User Manual

Version V1.0-20251212

User Manual
For Marine BenchVue

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Revision History

Version	Revision Date	Change Summary
1.0	20251212	Initial release

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1.Introduction

This user manual introduces how to use the Marine BenchVue software.

1.1 Overview

Marine BenchVue is an integrated suite of software tools designed to simplify data management, analysis, and coordinate transformation for hydrographic surveys conducted with the Tersus ES200 single-beam echo sounder.

With its intuitive interface and intelligent data processing capabilities, Marine BenchVue streamlines every step—from sonar data replay and correction to coordinate conversion—ensuring accuracy, efficiency, and productivity in marine data workflows.

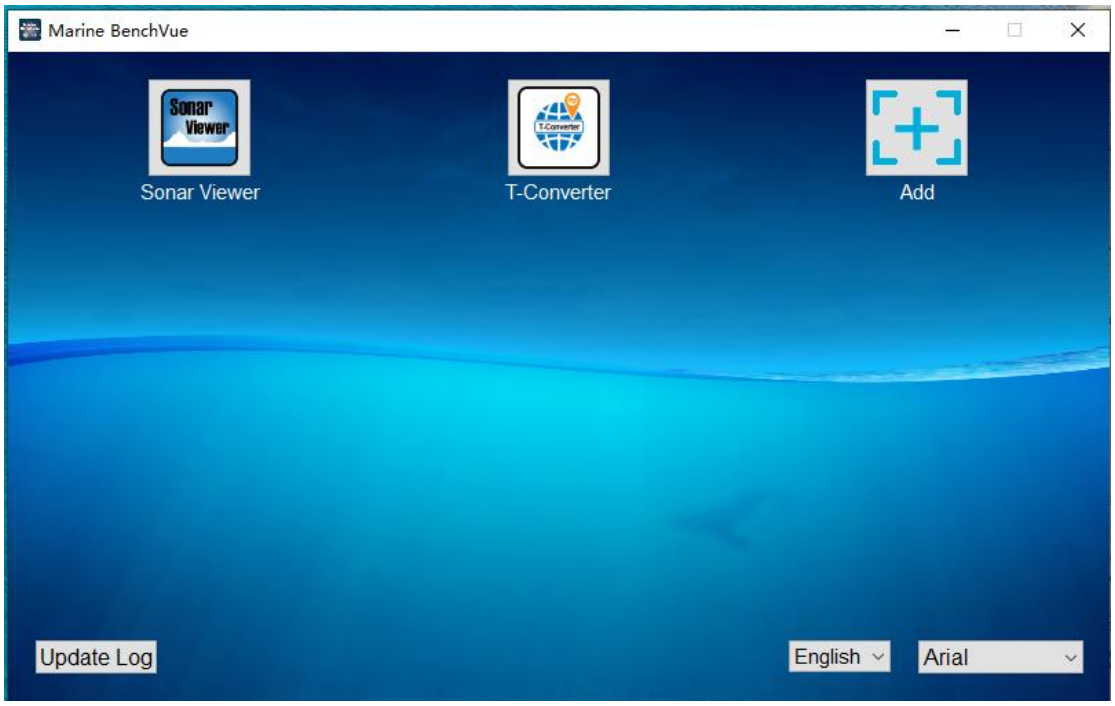


Figure 1.1 Marine BenchVue main interface

Marine BenchVue software consists of two main parts, Sonar viewer and T-Converter:

Sonar Viewer allows users to replay, analyze, and refine sonar data collected in the field. It includes advanced functions for error checking, data correction,

and flexible export formats.

T-Converter automatically reads the geodetic coordinate files exported from Sonar Viewer and converts them into any required projected coordinate system—whether for local mapframe, engineering, or navigation applications.

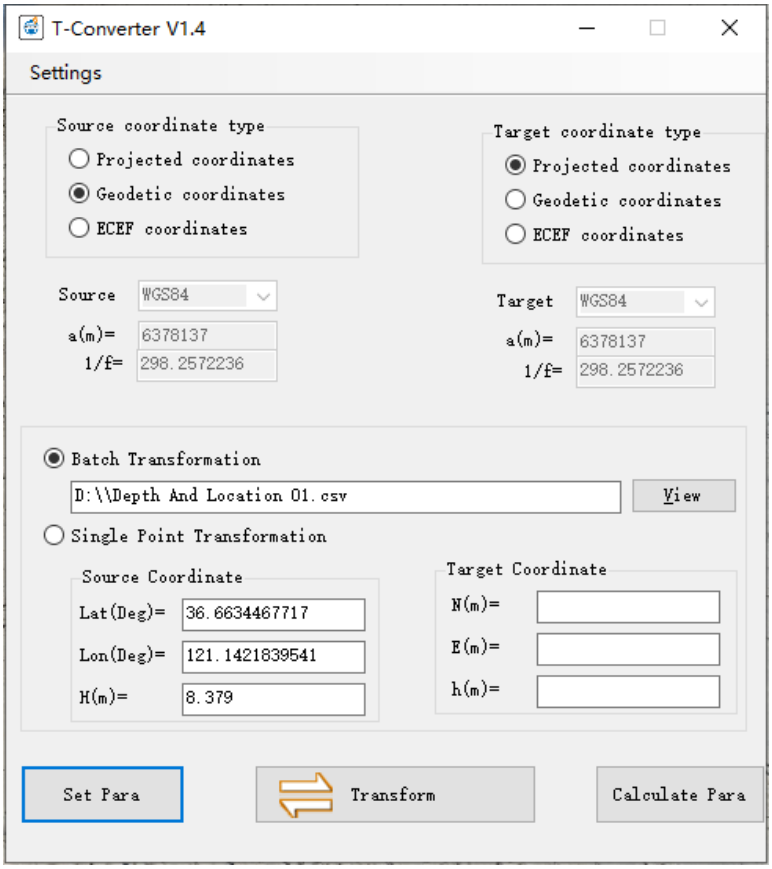


Figure 1.2 T-Converter main interface

1.2 Features

Sonar Viewer:

- Data Playback: Replay and inspect recorded sonar data intuitively
- Batch Frame Removal: Efficiently clean datasets by removing unnecessary frames in bulk.
- Batch Depth Correction: Apply uniform or customized depth corrections to multiple records.
- Automatic False Data Check: Detect and flag suspected erroneous or noisy data for review.

- Comprehensive Editing Tools: Bottom line adjustment, marking, and depth filtering functions
- Flexible Data Export: Output in CSV, TXT, KML, DXF, PNG, and TSL3 formats

T-Converter:

- Automatic File Import: Instantly recognize and open depth files from Sonar Viewer
- Single-Point & Batch Conversion: Process individual coordinates or transform entire datasets
- Universal Projection Support: Convert geodetic coordinates (latitude/longitude) into any projected coordinate system required by your project

1.3 System Requirements

Marine BenchVue is to run on a wide range of different computer configurations. The systems requirements are listed as below:

Table 1 System Requirements for Marine BenchVue

Operating System	Microsoft Windows 7, 8, 10 (32-bit and 64-bit)	
Hardware	Minimum	Recommended
Processor	Intel Core i3	Intel Core i5
RAM	4GB	8GB
Hard disk	10GB	1TB
Graphics card	Direct X9 compatible integrated graphics	Direct X9 compatible 2GB discrete graphics
Internet Connection	Ability to originate both http and https (SSL) connections	

2.Trial and Registration

2.1 Trial

After installing the software for the first time, clicking the Sonar Viewer icon will trigger a pop-up prompting you to insert the USB-KEY dongle.

