

# SPSPro

# **OPERATION MANUAL**

Release:8.26Date:03 November 2021

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SPSPro

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# 1 OVERVIEW

SPSPro is a software program which runs on the Microsoft Windows operating system, designed to enable the user to QC, analyse and manage Shell Processing Support (SPS) files used to record land and OBS seismic survey positioning data. The installation and licensing of this program is documented separately from this manual.

The SPS dataset need not contain any header records. If header records are present then certain features of the program will make use of this.

**Note:** When using header records the program assumes all headers found in the entire dataset are identical, and will read only the first header found.



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# 1.1 Projects

A project is a set of parameters defining all of the file locations and program parameters. This information is stored in a Project File with the extension "prj". When the software is initially installed, the default Project File is "SPSPro.prj", located in the folder: <spspro\_program\_folder>\Project.

# 1.1.1 Creating and Opening a Project

A project is created by first saving the current project as a new project by choosing *File* | *Save Project As* from the main menu, and then changing the setup parameters (see Setup).

To open a previously saved project, choose File | Open Project from the main menu.

# 1.2 Main Toolbar



Figure 1-1 – Main Form



Displays interactive map of the SPS file set for the selected display type.



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**SPSPro** 

QC

Quality Control, interactive time series plots, comparisons, statistical testing and trend analysis.



Used to manage files and display and edit data. Also provides functions for data interpolation.



Replays the SPS data set as acquired.



Format and integrity checking.

Intersection

Compute coordinates and differences in interpolated attribute data at line intersections.



Edit all application parameters.



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# 1.3 Main Menu

1.3.1 File

New Project:	Create a new project.
Open Project:	Dialog to open a previously saved project definition file.
Edit Project:	Change project parameters: name and folder.
Save Project As:	Dialog to copy the current project definition file.
Recent Projects:	Lists the last 8 opened projects for quick re-opening.
Printer Setup:	Invokes the Printer Setup dialog.
Exit:	Exits the program.

1.3.2 Utilities

Shapefile:

- Attach Header: Dialog to select a header file to attach to the beginning of all SPS files in the project.
- *Remove Headers:* Removes the header from all SPS files in the project.
- *Export to* Used to convert selected files into ESRI Shape format.
- SPS to P1/90: Converts selected SPS files into UKOOA P1/90 format.

SP number is assumed to be right justified and only the rightmost six digits will be used in order to maintain P1/90 format compliance.

Floating point SP numbers (SPS format rev. 2.1) will be rounded to integer.

For northings with 10 digits only the rightmost 9 digits will be used in order to maintain P1/90 format compliance.

*P1/90 to SPS:* Converts selected UKOOA P1/90 files into SPS format.



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SPS 1.0 to SPS 2.1	Convert files recorded in the SPS Rev. 1.0 format to the 2.1 format.	e SPS Rev.				
Split by Line Name:	Splits selected SPS files into their constituent lines. For each unique line name found in a consecutive block of records a separate SPS file named by the line name is produced. Duplicate lines are written to a file whose name contains an incremental number.					
Split by Point Index:	Split files in separate files each containing only one poir	nt index.				
Split by Point Code:	Split files in separate files each containing only one poir	nt code.				
Replace Tidal Corrections:	See section 1.3.2.1 below.					
Extract Point Range:	Extract SPS file(s) with specified inclusive point range.					

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# 1.3.2.1 Replace Tidal Corrections

This utility is used to replace tidal corrections, recorded in the Surface Elevation field, in the selected SPS files. After selecting the SPS files the tide data file dialog appears as shown in Figure 1-2. The following options are presented:

File:	Enter the tide file name or click the <i>Browse</i> button to display the file selection dialog.
Data:	The tide file contents are displayed. Click on a record in this file to enable highlighting of field specification in that record.
Format:	Specify the format string. Click <i>Format Description</i> for a description of the various format specifiers.
Fixed width:	Specifies that the file contains fixed width fields.
Delimited width:	Specifies that the file contains delimited fields.

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Field	delimiter:	If delimited width is specified, enter the field delim comma (,).	niter. The default is a
Start at record:		Enter the number of the first record in the file to b	e used.
Treat delim	t colon as hiter:	When checked, colons will be interpreted as delin the record. This is typically used when time in the present in an otherwise field delimited file.	niters when parsing format hh:mm:ss is
Max : differ	time ence:	The maximum time between a data record and a	tide record.

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Import Tidal Corrections

Release:

Date:

ata:					
21	MEAN SEA LEVEL	:	0.000		
22	MEAN LOW WATER NEAP	:	-0.030		
23	MEAN LOW WATER SPRING		-0.262		
24	L.A.T.	:	-0.395	ON 25-Jun-2025	
25					
26					
♦ 27	01-May-2019 00:00:00 0.0311	1			
28	01-May-2019 00:05:00 0.0310	D			
29	01-May-2019 00:10:00 0.0308	в			
art at rec	ord: 27		Treat cold	on as delimiter	
Format	Description				
lax time d	ifference (secs) 60				

Figure 1-2 – Utilities: Replace Tide Data

1.3.3	Help

Manual: Opens the user manual.

*About:* Displays the program version, licence number, number of days remaining for the licence and technical support contact details.

*Licence:* Open the licence management window.

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# 2 SETUP

Click on the *Setup* button on the main toolbar to display or edit the current Project parameters.

When changes are made to any of the parameters described in this section, click on the *Apply* button to apply the *whole* parameter set to the SPS dataset. The project file will be saved and changes cannot be automatically undone.

Click on the Cancel button to discard all changes and revert to the initial parameter set.

# 2.1 Files

The SPS dataset comprising source, receiver and relational files are specified in the *Source, Receiver* and *Relation* pages of the Setup window, as shown below in Figure 2-1. An additional set, *Auxiliary*, can be used for any type of SPS files. Each page has identical functionality.

👍 sps	Pro Setup													Х
Source	Receiver	Relation	Auxiliary	Graphics	Plot Options	Stations	Colour Keys	Scan	Format	QC				
Folder:														
C:\Dat	a \Demo OB	C Swath 1	0\Source									1	Browse Explore	er
Files in Fo	older:					Files in D	atabase:							
Name		Modifi	ied	Size		Nam	e	Modifie	d	Size	Version	First Pnt	First Time	Las
sw 10sp water d	s.final.1.zij lepth.csv	p 25/11 18/07	/16 18:36: /12 19:46:	12 193 H 48 316 H	B B	✓ sw1	Osps.final.1.s	14/09/	17 16:07:42	2 1 MB	SPS 1	0	327 00:06:38	0
					>									
					>>									
					<									
					<<									
						<								>
<b>V</b> /	Apply	X Cancel	Clos	e										

Figure 2-1 – Setup: Files

Enter, or browse for, the folder which contains the files required. All files in the folder, including non-SPS files, will be listed. Those which have previously been selected for

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inclusion in the database appear in the right list (*Database* list) and all remaining files appear in the left list (*Folder* list).

Click on the *Explorer* button to open the selected folder in Windows Explorer.

Files may be moved between the lists by either double clicking on the filename or using the arrow buttons.

Each list is initially sorted by file name. Clicking on the column headers will change the sort method to the attribute in the column title. Consecutive clicks on the same column header will toggle the sort between first-last and last-first.

# 2.1.1 SPS Format

The software will attempt to automatically detect which SPS format revision (1.0 or 2.1) in which input files are recorded. If it is unable to do so (e.g., there is no file header) then the user will be prompted to enter the format revision.

**Important:** without the correct format revision specified unexpected results will be seen throughout.

# 2.1.2 File Display Attributes

Right click on a file to display the popup menu. From this menu the plot visibility and colour for the selected file(s) can be changed. The attributes can also be changed by clicking on the file checkbox and colour box.

# 2.1.3 Viewing/Editing Files

A file may be opened for viewing/editing by right clicking on the file name and selecting *Edit* from the popup menu.

Standard file and text editing functions are available from the popup menu invoked by right clicking on the window, as shown above in Figure 2-2.

When the file is saved it is automatically re-read into the database if included in the dataset.

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S79-98-1030341	69591A1	4.0 0 9.6	338382.3	84460.4	0.6328005344	-
579-98-1030341	69651A1	4.0 0 8.6	338410.9	84486.3	0.6328005356	
579-98-1028221	69651A	Find	339346.4	83555.1	0.6328010608	
579-98-1028221	69591A	Dawlana	339317.7	83531.4	0.6328010619	
579-98-1028221	69531A	Keplace	339289.8	83507.3	0.6328010631	
579-98-1028221	69471A	Filter	339261.7	83482.5	0.6328010644	
579-98-1028221	69411A		339233.8	83456.9	0.6328010657	
579-98-1028221	69351A	Select All	339208.8	83427.7	0.6328010711	
579-98-1028221	69291A	Com	339184.0	83398.6	0.6328010724	
S79-98-1028221	69231A	Сору	339159.9	83370.4	0.6328010735	
579-98-1028221	69171A	Paste	339134.7	83343.2	0.6328010747	
579-98-1028221	69111A		339108.2	83316.6	0.6328010759	
579-98-1028221	69051A	Print	339081.0	83291.0	0.6328010811	
579-98-1028221	68991A	Save Ar	339054.0	83264.9	0.6328010823	
579-98-1028221	68931A	Jave As	339027.7	83238.2	0.6328010835	
579-98-1028221	68871A	Open	339001.8	83210.7	0.6328010847	
579-98-1028221	68811A		338976.3	83183.1	0.6328010859	
579-98-1028221	68751A	Close	338951.0	83155.7	0.6328010911	
579-98-1028221	68691AT	4.0 0 9.1	338925.9	83128.0	0.6328010923	+

Figure 2-2 – File Editor

# 2.1.4 Relation Files

Relation files are not required in order to plot the source and receiver files. They are required to highlight the link between source and receiver files.

# 2.1.5 Auxiliary Files

The Auxiliary category can be used to include any source or receiver files that are not an integral part of the SPS dataset, e.g., preplot files. These will then be available for display on the map, in the database and performing comparisons.

