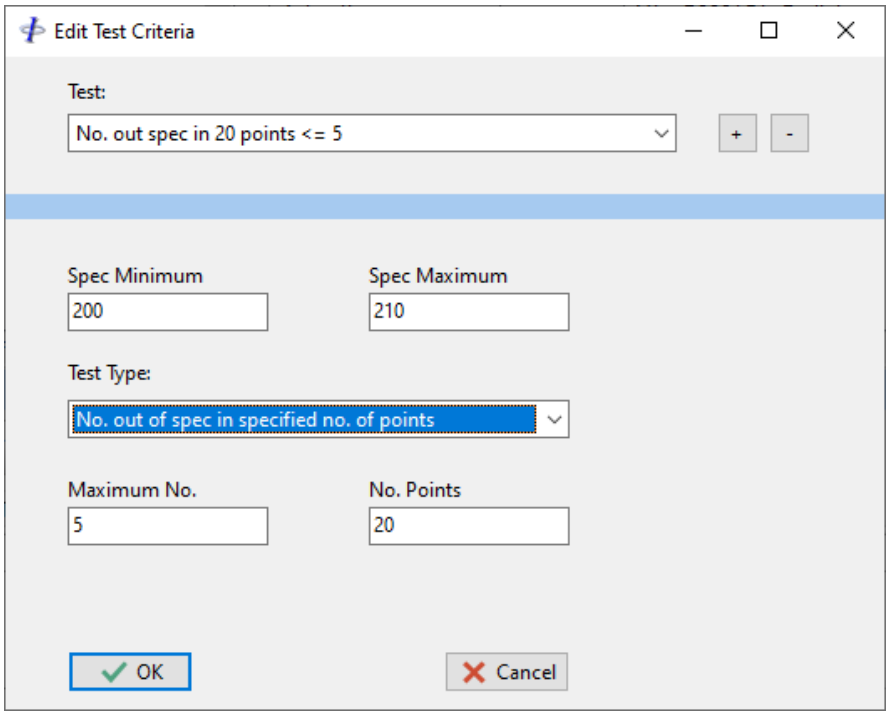


Figure 4-4 – TASTE: Acceptance test dialog

Note: cross-line and along-line offsets between nodes always have their absolute values used.

4.2.1.2 Copying and Pasting Test Criteria

Click on the test criteria cell and select *Copy* form the popup menu. Select the destination cell and *Paste.*

4.2.1.3 Saving and Loading a Configuration

To save the configuration right click on the table and from the popup menu, select Save Configuration, and enter a name.

To load the configuration right click on the table and from the popup menu, select Load Configuration, and select a configuration.

Important: Only load a configuration file with the filename extension that appears in the filename filter.

Once saved or loaded the name of the configuration appears in the status bar at the bottom of the window. The next time the TASTE module is started the configuration will default to the last one either saved or loaded

4.2.1.4 Synchronising the Configuration

There may be times when the *QC Module Configuration* has been changed and it is desired that these changes be applied to the *Test Criteria Configuration*. To apply these changes right click on the table and from the popup menu, select *Synchronise* and then select the desired *QC Module Configuration*. Any new data items are added to the *Test Criteria Configuration*, and the user is prompted to choose whether or not to remove from the *Test Criteria Configuration* data items which are not in the *QC Module Configuration.* The latter can be safely left in the *Test Criteria Configuration* so they can be used in the future should they be reintroduced in the *QC Module Configuration*.

Note: The QC Nodes and Comparison configurations are compatible with each other but not with Offset QC configurations.

4.2.2 Running the Tests

Meaningful tests can only be run once the appropriate test configuration for the *Data Type* has been defined and saved.

The tests can be run in two ways:

4.2.2.1 Running from the QC Module

Check the *Run Stat Tests* checkbox in the appropriate *QC Module* when performing the initial QC on the P1. The test is then performed immediately after the statistical data has been acquired.

4.2.2.2 Running from the TASTE module

Select the required *Data Types* for which tests are to be performed by checking the appropriate checkboxes. The required lines should then be selected from the line list which appears. This list can be sorted by sequence, line name or filename by clicking on the appropriate header. Clicking the *OK* button will start the tests.

The test on each line is run in the background. The execute menu item for the *Data Type* is disabled while the tests are running.

4.2.3 Test Report

A test report for each line is saved in the Report Folder as specified in the project parameters.

When running the test from the *QC Module* this report will be displayed once the test has completed only if there have been any failures

When running from the TASTE module, once all lines have been processed the individual reports are concatenated and displayed. Figure 4-5 shows an example of part of a

concatenated report. The concatenated report can be saved by right clicking on the report and selecting *Save As* from the popup menu.

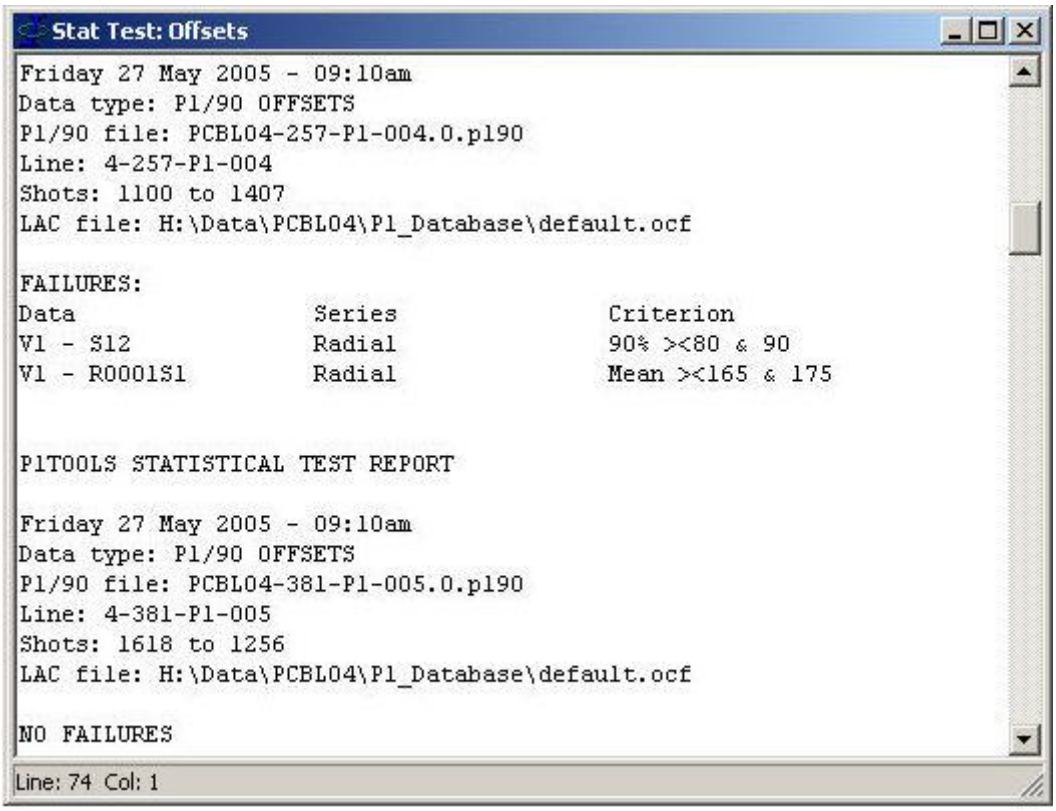


Figure 4-5 – TASTE: statistical test report

5 REPLAY

The *Replay* module enables interactive replay of one or two P1 datasets.

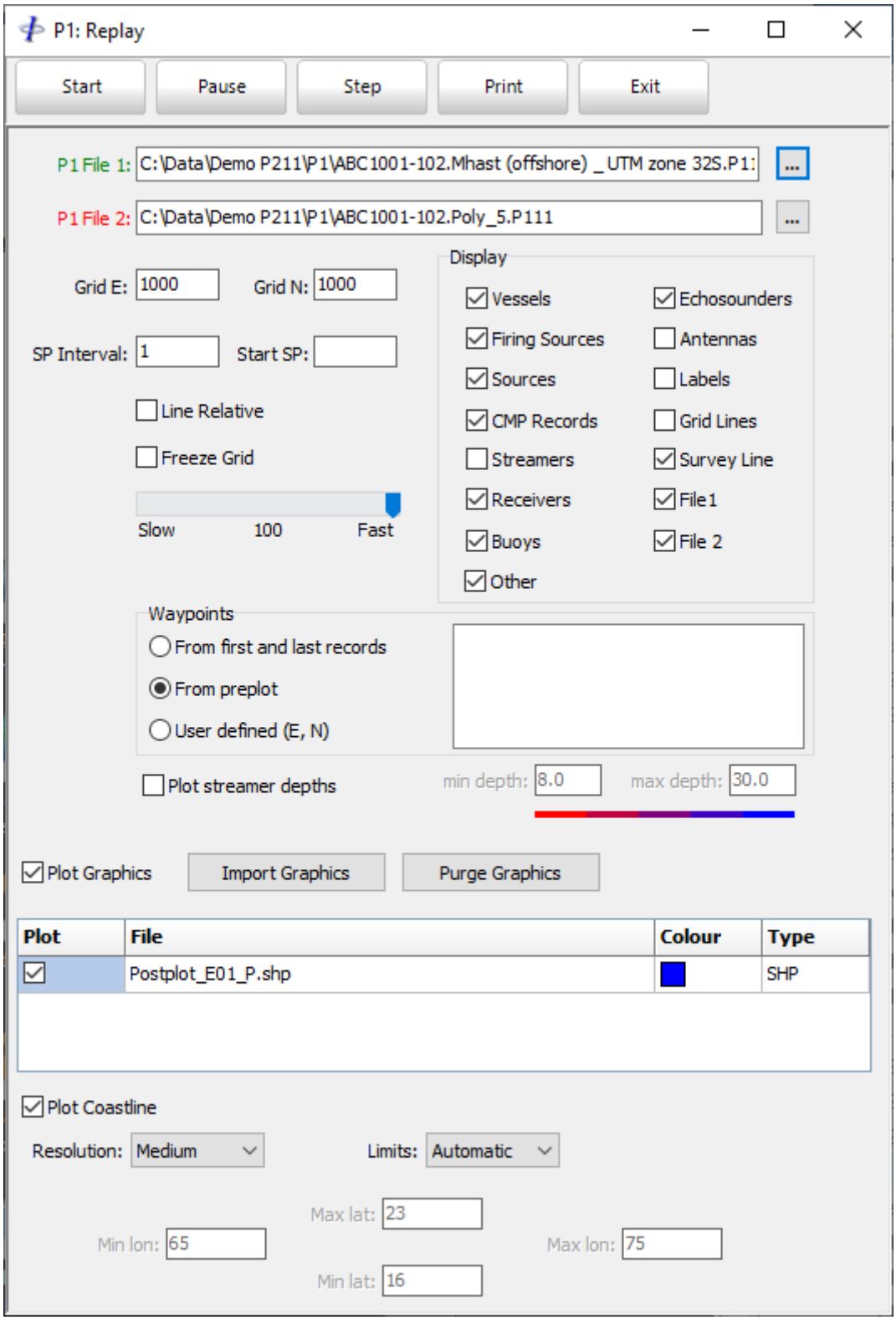

P1: Replay
Start
Pause
Step
Print
Exit
P1 File 1:
C:\Data\Demo P211\P1\ABC1001-102.Mhast (offshore) _UTM zone 32S.P1:
P1 File 2:
C:\Data\Demo P211\P1\ABC1001-102.Poly_5.P111
Grid E:
1000
Grid N:
1000
SP Interval:
1
Start SP:
Line Relative
Freeze Grid
Slow
100
Fast
Display
Vessels
Echosounders
Firing Sources
Antennas
Sources
Labels
CMP Records
Grid Lines
Streamers
Survey Line
Receivers
File1
Buoys
File 2
Other
Waypoints
From first and last records
From preplot
User defined (E, N)
Plot streamer depths
min depth:
8.0
max depth:
30.0
Plot Graphics
Import Graphics
Purge Graphics
Plot
File
Colour
Type
Postplot_E01_P.shp
SHP
Plot Coastline
Resolution:
Medium
Limits:
Automatic
Max lat:
23
Min lon:
65
Max lon:
75
Min lat:
16

Figure 5-1 – Replay control panel

5.1 Setup

P1 File 1: Mandatory: name of the P1 file on which QC checking is to be carried out. Either type in the full path name or use the *Browse* button to select the file.

P1 File 2: Optional: name of second P1 file on which QC checking is to be carried out. Either type in the full path name or use the *Browse* button to select the file.

Grid E: Spacing of displayed Eastings Grid.

Grid N: Spacing of displayed Northings Grid.

SP Interval: Selected SP interval to be replayed.

Start SP: Start Replay from this SP – if blank, starts from 1st SP in the file.

Line Relative: When checked, plot is relative to the survey line.

Freeze Grid: When checked the grid is static.

Slow...Fast: Adjust Replay speed.

Vessels: Toggle on/off vessel position display.

Firing Sources: Toggle on/off firing source position display.

Sources Toggle on/off non-firing source position display. For P1/90 these are read from Z records.

CMP Records: Toggle on/off CMP record position display.

Streamers: Toggle on/off streamer position display.

Receivers: Toggle on/off individual receiver position display.

Tailbuoys:	Toggle on/off tailbuoy position display.
Echosounders:	Toggle on/off echosounder position display.
Antennas:	Toggle on/off antenna position display.
Other:	Toggle on/off other record position display.
Labels:	Toggle on/off record label display.
Grid Lines:	Toggle on/off grid line display.
Survey Line:	Toggle on/off survey line display as defined by *Waypoints*.
Error Ellipses:	Display error ellipses (P1/11 only).
File 1:	Toggle on/off *P1 File 1* display.
File 2:	Toggle on/off *P1 File 2* display.

5.1.1 Waypoints

The waypoints are used to define the survey line for optional display. Select one of the following:

From first and last records:	The first and last records in the file will defined the waypoints. These will appear in the list when the start button is pressed.
From preplot:	For P1/90 produced by SeisPos version 8.30 or later the waypoints defined in the P2 header are written to the P1 header and will be used. For P1/11 the waypoints are recorded in the N1 records. Waypoints will appear in the list when the start button is pressed.
User defined:	Enter at least two pairs of waypoints in the format *E, N* e.g. as shown in Figure 5-1.

If user defined waypoints are invalid in format, or only one waypoint is entered, then waypoints from preplot will be automatically selected.

If waypoints from preplot are selected and are not found, then the first and last records will be used.

5.1.2 Streamer Depths

To plot the streamers or receivers in colour according to depth check the *Plot streamer depths* checkbox and enter the minimum and maximum depths.

The default colours can be changed by clicking on either end of the colour legend.

5.1.3 Import Graphics

Graphic files in the DXF and ESRI Shapefile formats are supported.

To display imported graphics:

1. Click the *Import Graphics* button to select files.
2. Select the colour for each file by clicking on the colour box in the right column of the file list.
3. Check the *Plot Graphics* checkbox.

5.2 Run

5.2.1 Display

Click on the *Run* button or *Step* button to start replaying the P1. A separate display window appears with the selected positions displayed. The current shotpoint appears at the left of the status bar at the bottom of the display.