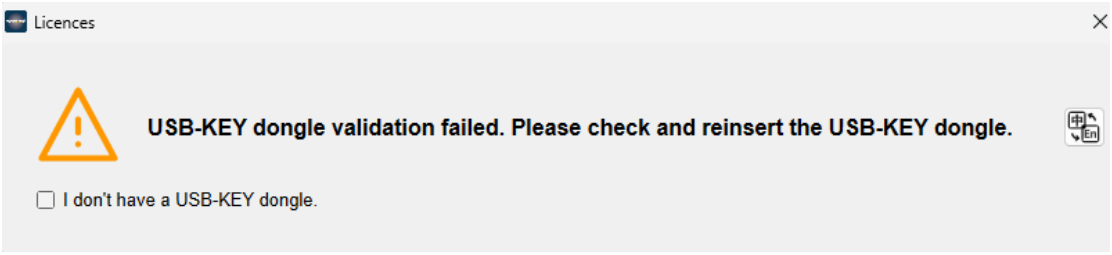


Figure 2.1 USB-KEY pop-up

Select “I don’t have a USB-KEY dongle” to view the details.

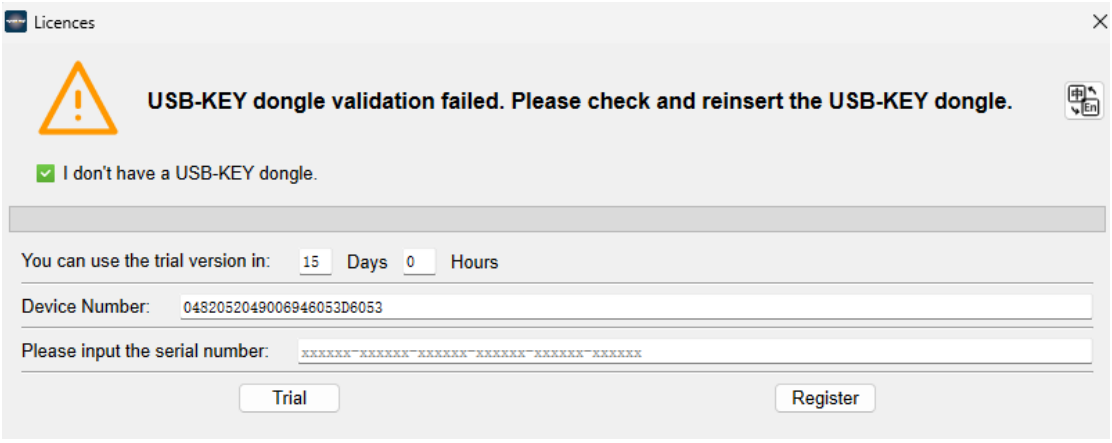


Figure 2.2 Trial and Registration interface

By clicking "Trial", you can use Sonar Viewer for a 15-day evaluation period. The software will become inactive once this trial expires.

2.2 Registration

To complete the registration, please provide the Device Number to the Tersus Support team. You will then receive a serial number. Enter this serial number and click “Register” to finalize the process.

3.Sonar Viewer

This chapter describes the Sonar Viewer.

3.1 Main Interface

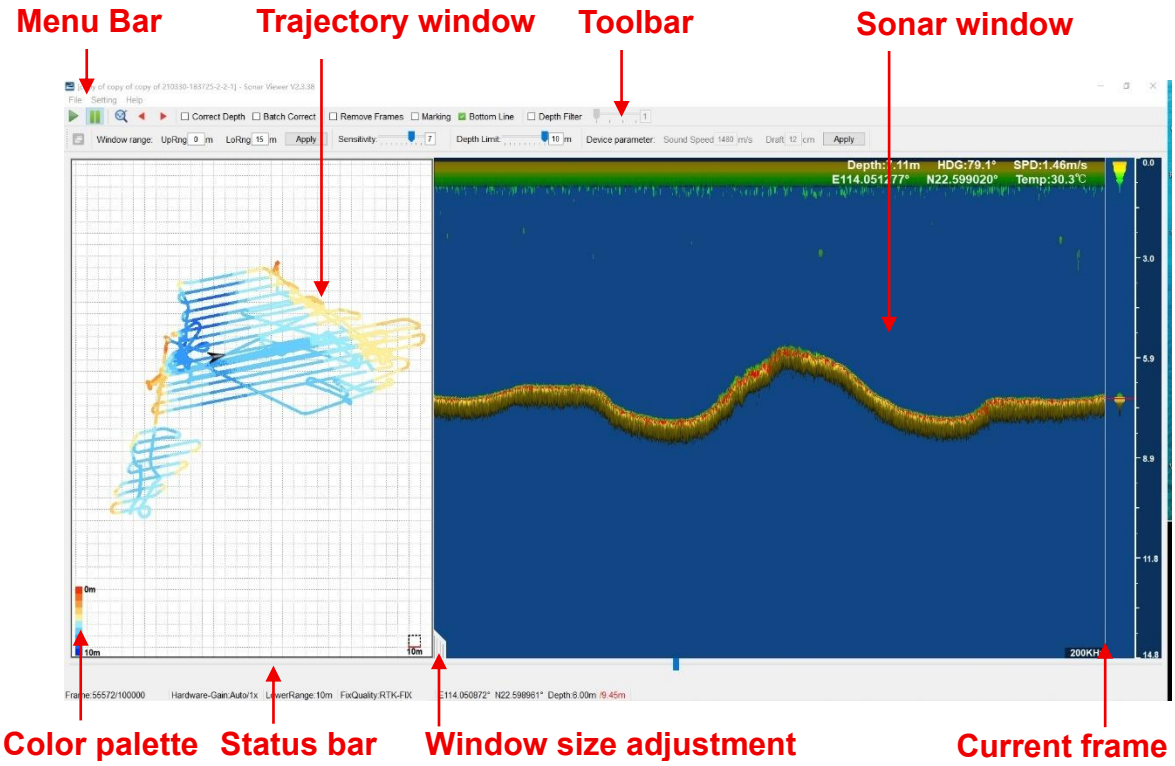


Figure 3.1 Sonar viewer main interface

3.1.1 Menu Bar

Figure 3.2 Menu Bar window

The are three options in the Menu Bar, File, Setting and Help.

3.1.1.1 File

Figure 3.3 File option and Open window

1) Open

- Using the [Open] Menu

The [Open] menu allows you to select 60–100 *.tsl3 files at once (hold the Shift key to multi-select). The exact number of files that can be opened depends on your computer's memory configuration.

- Sample Data After Installation

After the software is installed, sample *.tsl3 recording files are located in the default folder ..\ToslonMarineBenchVue\data. These files contain example data. You may open one of them to become familiar with the software's operation.