# 2.1.6 Imported Graphics Files

Graphics files in DXF and ESRI Shape format may be displayed on the map. Click the *Add Files* button to add files.

Set the colour and visibility from the popup menu by right clicking on the selected file(s).

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# 2.2 Map

Source     Receiver     Relation     Auxiliary     Graphics     Map     Stations     Colour Keys     Scan     Format     QC       Map Type     Display Information     Information     Information     Series     Series       Attribute     Index     Index     Cossline     Seismic Datum       Attribute     Time     Uphole Time	
Map Type     Display Information     Compare <ul> <li>Relational</li> <li>Code</li> <li>Series</li> <li>Index</li> <li>Index</li> <li>Crossline</li> <li>Series</li> </ul> <ul> <li>Attribute</li> <li>Time</li> <li>Inline</li> <li>Uphole Time</li> </ul> <ul> <li>Index</li> <li>Inline</li> <li>Uphole Time</li> </ul> <ul> <li>Inline</li> <li>Index</li> </ul> <ul> <li>Inline</li> <li>Index</li> </ul>	
● Relational     ☑ Code     Series       ○ Attribute     □ Index     ☑ Radial     □ Point Depth       ▲ttribute     □ Time     ☑ Inline     □ Uphole Time	
Attribute     Index     Radial     Point Depth       Attribute     Time     Inline     Seismic Datum	
Attribute     Time     Inline     Uphole Time	
Attribute Time Inline Uphole Time	
Static Correction	
Static Correction	
O Point Depth INorthing	
Static Corr	
O Seismic Datum	
Point Depth	
Uphole Time	
O Water Depth	
O Surface Elevation Water Depth	
Surface Elev	
O Distance Interval	
✓ Dist Interval	
Time Interval  Time Interval	
Speed	
Apply X Cancel Close	

Figure 2-3 – Setup: Map

# 2.2.1 Display Type

The Display Type group is used to specify what is displayed on the interactive map.

When set to *Relational* the sources and receivers are plotted using their specified *Active* colours (See section 0). This setting allows interactive visualisation of the active receivers for each source.

Selecting any one of the remaining attributes will map the sources and receivers using the specified colour legend (see section 2.4).

# 2.2.2 Display Information

The *Display Information* group is used to specify which attribute values are displayed in the on the interactive map when the mouse cursor is positioned over a source or receiver station. This information is also displayed when selecting points using one of the selection methods (see section 3).

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Up to four attributes can be selected for simultaneous display. To change the selection first deselect the unwanted attributes before selecting those required.

# 2.2.3 Compare

These settings apply to comparisons that are carried out on a selected area of the lines plotted on the map.

Series: Check the series to be compared.

# 2.3 Stations

# 2.3.1 Codes and Indexes

The code and index lists are populated from those found in the data records.

# 2.3.2 Plot

The *Plot* group allows the user to specify which stations are to be plotted on both the map display and the time series plots based on instrument code and station index.

To change the plot status for either of these attributes highlight the required attributes in any of the lists and then click on the *Plot* button or *Don't Plot* button.

# 2.3.3 Killed Stations

Optionally enter in the Codes list the 2-character codes which represent killed stations.

Optionally enter in the Indexes list the integer index numbers which represent killed stations.



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Figure 2-4 – Setup: Stations

# 2.3.4 Colours

The Colours group allows the user to specify which colours to use for plotting the stations on the map display and for specifying the map background colour.

To change any colour, click on the colour key with the left mouse button and select the new colour from the colour dialog.

Colours may be copied and pasted by right clicking on the colour key and selecting from the respective options in the popup menu.

# 2.3.5 Index

Individual index colours can optionally be specified. When enabled, these colours will be used to plot the specified indexes instead of their default colours.

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# 2.4 Colour Keys



Figure 2-5 – Setup: Colour Keys

The *Colour Keys* page allows the user to specify the colours and corresponding values for attribute mapping (see Display Type).

The points whose attribute value is *greater than* the key value will be plotted in the corresponding colour.

To change any colour, click on the colour key with the left mouse button and select the new colour from the colour dialog.

Colours may be copied and pasted by right clicking on the colour key and selecting from the respective options in the popup menu.

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# 2.4.1 Interpolation

To automatically interpolate the values, enter the first and last values then click the *Interpolate Values* button. The remaining values will be interpolated.

To automatically interpolate the colours, set the first and last colours then click the *Interpolate Colours* button. The remaining colours will be interpolated.

Interpolation may also be done for a sub-set by setting the required first and last value/colour of the sub-set and entering the sub-set range in the dialog that appears when the interpolation button is clicked.

# 2.4.2 Auto Range

To set the range and value interpolation to match the maximum and minimum values found in the dataset click the *Auto Range* button. Auto ranges will be applied to the selected categories – source, receiver, auxiliary and intersections (if intersections have been computed).

# 2.4.3 Outside Range

To suppress plotting of points whose value falls outside the specified maximum and minimum values check the *Do not plot...* checkbox.



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# 2.5 Scan

Refer to section 7 Scan.

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# 2.6 Format

PSPro Setup	
te   Receiver   Rela	ation   Auxiliary   Graphics   Plot Options   Stations   Colour Keys   Scan   Format   Compare
Line Num Forma	at (H31): H31 Line number format BLOCK(1:2), YR(4:2), SW(7:2), LINE(9:4); VER(13:1);
	Override SPS format v2.1 line number columns Two digit point index (format v2.1)
urce Records	
Point no. inc	:: 6.0 Line no. from col: 8 length: 7 Sequence no. from col: 12 length: 2
First Record	: S79-98-1032061 63951A1 4.0 0 11.7 335138.4 82715.4 0.6327000638
	Col:
ceiver Records	
Line no. inc	: 96.0 Station no. inc: 8.0 No. components: 1 Line no. from col: 8 length: 4
First Record	R79-98-6728 16761K1 0.0 0 8.0 343391.2 77454.6 0.0315000000
	Col:
xiliary Records	
Line no. from col	I: 23 length: 4
First Record	1:
	Col:
Keep original line nar	me when saving
🖊 Apply	ancel Close

Figure 2-6 – Setup: Format

The Format page is used to specify how the data records are parsed.

- **Important:** For SPS format revision 1.0 the line number location specification is not optional and needs to be correctly specified in order for the program to function correctly in all respects.
- **Important:** It is expected that all files in the same category (source, receiver, auxiliary) are formatted identically.

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# 2.6.1 Line Number Format

As an aid the H31 record (SPS format revision 1 only) in the first header found in the SPS dataset is displayed.

Additionally, first Source, Receiver and Auxiliary data records found in the SPS dataset are displayed in the *First Record* fields of their respective parameter groups. When the cursor is placed in these fields the cursor column position is displayed directly below the field.

# 2.6.2 SPS Revision 2.1

The SPS revision 2.1 format does not normally require manual specification of the line number location. However, it may be necessary to override the number location as stored in the file. Check the *Override…* checkbox to apply the line number location as specified in the *Source Records* and *Receiver Records* sections on this page.

Check the *Two-digit point index* checkbox if the SPS file utilises column 23 and 24 in the file for the point index.

Point Number Increment:	Enter the expected shotpoint numbering increment.
Line No:	Enter the starting column and number of characters (field length) used for the receiver line number. Optional for SPS format rev. 2.1.
Sequence No:	Enter the starting column and number of characters (field length) used for the line sequence number. This may be left blank.
2.6.4 Receiver Records	
Line Number Increment:	Enter the expected receiver line numbering increment.
Station Number Increment:	Enter the expected receiver station numbering increment.
No. Components:	Enter the number of receiver components (different instrument codes for each point).

#### 2.6.3 Source Records

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Line	No:	Enter the starting column and num	ber of characters (field length)

Enter the starting column and number of characters (field length) used for the receiver line number. Optional for SPS format rev. 2.1.

The line numbering increment and station numbering increment are specified for use in scanning the receiver file to report any exceptions in the ordering of the records. (Receiver records should be ordered by line number, point number and index number).

# 2.6.5 Auxiliary Records

*Line No:* Enter the starting column and number of characters (field length) used for the line number. This could be a receiver line or a source line depending on which file type has been selected for the auxiliary dataset. Optional for SPS format rev. 2.1.

# 2.6.6 Relation Records

For SPS format rev. 1 the line number positions within the line name are expected to be the same as in the source and receiver records, therefore no further parameters are required.

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# 2.7 Quality Control

#### 2.7.1 Overview

The basis of the Quality Control (QC) module is a set of QC *Items* from which plots may be generated. Each item will contain one or more *Series*, optionally associated with each *Series* are any number of *Tests*.

After making any changes, click *Apply* to save the changes or *Cancel* to discard the changes.

∳ SPSPro Setup			×
Source Receiver Relation Auxiliary Graphics Map Stations Colo	our Keys Scan Format QC		
Category Courses			
Category: source V			
Item	Tests		^
Attribute - Instr: A4			
Point Depth	Spec: Min: 11.0 Ma	x: 13.0 Total out of spec for whole dataset must be <=	5
Distance Interval	Spec: Min: 47.0 Ma	x: 53.0 Total out of spec for whole dataset must be <=	5
Time Interval	Spec: Min: 15.0 Ma	x: 30.0 Total out of spec for whole dataset must be <=	10
Speed	Spec: Min: 4.0 Ma	x: 5.5 Total out of spec for whole dataset must be <=	10
Comparison Source vs. Auxiliary - Instr: A3			
Crossline	Spec: Min: -15.0 Ma	x: 15.0 No. out of spec in 20 points must be <=	5
Inline	Spec: Min: -5.0 Ma	x: 5.0 No. out of spec in 10 points must be <=	5
Comparison Source vs. Auxiliary - Instr: A4			
Crossline	Spec: Min: -15.0 Ma	x: 15.0 No. out of spec in 20 points must be <=	5
Inline	Spec: Min: -5.0 Ma	x: 5.0 No. out of spec in 10 points must be <=	5
Source Separation - Instr: A3 - A4			
Crossline	Spec: Min: 45.0 Ma	x: 55.0 Total out of spec for whole dataset must be <=	10
		·	
		Total killed stos for whole dataset must be <-	8
		Percent killed stns for whole dataset must be <=	5.0
		No. killed stns over 1000gu must be <= No. of consecutive killed stns must be <=	2 9
			<b>v</b>
Trend sort order: Sequence $\checkmark$ Include SPS	file name in report name		
Report Folder: C:\Data\SPS\QC_Test\Report		Brows	ie
Apply X Cancel Close			
•••			

Figure 2-7 – Setup: Quality Control

2.7.2 Controls	
Category:	Select Source or Receiver from the dropdown list. All QC Items specified will be for the specified Category. The Category can be changed without losing the existing configuration.
Trend Sort Order:	The specified <i>Trend Sort Order</i> will be the default sort order when producing trend plots.