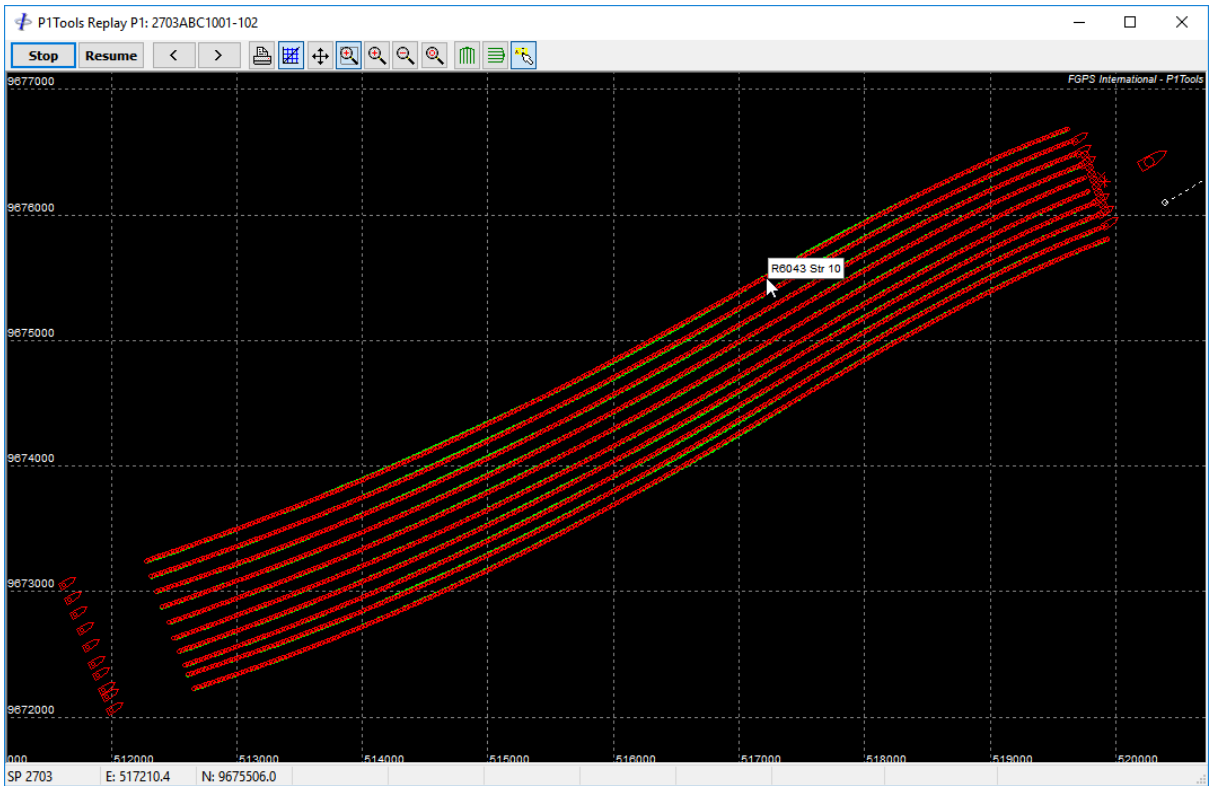


Figure 5-2 – Replay: Overlaid P1 datasets

To pause the replay either click on the *Pause* button or hold down a mouse button in the display.

Adjusting the speed of replay is done by altering the trackbar control in the setup panel. The maximum speed is limited by the size of the dataset(s) and computer resources.

All display settings except the P1 Files and the From SP can be implemented during replay.

5.2.2 Toolbar

Start	Start/stop.
Pause	Pause/resume.
<	Step back one shot.
>	Step forward one shot.


Print.


Both axes same scale.


Pan tool. Enables the mouse to be used for panning by dragging the image with the left mouse button.


Window zoom – when depressed use the left mouse button to define a zoom rectangle.


Zoom in.


Zoom out.


Zoom extents.


Orient up.


Orient right.


Show hint when mouse cursor over nodes.

5.2.3 Measurements

Use the right mouse button to make measurements on the display. The length, in grid units, of the line drawn using the right mouse button, the difference in Easting and Northing, in grid units, between the endpoints of the line, and the azimuth of the line in degrees are shown in the status bar at the bottom of the display.

5.2.4 Zooming

To zoom in at the mouse cursor location scroll the mouse wheel up.

To zoom out at the mouse cursor location scroll the mouse wheel down.

To zoom to full extents, click the *Zoom Extents* button or the mouse wheel.

5.2.5 Missing Receivers

Check the *Streamers* and *Labels* options for display. The first and last receiver group

numbers on each streamer are displayed. The receiver group number increment is calculated from the first two receiver group numbers in the file. Any subsequent changes to this increment will cause receiver group number labels to be displayed at all discontinuities, thereby indicating missing receiver groups.

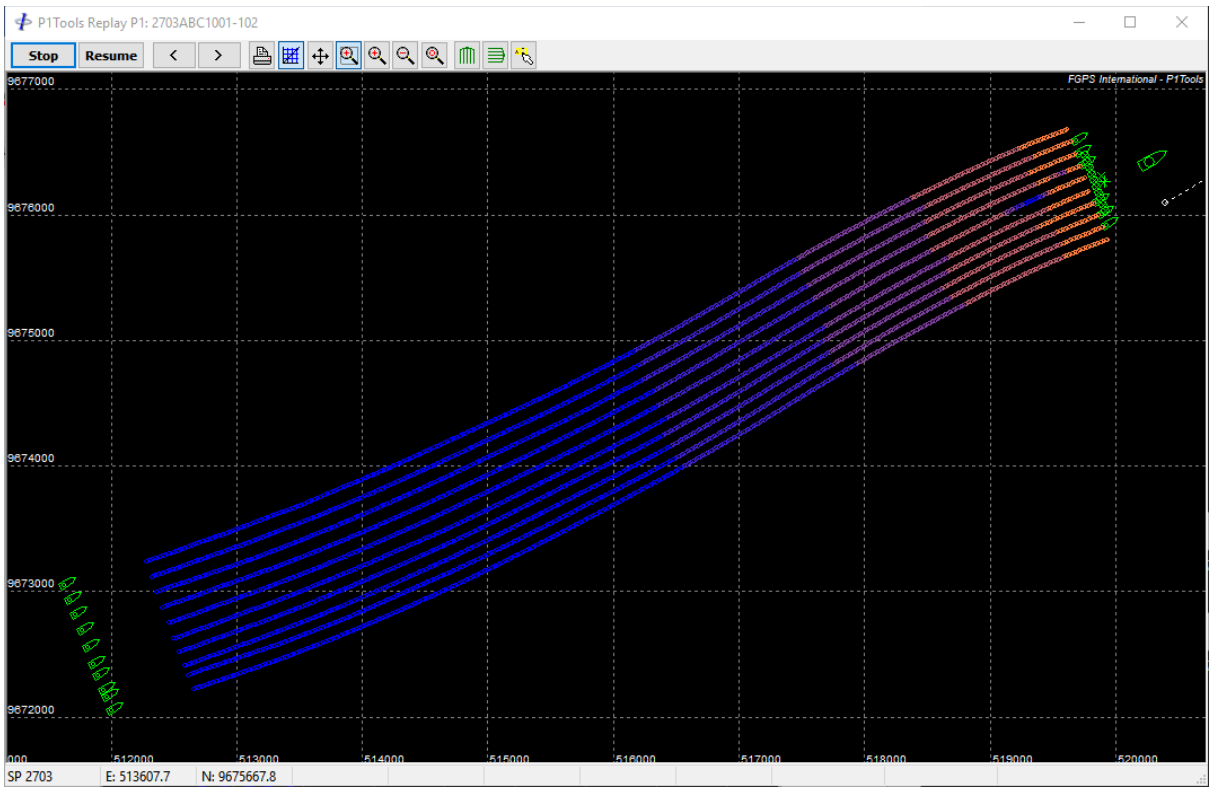
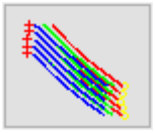


Figure 5-3 - Reply: Receiver depths

6 STREAMER SHAPE



This module provides a spatial plot of selected streamers for a specified shot range. Vessel, source and tailbuoy positions are also optionally plotted.

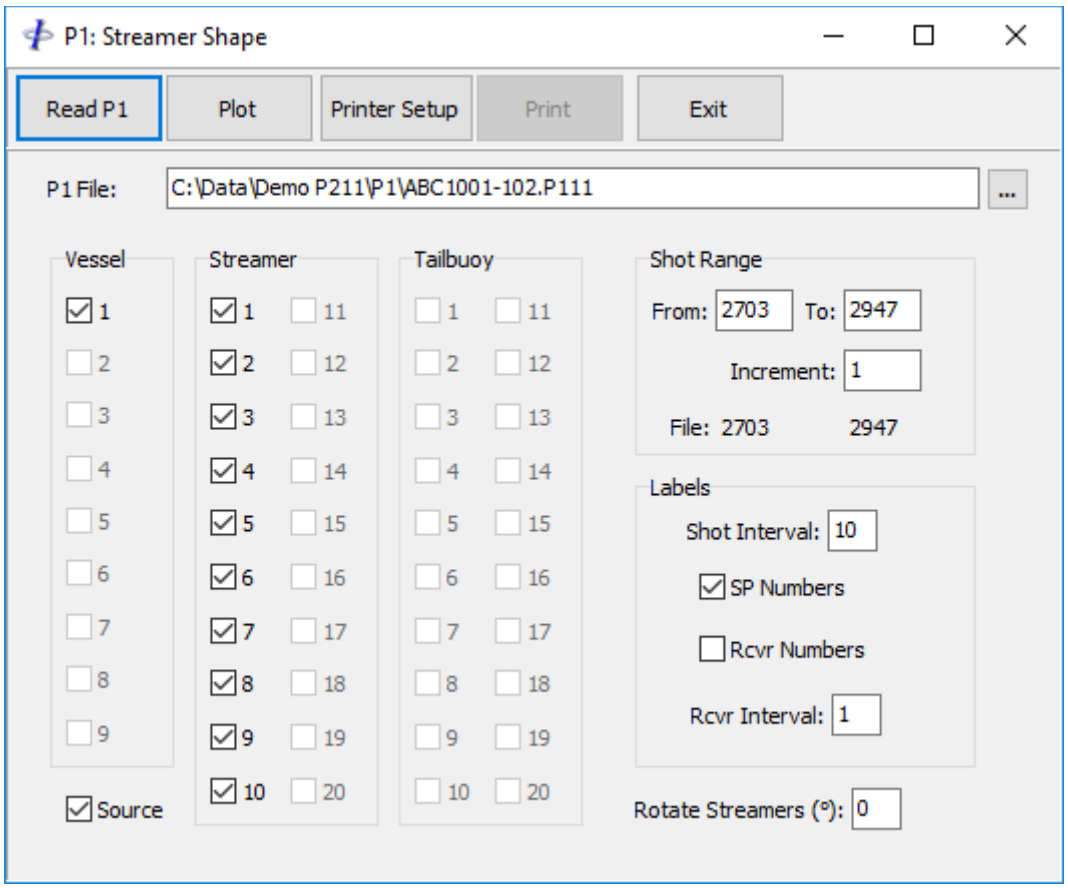


Figure 6-1 – Streamer Shape

6.1 Main Functions

Read P1: Read the P1 file. All data from the specified P1 are read into memory enabling the various display options without the need to re-read the file. This may take some time depending on the size of the dataset and the hardware specifications.

Plot: Displays the plot in a new window. This button is also used to refresh the display when any of the plotting options have been changed.

Printer Setup: Show the Printer Setup dialog.

Print: Prints the displayed plot.

Exit: Exits the Streamer Shape module.

6.2 Plotting Options

When changing the various plotting options described below the *Plot* button must be clicked to refresh the plot after the changes have been made.

6.2.1 Objects

The numbers of vessels, streamers and tailbuoys, and the presence of source records, are ascertained from the first set of shot records.

Check or uncheck any of the checkboxes to display or hide the associated object.

The object plot colours are:

Vessel:	white
Source:	red
Streamer:	green
Tailbuoy:	yellow

6.2.2 Shot Range and Increment

The default shot range is the first to last as found in the file. Select the shot range to be displayed. Set the shot increment.

6.2.3 Labels

Shot Interval: The shot interval at which all selected labels are plotted.

SP Numbers: Check to plot shotpoint numbers.

Rcvr Numbers: Check to plot receiver group numbers

Rcvr Interval: The interval along the streamer at which receiver numbers are plotted.

Receiver numbers, if enabled, are also plotted wherever a gap in receivers is detected,

indicating the last and first receiver before and after the gap respectively.

6.2.4 Rotate Streamers

There may be occasions when rotating the streamers from the near group enables a clearer plot. Figure 6-2 and Figure 6-3 show the same streamer with no rotation and with 90° rotation respectively.