2) Save as

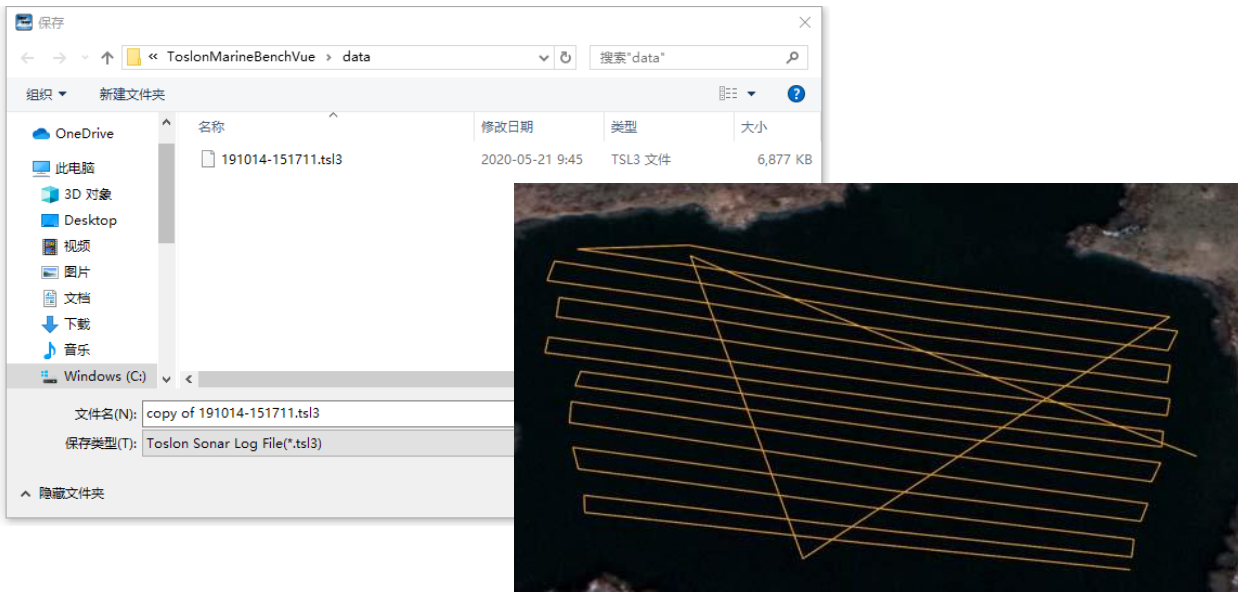


Figure 3.4 Save as option

After editing a data file, you can save it separately as a *.tsl3 file, preserving the original data. You may also choose to export the track as a *.kml file, which can be opened in Google Earth for viewing the test trajectory on a map.

3) Import KML

Import pre-prepared KML files into the system.

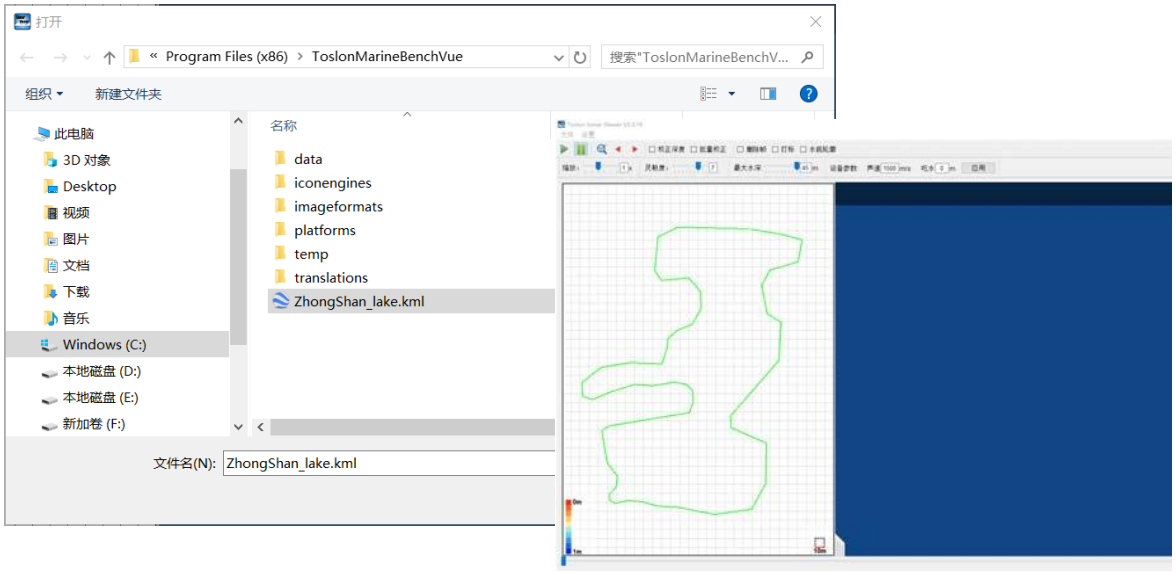


Figure 3.5 Import KML

4) Export as data

As shown in the figure below, after editing a data file, you can choose to export it in various data formats.

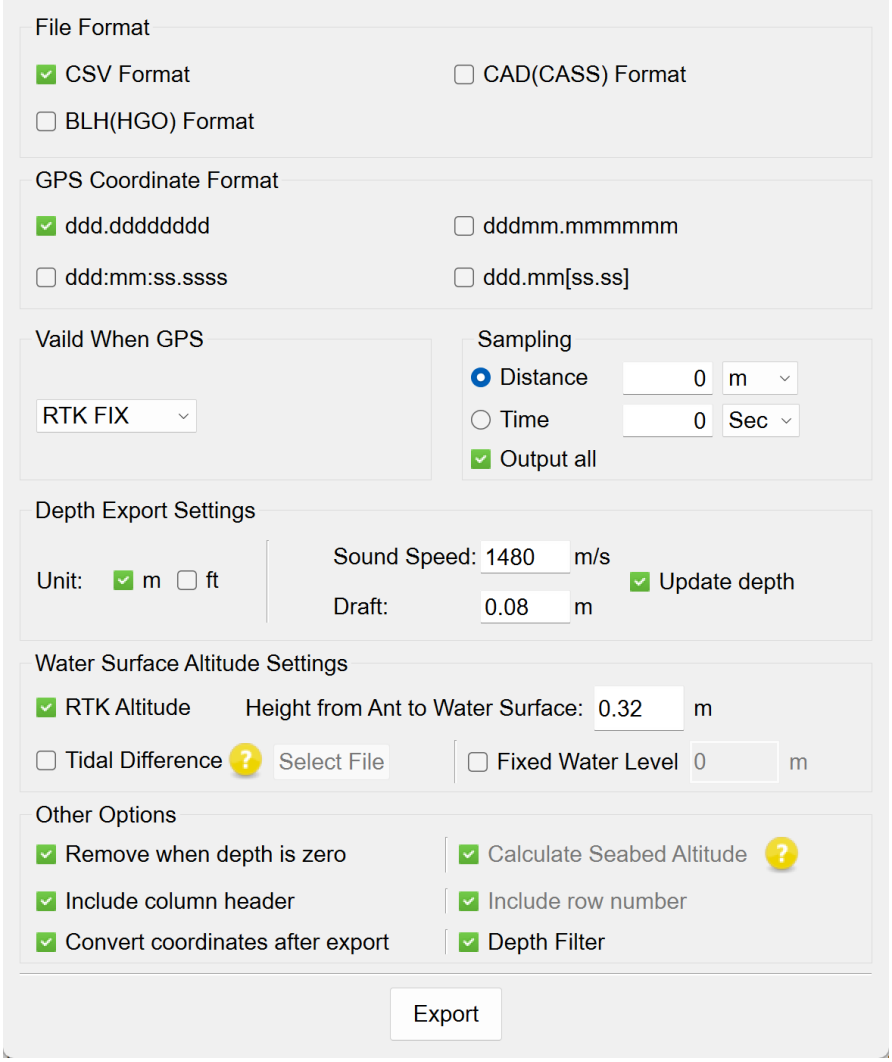


Figure 3.6 Export Settings

- File Format

CSV Format: Export as a universal comma-separated values file.

