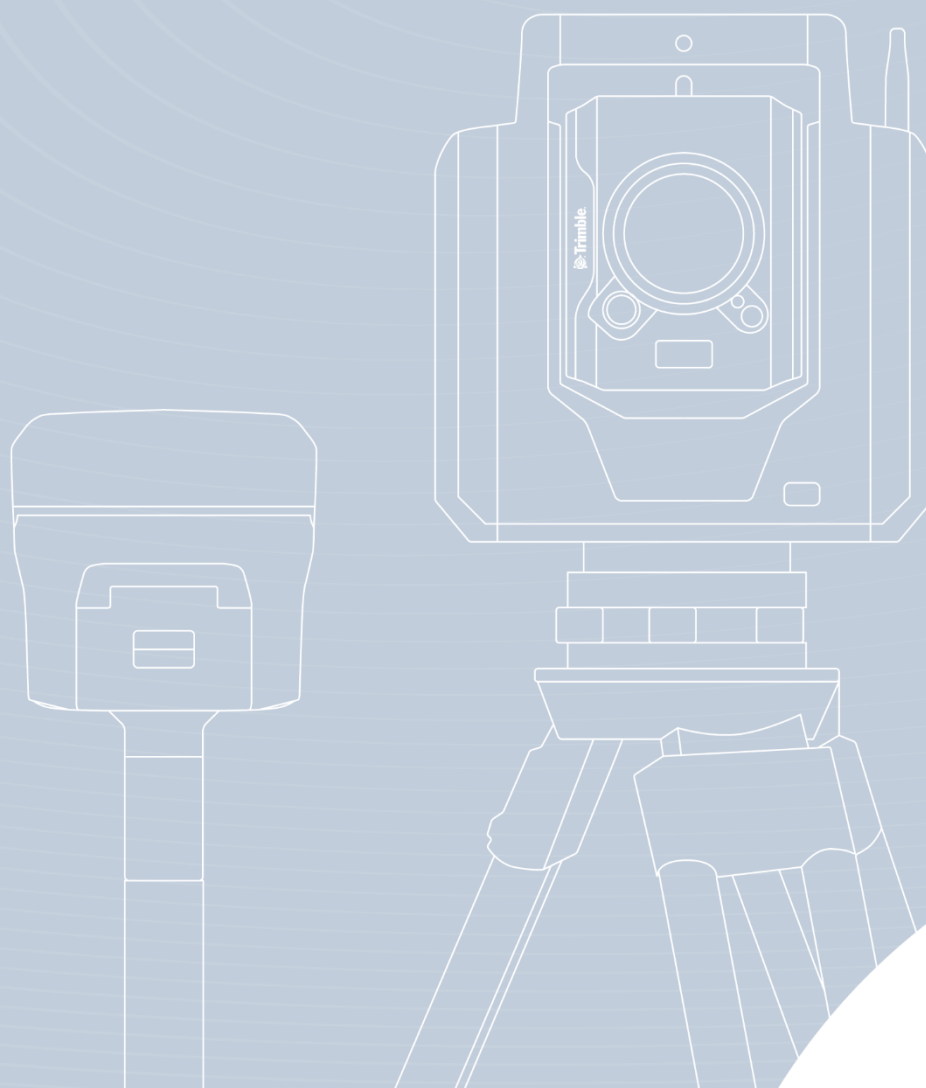


BathySurvey App for Trimble Access

Quick Start Guide



Oct. 2023, v2.0, O. Fennema, S. Terwee,
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**LEVERANCIER VAN
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1. Introduction

BathySurvey is an application for Trimble Access developed by Geometius. The BathySurvey app adds support to the Trimble Access Software for survey-grade single beam echosounders.

The BathySurvey app combines data of recorded echosounder depths and positions measured with GNSS or Total Station.

BathySurvey is only supported by Windows OS devices.

The BathySurvey app supports the following echosounders:

- Echologger EU400
- Echologger EU D24
- CEE-LINE

The settings for the echosounders can be altered within the BathySurvey app. The BathySurvey app can also be used with any echosounder that support NMEA DBS or NMEA DBT output. In this case the echosounder settings cannot be altered within the BathySurvey app.