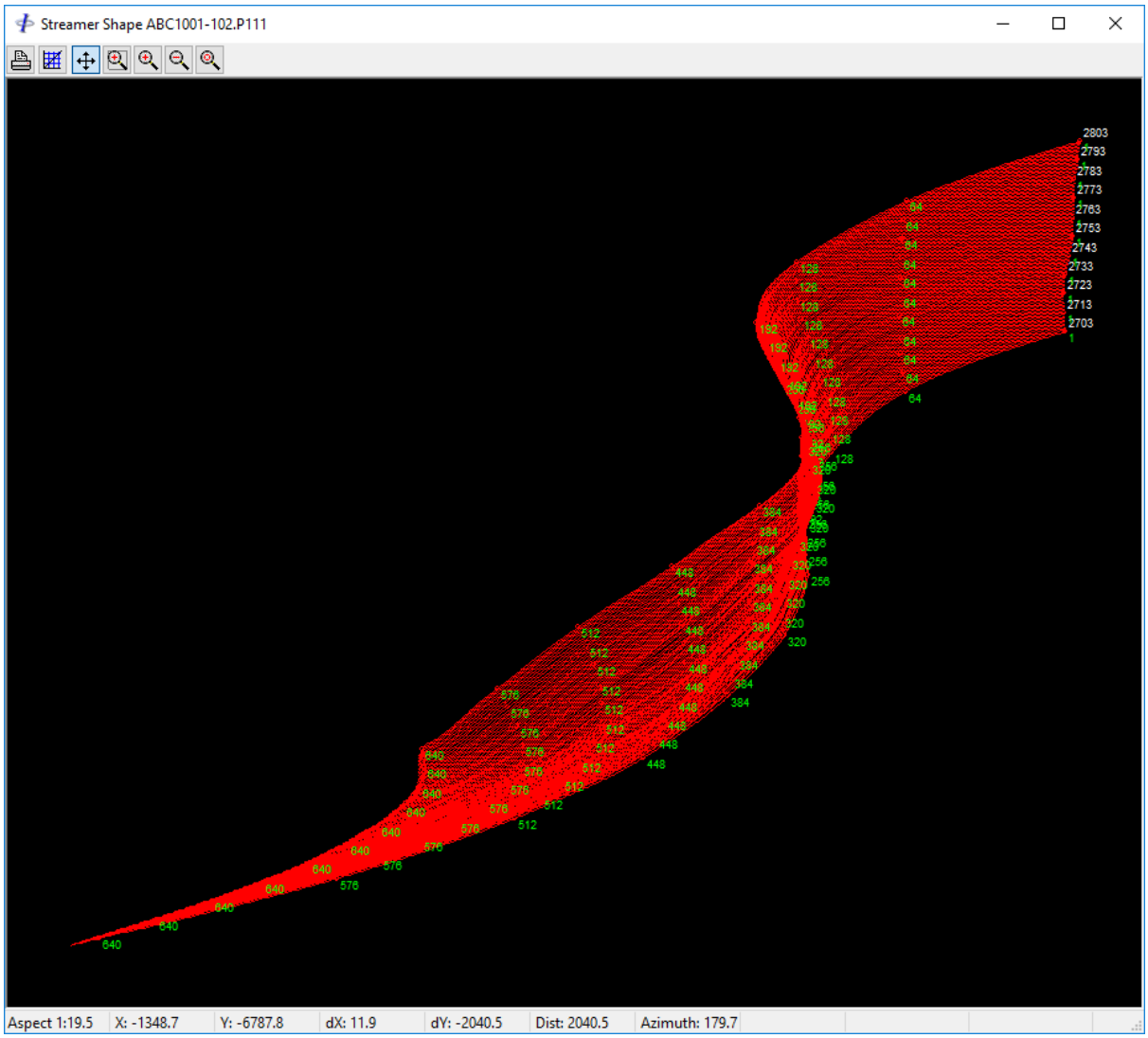


Figure 6-2 – Streamer Shape: single streamer for 100 shots, no rotation

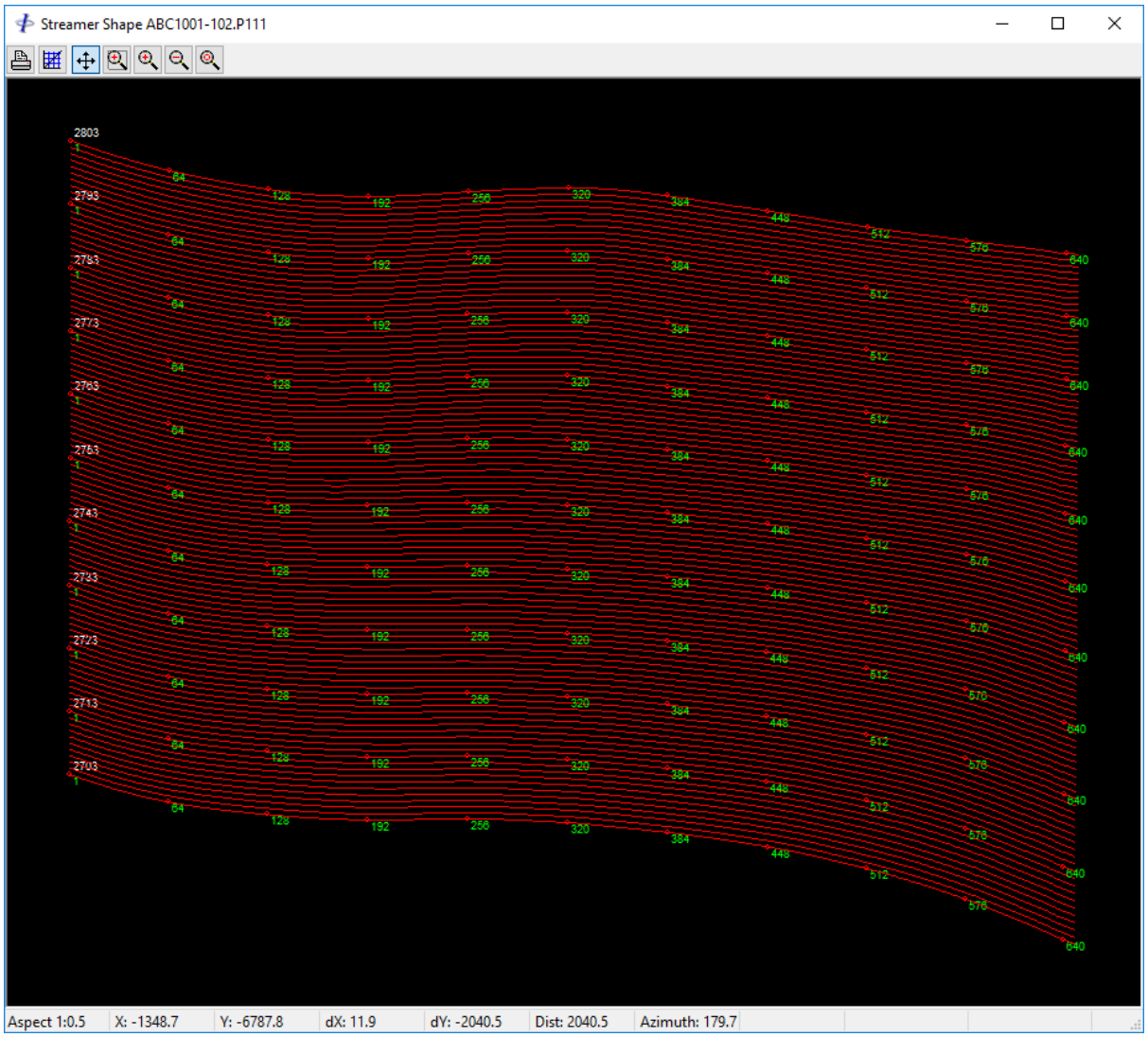


Figure 6-3 – Streamer Shape – single streamer for 100 shots, rotation 90°

6.3 Display

The display is shown in a separate window.

The P1 is rotated so that the line is plotted from the bottom to the top of the plot.

The default display is scaled to the full extent of the plotted objects. The resultant aspect ratio is shown in the status bar at the bottom of the display.

The toolbar provides functions for zooming, scaling and scrolling the display. These are described as follows:

Print.

Both axes same scale.

Pan tool. Enables the mouse to be used for panning by dragging the image with the left mouse button when scroll bars are visible.

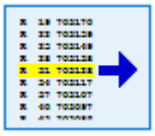
Window zoom – when depressed use the mouse left button to define a zoom rectangle.

Zoom in.

Zoom out.

Zoom extents.

7 EXTRACT



The *Extract* module provides utilities for data extraction and decimation of P1 files.

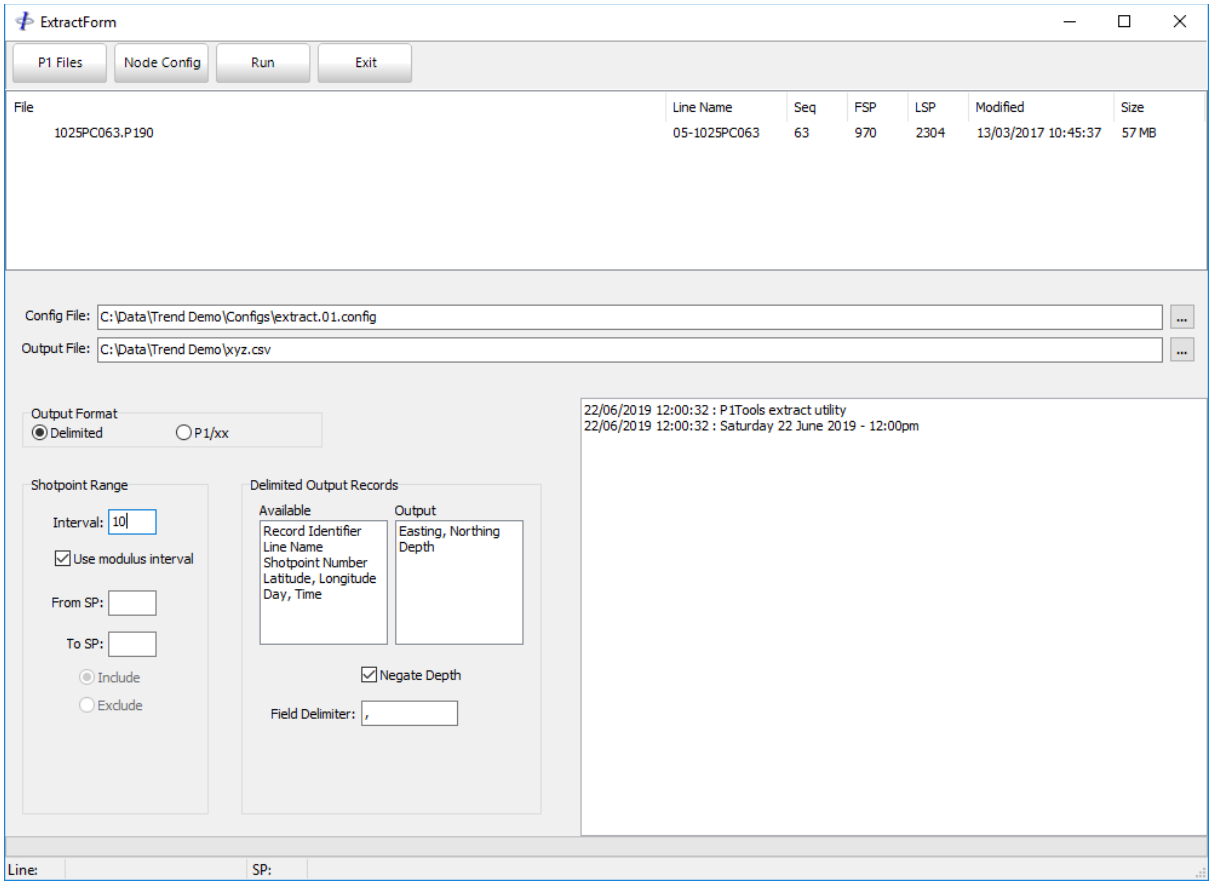


Figure 7-1 - Extract

7.1 Setup

7.1.1 Files

P1 Files: Click the *P1 Files* button to select the input files. To remove files from the list, select the files, right click on the selection and from the popup menu click *Remove*.

Node Config: Name of the configuration file to be used with this utility. Either type in the full path name or use the *Browse* button to select the file.

For first time use in a project only the path will be displayed. Click on the *Node Config* button to automatically create the config file.

Output File: Data in the selected format will be written to this file.

If the first character of the output file is a "$" then for each input file a single output file will be written and for each output file name the "$" will be replaced with the name of the input file.

7.1.2 Delimited Format Output

The Output panel will be displayed. The following attributes/fields are available for output for each record:

Record Identifier
Line name
SP Number
Julian Day and Time
Latitude and Longitude
Easting and Northing
Depth

For P1/90 receiver (R) records, latitude and longitude cannot be output.

For depth records, checking the *Negate* option will reverse the sign on the depths i.e. assuming all depths are positive they will be output as negative. This is useful when outputting data for import into contouring software.

Fields can be added to the output list, and reordered, by dragging with the mouse.

Specify the field delimiter.

7.1.3 P1 Format Output

The configured nodes will be output in P1 format.

7.1.4 Shotpoint Range

Interval:	Optionally specify the SP interval for output. Set to 1 or leave blank to output all shots in the specified range (see below).
Use modulus interval:	Output the first and last SPs, and each SP whose number is divisible by the specified value.
From SP:	Use to specify the first shotpoint in the range. Has no effect If left blank.
To SP:	Use to specify the last shotpoint in the range. Has no effect If left blank.
Include:	The range of shotpoints specified will be output.
Exclude:	All shotpoints in the file except the specified range will be output.

7.1.5 Receiver Processing Options

Receiver processing options are available for P1 output.

Reverse Receiver Numbers:	The numbering on each streamer will be reversed in the output file. The order of of the receivers in the file is unchanged
Renumber Receivers:	
Start from:	Select *Front* or *Tail.* The specified start number will be assigned to the front or tail.
Start Number:	Specify the start receiver number.
Increment:	Specify the receiver number increment.
Use same numbers for all streamers:	When checked, each streamer will have the same receiver numbers. When unchecked, receiver numbering will be continuous from streamer to streamer.

7.2 Batch Processing

Select the input files by clicking the *P1 Files* button. Files will be processed in the order in which they appear in the list. The list can be re-ordered by clicking the appropriate column header.

Two output options are supported:

Single File: Enter the name of the output file in the *Output File* field. This file will be created, or overwritten if it already exists, and all output will then be appended to it.

This is useful for example when requiring a single file containing all bathymetry data for a prospect to import into contouring software such as Surfer.

Multiple Files: Enter a "$" as the first character of the *Output File* followed by any number of characters. Do not include the full path in the output filename. For each output file the "$" will be replaced with the name of the input P1 file and path.

E.g. if the input *P1 Files* are:
c:\data\seq001.P1
c:\data\seq002.P1
c:\data\seq003.P1

and the *Output File* is specified as:
$_new.txt

then the output files will be:
c:\data\seq001.P1_new.txt
c:\data\seq002.P1_new.txt
c:\data\seq003.P1_new.txt

7.3 Edit Configuration

Click on the *Node Config* button.

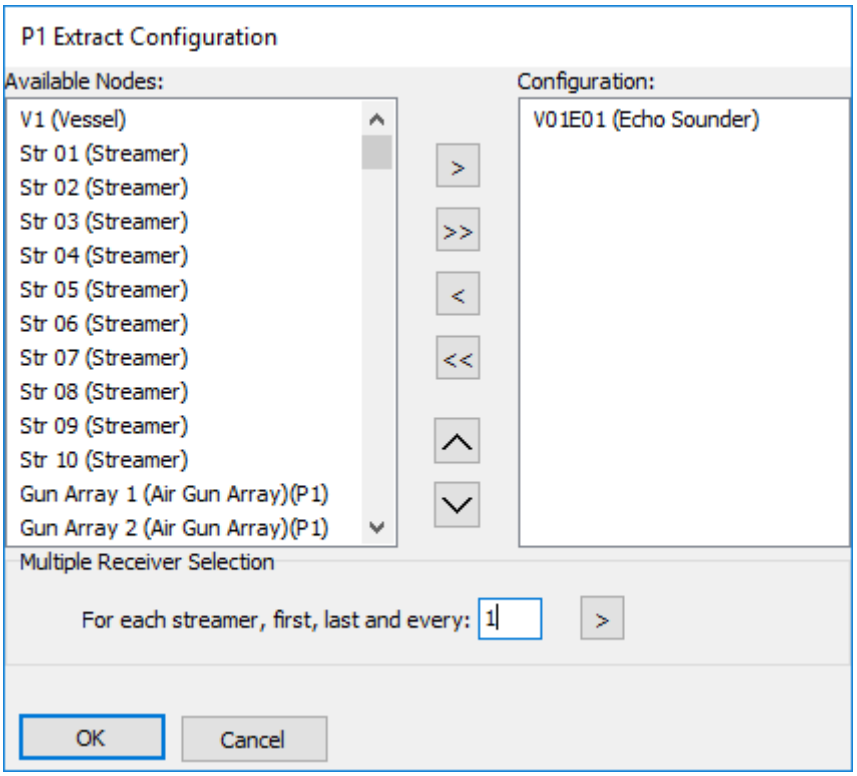


Figure 7-2 – Extract: Node configuration

>	Add the selected nodes to the configuration.
>>	Add all nodes to the configuration.
<	Remove selected nodes from the configuration.
<<	Clear the configuration.
^	Move the highlighted items up.
v	Move the highlighted items down.
OK	Accept the configuration and close the dialogue.
Cancel	Cancel all changes to the configuration and close the dialogue.