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*Include SPS file name in report name:* When checked, the name of the SPS file is included in the report file names. This will ensure that report files are uniquely named for different versions of the same line recorded in different files.

Report Folder: Enter the report folder location.

# 2.7.3 Popup Menu:

All configuration is done by accessing the popup menu by right clicking the mouse.

Add Item:	Invoke the dialog to add a new QC item.
Edit Selected Item:	Make changes to the selected QC Item.
Remove Selected Items:	Delete the selected QC Items.
Add Test for Selected Series:	Invoke the dialog to add a new test.
Edit Test for Selected Series:	Invoke the dialog to edit the selected test(s).
Copy Tests	Copy the selected tests. Selected tests must be for a single <i>Series.</i>
Apply Copied Tests:	Apply the copied tests to the selected Series.
Remove Test for Selected Series:	Invoke the dialog to delete a test from the selected Series.
Enable All:	Enable all items for processing.
Disable All:	Disable all item for processing.
Collapse All:	Collapse all items.
Expand All:	Expand all items.



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# 2.7.4 QC Item Setup

From the popup menu select Add Item or Edit Selected Item.

Type: Attribute   Instrument codes:   A1,A2,A3   Comma separated list, blank = all codes   Indexes:   1   comma separated list, blank = all indexes   Data precision (ndp):   1   Attributes   Static Correction   Dist Interval Radial   Point Depth   Dist Interval Across   Seismic Datum   Dist Interval Along					
Instrument codes: A1,A2,A3 Separate Code comma separated list, blank = all codes Indexes: 1 comma separated list, blank = all indexes Data precision (ndp): 1 Attributes Static Correction Dist Interval Radial Point Depth Dist Interval Across Seismic Datum Dist Interval Along		Type:	Attribute	~	
comma separated list, blank = all codes         Indexes:         1         comma separated list, blank = all indexes         Data precision (ndp):         1         Attributes         Static Correction       Dist Interval Radial         Point Depth       Dist Interval Across         Seismic Datum       Dist Interval Along	Ins	trument codes:	A1,A2,A3		Separate Codes
Indexes: 1 <i>comma separated list, blank = all indexes</i> Data precision (ndp): 1 Attributes Static Correction  Dist Interval Radial Point Depth Dist Interval Across Seismic Datum Dist Interval Along			comma sepa	arated list, blank =	all codes
comma separated list, blank = all indexes         Data precision (ndp):         Attributes         Static Correction         Static Correction         Dist Interval Radial         Point Depth         Seismic Datum         Dist Interval Along		Indexes:	1		
Static Correction     Dist Interval Radial     Point Depth     Seismic Datum     Dist Interval Along	Data	precision (ndp):	1	]	
<ul> <li>Point Depth</li> <li>✓ Dist Interval Across</li> <li>Seismic Datum</li> <li>✓ Dist Interval Along</li> </ul>		Attributes	stion	Dist Interv	al Radial
□ Seismic Datum □ Dist Interval Along			Cuon	Dist Interva	
		Seismic Dat	um	Dist Interva	al Along
Uphole Time Time Interval			2	Time Interv	val
Water Depth Speed		Water Dept	h	Speed	
Surface Elevation		Surface Ele	vation		

Figure 2-8 - Setup: QC Item Dialog - Attribute

2.7.5 Item Type	
Attribute:	Optionally specify the instrument code(s). If not specified then all codes will be included for this plot.
	Select any set of the available Series. Each Series selected will provide a separate time series plot.

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Comparison:	Optionally specify the instrument code(s). I codes will be included for this plot.	f not specified then all
	Select any set of the available Series. Each provide a separate time series plot.	n Series selected will
	Select from the dropdown list the category matching numbers will be compared. The c See section 2.6 for specification of line num	from which lines with default is <i>Auxiliary</i> . nber.
Source Separation:	Specify the instrument codes for the two so separation is to be calculated. If more than to be calculated then a separate <i>QC Item</i> n	ources for which one instrument pair is nust be configured.
	<b>Note:</b> the position of the non-firing source is interpolated to the time of the firin <i>instrument code</i> ) for the separation	( <i>To instrument code</i> ) g source ( <i>From</i> calculation.
	<b>Note:</b> the azimuth used for the separation current CMG of the firing source.	calculation is the
Killed Stations:	Optionally specify the instrument codes. If a codes will be included for this plot.	not specified then all
	Stations for which the code or index is inclust station definition will be counted.	uded in the killed
	If a code is specified then only those points character matches the specified code will b second character of the code will be used t code.	s whose second be considered and the to match with a kill
	E.g.: for instrument code A3, only points whis '3' will be counted, and any which corres specified kill codes whose second character as killed.	hose second character pond to one of the er is '3' will be counted
	See section 2.3.3 for specification of killed	stations.

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*Missed Stations:* Stations missed based on the specified point increment will be counted. See section 2.6 for specification of point increment.

# 2.7.6 Item Settings

Item settings will change according to the selected Item Type.

Instrument Codes:	Optionally enter the instrument codes for all instruments to be included in this QC item. The list must be comma separated.		
	Leave blank to include all instrument codes in the dataset.		
	Does not apply to Source Separation or Missed Stations.		
Separate Codes:	Applies only to derived attributes for distance intervals and time interval.		
	Checked: each point's derived attribute is calculated from the previous point of the same code.		
	Unchecked: each point's derived attribute is calculated from the previous point regardless of instrument code.		
From instrument code:	Specify a single instrument code.		
	Applies to Source Separation only.		
To instrument code:	Specify a single instrument code.		
	Applies to Source Separation only.		
Indexes:	Optionally enter the indexes for all stations to be included in this QC item. The list must be comma separated.		
	Leave blank to include stations of all indexes in the dataset.		
Data precision	Specify the precision, in number of decimal places, to be used.		

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Com	mara fila liati	Coloct the esterory from which the	comparison lines will be

*Compare file list:* Select the category from which the comparison lines will be taken. The default is *Auxiliary*.

# 2.7.7 Test Setup

Select one or more Series. From the popup menu select Add Test for Selected Series or Edit Test for Selected Series.

QC Test Parameters		×
Minimum 40	Maximum 50	
Test Type: No. out of spec over specified o	listance V	
Maximum No.	Distance (grid units)	
5	1000	
🗸 ОК	X Cancel	

Figure 2-9 – Setup: Acceptance Test Dialog

Test parameters vary depending on the QC Item type and the Test type, as tabulated in the following tables.

QC Item Types	Parameters
Attribute,	Minimum value
Comparison,	Maximum value
Source Separation	
	Any value outside the range specified is counted as <i>Out of Spec</i> .
Killed Stations, Missed Stations:	None
	Killed or missed points are counted.

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In the table below, depending on the QC Item type, \* = Out of Spec, Killed Stations or Missed Stations.

Test Type	Parameters
Total * for whole line:	Maximum number
Percent * for whole line:	Maximum number
Number of Consecutive *:	Maximum number
Number * in specified number of points:	Maximum number Number of points
Number * 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 * for whole line:	None.

**Note:** For tests specifying a window in number of points, these points are taken from the test dataset which may not be the whole line, e.g., if only one instrument code is defined then only records containing that instrument code will constitute the dataset.

# 2.7.8 QC Item Selection

Only checked QC Items will be processed.

The order of *QC Items* can be changed by dragging with the mouse.



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# 3 MAP

Click on the *Map* button on the main toolbar to display the map of the selected attribute as specified in the *Setup* | *Plot Options* | *Display Type*.



Figure 3-1 – Map

Sources are plotted as crosses, receivers as circles and auxiliary points as squares.

The information shown in the panel to the left of the map pertains to the source and/or receiver at the current cursor position. The information given is the line name, point number and the attributes specified in *Setup | Plot Options | Display Information*.

The Grid coordinates of the mouse cursor position are displayed in the lower left panel.

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To make distance and azimuth measurements on the map drag the mouse between the required points keeping the right mouse button depressed. The distance, delta east and north, and azimuth are displayed in the lower left panel.

To zoom in around an area use the left mouse button to define a rectangle. To zoom in or out centred at the mouse location use the mouse wheel.

# 3.1 Menu

*Options | Selection* Set the selection mode to use when selecting points on the map. *Mode* 

# 3.2 Toolbar

Close the display. **F** A Send the display to the default printer. Save the display as a Windows bitmap file (.bmp). Scale both axes the same. ₩ Enable mouse panning. Enable window zoom. Ð € Zoom in. Q Zoom out. Q Zoom extents. When down, the mouse can be used to highlight the active receivers for the × clicked source and active sources for the clicked receiver. ~ Enable editing of a point by dragging with the mouse. Toggle source display on/off. S Toggle receiver display on/off. R

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Α	Toggle auxil	iary display on/off.	
Sx	Plot source :	station numbers.	
Rx	Plot receiver	r station numbers.	
Ax	Plot auxiliary	y station numbers.	
昂	Toggles disp	play of imported DXF files.	
•	Toggles disp	play of imported Shape files.	
3.	Display hint	window with selected attribute values when n	nouse over point.
et.	Connect stat	tions as a visual aid.	
•	When plottin Surface Elev information p	ng water depths, toggles application of tidal re vation attribute. When invoked, water depths panel on the left and the hint window are the r	ductions stored as the displayed in the reduced depths.
×	Select points Mode.	s using the selection method as specified und	ler Options   Selection
i	Display the s	specified attributes of the selected points in a	separate window.
A-B	Compare the	e selected points.	