The BathySurvey app has a bar check wizard which can be used to calculate the sound velocity.

BathySurvey uses a stylesheet to export the recorded depths and positions to ASCII (CSV).

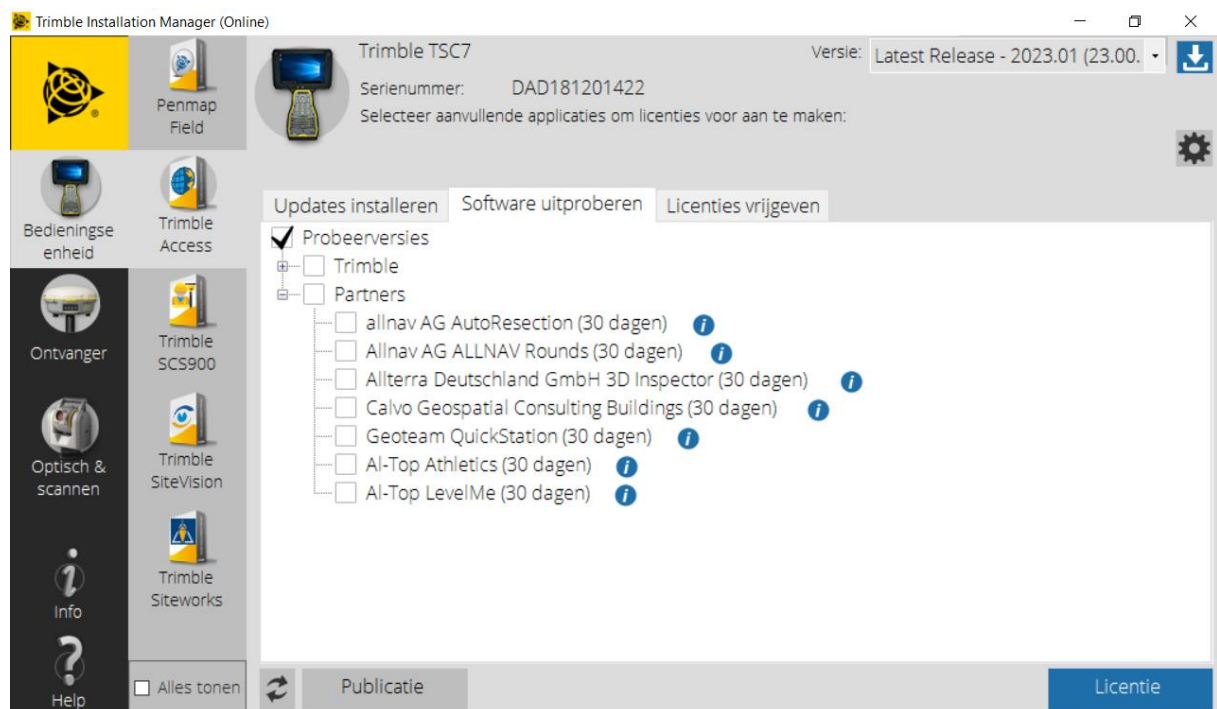
2. BathySurvey request and installation

Use Trimble Installation Manager to download BathySurvey. After installation the app will automatically appear in Trimble Access in the 'choose application' menu.