7.3.1 Multiple Receiver Selection

To automatically select multiple receivers on each streamer, enter the required receiver interval (n) and click the > button. The first, every nth, and last receiver on each streamer will be added to the existing configuration.

7.4 Run

Once the parameters have been set click on the *Run* button to start data extraction. The *Run* button changes to a *Stop* button which can be clicked at any time to stop extraction.

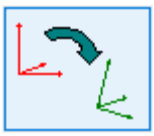
7.4.1 Delimited Output

Each shotpoint output will comprise one record for each of the configured nodes, containing all the selected fields, terminated by a carriage return/line feed. The selected fields for each node are separated by the specified *Field Delimiter*.

7.4.2 P1 Output

If the input file has a header then this will be output in its entirety first.

8 COORDINATE CONVERSION



The *Coordinate Conversion* module enables the conversion of P1 files from one horizontal Coordinate Reference System (CRS) to another.

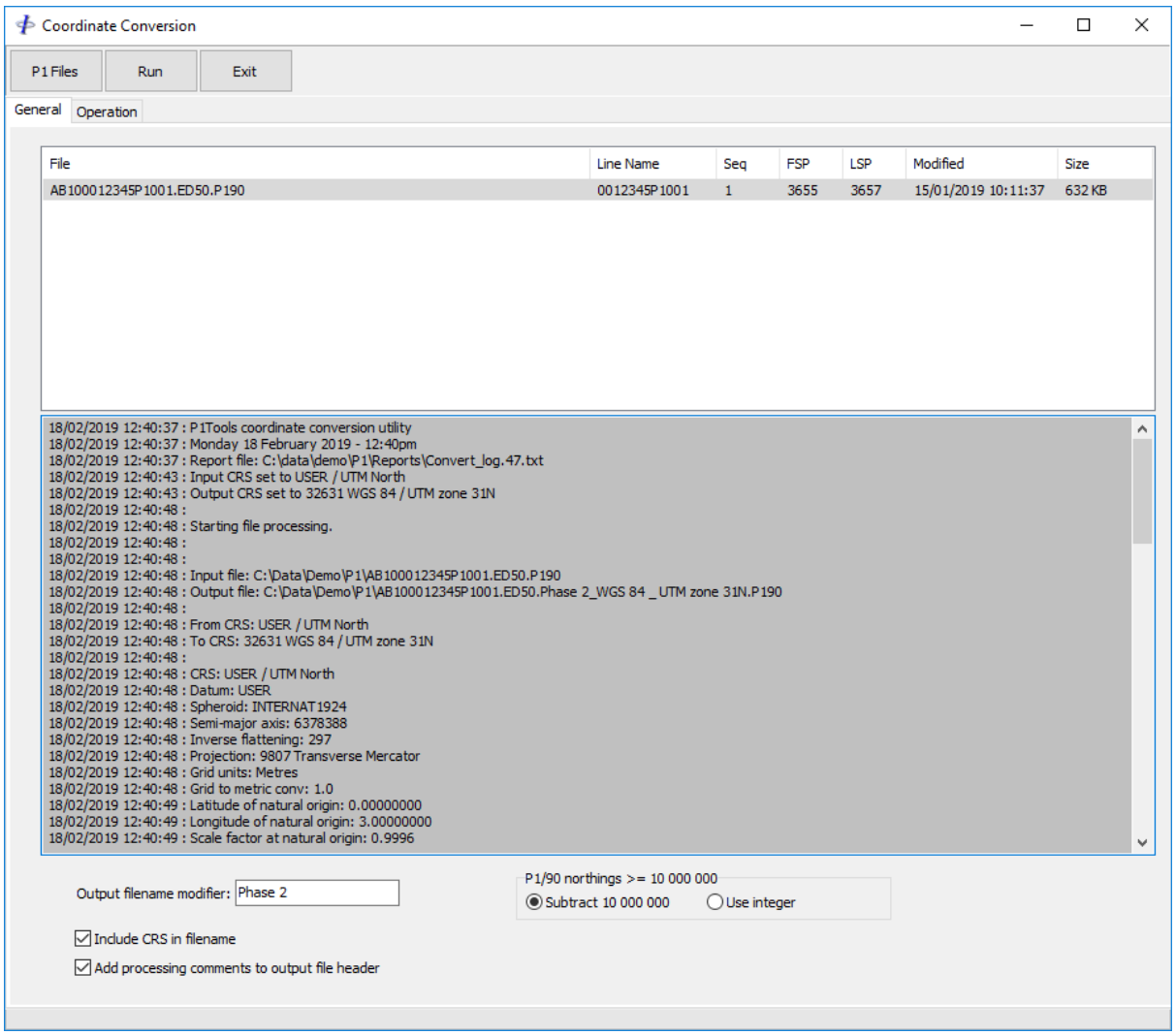


Figure 8-1 – Convert: General Parameters

8.1 Main Toolbar

P1 Files: Click the *P1 Files* button to select input files. These will appear in the file list.

Run:	Click the *Run* button to start the conversion after all parameters have been set up.
Exit:	Exits the module.

8.2 General Parameters

File list:	Displays the list of files for processing. Use the popup menu in the file list for options.
Output filename modifier:	Enter a string to modify the output file name. This will be appended to the file name before the filename extension.
Include CRS in filename:	Includes the output CRS name in the output file name.
Add processing comments to output file header:	Input and output CRSs and coordinate operation details will be written to comment records in the output file header.
P1/90 northings >= 10000000:	Specify the action to take if the conversion results in northing values greater than or equal 10 000 000. Applies only to P1/90.

8.3 Geodetic Parameters

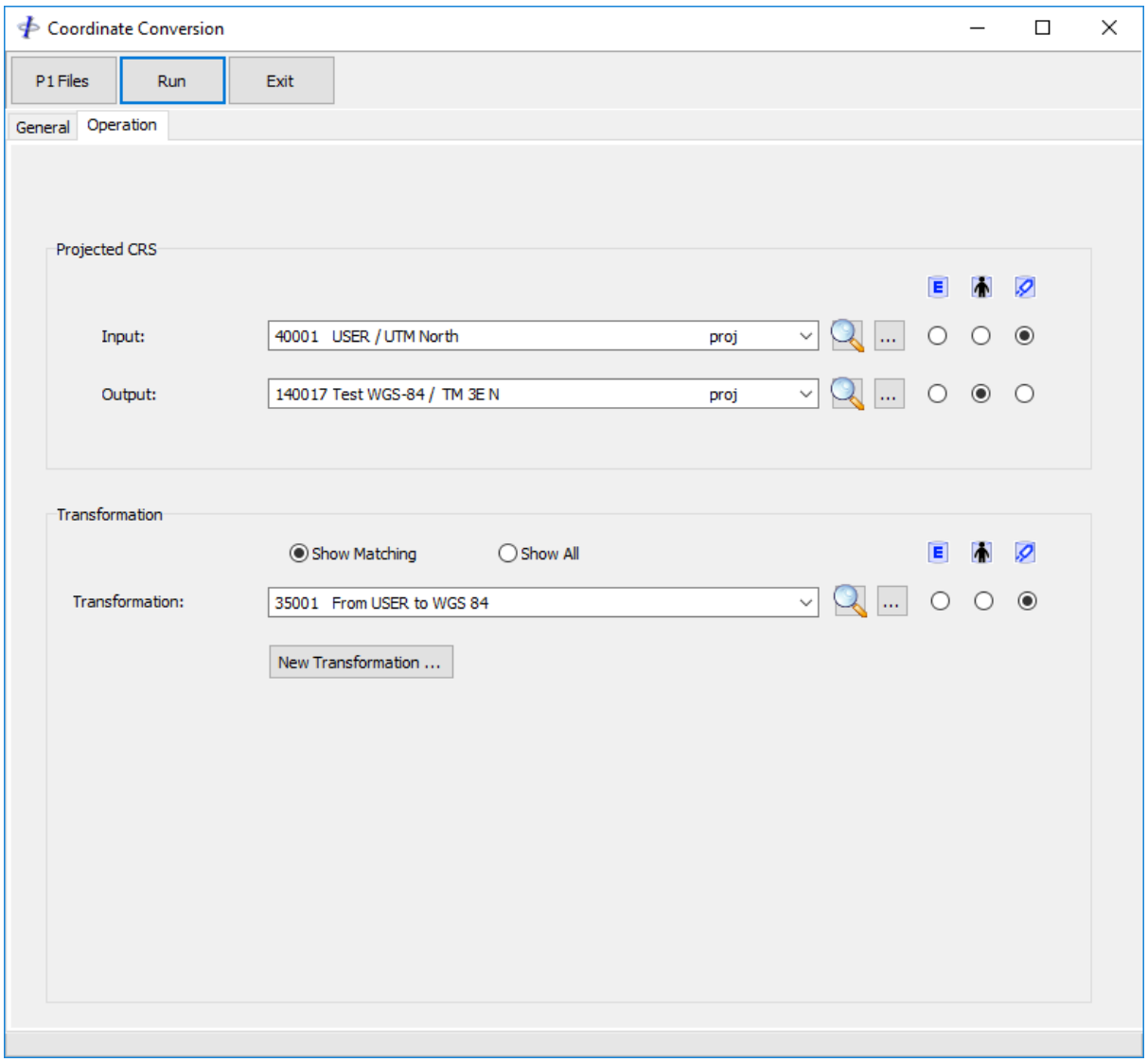


Figure 8-2 – Convert: Geodetic Parameters

Geodetic parameters are defined on the *Operation* page.

refer to the CRS manual for details of CRS management.

8.3.1 Databases

All lists contain entities from one of the three available databases:

	EPSG DB
	User DB
	Line DB (from input file header)

8.3.2 Projected CRS

The projected CRS panel lists the *Input CRS* and the *Output CRS*. The *Input CRS* is initially detected from the P1 header. If the header definitions are incorrect, or do not exist, then the *Input CRS* can be selected from the *User DB* or the *EPSG DB*.

The *Output CRS* is the CRS to which the coordinates in the file will be converted. The *Output CRS* may be selected from the *User DB, EPSG DB* or *Line DB*. If the *Output CRS* is the same as the *Input CRS* then the file will still be processed but no coordinate operation will be carried out and the coordinates in the output file will be the same as those in the input file.

8.3.3 Transformation

Database:	Select from EPSG DB, User DB or Working DB .
Show Matching:	Only transformations whose Source CRS or Target CRS code matches either the *Input CRS* or *Output CRS* or both CRSs will appear in the list. If a transformation is not reversible then it will only appear in the list if its Source CRS matches the *Input CRS*. For non-EPSG CRSs, the software will attempt to match these to an EPSG defined CRS based on its defining attributes (name, a and 1/f).
Show All:	All transformations in the selected database will be shown.
Link between CRSs and Transformation:	If the selected transformation's Source CRS or Target CRS cannot be matched to either the *Input CRS* or the *Output CRS,* then there will need to be manually specified using the fields shown in Figure 8-3.
New Transformation:	Click the *New Transformation* button to create a new transformation. Refer to the CRS_Manual.pdf for details on how to create a new transformation.

Search for entity.

Show entity details.

The direction in which the transformation will be applied will be automatically handled by the software. It is not necessary to select a transformation whose Source CRS matches the *Input CRS* and the operation will be reversed if necessary

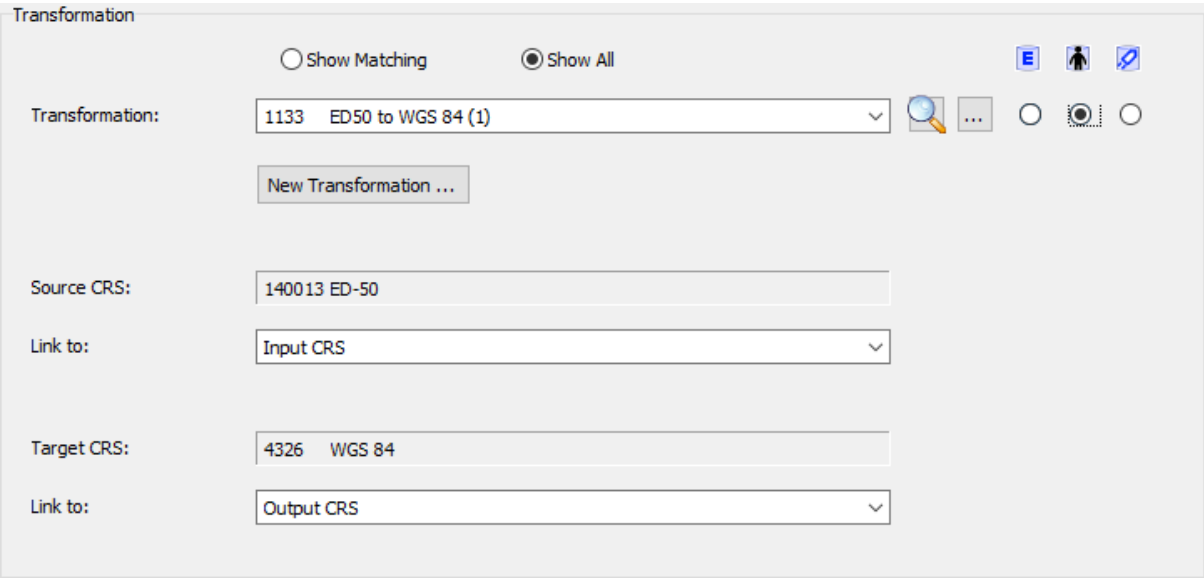


Figure 8-3 – Convert: Link CRSs to Transformation

8.4 Execution

8.4.1 P1/90

Geodetic records in the header are updated.

All coordinates in all data records are converted from geographic coordinates, where present, otherwise from grid coordinates.

Output northings greater than or equal to 10 000 000 (grid units) will either be reduced by this amount or be written as integers according to the specified action in the general parameters page

8.4.2 P1/11

Geodetic records in the header are updated.

Only those coordinates referenced to the defined input CRS will be converted. If data are recorded in more than one CRS then additional conversions would be required to convert all data records.

Data will be converted from geographic coordinates, where present, otherwise from grid coordinates.

8.4.3 Log

All actions and processes are recorded to the log which is both displayed in the Coordinate Conversion Module window and saved to file in the project P1 folder.

9 POSTPLOT

The Postplot module is invoked from the *Postplot* button in the main toolbar.