# 3.3 Logging

SPSPro allows logging of selected points on the map to a file. File types supported are comma separated value (.csv), tab delimited (.txt) and space delimited (.txt).

From the Main Menu select *File* | *Station Logging.* In the dialog select the file type. Select an existing log file or enter the name of a new log file. Click *Open*.

The menu item will be checked and the log file name and path will be displayed in the status bar of the main window. If the file already exists any new points logged will be appended to the file.

Click on *Map* in the main toolbar. As long as logging is enabled by clicking on a source or receiver on the map that point's position and all attributes will be written to the log file with each field separated by a comma, and the record terminated by a carriage return/line feed. The Windows Default Beep will play when a point is logged.

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To stop logging and close the log file select *File | Station Logging* again. This menu item will then be unchecked.

# 3.4 Kill Point

A *KL* code can be applied to a point by right clicking on the point with the mouse and selecting *Kill Point* from the pop-up menu. To resurrect a point, select *Un-kill Point* from the pop-up menu.

# 3.5 Relational Map

Under Setup | Plot Options | Display Type | select the Relational option, then click on the Map button.

The relational map allows visualisation of the active spread into which a shot is fired. Sources and receivers are plotted in the colours specified in *Setup | Stations | Colours*.

To highlight the active receivers or active sources, with the button down, click on any source or receiver point with the left mouse button. Active receivers or active sources will be plotted in the Active Receiver colour or Active Source colour.

When the mouse cursor is positioned over a receiver the number of active receivers in that line is displayed in the *Receiver* panel.

The total number of active receivers for the last clicked source point is displayed in the *Source* panel.

The total number of active sources for the last clicked receiver point is displayed in the *Receiver* panel.

# 3.5.1 Source / Receiver Gathers

When a source or receiver station is clicked when in Relational display, the corresponding receiver or source stations respectively are highlighted and their total is displayed in the Relation panel.



Figure 3-2 – Relational Map

# 3.6 Attribute Map

Under Setup | Plot Options | Display | select one of the attributes, then click on the Map button.

The attribute map displays values from the selected attribute colour coded according to the colour key settings for that attribute specified in *Setup | Colour Keys*.
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Any one of the following attributes can be mapped provided the data is present in the SPS data file:

Static Correction Point Depth Seismic Datum Uphole Time Water depth Surface Elevation



Figure 3-3 – Attribute Map



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### 3.6.1 Intersections

If intersections have been computed then to display attribute differences at intersections on the map, under *Setup* | *Colour Keys* use the *Intersections* option for calculating the legend range automatically.

### 3.6.2 Selection

Points on the map may be selected for the purpose of gathering attribute information and performing comparisons. Before selecting points set the selection method from the *Menu* | *Options* | *Selection Mode*. The following selectin modes are supported:

Rectangle

Circle

Freehand

From external graphics

Click on or near to the plotted object from one of the imported graphics files. E.g., as polygon representing an area of interest.

Click the *Selection* button, And use the mouse to perform the selection. The selected poits will appear in grey. Multiple selections can be made. To cancel the existing selectionn click the selection button again.

To display the specified attributes (see section 2.2.2) click the Attributes button,

### 3.6.3 Comparisons

Comparisons can be performed on points that fall within a selected area by clicking the

*Compare* button, AB, after making a selection. Matching points from different lines of the same line number will be compared according to the comparison settings as described in secion **Error! Reference source not found.** 

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# 4 QUALITY CONTROL

The QC module provides the interface to execute the QC functions as configured in the Setup module (see section 2.7), and to produce plots of the results.

\$	QC									_	· 🗆	×
File	Tools											
The	10013											
	Category: Source 🗸 🗸											
File		Line Name	Line No.	Seq	Туре	FSP	LSP	FS JD Time	Modified	Size	Status	^
	130310097.s01	130310097	1303	97	S	2790	1593	309 - 22:47:24	23/02/21 15:27:29	231 KB	O 1	
	133510099.s01	133510099	1335	99	S	1560	2822	310 - 02:52:34	11/11/19 21:47:24	214 KB	<ul> <li>Image: A second s</li></ul>	
	129510101.s01	129510101	1295	101	S	2782	1603	310 - 07:08:27	11/11/19 21:47:30	201 KB	<ul> <li>Image: A set of the set of the</li></ul>	
	132710103.s01	132710103	1327	103	S	1567	2814	310 - 11:10:26	11/11/19 21:47:38	212 KB	×	
	129110105.s01	129110105	1291	105	S	2777	1608	310 - 15:34:23	11/11/19 21:47:46	199 KB	×	
	132310107.s01	132310107	1323	107	S	1571	2734	310 - 19:36:48	23/02/21 17:59:20	204 KB	× –	
	132320109.s01	132320109	1323	109	S	2735	2810	311 - 02: 19:38	11/11/19 21:47:56	109 KB	- <b>-</b>	
	135510111.s01	135510111	1355	111	S	2842	1542	311 - 03:18:55	11/11/19 21:48:04	221 KB	<ul> <li>Image: A set of the set of the</li></ul>	
	131910113.s01	131910113	1319	113	S	1575	2806	311 - 08:00:57	11/11/19 21:48:12	209 KB	×	
	135110115.s01	135110115	1351	115	S	2838	2186	311 - 12:16:43	11/11/19 21:48:18	164 KB	- <b>-</b>	
	135120117.s01	135120117	1351	117	S	2185	1545	312 - 00:05:57	11/11/19 21:48:22	163 KB	× –	
	133120119.s01	133120119	1331	119	S	1564	2003	312 - 06:15:57	11/11/19 21:48:26	78 KB	- <b>-</b>	
	133910121.s01	133910121	1339	121	S	1556	2826	312 - 14:56:22	11/11/19 21:48:42	216 KB	×	
	133920139.s01	133920139	1339	139	S	2826	2096	314 - 15:19:32	11/11/19 21:49:40	126 KB	×	
	128720145.s01	128720145	1287	145	S	1613	1799	315 - 03:36:37	11/11/19 21:49:52	35 KB	- <b>-</b>	
	200310243.s01	200310243	2003	243	S	3135	1299	334 - 21:04:37	09/06/20 13:29:16	310 KB	× –	
	204710245.s01	204710245	2047	245	S	1301	3139	335 - 03:03:16	09/06/20 13:29:20	311 KB	<b>e</b>	
	179120247.s01	179120247	1791	247	S	3099	2416	335 - 09:00:03	09/06/20 13:28:27	119 KB	<ul> <li>Image: A set of the set of the</li></ul>	
	186320249.s01	186320249	1863	249	S	2416	3113	335 - 11:33:32	09/06/20 13:28:45	208 KB	<b>— X</b>	
	180320251.s01	180320251	1803	251	S	3101	2416	335 - 13:54:29	09/06/20 13:28:30	119 KB	<ul> <li>Image: A set of the set of the</li></ul>	
	180720253.s01	180720253	1807	253	S	2416	3102	335 - 16:44:27	09/06/20 13:28:31	205 KB	×	
	181120255.s01	181120255	1811	255	S	3103	2416	335 - 19:16:47	09/06/20 13:28:32	119 KB	<b>e</b>	
	185520257.s01	185520257	1855	257	S	2416	3112	335 - 21:59:01	09/06/20 13:28:44	208 KB	<ul> <li>Image: A second s</li></ul>	
	185120259.s01	185120259	1851	259	S	3111	2416	336 - 00:31:22	09/06/20 13:28:43	121 KB	<ul> <li>Image: A set of the set of the</li></ul>	5
	100010001 01	100010001	1000		-		0400	000 04 05 04		010100	_	•
F	Process All Process Sel	ected Stop Proc	ess	Plot Se	lected	C	)ata Tre	nd Test Tr	end Report Fo	lder		

Figure 4-1 – Quality Control

# 4.1 Menu

Tools

Clean Database:

Removed all database references to lines, QC Items, QC Series and acceptance tests which have been removed from the project.

# 4.2 Controls

Category:

Select from *Source* and *Receiver*.

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Proc	ess All:	Process all lines.	
Proc	ess Selected:	Process selected lines.	
Stop	Process:	Stop processing.	
Plot Selected:		Plot the time series for the selected lines.	
Data Trend:		Plot the data trends for the selected lines.	
Test Trend:		Plot the test trends for the selected lines.	
Repo	ort Folder:	Open the report folder in Windows Explorer.	

### 4.3 Line List

The line list contains all lines in the project in the specified category (Source or Receiver).

Clicking on a column header will sort the list by the contents of the selected column.

Repeated clicks will reverse the sort order.

#### 4.3.1 Status



Processing not complete due to error.

### 4.3.2 Line List Popup Menu

Right click on the line list to display the popup menu.

- Select All: All lines will be selected.
- Select None: No lines will be selected.
- From the sub-menu select which attribute to filter and enter a filter Select by Attribute: string. All lines whose selected attribute contains the specified filter string will be selected.

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Select by Status:	From the sub-menu select which status to filter by. All specified status will be selected.	lines with the
Invert Selection:	Inverts the current selection.	
Remove:	Removes the selected lines from the list. This can also pressing the <delete> button on the keyboard.</delete>	be done by
Filter:	From the sub-menu select which attribute to filter and string. All lines whose selected attribute does not conta specified filter string will be removed.	enter a filter ain the
Edit:	Displays the contents of the selected file for viewing/ed not apply to multiple selections.	diting. Does
Set Point Range:	Display the dialog to set the point range to be used for line. All QC items for the selected line will be carried or specified point range.	the selected ut on the
Revert to first- last point:	Revert to using the first to last points in the line.	
Report:	Open the QC report (PDF) for the selected line.	