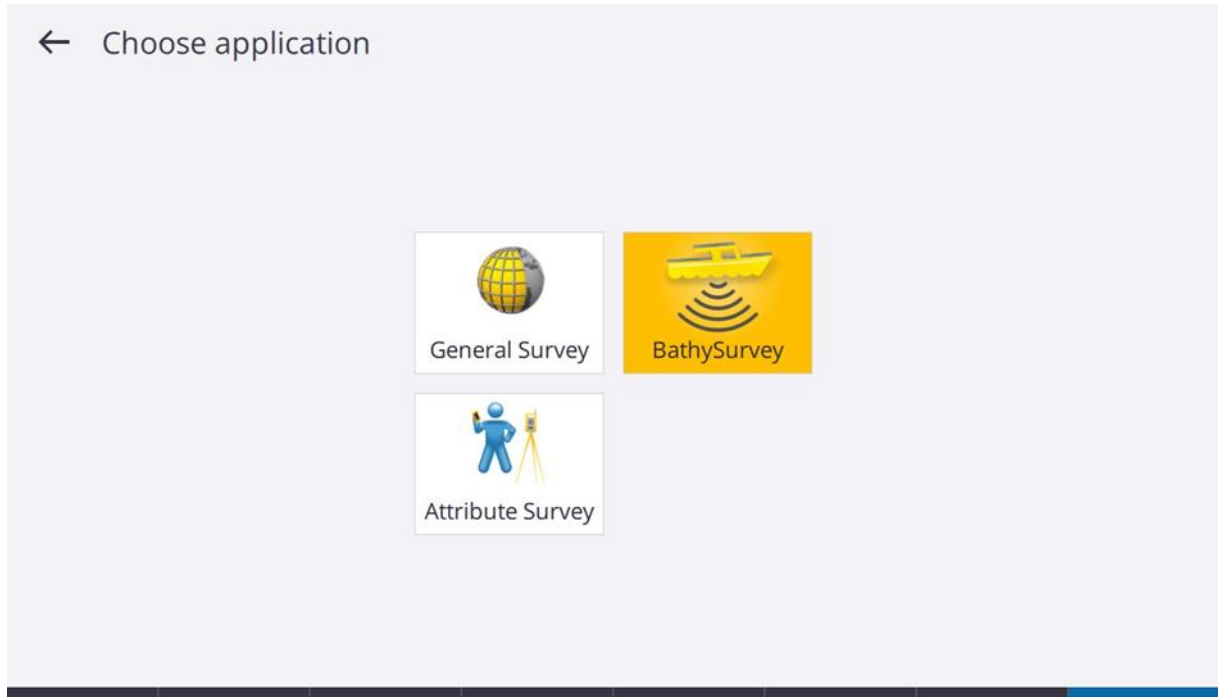
The application can be used freely for 30 days as a trial version. After 30 days the app can be purchased via Geometius or any other Trimble dealer. The app can be used for one year. After one year, a license code is required. This license code can be requested from Geometius and is valid for one year. Please send an email to info@geometius.nl for requesting BathySurvey app or BathySurvey license. Please send the following details with your request:

- Trimble Access version
- Device type (e.g. TSC7)
- Serial number of your device

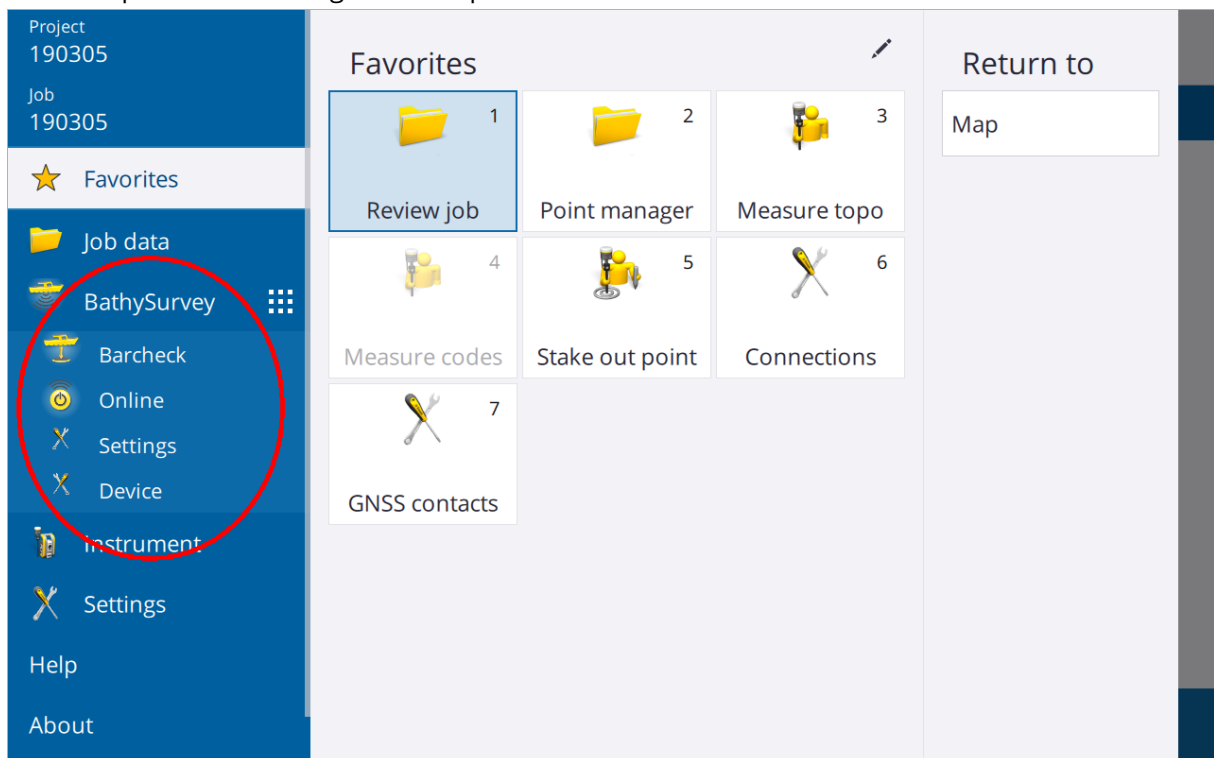
Open the Trimble Installation Manager. Select 'BathySurvey' in the Try software tab. Select Create License and install the software.