The module allows the records in a P1 file to be output in to the following formats:

- DXF
- ESRI Shapefile
- KML

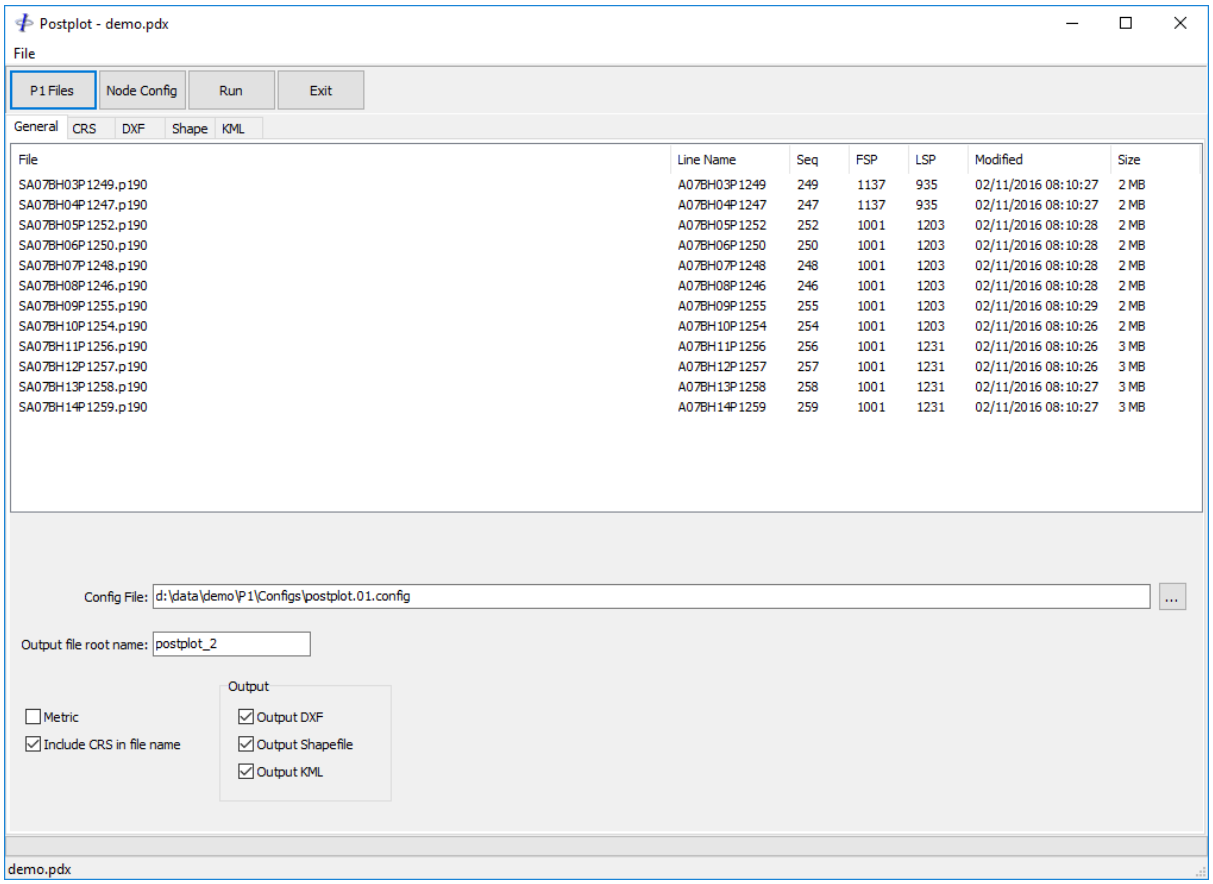


Figure 9-1 – Postplot

9.1 Menu

New parameter set: Create a new parameter set.

Open parameter set: Open an existing parameter set.

Save parameter set: Save the current parameter set.

Save parameter set as:	Save the current parameter set under a new name.
Recent parameter sets:	Open a recently used parameter set.
Exit:	Exit the Postplot module.

Parameter sets store all settings except for the line list.

9.2 General Options

9.2.1 Files

Click the *P1 Files* button to select the input files.

The line list can be sorted by clicking on the appropriate column header. Lines can be removed from the list by pressing the Delete key or by selecting *Remove* on the popup menu, which is invoked by right clicking on the list. Additional lines can be added to the list from any location in the computer by clicking on the *P1 Files* button.

9.2.2 Node Configuration

The node configuration determines which records in the P1 are to be processed. The same node configuration applies to all files in the list.

To set the configuration first add at least one P1 file to the file list. Click the *Node Config* button.

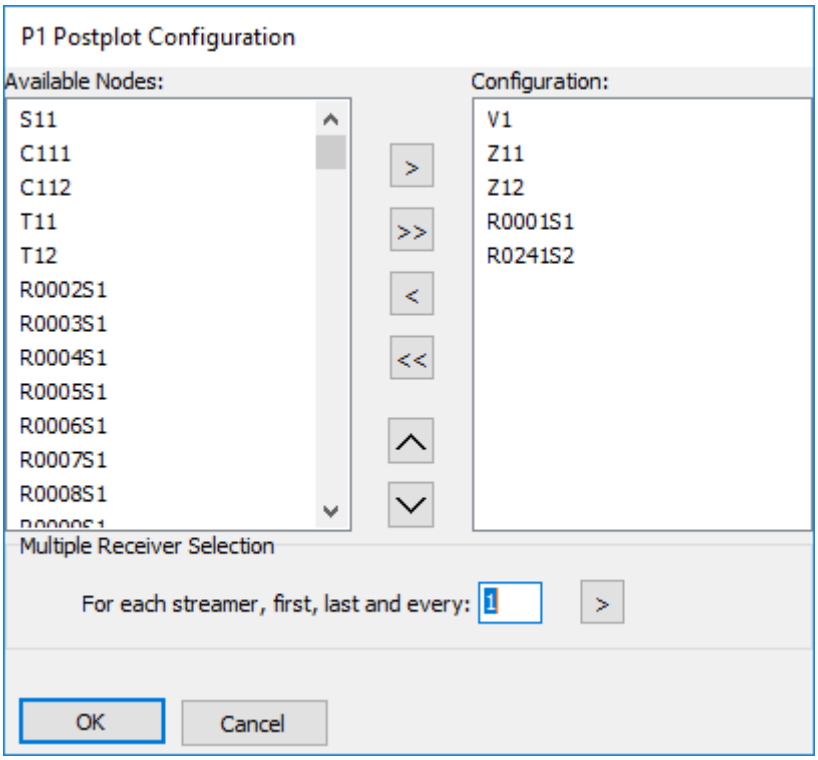


Figure 9-2 – Postplot: node configuration

The config file name appears in the *Config File* field. The default path is that specified in the P1Tools project.

9.2.3 Other Options

Output file root name:	Enter the root name of the output file. Applies to DXF. Applies to Shapefile and KML outputs when single output is specified under these options (see Shapefile and KML options).
Metric:	Forces outputs for non-metric CRSs to be converted to metres.
Include CRS in filename:	Include the CRS in the output file name(s).
Output:	Select which outputs to produce by checking the appropriate checkboxes. Parameter pages will be displayed only for those output types selected.

9.3 Coordinate Reference System (CRS)

The CRS page displays the parameters for the CRS read from the first file in the list. If no files have been added to the list then the CRS parameters are empty.

For P1/11 files which may contain data in more than one projected CRS, select from the dropdown list the CRS to use. Only data referenced to that CRS will be processed.

For details on the *CRS Inspector* and *CRS Manager* refer to the CRS manual.

9.4 DXF

DXF is the AutoCAD Drawing eXchange Format.

9.4.1 Parameters

General Information:	Enter general information to appear on the map.
Revisions:	Enter revision details to appear on the map
Data Type	
Preplot:	P1/90 contains only waypoint coordinates. A line will be plotted connecting waypoint belonging to the same line. P1/11 waypoints are taken from N1 records.
Postplot:	Selected records will be plotted individually.
Annotation	
Line label size:	Enter the line label size in points.
Point label direction:	Enter the point label orientation in degrees. Check the *Automatic* checkbox to plot labels at right angled to the line direction.
Point size scale:	Enter a scalar for the point size.
SP number:	Check to plot shotpoint numbers.
Modulus interval:	Check to output labels at modulus *<label_interval>* where *<label_interval> is* specified in the record attributes. See section 9.4.2.
Water depth:	Check to output water depths.

Margins:	When margins are 0 or blank then the map is scaled to fit the contents. Override any of the margins by the margin in grid units. This may be required if entities re to be added to the map from other sources.
Layers:	Check the appropriate checkboxes to output the specified layers.
Graticule Spacing:	If 0 or blank the projection graticule spacing is automatically calculated. Specify a value to override the graticule spacing.
Info Bar Position:	Select from: *Automatic* *Side* *Bottom*

.

9.4.2 Nodes

The node list is populated with the nodes in the node configuration. When the node configuration is created or edited by clicking the *Node Config* button the node list will be changed accordingly.

To change the node attributes, select the nodes for which attributes are to be modified, right click and select *Attributes* from the popup menu to display the attributes dialog. If multiple nodes are selected then the fields in the attributes dialog will be greyed out, as seen in Figure 9-3, and only those attributes that are changed will be applied to all selected nodes.

Attributes

Symbol:	Select the symbol to be plotted for the selected nodes.	
Colour:	Select the colour for the selected nodes.	
Size:	Specify the size, in grid units, of the symbol.	
Label size:	Specify the size, in points, of the label font.	
Label position:	Selected the label position relative to the point.	
Label interval:	Specify the label interval. If *Modulus Interval* is checked in the main DXF page then the shotpoints for which labels are plotted will be a multiple of the specified interval.	
Layer:	*Node:*	The selected nodes will be added to a layer of the node name.

Line: The selected nodes will be added to a layer of the line name.

Specify: Enter a name in the *Layer Name* field. The selected nodes will be added to a layer of the specified name.

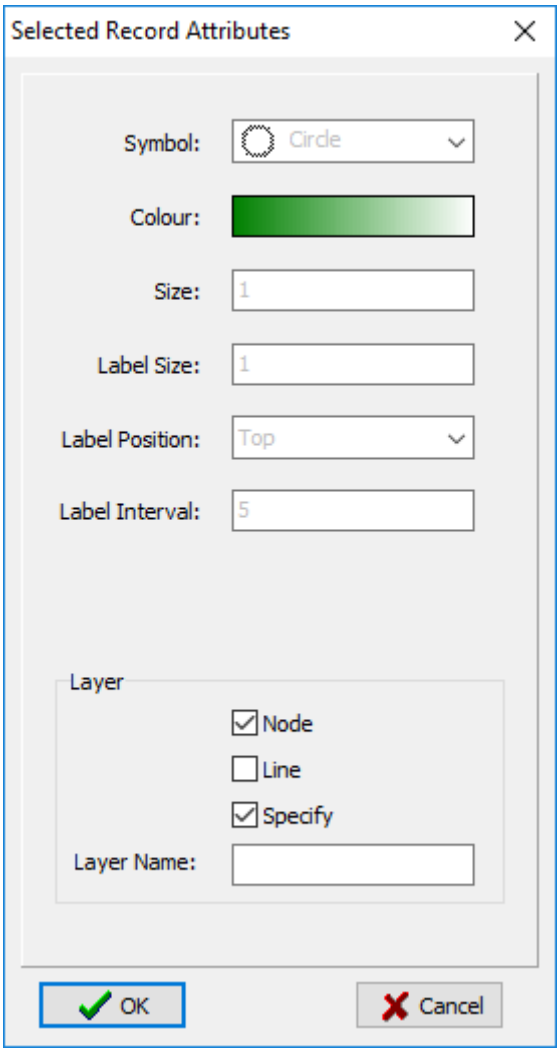


Figure 9-3 – Postplot: DXF node attributes

9.5 Shape

9.5.1 Parameters

Multiple Input Files:	Select from:	
	Output to separate files:	Data from each input file will be output to a separate file of the same name, with appropriate file extension. *Output File Root name* defined in the *General* page will not be used.
	Output to same file:	Data from all input files will be output to the same file using the *Output File Root Name*, and the appropriate extension.
Multiple Nodes:	Select from:	
	Output to separate files:	Data for each node will be output to a separate file whose name will contain the node name.
	Output to same file:	Data for all nodes will be output to the same file.
Feature Class	*Point Z:*	Output a PointZ file.
	Polyline M:	Output a PolylineM file.

9.6 KML

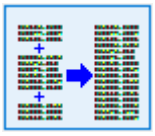
Keyhole Markup Language (KML) files are referenced to the WGS-84 CRS. If the input file CRS is not WGS-84, and cannot be transformed to WGS-84, then no output will be created.

9.6.1 Parameters

Multiple Input Files:	Select from:	
	Output to separate files:	Data from each input file will be output to a separate file of the same name, with appropriate file extension. *Output File Root name* defined in the *General* page will not be used.

	Output to same file:	Data from all input files will be output to the same file using the *Output File Root Name*, and the appropriate extension
Multiple Nodes:	Select from:	
	Output to separate files:	Data for each node will be output to a separate file whose name will contain the node name.
	Output to same file:	Data for all nodes will be output to the same file.
Placemarks:		
	Interval (SPs):	Specify the shotpoint interval to appear on the map.
	Modulus Interval:	When checked only the first, last and shotpoints whose number is a multiple of the interval will be displayed.
	Show ID:	Display the node ID.
	Show SP:	Display the shotpoint number.
Output File Type:	Select from:	
	KML	
	KMZ:	compressed KML.

10 CONCATENATE



The Concatenate module is invoked from the *Concatenate* button in the main toolbar.

The module is used to concatenate any number of P1 files to produce a single file.

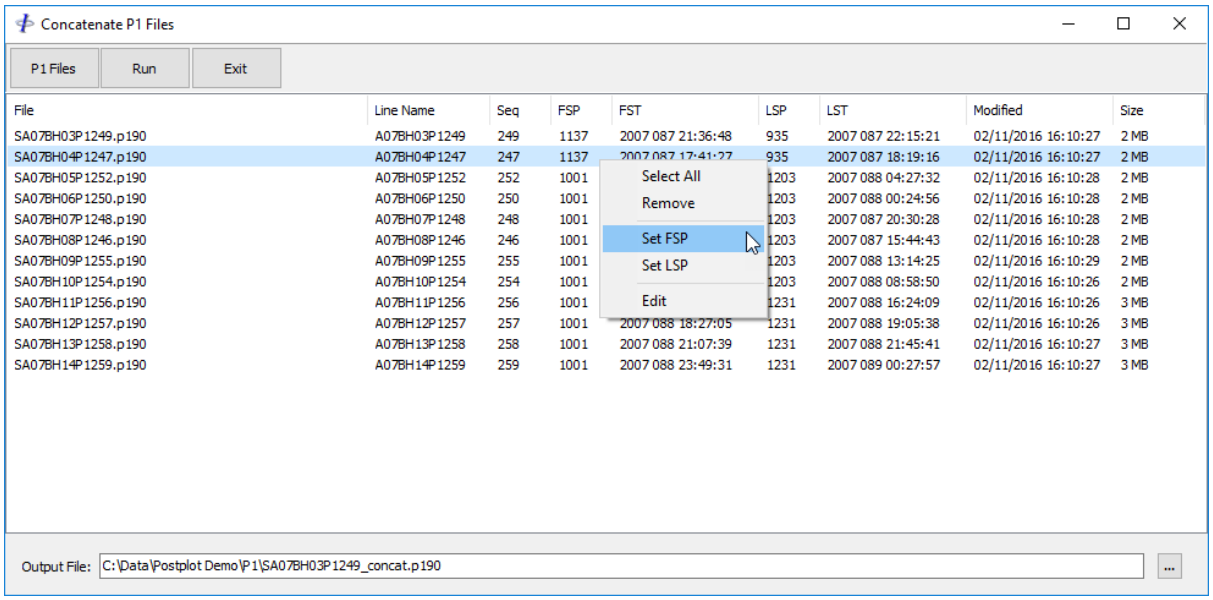


Figure 10-1 – Concatenate

10.1 Files

Click the *P1 Files* button to select the input files.