BLH (HGO) Format: Export as BLH (HGO) text format.

CAD (CASS) Format: Export in a format compatible with CAD (CASS) plugins.

Note: The exported GPS BLH data can be converted or projected using the T-Converter coordinate transformation tool.

- GPS Coordinate Format

Select the coordinate format required for data processing. Four options are available.

- Valid When GPS

Choose to export data only when the GPS status is: All / Single / DGPS / RTK

FLOAT/ RTK Fixed Solutions.

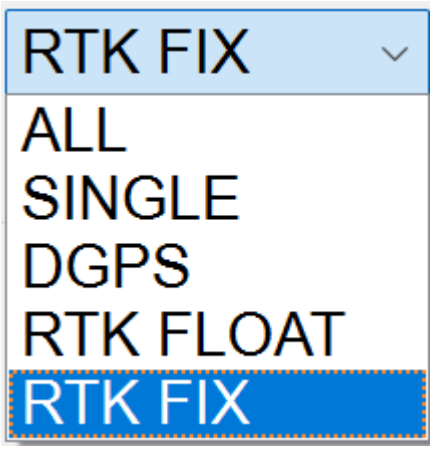


Figure 3.7 GPS status

- Sampling

Set the interval for extracting data points. Distance interval and Time interval can be used. If selecting “Output All”, then all data will be output.

- Depth Output Settings

Unit: Set the depth unit for exported data: Meters (M) or Feet (Ft).

Sound Speed: Set the actual sound-speed parameter for the operating environment. The value should be the same as those set in the configuration file on the SD card of the echo sounder.

Draft: Set the actual draft parameter for the operating environment. The value should be the same as those set in the configuration file on the SD card of the echo sounder. The default for TheDuck™ USV is 0.08 m.

Notes:

1. If “Update Depth” is not selected, the depth in the exported file remains the raw depth output from the echo sounder.

2. The settings here are intended for correction only when the echo sounder parameter settings are incorrect. If “Update Depth” is selected, the exported depth data will be converted proportionally based on the ratio between the sound speed set here and the echo sounder’s sound-speed setting.

- Water Surface Attitude Settings

RTK Altitude Height from Ant to Water Surface:

Set the eight of the RTK antenna above the water surface.

Tidal Difference: Import a tidal correction data file.

Note: For the required file format, refer to the template in the ToslonMarineBenchVue\dat directory.

Fixed Water Level: Set the fixed water level if needed.

Note:

For TheDuck™ USV connected to a Luka-TAP GNSS Receiver:

Antenna height = 0.2 m (water surface to battery-cover plate) + 0.04 m (quick-release head) + 0.08 m (PCO of Luka GNSS Receiver) = 0.32 m.

For TheDuck™ USV connected to an Oscar-series GNSS Receiver:

Antenna height = 0.2 m (water surface to battery-cover plate) + 0.04 m (quick-release head) + 0.094 m (PCO of Oscar GNSS Receiver) = 0.334 m.

- Other Options

Remove when depth is zero: Remove invalid depth data where depth equals zero.

Calculate Seabed Altitude: Compute seabed elevation using the conventional method. Click the ? to view the calculation formula.

Include column headers: Include column titles in the exported file.

Include row number: Include row number in the exported file.

Convert coordinates after export: When selected, the T-Converter will be opened automatically after export.

Depth Filter: Apply the “Depth Filter” settings.

3.1.1.2 Setting

- Load Color Scheme

Color schemes can be provided by customer support based on user preference, and then imported into the software.

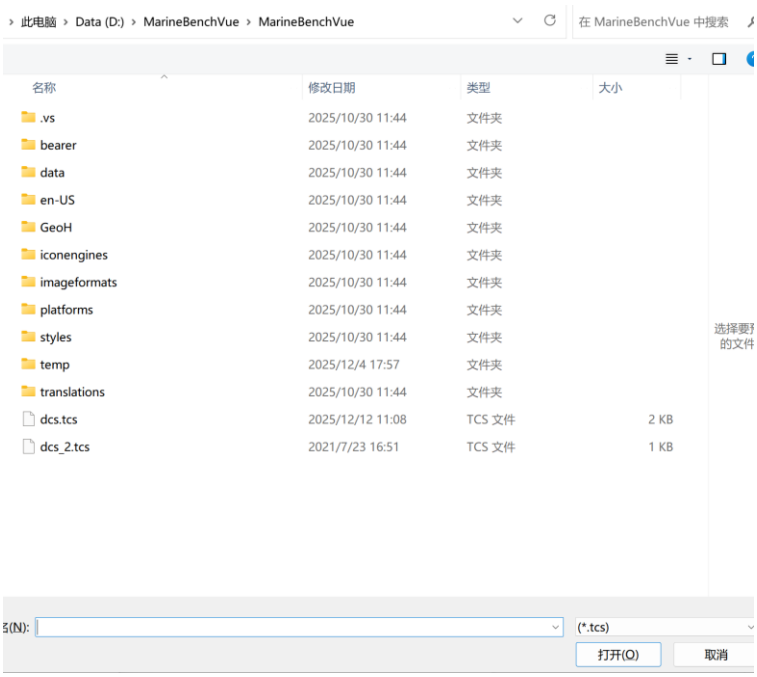


Figure 3.8 Load Color Scheme

- Background Color

You can select White / Black / Blue as the background color.

- Track Style

You can choose Solid Line or Depth-Value as the track display style.

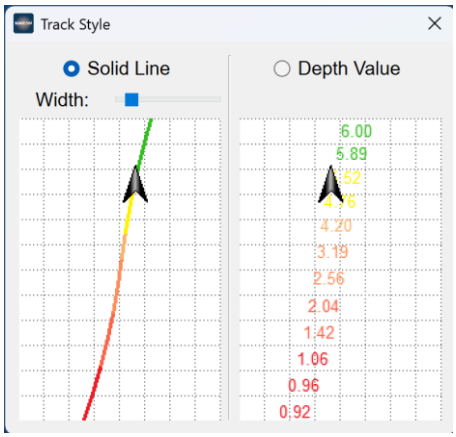


Figure 3.9 Track Style

3.1.1.3 Help

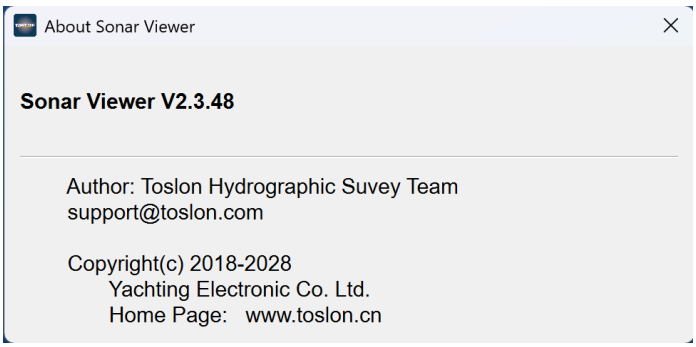


Figure 3.10 Help Interface

Display the software version.