Open Trimble Access. Select BathySurvey from the **Choose application** menu.



Several options and settings can be opened from the menu.



One year after installation of BathySurvey, the app will automatically ask for a license code. This license can be requested from Geometius and is valid for one year. Fill in the license code to continue using BathySurvey.

		10:23 17-7	 95%			
Licentie 						
Serienummer DAD181201422						
Vul licentie code in of neem contact op met Geometius BV						
Licentie code <input type="text" value="?"/>						
<input type="button" value="Update licentie"/>						
Geldige licentie met Echologger functionaliteit tot 10-7-2024 23:59:59						
Esc						Accept.

3. Device

The type of echosounder and the interfacing of the echosounder can be selected in the **Device** menu.

The screenshot shows the 'Device' settings screen. At the top, there is a status bar with a menu icon, a Bluetooth icon, the time 09:52, a battery icon at 51%, and a sonar icon. Below the status bar is a blue header with a star icon. The main area contains settings for Device (Echologger EU D24), Baud rate (115200), Stop bits (1), Flow control (None), Controller port (COM26), Data bits (8), and Parity (None). At the bottom is a dark bar with buttons for Esc, Load available ports only, and Accept.

In case the port used by the echosounder is unknown, all USB and serial connections can be found in the Windows **Device Manager**. When the echosounder is connected using Bluetooth the used port can be found in the Windows Bluetooth settings (**more bluetooth settings**).

After starting the BathySurvey, the app will search all available ports. If the echosounder is connected after starting Trimble Access the used port might not be available. Restart Trimble Access to search for available ports, and try again.

When a connection to the echosounder is established, the settings can be changed in the **Settings** window. When an echosounder with NMEA DBS or NMEA DBT output is used the settings cannot be changed.

For Echologger choose baud rate 115200. For CEE-LINE choose baud rate 9600.

4. Settings: Echologger EU400

Echologger

Version

Device ID: 0217 Echologger 450000 Hz Type USB / RS-232, 422, 485

Maximum Depth (mm)	Interval (s)
10000	1.0
Digitiser Threshold (%)	Offset (mm)
10	0
Deadzone (mm)	TX Length (µs)
150	50
Sound Speed (mps)	TVG Gain (dB)
1500	0

Esc Defaults Accept

Using the **Defaults** button all settings will be set to their default. The default settings are visible in the screenshot above.

The **Maximum Depth** is the maximum depth the echosounder can measure in millimetres. This must be greater than the maximum depth of the survey area (maximum of 100000mm).

The **Digitiser Threshold** is the minimal percentage of the reflection strength required to accept a reflection.

The **Deadzone** is the minimum depth the echosounder in millimetres. This value must be lower than the minimum depth of the survey area (minimum of 150mm). By setting a larger deadzone the disruptive effect of turbulence near the transducer can be reduced.