# 4.4 Process

Processing consists in the following:

- 1. All QC Items that are checked (see section 2.7.8), along with any associated tests, will be processed.
- 2. The results stored in the database. Existing results will be overwritten.
- 3. A PDF QC Report for each line is saved in the specified report folder. Existing reports will be overwritten.
- 4. A single text file containing all test results is saved in the report folder.
- 5. For comparisons additional reports are saved in sub-folders under the report folder.

The process can be stopped by clicking the Stop Process button.

### 4.4.1 Derived Attributes

Derived attributes are:

- Point distance interval •
  - Radial
  - Along line
  - Across line

 $\mathbf{A}$ 

 $\mathbf{P}$ 

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- Point time interval
- Point speed

# 4.4.2 Source Line Identification

It is conventionally required, in the case of derived attributes for sources, that these pertain to an individual source line.

**Important:** A point on the same source line is identified as having the same second character of the instrument code.

E.g.:

The following codes are considered to be on the same source line: L1, K1, A1

The following codes are considered to be on different source lines: A1, A2, A3

# 4.5 Report

Report is saved in the specified category's report folder.

The following reports are produced for each line:

- A PDF report comprising the following for each QC Item:
  - A separate time series plot of each series.
  - The test result for each series, indicating *pass* (green) or *fail* (red), and stating the maximum / minimum value(s).
- A csv file with the following columns:
  - Instrument code
  - $\circ$  Line number
  - Point index

- Point index (in comparison dataset)
- For each series configured:
  - Series data
    - For each test configured:
      - Test parameters
      - Test result (blank or FAIL).

The following summary reports are generated and updated after re-processing:

- A csv file for all lines containing the following columns:
  - File name
  - o Line name
  - Sequence

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- Instrument code(s) if specified
- Index(s) is specified
- o FSP
- o LSP
- o Number of shots
- For each series:
  - Mean
  - Minimum
  - Maximum
- Summary text report for all lines

### 4.6 Plot

For all selected line, displays interactive plots of the time series for all QC Item Series in a single instance of the *Multiplot* module.

Refer to the <u>MultiPlot manual</u> for description of the *Multiplot* module.

# 4.7 Data Trend

This function is used to display interactive plots of the data trends for all *QC Item Series* for the selected lines. If less than three lines are selected all lines will be included in the plot. The line sort order used for the plot is the current sort order of the line list.

For each QC Item Series, the plot contains three series showing the mean, minimum and maximum value for each line, except for Killed Stations and Missing Stations.

For *Killed Stations* and *Missing Stations* the plot displays the number of killed or missing stations for each line as a bar chart.





Figure 4-2 - Quality Control: Data Trend Plot

# 4.8 Test Trend

This function is used to display interactive plots of the test results as a Boolean value for all *tests* for the selected lines. If less than three lines are selected all lines will be included in the plot. The line sort order used for the plot is the current sort order of the line list.

For a single test, each line is plotted as single bar, green for a pass and red for a fail.

Refer to the MultiPlot manual for description of the Multiplot module.



Figure 4-3 - Quality Control: Test Trend Plot

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# 5 DATABASE

The Database module provides the means to organize, browse and edit the SPS dataset. It also provides a number of utilities for modifying the data.

From the main menu click on the Database button.

Data is organised in a tree with five main branches:

- Header
- Source
- Receiver
- Relation
- Auxiliary

### 5.1 Header

Click on the *Header* branch to display the header records as shown in Figure 5-1 below.

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I SPSPro Database		
File Database Utilities		
Header	Header	
File       Database       Utilities         P       Source       Source         P       Receiver       Receiver         P       Relation       Auxillary	NeaderH00 SPS format version num.Shell report EP 90-2935, October 1991;H01 Description of survey areaSurvey Area;H02 Date of survey19.05.1999,21.05.1999;H022Tape/disk identifier98-07-01011;H03 ClientClients;H04 Geophysical contractorPositioning Contractor;H05 Positioning contractorPositioning Contractor;H06 Pos, proc. contractorProcessing Contractor;H07 Field computer system(s)SPECS, SYNTRAK 960-24, OBCNAV;H09 Offset from coord. locationN/A;H11 SpareN/A;H12 Geodetic datum,-spheroidMinnaH13 SpareN/A;H14 Geodetic datum parameters111.916 87.852-114.499-1.875-0.202-0.2H15 SpareN/A;H16 Projection typeTransverse Mercator;H17 Vertical datum descriptionN/A, ;H20 Forjection typeInternational Metre;H20Log, of central meridian083000.000EH23Orid origin040000.000N 083000.000EH23Orid origin040000.000N 083000.000EH23Orid origin040000.000N 083000.000EH23Orid origin040000.000N 083000.000EH24IScale factor0.9997500000H24IScale factor0.9997500000H24E vessel: Yessel 1: DGPS, SKYFIX & Sargas-V;H26 Cable Vessel: Vessel 2: DGPS, SKYFIX & Sargas-V;H26 Cable Vessel: Vessel 3: DGPS, SKYFIX & Sargas-V;	293.465 219-0.032
	LIAO 4T	

Figure 5-1 – Database: Header

The header is the first header read in the whole SPS dataset. It may be edited and saved to all SPS files in the project by choosing from the menu *File | Save*.

The header may be saved to a separate file by choosing File | Save As from the menu.

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# 5.2 Data

The SPS dataset is subdivided by *Type*, i.e.: source, receiver and relation, *File* and *Line*, represented in the tree by level 1, 2 and 3 branches respectively, as shown in Figure 5-1 above.

To display attributes of the main data types, click on the relevant level 1 branch. In the right panel the folder, number of files and number of lines are displayed.

# 5.2.1 Files

To display file data, click on any level 2 branch, as highlighted in Figure 5-2 below.

File         Database         Utilities                • Beader          • Source         • Source                • Source         • Source         • Source                • Source         • D:\pata\peno OBC Swath 10\Source\sw10sps.fnal.1.s                • 79-99-1021801                • 79-99-1021801          • Source                • 79-99-102181          • Source                • 79-99-1021801          • Source                • 79-99-102181          • Source                • 79-99-102181          • Source                • 79-99-1021801          • Source                • 79-99-102180          • Source                • 79-99-103201          • Source                • 79-99-1033801                 • 79-99-1033801          • Source                • 79-99-1033801                 • 79-99-1033801                 • 79-99-1033801                 • 79-99-1033501                 • 79-99-1033501                 • 79-99-1033501                 • 79-99-102801	• X							
Header         Source           98:10595:fhal.1:5         mme           79:98:1021501         sw10sps.fhal.1:5           79:98:1021701         Path           79:98:1021701         b:1/2 tab (2 pemo OBC Swath 10 (Source (sw 10 sps. fnal. 1:s           79:98:102181         size           79:98:102181         b           79:98:1032061         79:98:103261           79:98:103261         79:98:1033061           79:98:1033061         1           79:98:1033061         1           79:98:1033061         1           79:98:1033061         1           79:98:1033061         1           79:98:1033061         1           79:98:1033061         1           79:98:1033061         1           79:98:1033061         1           79:98:1033061         1           79:98:1032661         79:98:1032661           79:98:1032661         79:98:1032661           79:98:1028061         79:98:1028061           79:98:1028061         79:98:102801           79:98:1028061         79:98:102801           79:98:1028101         79:98:102801           79:98:102811         79:98:102814           79:98:1028161         79:98:102816 <th colspan="8">File Database Utilities</th>	File Database Utilities							
▲ ● Source         Name         sw10sps.fnal.1.s           79-98-1021501         Path         D:\pata\pemo OBC Swath 10\Source\sw10sps.fnal.1.s           79-98-1021701         D:\pata\pemo OBC Swath 10\Source\sw10sps.fnal.1.s           79-98-1022181         Size         1090682           79-98-1032061         Tuesday 12 September 2017 - 10:03:01am         Size           79-98-1032061         79-98-1033981         Size         109           79-98-1033981         79-98-1033981         1         Size         Size           79-98-1032061         79-98-1033701         1         Size         Size           79-98-1032061         79-98-103261         79-98-103261         Size         Size           79-98-1022181         Tip-98-103261         Size         Size         Size           79-98-103261         79-98-103261         Size         Size         Size           79-98-1022181         79-98-1022181         Size         Size         Size           79-98-1022181         79-98-1022181         Size         Size         Size           79-98-1022181         79-98-1022181         Size         Size         Size           79-98-1025811         79-98-1025801         Size         Size         Size								
• wt0sps.final.1.s           79-98-102191           79-98-102191           79-98-102191           79-98-102191           79-98-102181           79-98-102181           79-98-102181           79-98-102181           79-98-102181           79-98-102181           79-98-103201           79-98-103301           79-98-103301           79-98-103301           79-98-103301           79-98-103301           79-98-103301           79-98-103301           79-98-103301           79-98-103301           79-98-103261           79-98-103261           79-98-103301           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-103261           79-98-102801           79-98-102801           79-98-102801           79-98-102801           79-98-10								
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79-98-1033021         79-98-1033931         79-98-1033941         79-98-1034941         79-98-1034941         79-98-1034941         79-98-1034941         79-98-1034941         79-98-103261         79-98-1031581         79-98-103101         79-98-103101         79-98-103101         79-98-103101         79-98-1030141         79-98-1028061         79-98-1028051         79-98-1028051         79-98-1028051         79-98-1025821         79-98-1025821         79-98-1035142         79-98-1035142         79-98-1034181         79-98-1034182         79-98-1034182         79-98-1034182								
79-98-1033001         79-98-1034941         79-98-1033701         79-98-1033701         79-98-1033701         79-98-1033701         79-98-103181         79-98-103181         79-98-1030621         79-98-1029661         79-98-1029661         79-98-102961         79-98-102961         79-98-102961         79-98-102961         79-98-102961         79-98-102961         79-98-102961         79-98-102961         79-98-102961         79-98-102961         79-98-102962								
79-98-1033981         79-98-1034941         79-98-1033701         79-98-1033261         79-98-1031581         79-98-1030621         79-98-1030621         79-98-1030141         79-98-1025661         79-98-1024581         79-98-1025821         79-98-1025821         79-98-1025821         79-98-1034181         79-98-1034182         79-98-1034182         79-98-1034522								
79-98-1034461         79-98-103301         79-98-1032261         79-98-1031581         79-98-1031581         79-98-1030621         79-98-1030621         79-98-1030641         79-98-1025661         79-98-1024581         79-98-1024581         79-98-1025821         79-98-1024581         79-98-1024581         79-98-1025821         79-98-1034181         79-98-1034181         79-98-1034182         79-98-1035622								
79-98-1033701         79-98-1033701         79-98-1032261         79-98-1031581         79-98-103101         79-98-1030141         79-98-1029661         79-98-1029661         79-98-1024581         79-98-1024581         79-98-1024581         79-98-1024581         79-98-1024581         79-98-1024581         79-98-10245821         79-98-1035142         79-98-1034182         79-98-1034182         79-98-1034182         79-98-1034522								
79-98-1032261         79-98-1032261         79-98-1031581         79-98-1030101         79-98-1030141         79-98-1029661         79-98-1029661         79-98-1028701         79-98-1028811         79-98-1025821         79-98-1025821         79-98-1025821         79-98-1035142         79-98-1035142         79-98-1035142         79-98-1034181         79-98-1034182         79-98-1034522								
79-98-1031581         79-98-1031581         79-98-1030621         79-98-1030621         79-98-1029661         79-98-1029661         79-98-102801         79-98-102801         79-98-1025821         79-98-1025821         79-98-1025821         79-98-1035142         79-98-1034181         79-98-1034182         79-98-103452								
79-98-103101         79-98-1030621         79-98-1030141         79-98-1029661         79-98-1029181         79-98-1028701         79-98-1025821         79-98-1025821         79-98-1025821         79-98-1034181         79-98-1034182         79-98-1035622								
79-98-1030621         79-98-1030621         79-98-1029661         79-98-1029181         79-98-1024501         79-98-1024581         79-98-1025821         79-98-1025821         79-98-1034181         79-98-1034182         79-98-1035622								
79-98-1030141         79-98-1029661         79-98-1029181         79-98-1028701         79-98-1024581         79-98-1025821         79-98-1025821         79-98-1034181         79-98-1034181         79-98-1034182         79-98-103452								
79-98-1029661         79-98-1029181         79-98-1028701         79-98-102581         79-98-1025821         79-98-102501         79-98-1035142         79-98-1034181         79-98-1034182         79-98-1035622								
79-98-1029181         79-98-1028701         79-98-1024581         79-98-1025821         79-98-1025821         79-98-1025101         79-98-1035142         79-98-1034181         79-98-1034182         79-98-1035622								
79-98-1028701         79-98-1024581         79-98-1025821         79-98-1026001         79-98-1035142         79-98-1034181         79-98-1034182         79-98-1034522								
79-98-1026301           79-98-1035142           79-98-1034181           79-98-1034182           79-98-1034522								
79-98-1035142 								
79-98-1034181 79-98-1034182 79-98-1035622								
79-98-1034182 79-98-1035622								
79-98-1035622								
79-98-1036101								
79-98-1036581								
79-98-1037061								
79-98-1036382								
79-98-1035421								
7996-1035422								
7936-103062								
79-30-1002021								
79-90-10-021								