3.1.2 Trajectory window

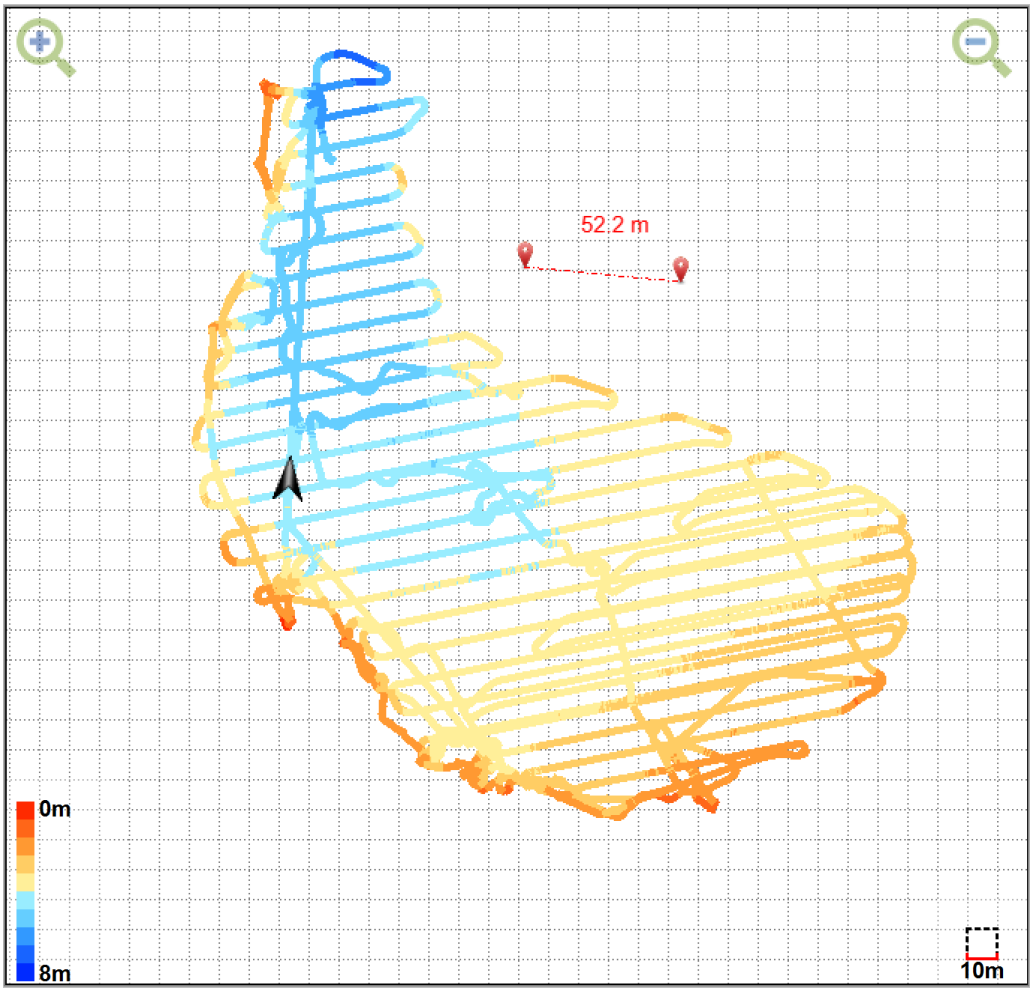


Figure 3.11 Trajectory window

- Drag the line between the track window and the sonar image window to adjust their respective sizes.
- Scroll the mouse wheel to change the scale of the track window.
- Right-click in the track window to measure the distance between two points.
- A blue track indicates deeper water, while red indicates shallower water.

3.1.3 Toolbar

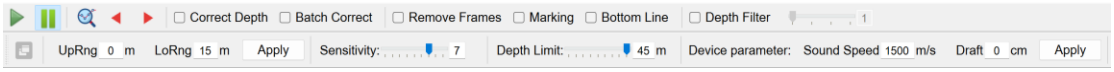
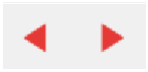


Figure 3.12 Toolbar

-  : Playback the data.
-  : Pause playback.
-  : Check for suspected incorrect data.
-  : Jump to the previous/next incorrect data frame.
- Correct Depth: Adjust the depth value of a single frame.
- Batch Correction: Click and drag the mouse to correct depth across multiple frames at once. The detailed steps are as follows:
  - Enable the Batch Correction function from the toolbar.
  - Drag the mouse along the correct seabed echo in the echogram.
  - Confirm the seabed contour line recalculated by the software.

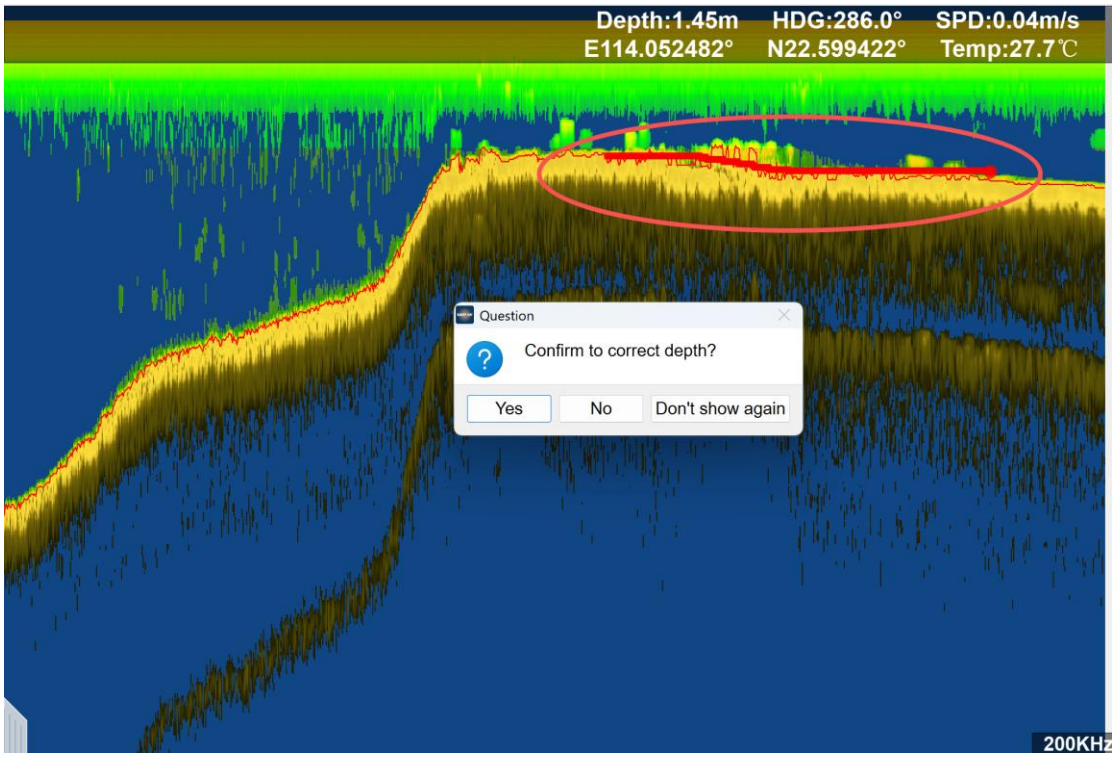


Figure 3.13 Batch correct depth

- Remove Frames: Remove unwanted frames.
- Marking: Place coordinate markers on the sonar echogram at specified measurement intervals.
- Bottom Line: Display the bottom line.
- Depth Filter: Automatically adjust the depth of the overall data. There are a total of 4 levels, which can filter data of different echo intensities.
- UpRng 0 m LoRng 14 m Apply : Adjust the depth display range of the echo image in the sonar window, and it can also be adjusted through the mouse wheel.
- Sensitivity: Adjust the display threshold of the echo image.
- Depth Limit: Set the maximum depth display in the Trajectory window (default is auto-detected).
- Device Parameters: Enter the parameters stored in the configuration file on the echo sounder's SD card.