The **Sound Speed** is the sound velocity in water (meters per second). See chapter 7 for more information about setting the sound velocity.

The **Interval** is the time between measurements in seconds. This should be set as low as possible, however, this is limited by the depth and the baud rate. With a baud rate of 115200 a minimal interval of 0.2s should be used for depths up to 40m and 0.3s for depths up to 100m.

The **Offset** is the draught of the echosounder in millimetres.

The **TX Length** is the length of the acoustic pulse send by the echosounder in microseconds. A longer pulse has a better range, a shorter pulse has a better resolution.

The **Gain** in decibels is the factor by which the received signal is multiplied. This allows a weak signal to be distinguished from the noise.

5. Settings: Echologger EU D24

Echologger EU D24

Version
DeviceID: 040 Description: EU-D24

Frequency mode High	Maximum Depth low (mm) 10000
Maximum Depth high (mm) 10000	Interval (s) 1.0
Digitiser Threshold low (%) 0	Digitiser Threshold high (%) 0
Offset low (mm) 0	Offset high (mm) 0
Deadzone low (mm) 300	Deadzone high (mm) 200
TX Length low (µs) 100	TX Length high (µs) 50

Esc Defaults Accept.

The EU D24 is a Dual Frequency Echosounder. For most of the settings, the settings for low and high frequency can be set separately. This is indicated by **low** and **high**.

The **Defaults** button will set the standard settings.

The **Frequency mode** controls which of the two available frequencies are used. The options are High, Low and Dual.

The **Maximum Depth** is the maximum depth the echosounder can measure in millimetres, this has to be greater than the maximum depth of the survey area (maximum of 100000mm).

The **Digitiser Threshold** is the minimal percentage of the reflection strength required to accept a reflection.

The **Deadzone** is the minimum depth the echosounder can measure in millimetres. This value must be lower than the minimum depth of the survey area (minimum of 150mm). By setting a larger deadzone the disruptive effect of turbulence near the transducer can be reduced.

The **Interval** is the time between measurements in seconds. This should be set as low as possible, however, this is limited by the depth and the baud rate. With a baud rate of 115200 a minimal interval of 0.2s should be used for depths up to 40m and 0.3s for depths up to 100m.

The **Offset** is the draught of the echosounder in millimetres.

The **TX Length** is the length of the acoustic pulse send by the echosounder in microseconds. A longer pulse has a better range, a shorter pulse has a better resolution.

The screenshot shows the configuration interface for the Echologger EU D24. At the top, there is a status bar with icons for menu, echosounder, time (15:59, 28/03), battery (100%, 20%), depth (28), and other sensors. The main title is "Echologger EU D24" with a star icon. The settings are organized into two columns:

Setting	Value
TX Length low (µs)	100
TX Length high (µs)	50
Sound Speed (mps)	1500
TVG Gain low (dB)	0.0
TVG Gain high (dB)	0.0
TVG Curve type	1
TVG Spreading coefficient low	15.0
TVG Spreading coefficient high	15.0
TVG Absorption low (dB/m)	0.1
TVG Absorption high (dB/m)	0.1
Attenuator enable time low (µs)	0
Attenuator enable time high (µs)	0

At the bottom, there are buttons for "Esc", "Defaults", and "Accept.".

The **Gain** in decibels is the factor by which the received signal is multiplied, which allows a weak signal to be distinguished from the noise.

The **Sound Speed** is the sound velocity in water (meters per second). See chapter 7 for more information about setting the sound velocity.

The power of the transducer can be reduced using the **Transmit Power** setting. This means only negative values can be entered. The transmit power cannot be increased using this setting. The recommended setting is 0.

The **TVG** or Time Variable Gain can correct for the signal loss with increasing depth. The TVG can be controlled using the **TVG Curve type**, **TVG spreading coefficient** and **TVG absorption**. The default setting will be sufficient for most applications, details on the TVG setting can be found in the Echologger EU D24 manual.

The **Attenuator enable time** is the time interval in microseconds between transmitting the acoustic signal and enabling the -20 dB attenuator. When the attenuator is enabled, all received signals will be reduced by -20dB. The recommended setting is 0. This will disable the attenuator.

