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# P1Tools

P1Tools is a Windows based program used to perform Quality Control of navigation data for seismic surveys recorded in the industry standard UKOOA / OGP P1 format, and which also provides an extensive set of utilities relating to P1 and Shell Processing Support (SPS) datasets. Multiple file and zipfile input is supported.

## Quality Control Modules

### QC Module

This module enables P1 batch processing to simultaneously perform any combination of the following QC operations:

- ***Format and Integrity Check***
  - Record integrity checking:
  - Number of vessels, streamers, receiver groups
  - Source firing sequence
  - Shotpoint interval
  - Comprehensive format checking
  - EPSG DB cross-checks

- ***Offsets***
  - Computes ranges between pairs of nodes as configured by the user.
  - The following components are computed for each pair configured:
    - Radial, cross line and along line distance
    - Azimuth
  - Azimuth for along and across line components is selectable from course made good and line heading (first to last shot)

- ***Nodes***
  - Computes shot to shot movement and depth of nodes configured by the user. The following components are computed for each node configured:
    - Radial, cross line and along line distance
    - Delta cross line and delta along line distance
    - Depth
  - The waypoints for line azimuth for computing the along and cross line components are selectable from:
    - First and last shotpoints
    - SeisPos generated P1 header – the waypoints defined in the P2 header – allowing analysis of vessel steering and offset
    - User defined

- ***Streamer Depths***
  - Comparison with nominal Streamer Depth Profile (.sdp file)

    - Plots and statistics for each streamer
    - Plots and statistics for each receiver
    - Tests against acceptance criteria

- ***Receiver Interval Analysis***
    - For each consecutive receiver pair, Mean, minimum and maximum interval
    - Overall Minimum and maximum interval

- ***Feather***
    - Mean, minimum and maximum for each streamer.

For all modules, where applicable, the following outputs are available:

- Tabulated summary
- Interactive time series plots
- Log file
- Text reports
- Csv file summary file

### *Compare Module*

- Performs shot by shot comparison of positions and depths between two P1 files for nodes configured by the user. The following components are computed for each node:
    - Radial, cross line and along line distance
    - Depth
- Output to csv file summary results: mean, minimum and maximum values
- Interactive time series plots of the computed components

### *Trend Analysis*

- Line-by-line time series plots of:
    - Node offsets
    - Node movement
    - P1 Comparison
    - Streamer Depth

### *Statistical Testing*

- Application of user defined acceptance criteria to:
    - Node offsets
    - Node movement
    - P1 Comparison
    - Streamer Depth
- Statistics available:
    - Average
    - Standard deviation
    - Percentile
- Tests:
    - Equality

    - Inequality
    - Greater than
    - Less than
    - Inclusion

### *Replay*

- Interactive graphical replay of P1, one file or two files overlaid.
- Displays:
    - Vessel, sources, receiver groups, tailbuoys, near CMPs
    - Streamer depths by colour
    - Survey line
    - Waypoints (from SeisPos generated header)
- DXF and ESRI Shape file overlay
- Coastline display
- Zooming and scaling functions
- Supports onscreen measurements
- The waypoints for line azimuth are selectable from:
    - First and last shotpoints
    - SeisPos generated P1 header – the waypoints defined in the P1 header, allowing analysis of vessel steering and offset
    - P1/11 preplot records
    - User defined

### *Streamer Shape Plot*

- Plot user specifiable selection of Vessels, Source, Streamers and Tailbuoys
- Specifiable receiver group interval
- Specifiable shot range
- Supports application of streamer rotation to improve clarity of display
- Plot to screen and printer/plotter

## *Utilities*

### *Extract*

- Extracts data from P1 file in field delimited or P1 format
- User specifiable record and attribute configuration
- Supports P1 decimation
- Specifiable inclusive or exclusive shot range and interval

### *Coordinate Conversions*

- Geodetic definitions from:
    - File header
    - EPSG database
    - Manually specified
- Batch processing

### *Postplot*

- Output to DXF, Shapefile, KML formats
- Flexible record attribute specification

### *Concatenation*

- Concatenate all input files with header from first file

### *Intersection*

- SPS supported
- Compute reverse intersections option
- Output format options:
    - Native
    - Omega

### *Bathymetry*

- Tidal reductions from flexible format text file
- Datum and propagation velocity corrections

### *Split File*

- Splits P1 and P2 lines based on shot-by-shot geographical location
- Typical application to separate whole survey dataset by block boundary

### *Header Update*

- Attach/replace headers for P1 file
- Batch processing

### *Merge*

- Automatic merge files based on closest common shot
- Manual selection
- Batch processing