  Note: The SD card default values are: sound speed 1500 m/s and draft 0.0 m. It is recommended to keep these defaults and modify them only

during data export.

3.1.4 Sonar window

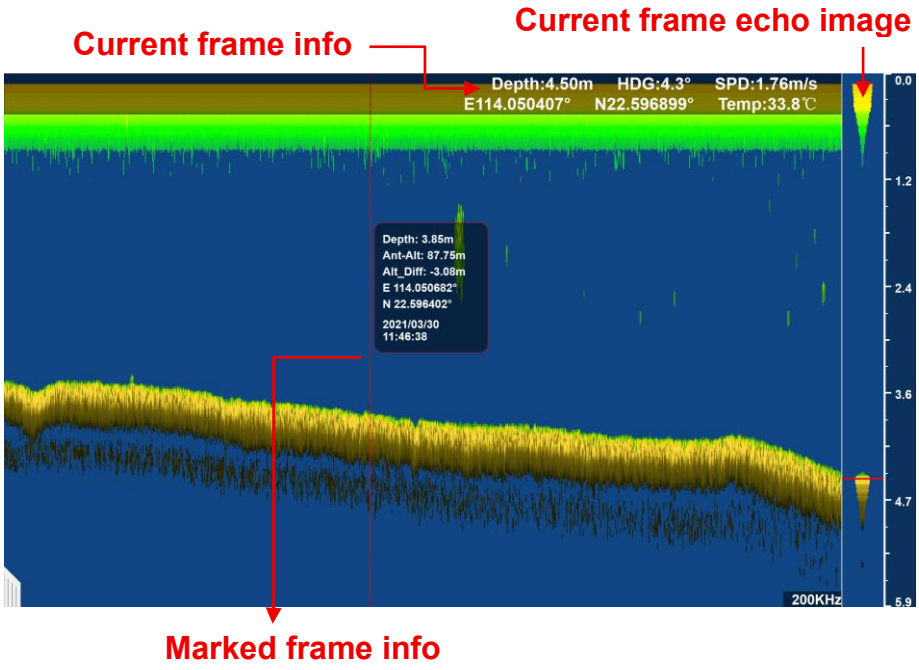


Figure 3.14 Sonar window

Mouse Operations in the Sonar Window：

- Double-click the left mouse button in the sonar window to mark a frame, displaying its depth and coordinate information.
- Simultaneously, the corresponding position will be highlighted on the track line.

3.1.5 Status Bar

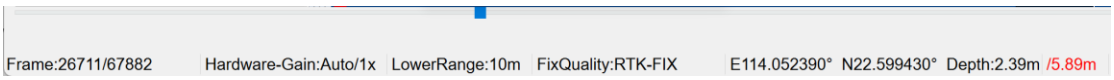


Figure 3.15 Status Bar

- Frame: The sequence number of the current frame (corresponding to the rightmost echo image / the vessel's current position).
- Hardware-Gain: The hardware gain value applied to the current frame.
- LowerRange: The lower limit of the measurement range for the current

frame.

- FixQuality: The GPS status of the current frame.
- E (Longitude) / N (Latitude): The GPS coordinates of the current frame / the frame under the mouse cursor.
- Depth: The depth of the current frame / the frame under the mouse cursor. Black text indicates the original depth value; red text indicates the depth at the cursor location.

3.2 Export File Header Descriptions

Users can export data in different formats according to their needs. The following describes the column headers in a *.CSV format file:

SN	Date	Time	Ticks	E/W	longitude N/S	latitude	Depth(DBT)+Draft	Antenna Altitude	Alt Diff of WGS84-Geoid	FixQuality	SoundSpeed	Draught	Antenna Height	Seabed Altitude
			(ms)		(ddd:mm:ss.ssss)	(dd:mm:ss.ssss)	(m)	(m)	(m)		(m/s)	(m)	(m)	(m)
1	2E+07	11:40:41	1220439	E	114:03:01	N 22:35:47.0485	0.55	87.779	-3.084	4	1480	0.12	0.37	83.775
2	2E+07	11:40:56	1235195	E	114:03:01	N 22:35:47.1091	1.03	87.778	-3.084	4	1480	0.12	0.37	83.294
3	2E+07	11:41:00	1238964	E	114:03:01	N 22:35:47.1774	1.73	87.713	-3.084	4	1480	0.12	0.37	82.529
4	2E+07	11:41:01	1240004	E	114:03:01	N 22:35:47.2543	2.14	87.787	-3.084	4	1480	0.12	0.37	82.193
5	2E+07	11:41:02	1240784	E	114:03:01	N 22:35:47.3288	2.37	87.794	-3.084	4	1480	0.12	0.37	81.97
6	2E+07	11:41:03	1241759	E	114:03:01	N 22:35:47.3840	2.46	87.767	-3.084	4	1480	0.12	0.37	81.853
7	2E+07	11:41:04	1242604	E	114:03:01	N 22:35:47.4324	2.69	87.753	-3.084	4	1480	0.12	0.37	81.609
8	2E+07	11:41:05	1243579	E	114:03:01	N 22:35:47.5063	2.89	87.782	-3.084	4	1480	0.12	0.37	81.438
9	2E+07	11:41:06	1244814	E	114:03:01	N 22:35:47.5539	3.15	87.756	-3.084	4	1480	0.12	0.37	81.152
10	2E+07	11:41:07	1245789	E	114:03:01	N 22:35:47.5398	3.22	87.794	-3.084	4	1480	0.12	0.37	81.12
11	2E+07	11:41:09	1247999	E	114:03:01	N 22:35:47.5165	3.23	87.761	-3.084	4	1480	0.12	0.37	81.077
12	2E+07	11:41:14	1252809	E	114:03:01	N 22:35:47.5105	3.59	87.776	-3.084	4	1480	0.12	0.37	80.732
13	2E+07	11:41:31	1270164	E	114:03:01	N 22:35:47.5712	3.83	87.759	-3.084	4	1480	0.12	0.37	80.475
14	2E+07	11:41:34	1272764	E	114:03:01	N 22:35:47.6045	3.8	87.755	-3.084	4	1480	0.12	0.37	80.501
15	2E+07	11:41:40	1278614	E	114:03:01	N 22:35:47.6048	3.52	87.767	-3.084	4	1480	0.12	0.37	80.793
16	2E+07	11:41:45	1283749	E	114:03:01	N 22:35:47.5359	3.21	87.759	-3.084	4	1480	0.12	0.37	81.095
17	2E+07	11:41:47	1285959	E	114:03:01	N 22:35:47.4682	3.03	87.769	-3.084	4	1480	0.12	0.37	81.285
18	2E+07	11:41:49	1288494	E	114:03:01	N 22:35:47.4251	2.93	87.764	-3.084	4	1480	0.12	0.37	81.38
19	2E+07	11:41:51	1290379	E	114:03:01	N 22:35:47.4476	3.43	87.742	-3.084	4	1480	0.12	0.37	80.858
20	2E+07	11:41:52	1291159	E	114:03:01	N 22:35:47.5094	3.91	87.801	-3.084	4	1480	0.12	0.37	80.437
21	2E+07	11:41:53	1291809	E	114:03:01	N 22:35:47.5686	4.03	87.84	-3.084	4	1480	0.12	0.37	80.356
22	2E+07	11:41:53	1292394	E	114:03:01	N 22:35:47.6326	4.07	87.834	-3.084	4	1480	0.12	0.37	80.31
23	2E+07	11:41:54	1292979	E	114:03:01	N 22:35:47.6906	4.12	87.808	-3.084	4	1480	0.12	0.37	80.234
24	2E+07	11:41:55	1293759	E	114:03:01	N 22:35:47.7592	4.17	87.752	-3.084	4	1480	0.12	0.37	80.128
25	2E+07	11:41:56	1294994	E	114:03:01	N 22:35:47.8046	4.07	87.756	-3.084	4	1480	0.12	0.37	80.232