Figure 5-2 – Database: File

The attributes applicable to the file are displayed in the panel on the right. None of these attributes can be edited.

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## 5.2.1.1 Creating Files

To create a new file into which existing lines may be copied, from the menu choose *File* | *New*, then select from the sub-menu which type of file to create: source, receiver or relation.

# 5.2.1.2 Renaming Files

To rename a file click twice on the branch label or press  $\langle F2 \rangle$ , type in the new name and press  $\langle Enter \rangle$ .

### 5.2.2 Copying Lines

To copy an existing line to a different file, highlight the required line branches and using the left mouse button drag them onto the destination file as shown in Figure 5-3 below.

I SPSPro Database		
File Database Utilities		
79-98-1037341 79-98-1036582	Source Line Data	
79-98-1037062	Name	79-98-1063831
79-98-1037541	Sequence	83
79-98-1038021	Number	1063831.00
79-98-1038501	File	D:\Data\Demo OBC Swath 10\Source\sw10sps.final.1.s
79-98-103/821	No. shots	204
79-98-1038781	First shot	2646
79-98-1039261	Last shot	4270
79-98-1039741	Day-time of first shot	330 - 17:59:49
79-98-1038981	Day-time of last shot	330 - 18:50:59
79-98-1039461		
79-98-1039941		
79-98-1040421		
79-98-1040901		
79-98-1040221		
79-98-1040701		
79-98-1041181		
79-98-1041661		
79-98-1042141		
79-98-1041861		
79-98-1042341		
79-98-1042821		
79-98-1042621		
79-98-1063891		
79-98-1063771		
79-98-1063711		
79-98-1063831		
New File 1. 79-98-1063831		
D Relation		
Auxiliar y		

Figure 5-3 – Database: Copy Lines

Lines cannot be copied to files of a different data type.



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The file and data type icons change to red to indicate that the file has been edited.

# 5.2.3 Deleting Lines

To remove lines from the database, highlight the lines in the list and from the menu choose *Database | Delete Lines*.

The file and data type icons change to red to indicate that the file has been edited.

### 5.2.4 Line Data

Each file is subdivided into the individual lines found within that file which are represented by level 3 branches as highlighted in Figure 5-4 below.

spSPro Database								
File Database Utilities								
Header	Source Line Data							
A 😔 Source								
sw10sps.final.1.s	Name	79-98-1021501						
79-98-1021501	Sequence	50						
79-98-1021981	Number	1021501.00						
79-98-1021701	File	D:\Data\Demo OBC Swath 10\Source\sw10sps final 1 s						
79-98-1022181	No. shots	06						
79-98-1022183	First shot	6305						
79-98-1032061	Last shot	6055						
79-98-1032541	Day time of first shot	226 17:05:56						
79-98-1033021	Day-une of first shot	320 - 17:03:30						
79-98-1033301	Day-ume of last shot	320 - 17:24:11						
79-98-1033961								
79-98-1034941								
79-98-1033701								
79-98-1032261								
79-98-1031581								
79-98-1031101								
79-98-1030621								
79-98-1030141								
79-98-1029661								
79-98-1029181								
79-98-1028701								
79-98-1024581								
79-98-1025821								
79-98-1026301								
79-98-1035142								
79-98-1034181								
79-98-1034182								
79-98-1035622								
79-98-1036101								
79-98-1036581								
/9-98-103/061								

Figure 5-4 – Database: Line

The attributes applicable to the line are displayed in the *Line* tab page in the panel on the right. Of these only the line name may be edited.

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### 5.2.4.1 SPS Records

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The individual records in the file for the selected line are displayed in the *Data* tab page in the panel on the right, as shown in Figure 5-5 below.

All record attributes may be edited by typing in the new value.

PSPro Database								
Database Utilities		Data						
	<ul> <li>Source Line</li> </ul>							
		SP	Code	Index	Julian Day	Time	Easting	Nor
79-98-1021501	1	6395.00	B1	1	326	17:05:56	339820.3	780
79-98-1021981	_ 2	6401.00	B1	1	326	17:06:07	339846.5	780
79-98-1021701	3	6407.00	B1	1	326	17:06:18	339873.4	78:
79-98-1022181	4	6413.00	B2	1	326	17:06:29	339900.0	78
79-98-1022183	5	6419.00	B1	1	326	17:06:41	339927.2	78
79-98-1032061	6	6425.00	B1	1	326	17:06:52	339953.4	78
79-98-1032541	7	6431.00	B1	1	326	17:07:03	339980.6	783
79-98-1033021	8	6437.00	B1	1	326	17:07:15	340007.7	783
79-98-1033501	9	6443.00	B1	1	326	17:07:26	340034.5	78
79-98-1033981	10	6449.00	B1	1	326	17:07:37	340061.1	78
····· 79-98-1034461	11	6455.00	B1	1	326	17:07:48	340087.2	78
79-98-1034941	12	6461.00	B1	1	326	17:08:00	340113.2	78
79-98-1033701	13	6467.00	B1	1	326	17:08:11	340138.3	78
79-98-1032261	14	6473.00	B1	1	326	17:08:23	340165.6	78
79-98-1031581	15	6479.00	B1	1	326	17:08:34	340191.8	78
79-98-1031101	16	6485.00	B1	1	326	17:08:46	340218.6	78
79-98-1030621	17	6491.00	B1	1	326	17:08:57	340244.7	78
79-98-1030141	18	6497.00	B1	1	326	17:09:08	340271.9	78
79-98-1029661	19	6503.00	B1	1	326	17:09:20	340298.5	78
79-98-1029181	20	6509.00	B1	1	326	17:09:31	340323.7	78
79-98-1028701	20	6515.00	B1	1	326	17:00:43	340340.0	78
79-98-1024581	21	6521.00	B1	1	326	17:00:54	340374.9	78
79-98-1025821	22	6527.00	D1	1	320	17:10:05	240401.6	700
79-98-1026301	23	6527.00	D1	1	320	17:10:00	240420.6	700
79-98-1035142	27	6555.00	D1	1	320	17:10:10	340453.0	700
79-90-1024102	25	6539.00	D1	1	320	17:10:29	240470.0	78/
79-90-102-102	20	6545.00	BI	1	320	17:10:41	3404/9.6	78
79-98-1035022	2/	6551.00	81	1	326	17:10:52	340506.2	/8/
79-98-1036581	28	6557.00	81	1	326	17:11:04	340532.9	/8/
70.09.1027061	- 4	6563.00	R1	1	376	17:11:15	340559 7	789

Figure 5-5 – Database: Line Data

# 5.2.5 Editing Data

### 5.2.5.1 Editing

To enter edit mode in a cell, click twice in the cell, or press  $\langle F2 \rangle$ . The cursor appears and the cell contents may be edited.

To exit edit mode either press < Enter> or click on a different cell.

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# 5.2.5.2 Deleting

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Records (entire rows) may be deleted by first highlighting at least one cell of each record to be deleted, then from the menu choosing *Database | Delete Records*.