The line list can be sorted by clicking on the appropriate column header. Lines can be removed from the list by pressing the Delete key or by selecting *Remove* on the popup menu, which is invoked by right clicking on the list. Additional lines can be added to the list from any location in the computer by clicking on the *P1 Files* button.

In the *Output File* field enter or browse for the name of the file to be created.

10.1.1 Shot Range

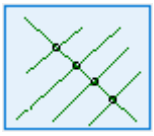
The default SP range is the first to last shot found in each file. To change this select the file(s), right click and from the popup menu select *Set FSP* or *Set LSP*.

10.2 Execution

Click the *Run* button to start processing.

Note: The header records in the first line in the list will be used as the header of the concatenated file. Headers in subsequent files will be ignored.

11 INTERSECT



The Intersect module is invoked from the *Intersect* button in the main toolbar.

The module is used to compute line intersections.

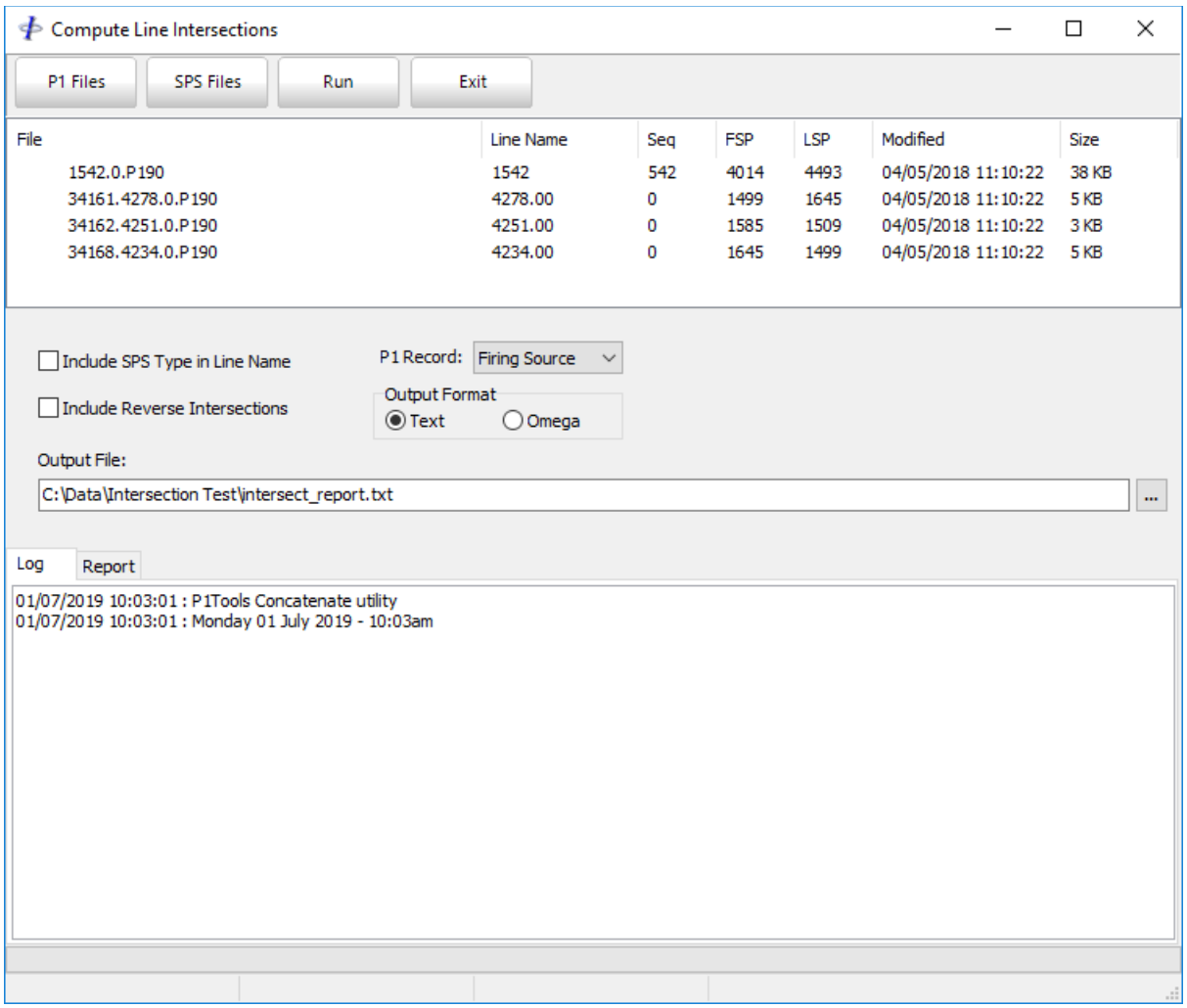


Figure 11-1 – Intersect

11.1 Files

Click the *P1 Files* button to select the input files. Supported file types are P1 and SPS.

The line list can be sorted by clicking on the appropriate column header. Lines can be removed from the list by pressing the Delete key or by selecting *Remove* on the popup menu, which is invoked by right clicking on the list. Additional lines can be added to the list from any location in the computer by clicking on the *P1 Files* or *SPS Files* button.

In the *Output File* field, enter or browse for the name of the file to be created.

11.2 P1 Record Type

Select the Record Type from the dropdown box. The coordinates of the selected Record Type will be used in computing the intersections.

11.3 Output Format

Two formats are supported: *Text* and *Omega*.

11.3.1 P1Tools Format

This is the P1Tools test format, as shown in Figure 11-2.

C:\Data\Intersection Test\Output\intersections.txt

Line	Pnt Ndx	Line	Pnt Ndx	E	N
1542	4278.30	4278.00	1537.81	405681.8	3063947.0
1542	4251.62	4251.00	1529.41	404335.7	3063735.9
1542	4234.57	4234.00	1529.26	403489.1	3063732.0

Line: 1 Col: 1

Figure 11-2 – Intersect: Output Text

Each output record has the following attributes in the order shown:

Line: Line number of the intersected line.

Pnt: Point number of the *nearest* point on the intersected line.

Ndx: Index number of the point in the case of SPS format.

Line:	Line number of the intersecting line
Pnt:	Point number of the *nearest* point on the intersecting line.
Ndx:	Index number of the point in the case of SPS format.
E:	Easting of the point of intersection.
N:	Northing of the point of intersection.

11.3.2 Omega Format

This format is commonly used in seismic processing. An example is shown in Figure 11-3. Refer to the Omega Manual for a description of this format.

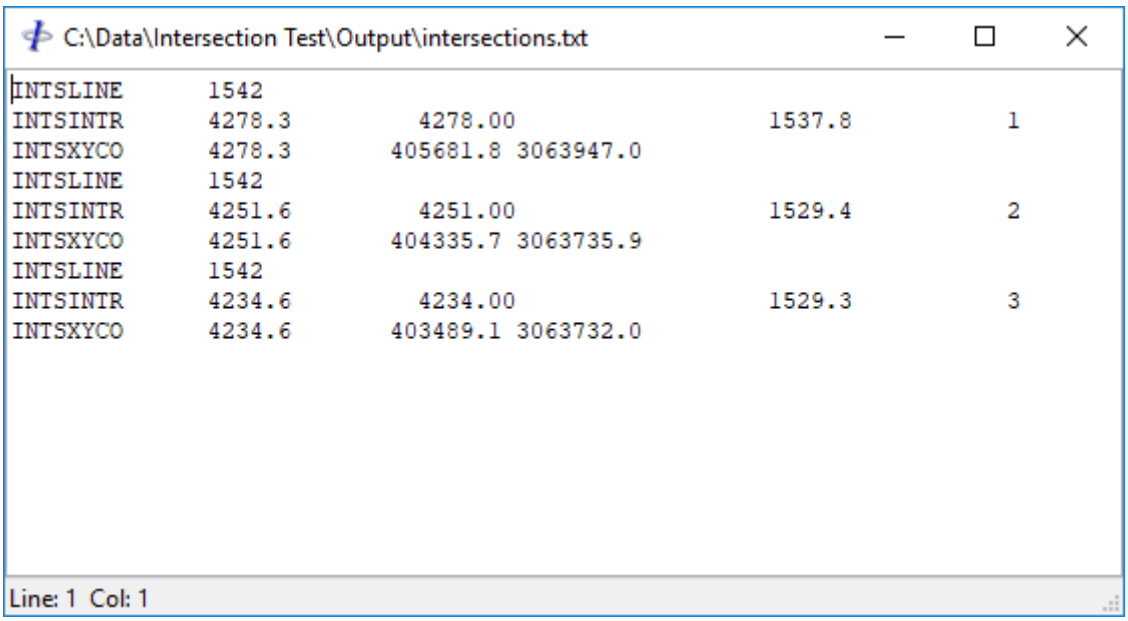


Figure 11-3 – Intersect: Output Omega

11.4 Options

Include SPS Type in Line Name:	Check this option to include the SPS Type (an ‘S’ or an ‘R’) in the Line Name

Include Reverse Intersections: When this option is checked, the output records are repeated with the intersecting and intersected lines swapped.

11.5 Execution

After the files have been selected, click the *Run* button to start processing. During processing, the line names of the lines currently being processed in the Status Bar at the bottom of the window.

ON completion the report will be saved and displayed in the *Report* tab.

12 BATHYMETRY

The Bathymetry module is invoked from the *Bathymetry* button in the main toolbar.

The module is used to apply various bathymetric corrections to P1 datasets.

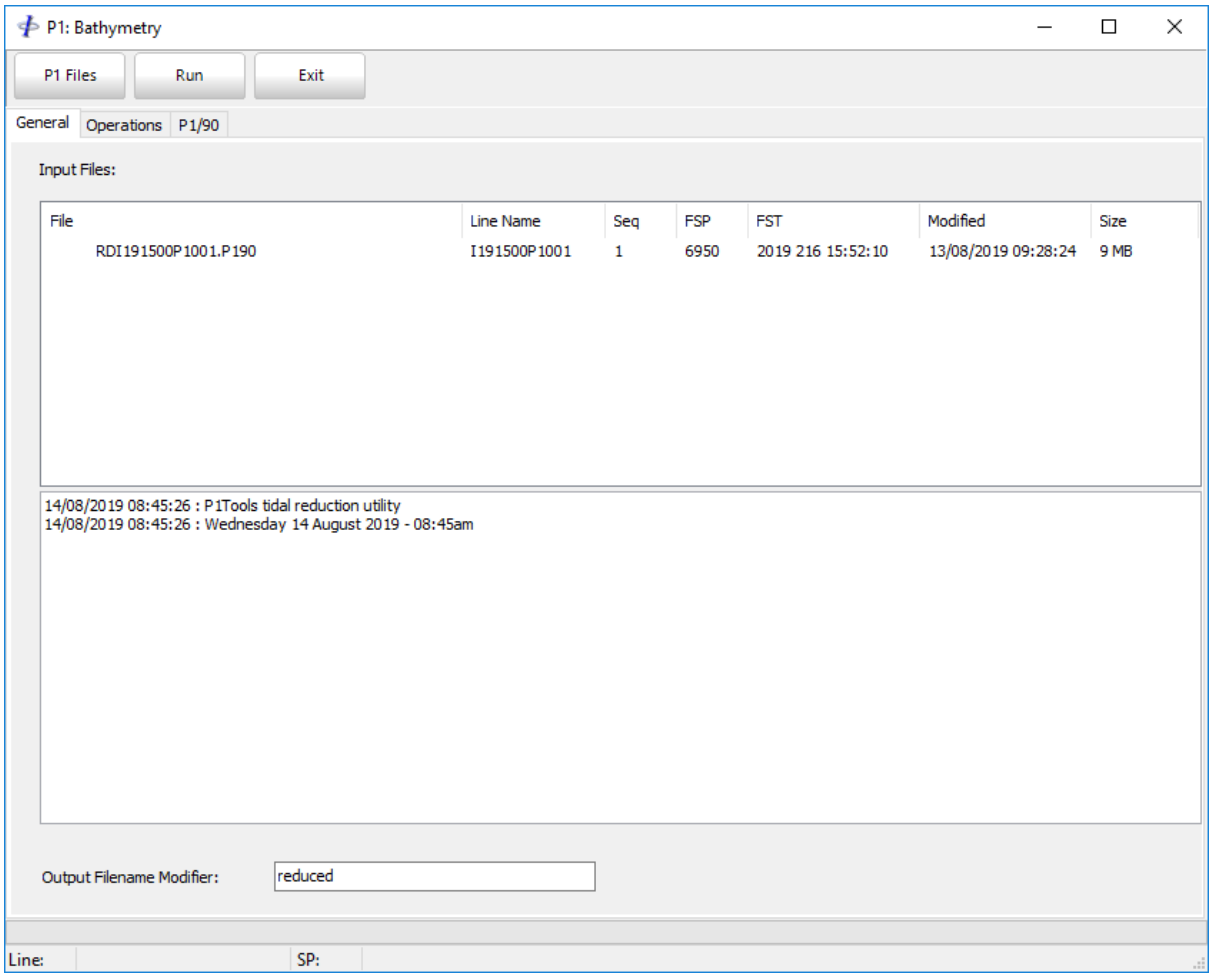


Figure 12-1 – Tide

12.1 Files

Click the *P1 Files* button to select the input files.

The line list can be sorted by clicking on the appropriate column header. Lines can be removed from the list by pressing the Delete key or by selecting *Remove* on the popup menu, which is invoked by right clicking on the list. Additional lines can be added to the list from any location in the computer by clicking on the *P1 Files* button.

Note: Do not mix P1/90 and P1/11 files in the same list because the operations applied require different parameterisation.

12.1.1 Year

The P1/90 format does not support the year in the shot time stamp. This may be needed if processing a dataset that spans the new year. To set the year in files, select the files in the list then right click and select *Set Year* from the popup menu. In the dialog which appears enter the year in which the first shot was acquired.

12.2 General Parameters

Output filename modifier: Enter the filename modifier which will be appended to the output file names before the filename extension.

12.3 Operations

12.3.1 Tidal Reduction

Check the *Apply Tidal Reduction* checkbox to apply bathymetric corrections from external file.

Click the *Tide Data* button to select the file containing the external data.

Select the file and enter the format specification in the *Format* field. Details of how to specify the format are displayed by clicking on the *Format Description* button.

Specify either *Fixed Width* format or *Delimited* format. Note that a <Tab> character in the delimiter field should be entered as ^*t*.

Note that when specifying a fixed width format, the fields in a file which contains tabs will not necessarily align with the format string as can be seen in the example in Figure 12-2. To check the alignment, select a part of the format string – the corresponding part of the first record in the file will be highlighted.

12.3.1.1 Time Based Data

The data in the tide file must be in chronological order. If the P1 dataset spans a new year then the year must be present in the tide data. The time of the first to last records in the reduction file must span the entire P1 dataset in order for the corrections to be applied.

If the year is to be used in synchronizing the P1 data with the tide file then this must be set for P1/90 files. See section 12.1.1.

12.3.1.2 Shot Based Data

The data in the tide file can be in either ascending or descending order. The shotpoint of the first and last records must span the entire P1 dataset in order for the corrections to be applied.