Figure 3.16 Exported CSV File

- SN.: Frame sequence number.
- Date: The date of the measurement.
- Time: The local time for each measurement point. The time zone follows the parameter set on the SD card.
- Ticks: Millisecond-level timestamp of the frame, starting from system power-on, with a maximum value of 2^32 milliseconds.
- E/W: East or West for Longitude.
- Longitude: Longitude value of the current frame.
- N/S: Noth or South for Latitude.
- Latitude: Latitude value of the current frame.
- Depth (DBT)+Draft: Water depth value. If a draft is set and depth update is

enabled, this value already includes draft compensation.

- Antenna Altitude: Field <9> in the GGA sentence – antenna height value.
- Alt Diff of WGS84-Geoid: Field <10> in the GGA sentence – difference between the WGS84 ellipsoid and the geoid.
- FixQuality: Field <6> in the GGA sentence – 0: Initializing, 1: Single, 2: DGPS, 3: Invalid PPS, 4: Fixed Solution, 5: Float Solution.
- SoundSpeed: Set sound speed value.
- Draught: Draft of the transducer, set via SD card parameters or the export interface.
- Tide Level: Tide level setting, configured in the export interface. If not set, it will be empty
- Antenna Height: Height of the antenna above the water surface.
- Seabed Altitude: Bottom elevation value after applying compensation for draft, elevation (tide level), geoid undulation, antenna height, and sound speed.

4.T-Converter

This chapter describes operations of T-Converter.

T-Converter automatically reads the geodetic coordinate files exported from Sonar Viewer and converts them into any required projected coordinate system—whether for local mapping, engineering, or navigation applications.

You can also directly open this tool to perform coordinate conversion. It supports single-point conversion and batch conversion.

4.1 Main Interface

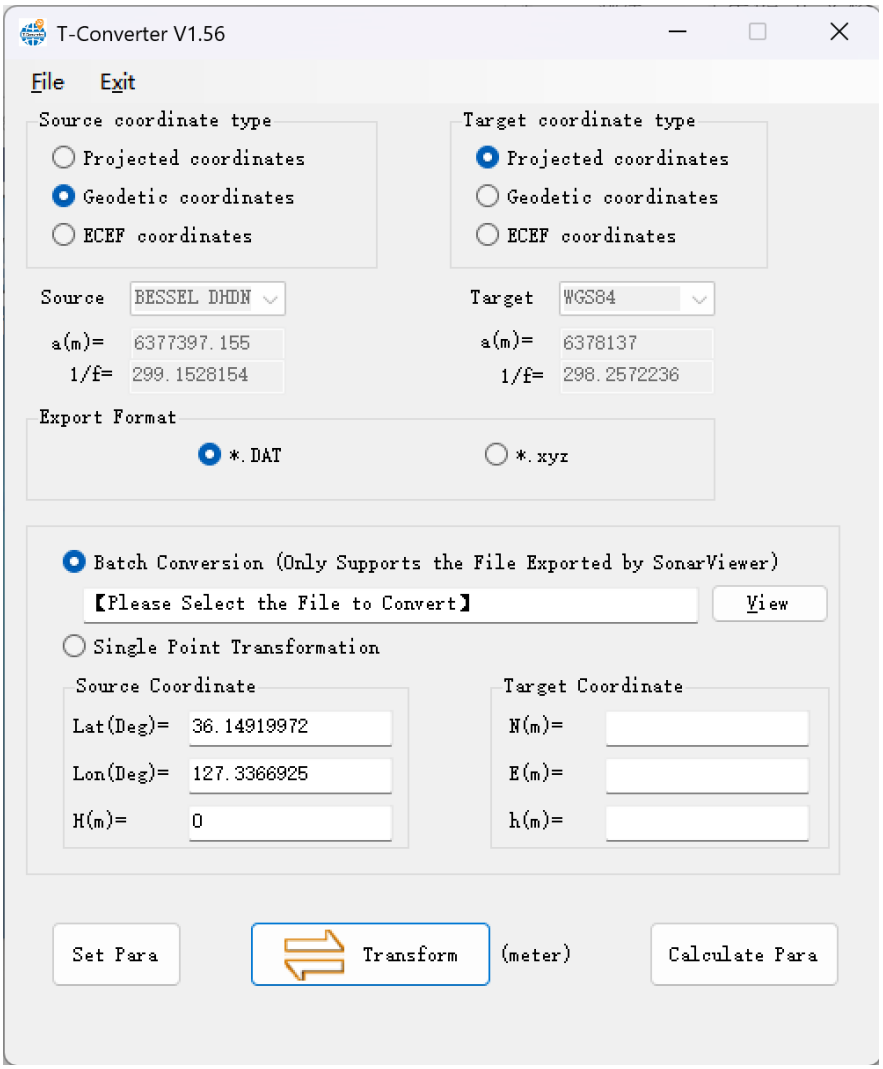


Figure 4.1 T-Converter main interface

4.2 Workflow

1) Select “Geodectic coordinates” in the Source coordinate type option and “Projected coordinates” in the Target coordinate type.
2) Select “.DAT” in the Export Format option.
3) Select the CSV file exported from the Sonar Viewer software in Batch Conversion. (It will be automatically loaded after export).
4) Click “Set Para” to set the coordinate system parameters needed. In the Ellipsoid interface, select “WGS84” in the Source option, and select the Target ellipsoid needed.