# 5.2.5.3 Copying and Pasting Data

To copy selected cells of data to the clipboard highlight the cells with the mouse, or by using the shift and cursor keys, right click and from the popup menu select *Copy*. Key combinations <Ctrl> + <Insert> and <Ctrl> + C may also be used to copy the selection to the clipboard.

To highlight the whole column, click on the column header.

To paste data from the clipboard, highlight the cells into which the data is to be pasted, right click, and from the popup menu select one of the paste functions. All but the first of these functions are numeric. These are:

Replace:	Replaces the data in the cell with the data in the clipboard. Key combinations <shift> + <insert> and <ctrl> + V may also be used to paste the contents of the clipboard.</ctrl></insert></shift>
Add:	Adds the value of the data in the clipboard to that in the cell.
Subtract:	Subtracts the value of the data in the clipboard from that in the cell.
Multiply:	Multiplies the data in the cell by the value of the data in the clipboard.
Divide:	Divides the data in the cell by the value of the data in the clipboard. If the value of the data in the clipboard is zero then no action takes place.

If the paste selection is greater than the copied selection then only the number of cells copied will be pasted

It is possible to copy and paste to and from external applications e.g., spreadsheets and text files with carriage return/line feed.

### 5.2.5.4 Saving Edits

When edits are made to the table, including deletion of records, they are not put into effect until changes are saved to the database by choosing from the menu *Database | Save Line*. Once the database has been saved after any changes have been made, these changes are immediately made available to all other SPSPro program features such as the *Map Display*.

At the same time, the File and Data Type branch icons turn red to indicate that the database



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is now different from the file on disk.

These changes are only saved to the file on disk when the file is saved.

# **Warning:** Once the file has been saved the changes are not reversible. It is advisable that backups are made to all original SPS files before selecting them for use in the project.

### 5.2.5.5 Undoing Edits

For files which have not been saved, i.e., those whose branch icons are red, all edits which have been made may be undone by choosing from the menu *Database | Undo All Edits*.

### 5.3 Sorting

The default sort order for S records is by time. In the case of files with no time or identical time stamps, e.g., preplots, the sort order is by line number, point number, point index.

The default sort order for R records is line number, point number, point index.

The default sort order for source lines is time, and for receiver lines is line number. These sort orders can be changed by going to *Utilities | Sort Lines By*.

Before sorting by line number can be done with SPS format revision 1.0 files the line number fields must be correctly specified in the *Setup* module, *Format* page.

Before sorting by sequence can be done the sequence fields must be correctly specified in the *Setup* module, *Format* page.

### 5.4 Utilities

The following sections describe the utilities accessed from the Utilities menu.

### 5.4.1 Importing Data

External ascii data can be imported into any of the following columns:

Static correction Point depth Seismic datum Uphole time Water depth Surface elevation

To import external data first in the tree list, highlight the lines into which the data is to be imported. Then from the menu select *Utilities | Import Data*. The External Data dialog appears, an example of which is shown below in Figure 5-6. When the parameters are

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correctly set up click the OK button.

File:	U:\Data\FB Data\Exdat	.txt	Browse
Data: ormat:	78 00:00:20 000 78 00:01:26 000 78 00:02:53 000 78 00:04:19 000 78 00:05:46 000 78 00:07:12 000 78 00:08:38 000 78 00:10:05 000 78 00:11:31 000 78 00:12:58 000	01.10 1181 02.75 1183 03.18 1185 04.45 1187 05.91 1189 06.37 1191 07.70 1193 08.91 1195 09.38 1197 10.19 1199	
	Fixed Width	C Delimited	Field Delimiter:
	Search Key C Time	Station/shot ID	
	Attribute: Static Correct	ion 💌 O	Iperation: Replace
	Format Description		

Figure 5-6 – Database: Importing data

# 5.4.1.1 Format

The external data field format can be fixed width or de-limited. Each record must be terminated by a carriage return/line feed.

The format is defined by entering a format definition string in the *Format* field using the following convention:

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Fixed width:

format characters must match exact file positions

e.a. data: 2001 306 6:24:09.3 294.5 format: yyyy ddd hh mm ssss xxxxx

Delimited:

only one character is used to represent a field, field delimiter character(s) must be provided

e.g. data: 2001,306,16,24,9.3,294.5 format: ydhmsx field delimiter: ,

### 5.4.1.2 Synchronisation

The external data is synchronised with the SPS records either by time or station/shot ID. One of these must be therefore present in the external data records. Both can be present but only that selected as the Search Key will be used, and the appropriate field should be defined in the format string.

### 5.4.1.2.1 Time

The Search Key must be set to Time.

The external data records must be in chronological order.

The time for each SPS record must fall within the time range of the external data otherwise no data will be imported for that record and an entry will be made to the error log.

If the SPS record time does not match exactly an external data record time then the imported attribute value will be linearly interpolated.

### 5.4.1.2.2 Station or Shot ID

The Search Key must be set to Station/shot ID.

For each SPS record the program searches the external data file from the last used record for a matching ID number. If no match is found then all remaining SPS records will be unchanged and an entry for each record made in the error log.

In the following two examples all SPS records will be matched:

External file ID	SPS file1 ID	SPS file 2 ID
1	1	2
2	2	2

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-		
3	3	4
4	4	4
5	5	6
6	6	6
7	7	8
8	8	8
9	9	10

In the following example only the first SPS record will be matched:

External file ID	SPS file1 ID
1	1
3	2
5	3
7	4
9	5
11	6
13	7
15	8
17	9

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### 5.4.2 Exporting Data

icius.			
Line Name			
SP SP			
Code			
Index ↓			
<ul> <li>Easting</li> </ul>			
✓ Northing Static Corr			
Point Depth			
Seismic Datu	m		
Uphole Time			
Surface Elev			
	Select None		
Select All			
Select All			
Select All	der rom		
Select All	der row		
Select All Include head	der row		
Select All Include head	der row C Text		
Select All Include head CSV	der row C Text		
Select All Include head Solution Soluti	der row C Text estern\swath 10\Rep	ports\Sources	.csv

Figure 5-7 – Database: Exporting data

Selected attributes from the currently displayed table for all selected lines can be exported to CSV or text file by selecting form the menu *Utilities* | *Export Data*.

Highlight all lines in the tree display from which data is to be exported.

Check the fields which are to be exported.

Specify whether or not to include the header row.

Specify the file type.

Click OK.

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# 5.4.3 Interpolating Receivers

This function is used to interpolate receivers in situations where only certain receiver positions have been computed at regular intervals. For example every 5<sup>th</sup> receiver may have been computed using an acoustic positioning system and it is required to interpolate the receivers between the existing ones.

The SPS receiver file should contain only the computed receivers, for example as shown in Figure 5-8 and Figure 5-9.

Station	Code	Index	Julian Day	Time	Easting	Northing
1275		1	0	00:00:00	537206.4	409490.2
1280		1	0	00:00:00	537158.6	409535.8
1285		1	0	00:00:00	537098.6	409617.2
1290		1	0	00:00:00	537037.3	409695.7
1295		1	0	00:00:00	536973.8	409771.6
1300		1	0	00:00:00	536911.6	409850.5
1305		1	0	00:00:00	536847.8	409930.8
1310		1	0	00:00:00	536790.0	410010.6
1315		1	0	00:00:00	536728.8	410093.2
1320		1	0	00:00:00	536668.8	410168.9
1325		1	0	00:00:00	536607.6	410249.3
1330		1	0	00:00:00	536556.6	410324.1

Figure 5-8 – Database: Interpolating receivers



Figure 5-9 – Database: Interpolating receivers

From the menu select *Utilities* | *Interpolate Receivers*. Enter the required receiver number interval – for the above example to interpolate four new receivers between existing ones enter 1.

The new receivers are linearly interpolated between the existing receivers. The same example after interpolation is shown in Figure 5-10.



Figure 5-10 – Database: Interpolating receivers

### 5.4.4 Interpolating Killed Points

This function is provided to interpolate source and receiver points for which the computed position has been deemed unacceptable. A killed point is identified by having either an instrument code or point index which is amongst the list of killed codes or indexes, Refer to section 2.3.3.

Select the objects in the tree in the left hand side panel for which interpolation is required. These may be either at category level, file level or line level. Multiple selections can be made by holding down the <Ctrl> key.

From the menu select Utilities | Interpolate Killed Receivers.

Killed points in the selected lines will be linearly interpolated between the nearest "good" points either side. The instrument codes and indexes are not changed. To change instrument codes, refer to section 5.4.7.

**Note:** no extrapolation is carried out and therefore the first and last points in the line cannot be interpolated.

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# 5.4.5 Interpolate Receiver Depths from Source Depths

To interpolated receiver depths from source depths, select from the menu *Utilities* | *Interpolate receiver depths from source depths.* 

Enter the search radius. This is the distance from each receiver within which all source locations will be used. The specification of this parameter would depend upon the density and distribution of source locations and the seabed topography.

A linear interpolation will be carried out, using data from each source location within the search radius, weighted according to the inverse of the square of the distance from the receiver location.

# 5.4.6 Interpolate Depths from Bathymetry File

From the menu select Utilities | Interpolate Depths from Bathymetry File.

The bathymetry file should contain grid coordinates and water depth. It may optionally also contain tidal reductions along with their times.

The water depth interpolation is performed using the weighted inverse square method. All depths within a specified search radius are used and weighted by the inverse of the square of their distance from the point being interpolation.

Tide data, if present, will be interpolated linearly using the specified interpolation limit as a maximum.

On completion if there are errors then these will be listed in a separate window and the reason for each failure is given.

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Import Bat	hymetry
File:	D:\Data\Demo OBC Swath 10\XYZ.csv Browse
Data:	343391.2,77454.6,7.973
	343391 2.77454 6.7 973
	343355.2,77489.9,7.970
	343336.5,77470.9,8.023
	343355.2,77489.9,7.970
	343319.4,77524.5,7.928
Front	XYZ
Format:	
	◎ Fixed Width
	Interpolate sources Replace surface elevation
	✓ Interpolate receivers
	Only read file within data geographical extent  Depths are reduced
	Tide reduction interpolation limit (secs): 5
	Search Radius (m): 100
	Format Description
	OK Cancel

Figure 5-11 – Database: Interpolate depths from bathymetry file

Select the file.