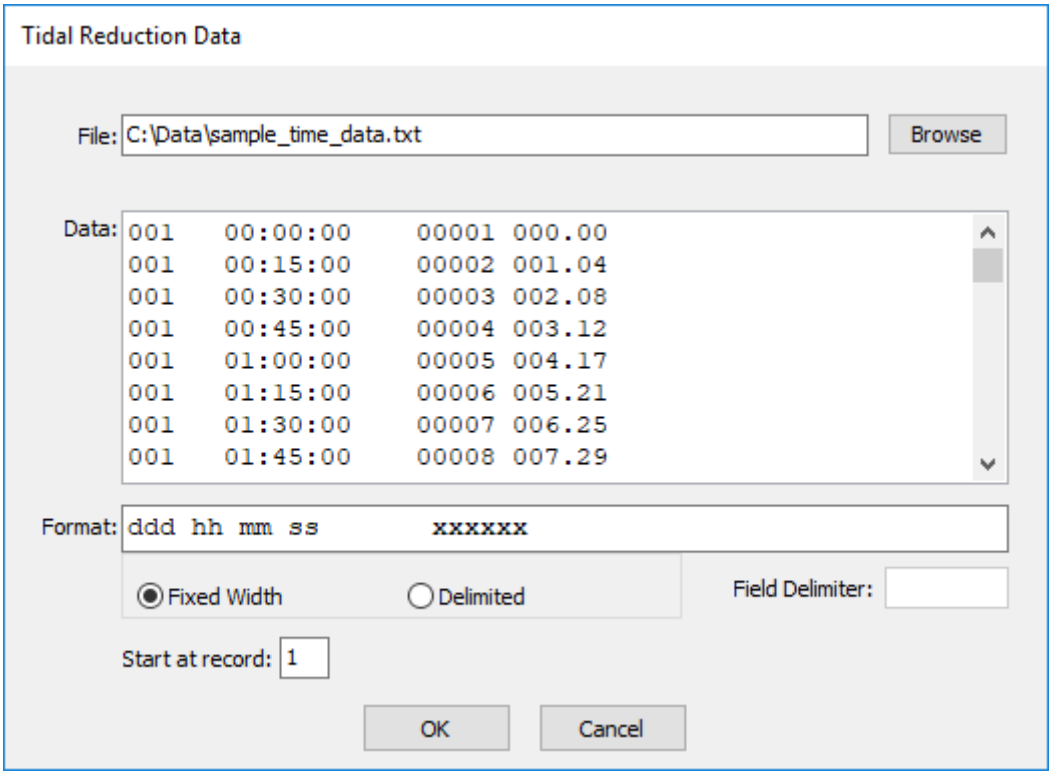


Figure 12-2 – Tide: Reduction Data

12.3.1.3 Operation

Subtract data from recorded depth:	The values in the data file are **subtracted** from the depths in the P1 for the specified record types. This operation should be used if the values provided in the data file are reductions. This is the recognised convention
Add data to recorded depth:	The values in the data file are **added** to the depths in the P1 for the specified record types. This operation should be used if the values provided in the data file are corrections.

Replace recorded depth:	The depths in the P1 for the specified record types are **replaced** with the values in the data file. `
Replace tide with data (data is a reduction):	For P1/90: Recorded depths have the data value subtracted. For P1/11: Recorded depths which are referenced to the same vertical CRS as recoded tide will have the existing tide component removed (added in order to remove a reduction), then the data is **subtracted** from the depth. If tide is recorded in a P1/11 record extension field referencing the same vertical CRS as the water depth then this value will also be replaced. The extension record field name should contain either the word “tide” or “tidal” (non-case sensitive).
Replace tide with data (data is a correction):	For P1/90: Recorded depths have the data value added. For P1/11: Recorded depths which are referenced to the same vertical CRS as recoded tide will have the existing tide component removed (added in order to remove a reduction), then the data is **added** from the depth. If tide is recorded in a P1/11 record extension field referencing the same vertical CRS as the water depth then this value will also be replaced. The extension record field name should contain either the word “tide” or “tidal” (non-case sensitive).

12.3.2 Datum Correction

Check the *Apply Datum Correction* checkbox to apply a datum correction.

Specify the value which will be added to depths in the file.

12.3.3 Scale Correction

Check the *Apply Scale Correction* checkbox to apply a scale correction.

Specify the value with which the depths in the file will be multiplied.

Specify the vessel draft. This value is subtracted from the depth before scaling and added back after scaling.

12.4 P1/90

This page will only appear if the first file in the list is in the P1/90 format.

Records:	Specify which record types to which all operations will be applied.
Datum in Header:	Select from: *LAT* *MSL* *SL* *ES*
Height Units:	To change the height units, check the *Change Height Units* checkbox, enter the unit name and enter the conversion factor to convert from the new units to metres.

12.5 P1/11

This page will only appear if the first file in the list is in the P1/11 format.

Select existing vertical CRS:	The dropdown list is populated with all vertical CRSs defined in the P1/11 header. Select the one for which all operations are to be applied.
Replace CRS:	Optional. Click the *CRS Manager* button to add a new vertical CRS to the *Line Database*. Refer to the CRS manual for a detailed description of the CRS Manager. The selected *existing* CRS will be replaced with the selected *new* CRS.

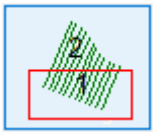
12.6 Execution

Click on the *Run* button to start processing.

12.6.1 Log

A log of the progress, and any error messages, is written to the log displayed in the *General* parameters page. This log may be saved by right clicking on it and selecting *Save* from the popup menu.

13 SPLIT FILES



The Split Files module provides the means to split P1 and P2 files based on location. The module is accessed from the *Split Files* button in the Utilities toolbar.

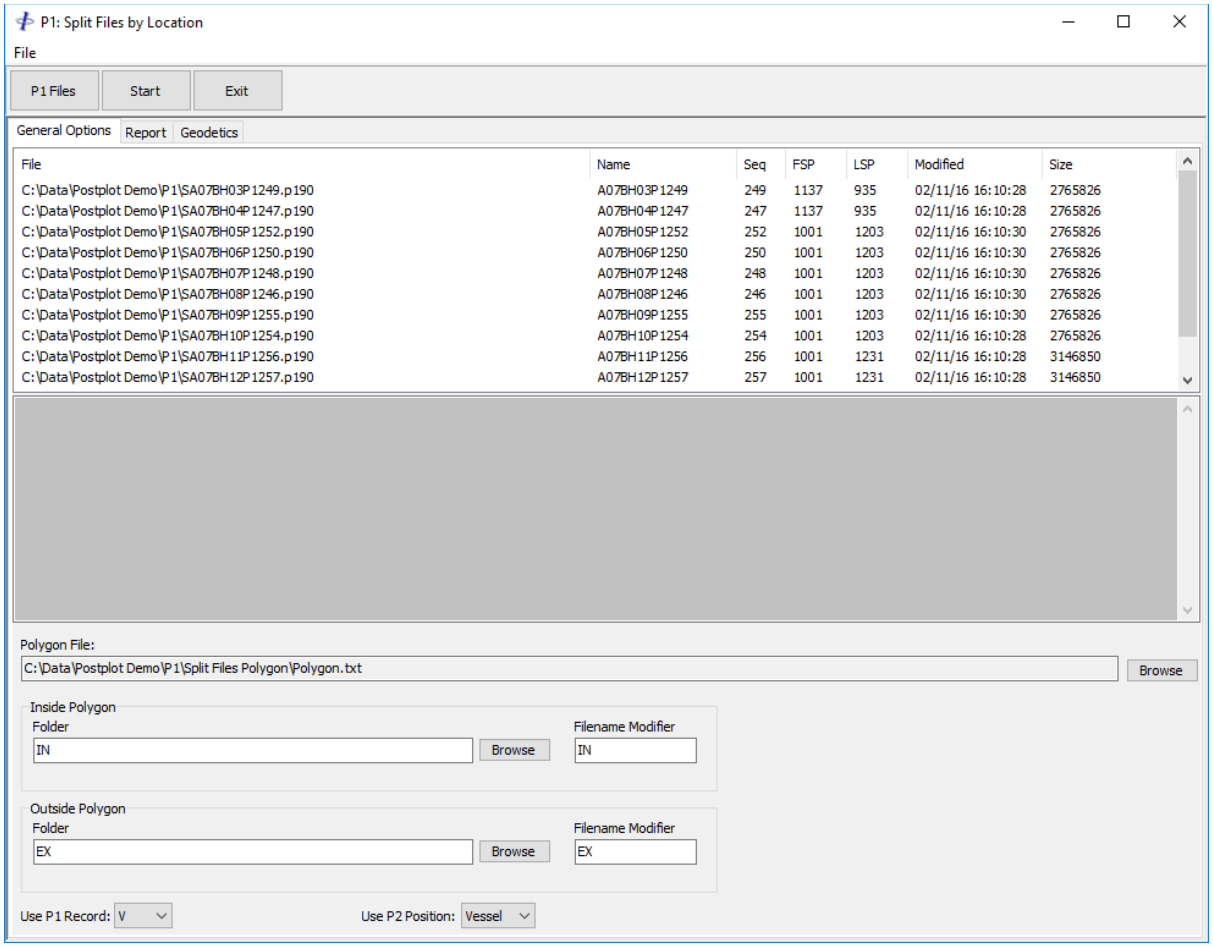


Figure 13-1 – Split Files

The files are split according to whether or not a specified node position falls inside or outside of a defined polygon.

13.1 General Options

13.1.1 Input Files

Valid file types are UKOOA P1/90 and UKOOA P2/94.

Click the *Files* button to present the file open dialog. Multiple files and zip archives may be

selected.

To remove files from the list, highlight the files and press <Delete> or right click the mouse button and select *Remove* from the popup menu.

13.1.2 Polygon

Click the *Browse* button to invoke the Open Polygon dialog. Click the *Browse* button on this dialog to select the polygon file.

The file format may be delimited or fixed width, and each record must contain the coordinates of a polygon node.

The format must be specified by entering a format string. Click the *Format Description* button for an explanation and examples of the format string.

A typical format example is shown in Figure 13-2.

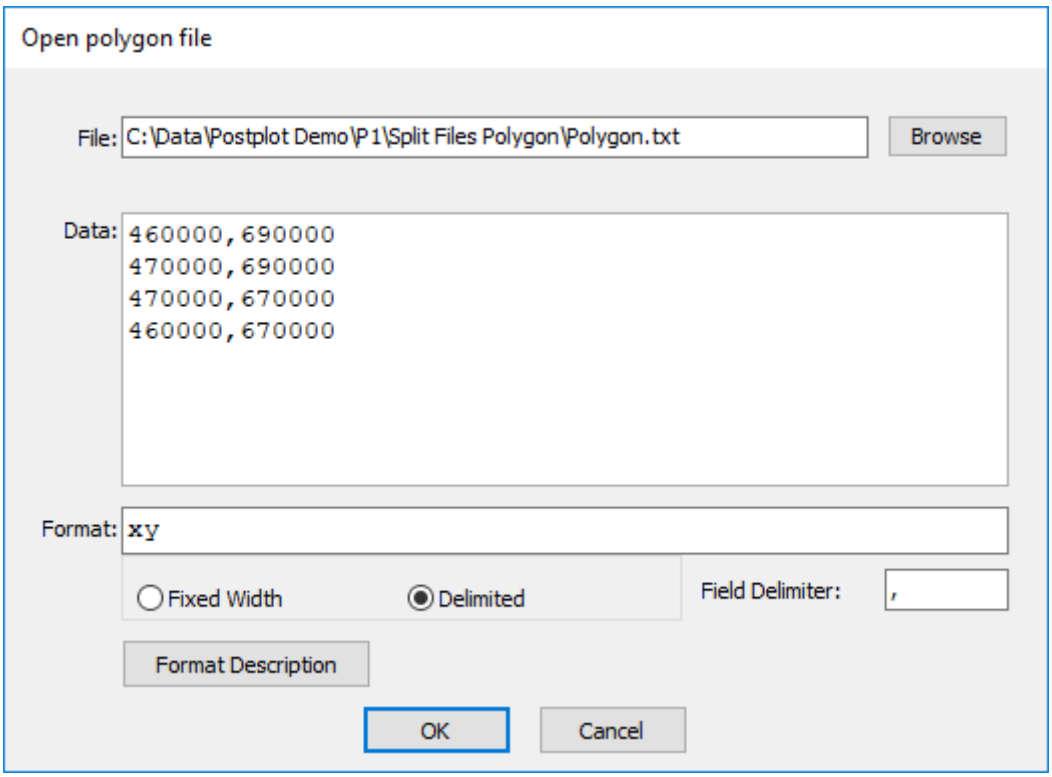


Figure 13-2 – Split Files: Polygon

13.1.3 Filename Modifiers

Specify the filename modifiers to be used to identify files according to whether they fall inside or outside the polygon.

13.1.4 Position Criterion

The split is based on whether the coordinates of a specified record (in the case of P1) or position (in the case of P2/94) falls inside or outside of the polygon.

13.1.4.1 P1/90

For P1 files select from the *Use P1 Record* list which record to be used.

If selecting CMP then the CMP for every receiver group is calculated and used.

13.1.4.2 P2/94

For P2/94 files select from the *Use P2 Position* list which position to be used.

In the case of P2/94 files, the position can be either *Vessel* or *Source*. The coordinates of these are read from the E12 (field derived positioning data) records for the node collocated with the selected position type (vessel or sources).

important: the correct identification of the vessel or source E12 records depends on the file header being correct.

13.2 Geodetics

The datum and projection to which all coordinates in all input files and the polygon file are referenced must be specified. This is necessary to convert from geographical to grid, if necessary, the coordinates in the polygon file or the P2/94 E21 records. Transformation parameters are not required.

If the first input file selected is a P1 then the geodetic parameters are automatically read form the header of that file. If only P2/94 files are selected then the geodetic parameters are not read from file and must be manually entered or loaded from a previously saved parameter set by clicking the *Load* button.

13.3 Report

Generate report only:
No output P1 or P2 files are produced, only the report is generated.

Report SP ranges falling inside polygon:
SP ranges for which the selected position falls inside the polygon are reported.

Report SP ranges falling outside polygon:
SP ranges for which the selected position falls outside the polygon are reported.

P1 Line Name Parsing:
Enter the start column and length of the line name and sequence components of the line name field stored in the P1 records.

For example:

```
VABC1024P123 ...
```

In the above record:

Line name start col 4, length 3 gives 1024
Sequence start 9, length 3 gives 123

Report File:
Enter the name of the report file.

13.4 Execution

Click the *Start* button to start processing. A log file is created in the same folder as the first input file and is also displayed in the *General Options* page as processing progresses.

The *Start* button changes to a *Stop* button and execution may be stopped at any time by clicking this button.

13.5 Receivers and CMPs

If the P1 record selected is R or CMP then only the individual receivers will be output to the respective output files. Figure 13-3 shows a P1 containing only receivers falling inside the polygon.

Note: In this case a non-standard P1 will be produced because the number of receivers per shotpoint is not constant.