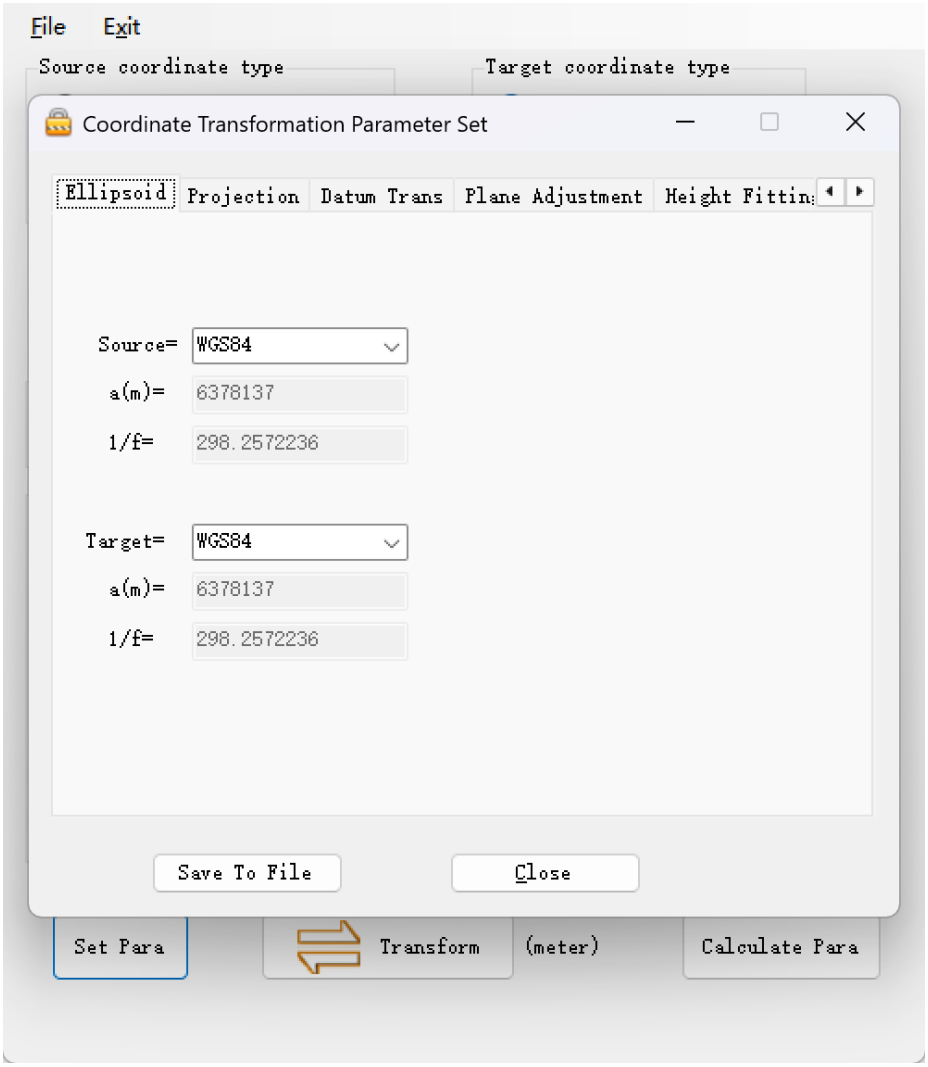


Figure 4.2 Set Para interface

5) Set other parameters for the local coordinate system needed. For example, the “Projection”, “Datum trans”, “Plane Adjustment” and “Height Fitting”.
6) After setting the needed coordinate system, click “Save to file” to save the configuration.
7) Click Transform and get the “.DAT” file in the same path of the CSV file. (The units in parentheses are Meter or Feet, which are the same as those set when exporting data in Sonar Viewer).
8) Find the “.DAT” file and check the results. The order of each row of data is Frame sequence number, North, East and Seabed Altitude.

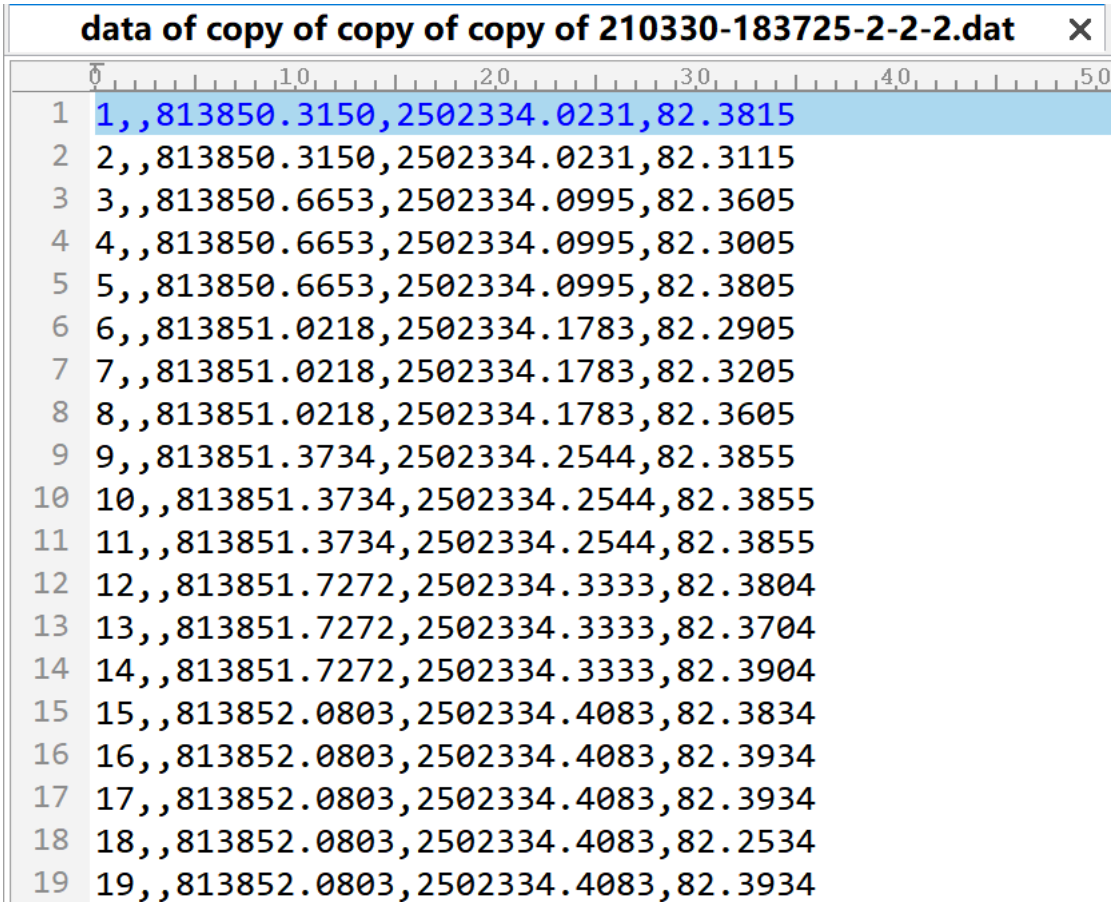


Figure 4.3 Exported DAT File

5.Terminology

Table 2 Terminology

Abbreviation	Description
USV	Unmanned Surface Vessel
SBES	Single Beam Echo Sounder
RTK	Real-Time Kinematic
TAP	Tersus Advanced Positioning
PP	Polypropylene
HD	High Definition
RF	Radio Frequency
GNSS	Global Navigation Satellite System
CORS	Continuously Operating Reference Stations
NMEA	National Marine Electronics Association
TF	TransFlash
USB	Universal Serial Bus
UHF	Ultra-high Frequency

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