Specify the file format:

The following fields are mandatory: X = easting Y = northingZ = depth (with or without tide - see below)

The following field group is optional if Z is not the reduced depth: T = tidal reduction SPSPro

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D = day of yearH = hourM = minuteS = second

Any other character = do not import field

File records must be terminated with a carriage return and line feed, or newline.

### Fixed width:

format characters must match exact file positions.

**e.g.** data: 12345.6 34567.8 45.6 1.2 123123456 format: XXXXXX YYYYYY ZZZZ TTT DDDHHMMSS

### **Delimited:**

only one character is used to represent a field, field delimiter character(s) must be provided.

e.g. data: 12345.6,34567.8,45.6,1.2,123,12,34,56 format: XYZTDHMS field delimiter:,

The following options are available:

Interpolate sources:	Interpolate source depths
Interpolate receivers:	Interpolate receiver depths
Only read file within data geographical extent:	If reading very large files then checking this option will save time by restricting reading of the file to the geographical extent of the data.
Replace surface elevation:	Replace the surface elevation attribute with the interpolated value of the tide.
Replace point depth:	Replace the value of the point depth attribute with the water depth.
Depths are reduced:	If checked then the tide, if available, is removed from the depth before populating water depth and/or point depth attributes.

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Tide ı interp	reduction olation limit:	The maximum time, in seconds, allow	red for tide interpolation.
Search radius:		All points within the specified radius we depth interpolation.	vill be used for the weighted

# 5.4.7 Instrument Code Processing

Select from the menu Utilities | Instrument Code Processing.

This utility provides the means to change, delete and add instrument codes, including conversion of single component files to multi-component files.

Instrument Code Processing		×
Action		
Replace specified code	lace all codes 💿 D	elete records with specified code
Search for code: HG (# = do not replace cha	Repla aracter)	ace with: HG G1 G2 G3
	Cancel	

Figure 5-12 – Database: Instrument code processing

Options:

Replace specified code:	Replace only the code specified as the Search for code.
Replace all codes:	Replace all codes. The Search for code is not used.

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Delete specifi	e records with ied code:	Records whose instrument code is the Search for deleted.	<i>code</i> will be
Search for code:		The instrument code to search for when performin above operations.	ng some of the
Replace with: The coordinate of the coordinate o		The codes listed here will be used to replace the of file. The example shown in Figure 5-12 would be a single-component file to a four-component file.	codes in the used to convert

All instrument codes must be two characters.

No changes are made to the file header.

### 5.4.8 Merge Lines

The *Merge Lines* utility provides options for handling multiple station positions. A typical example would be a partial reshoot after stations have been moved.

From the menu select Utilities | Merge Lines.

👍 Merge Lines				
Selected Lines	All Source Lines	All Receiver Lines	🕅 All Auxilliary Lines	Close
Line: R2545407	▼ Delete	Index + Index -	Edit Code Revert Save	]
2545407.R01	2545407.reshoot.R01			
1 - 00:01:00	1-01:01:00			
1591-1-HG				
1592-1-HG				
1593-1 <b>-</b> HG				
1594-1-HG	1594-1-HG			
1595-1 <b>-</b> HG	1595-1-HG			
1596-1 <b>-</b> HG	1596-1-HG			
1597-1-HG	1597-1-HG			
1598-1 <b>-</b> HG	1598-1-HG			
1599-1 <b>-</b> HG	1599-1-HG			
1600-1 <b>-</b> HG	1600-1-HG			
1601-1-HG	1601-1-HG			-

### Figure 5-13 - Database: Merge lines

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Options:

Selected lines:	Include only the selected lines in the database tree for potential merging.
All source lines:	Include all source lines as candidates for merging.
All receiver lines:	Include all receiver lines as candidates for merging.
All auxiliary lines:	Include all auxiliary lines as candidates for merging.
Use instrument codes:	Display and enable editing of instrument codes.
Line:	Select the line to merge from the dropdown list. All lines with the same line number will appear, each in a separate column.
Delete:	Delete the selected points.
Index +:	Increment the index for the selected points.
Index -:	Decrement the index for the selected points.
Edit Code:	Edit the instrument code for the selected point. A dialog will appear to enter the new code.
Revert:	Revert all changes to the current line.
Save:	Save changes to the current line. A prompt will appear to enter a name for the merged file

Select all points in a column by clicking on the column header.

The second row displays the time of the first point.

When saving, the points in all columns will be merged into a single file. A warning will be given if duplicate points are found before saving.

### 5.4.9 Auto-index Source Points

From the menu select Utilities | Auto-index Source Points.

This utility will re-index all duplicate source points in chronological order. Points with the same line number, point number and index will be given incremental indexes so that a duplicate point with a later time stamp will have an incremented index.

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# 5.4.10 Renumber Lines

From the menu select Utilities | Renumber Lines.

This utility will add a specified increment to the line number of the specified lines.

💠 Renu	—	$\times$	
	Process		
	<ul> <li>Selected lines</li> </ul>		
	○ All source lines		
	O All receiver lines		
	Increment line number by:		
	🗸 ок 🗶	Cancel	

Figure 5-14 - Database: Renumber lines

Options:

Selected lines:	Include only the selected lines in the database tree for renumbering.
All source lines:	Include all source lines for renumbering.
All receiver lines:	Include all receiver lines for renumbering.
Increment line number by:	Enter the value by which to increment the line numbers. Specify a negative value to decrement the line numbers.

After processing, the line databases will need to be saved, then the files will need to be saved.

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# 6 REPLAY

Under Setup | Plot Options | Display | select the Relational option. On the main toolbar click on the Replay button. The replay toolbar shown below in Figure 6-1 appears.

Replay replays the swath as it was acquired, displaying the active spread for each shot, provided that the Source and Relation records are sorted chronologically as is required by the SPS format.

SPSPro Replay			<b>E</b>
Start	Pause	Step	SP Interval: 1

Figure 6-1 – Replay

*Start:* Start replay. This button then changes to the *Stop* button.

Pause: Pauses replay.

Step: Replays the next shot.

*SP Interval:* Replays only every *n*th shot where *n* is the specified interval.

Click on the Start button or Step button to commence replay.

The speed of replay can be increased by increasing the SP interval.

The active source's selected attributes are displayed in the left panel.

Once replayed, sources are plotted in grey as shown below in Figure 6-2.





Figure 6-2 – Replay Map

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# 7 SCAN

The *Setup* | *Scan* page, in conjunction with the Setup | *Format* page allows the user to specify the parameters used to check all files in the SPS dataset for integrity and format compliance. See section 2.6 above for the format setup.

💠 SPSPro Setup							×
Source Receiver Relation	Auxiliary Graphics	Plot Options	Stations	Colour Keys	Scan	Format	Compare
Check Source Files	V	Check Receiver Files		Check Relational Files		tional Files	
Check Integrity							
🔽 Line number increment (	R lines)	Count valid ar	nd killed poi	nts	V C	heck instru	ument codes
Point number increment	8	First index mu	ist be 1				
Time increment (S record	ds)	Index increme	ent				
List missing points	8	List index ran	ges				
<ul> <li>Check Format Compliance</li> <li>Header records</li> <li>Data records</li> </ul>		Strict i.e. case	e sensivity, ni-colons	blank attribute	e fields a	nd literal p	parameter descriptions
Atttributes:	R Daiat Darath						
	Seismic Datum	⊻ w	ater Deptr Irface Elev	ation			
Static Correction	Uphole Time		ay/Time				
Report File: D:\Data\SPS\swath10\Report	rts\Scan Report.txt						Browse
Apply X Cancel	Close						

Figure 7-1 – Scan

# 7.1 Setup

Check the file checkboxes at the top of the form to specify which file categories to be included in the scan.



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Check all options required. These are explained below.

Specify the path and name of the report file to which the scan report will be written.

# 7.2 Integrity Checks

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Integrity checks are performed on a line-by-line basis.

Line number increment:	Reports exceptions to the receiver line number increment specified under Setup   Format.
Point number increment:	Reports exceptions to the receiver and shot number increments as specified under <i>Setup   Format</i> .
Time increment:	Shot records must be sorted by time. This option reports records in source files for which the shot time decrements.
List missing points:	Lists all missing points based upon the shot and receiver number increments specified under Setup   Format.
Count valid and killed points:	Reports the number of killed and not killed points. A killed point is defined as having the instrument code "KL".
First index must be 1:	Reports exceptions where the first index of a point is greater than 1.
Index increment:	Reports records for which the increment in index for the same point ID is greater than 1.
List index ranges:	Lists the point ranges for each index found in the line.
Check instrument codes:	Reports records for which the instrument code does not appear in the header. Do not enable this option if there is no file header.

# 7.3 Format Compliance

Format compliance on data records will be performed only on those fields corresponding to the attributes whose checkboxes are checked.

*Check Header Records:* Include header records i.e., all records starting with 'H' when checking format compliance.

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Check Data Records:	Include data records i.e., all records starting wi when checking format compliance.	th 'S', 'R' or 'X'		
Strict Format Checking:	Case sensitive checking is performed for string header record descriptions.	literals in the		
Check for semi-colons:	Check for the presence of semi-colons at the e header record with the format specified as 12A	nd of each 4.		
Microsecond time:	Check if microsecond times are expected in the	e dataset.		

# 7.4 Relation-specific Operations

Count shot gathers:	For each shot, report the total number of active receivers based on the relational file and the actual receivers recorded.		
Count receiver gathers:	For each receiver, report the total number of active shots based on the relational file and the actual shots recorded.		
Relational statistics	<ul> <li>For each line in the relational file, report the</li> <li>first and last tape</li> <li>first and last SP</li> <li>first and last record</li> <li>number of records</li> <li>first and last time</li> </ul>		


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