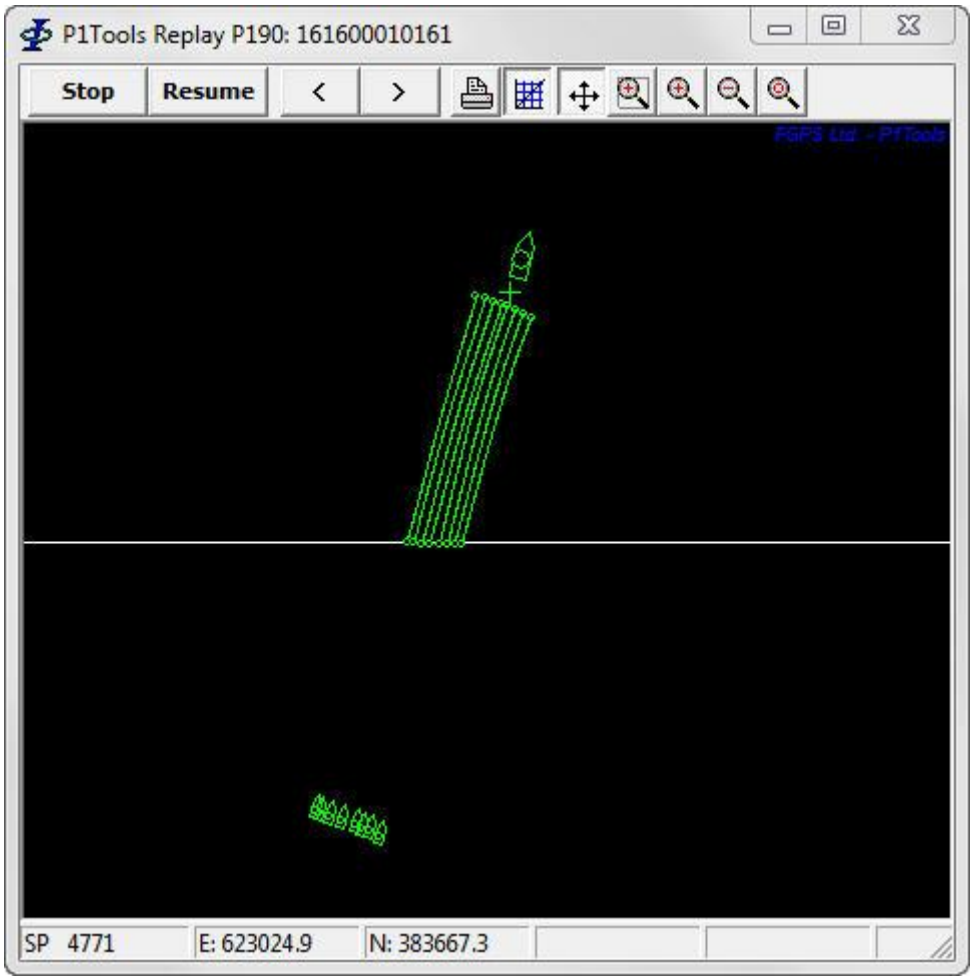


Figure 13-3 – Split Files: Results

14 UPDATE HEADERS

The *Update Headers* module is used to replace headers in a P1 data set. The module is accessed from the *Update Headers* button in the *Utilities* menu.

File types supported are P1/90 and P1/11, but these must not be mixed within the data set.

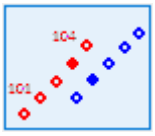
Select the header file.

Optionally enter the *Output Filename Modifier*.

Select the P1 files.

Click *Start*.

15 MERGE



The Merge module enables merging of multiple files into one based on overlap criteria. This would typically be used to merge reshoot lines. The module is accessed by clicking the *Merge* button in the Utilities toolbar.

For typical usage, two or more P1 files containing overlapping data from the *same preplot line* would be selected and merged into a single line.

Various processing options may also be applied to the selected files without a merge being performed.

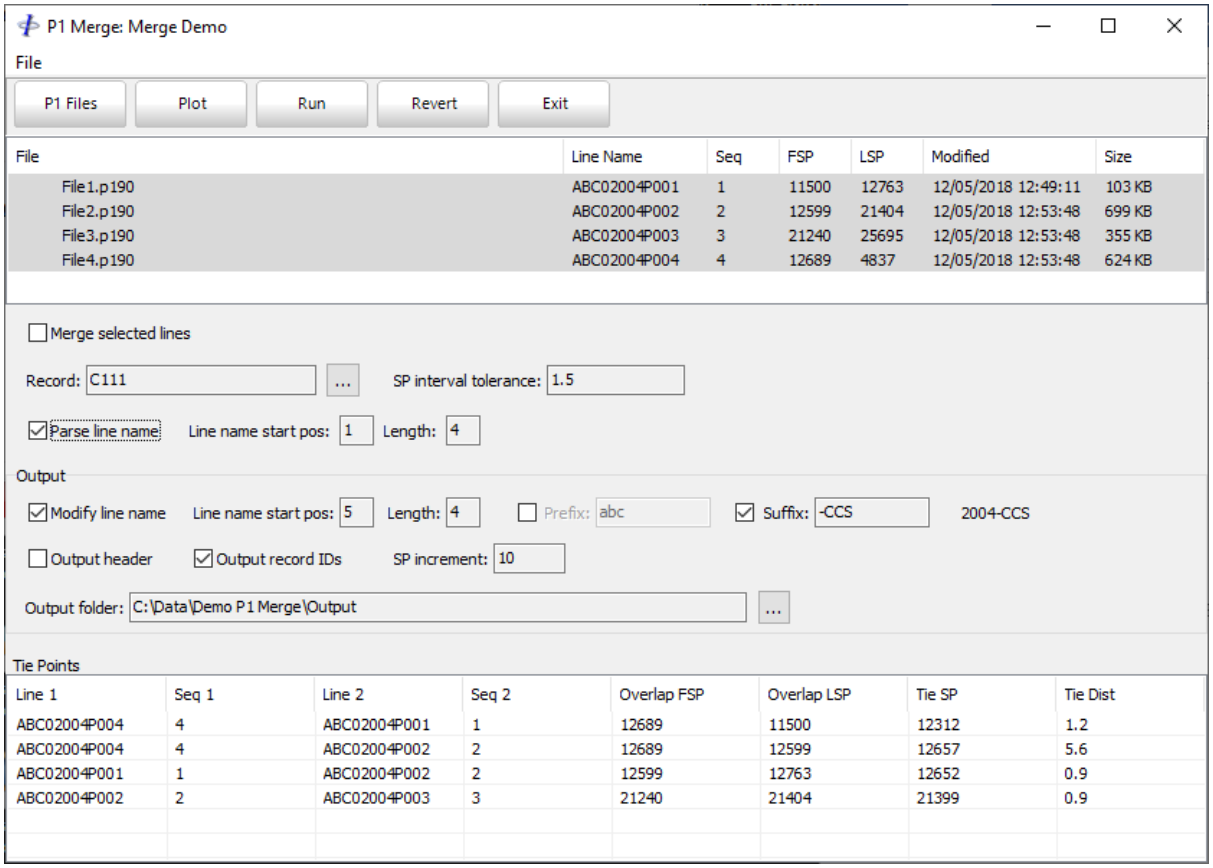


Figure 15-1 – Merge

15.1 Menu

File

New Project: Create a new project.

Open Project: Open an existing project.

Save Project: Save the current project. All parameters except P1 file section are saved.

Save Project As: Save current project under a different name.

Recent Projects: Open a recently saved project.

Exit: Exit the *Merge* module.

15.2 Toolbar

P1 Files: Click the *P1 Files* button to add files to the list. Supported file formats are UKOOA P1/90 and IOGP P1/11. These formats cannot be mixed in the same data set.

Subsequent operations will be performed only on files in the list that have been selected with the mouse

Plot: Click the *Plot* button to plot the selected files.

Run: Click the *Run* button to perform the specified actions.

Revert: Click the *Revert* button to revert to the automatically selected merge points.

15.3 Parameters

Merge selected lines: When checked, the selected lines will be candidates for merging.

When not checked no merge will take place but other processing may be performed.

Record: Click on the … button. A list of records from the first file in the list will be displayed. Select from this list which record is to be used to perform the merge calculations.

SP interval tolerance:	The median SP interval for the line will be calculated. If any SP interval differs from this median by more than the tolerance entered then it will be reported.
Parse line name:	When checked, only lines whose parsed names match will be candidates for merging together.
Line name start position and length:	Enter the character number of the start, and the number of characters to use for the required line name for parsing.
Modify line name:	When checked, the line name will be modified according to the parameters specified (described below).
Line name start position and length:	Enter the character number of the start, and the number of characters to use for the required line name modification.
Prefix:	When checked, the specified prefix will be pre-pended to the line name.
Suffix:	When checked, the specified suffix will be appended to the line name.
Output header:	When checked, the input file header, if any, will be output.
Output record IDs:	When checked, record IDs in the input file will be output.
SP increment:	If a number greater than 1 is specified, the output file will contain only the first, last and <*modulus increment*> shots.
Output folder:	Click the … button to browse for the folder to which the output file(s) and the log, will be written.

15.4 Tie Points

After the *Plot* or *Run* buttons have been clicked, the automatically calculated tie points are listed. A tie point will be listed when the following conditions are met:

- Candidate lines for the tie point have the same line name in the file
- Candidate lines for the tie point have an overlap with at least one common SP number.

15.4.1 Attributes

For each tie point calculated, the following attributes are listed:

Line 1:	The name of the first line for this tie point.
Seq 1:	The sequence of the first line for this tie point.
Line 2:	The name of the second line for this tie point.
Seq 2:	The sequence of the second line for this tie point.
Overlap FSP:	The SP number, common to both lines, of the start of the overlap.
Overlap LSP:	The SP number, common to both lines, of the end of the overlap.
Tie SP:	The SP number, common to both lines, of the tie point.
Tie Distance:	The distance between the tie SP in both lines.

15.4.2 Automatic Tie Points

An automatic tie point is calculated as being the common SP which has the shortest tie distance. Tie points are automatically calculated when the *Plot* or *Run* buttons are first clicked.

15.4.3 Zoom to Tie Point

By double clicking the mouse button on a tie point in the list, or selecting *Zoom to point* from the popup menu, the point will be zoomed into view on the plot. If the plot is not visible it will be created and brought to the front of the desktop.

15.5 Plot

The plot will be displayed when the *Plot* button is clicked or a tie point is zoomed to (see section 15.4.3).

15.5.1 Toolbar

Zoom in by drawing a rectangle with the left mouse button.

Pan the image using the left mouse button.

Zoom extents.

Display the previous view stored in the view buffer.

Display the next view stored in the view buffer.

Display every tenth SP label.

Display line and SP number in the hint window when the mouse pointer is over a SP.

When this button is depressed, by clicking a SP with the left mouse button the tie point will be changed to that SP. The tie point list will be updated.

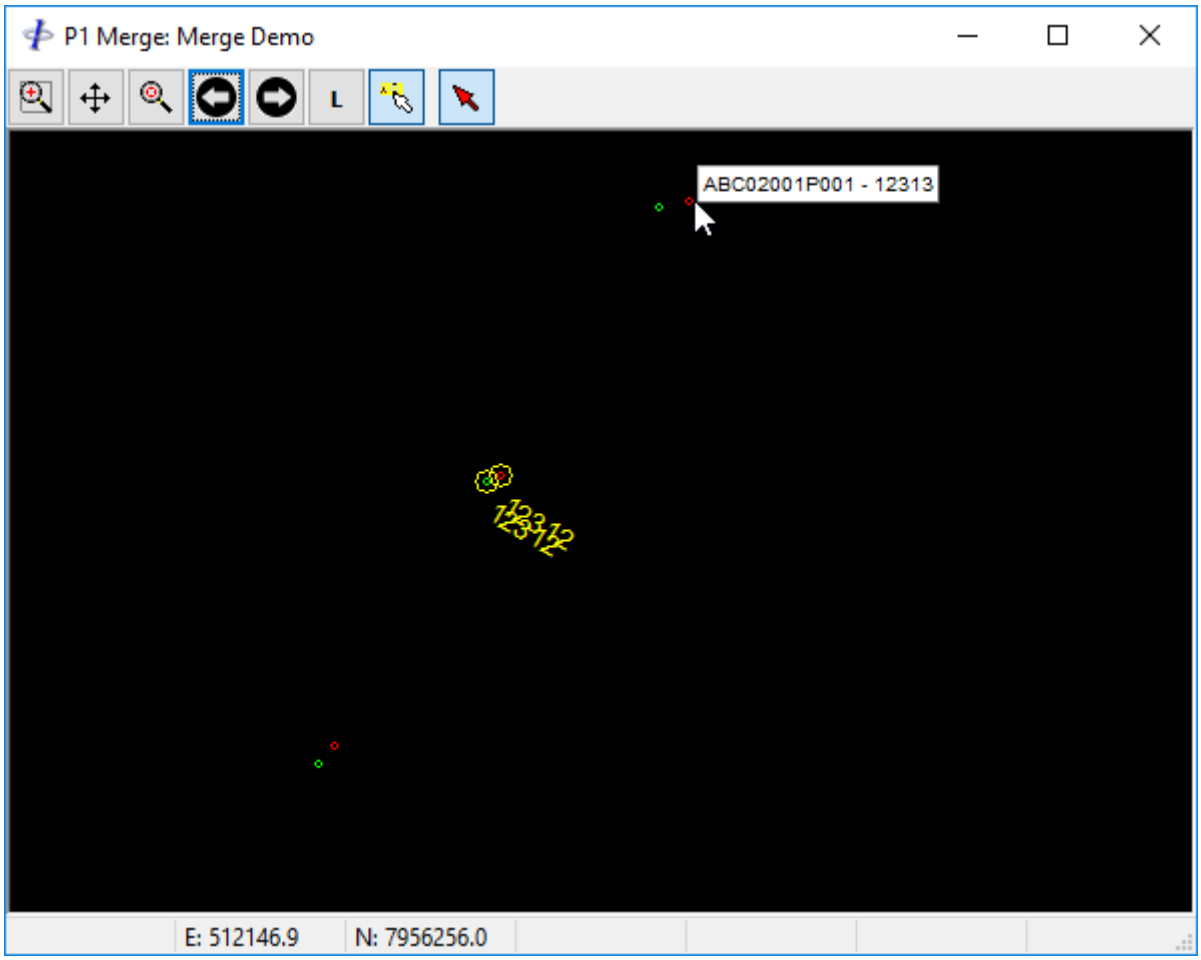


Figure 15-2 - Merge: Plot

15.6 Execution

Click the *Run* button to process the selected input files according to the parameter settings.

15.6.1 Merge Processing

If the *Merge selected lines* checkbox is checked, and the tie point list has at least one entry, then files containing tie points will be merged into a single file of the same line name, subject to the optional line name parsing parameters. Lines which have been acquired in the opposite direction to the first line will have their records reversed. The tie point record in the merged line is taken from the first of the tie lines.

Optional processing according the parameter settings will be performed.

The output file name is the same as the output line name, except that an incremental number will be inserted in the file name to avoid overwriting existing files.

15.6.2 Non-merge Processing

Each file will be processed according to the parameter settings, and output to a separate file.

The output file name is the same as the output line name, except that an incremental number will be inserted in the file name to avoid overwriting existing files.

15.6.3 Log File

The log file is saved to the output folder and displayed in a separate window when the input files are processed.

The following are recorded in the log file for merge and non-merge processes:

- SP interval exceptions
- SP increment exceptions

The following are recorded in the log file for merge processes:

- Tie points as displayed in the module main window
- Output file name
- For each output file, the input files along with SP ranges, in order of appearance in the output file.