6. Settings: Trimble Access

Survey Styles: Echosounder

When using the BathySurvey app, the echosounder setting in the survey style should be set to **none**.

Survey Styles: Continuous points

When the vessel moves a lot during surveying it is recommended to turn off **tilt warnings**. For the best result it is also recommended to use **low latency positions**.

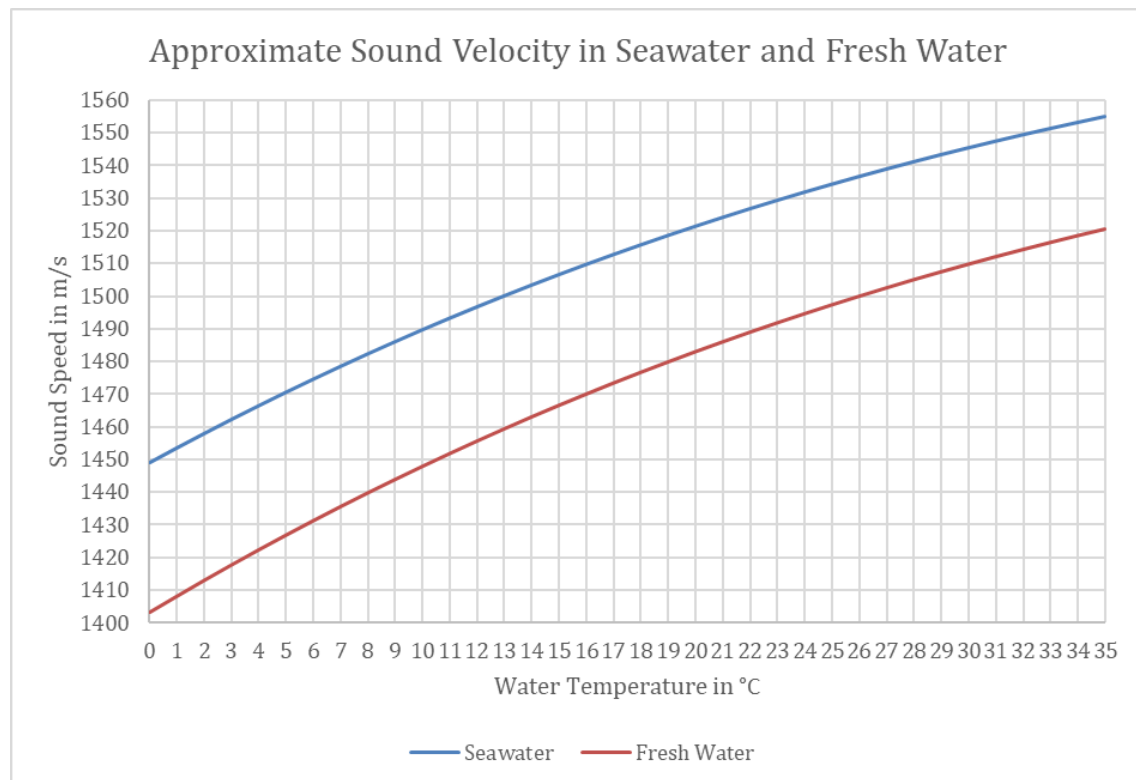
Settings for Continuous points are only applicable when using certain GNSS receivers, such as the Trimble R10.

7. Sound velocity

In order to get good results it is important to know the sound velocity in the water. Generally, the sound velocity ranges from 1400 m/s to 1550 m/s and depends on the salinity, temperature and water depth.

The sound velocity can be determined with a sound velocity sensor or by performing a Bar Check.

The sound velocity for various temperatures at a **depth of 5 m** can be seen in the graph below. When a Bar Check cannot be performed the graph can be used to provide an approximate sound velocity.












8. Bar Check

The sound velocity can be determined by holding a bar or plate at a known depth below the echosounder. The depth of the bar or plate is often marked on the cable(s).

During the first step the bar or plate should be held at a depth not greater than 1 m below the echosounder. The depth measured by the echosounder is displayed under **Digitized Depth**.

Enter the draft of the transducer. The draft can be measured from the bottom of the transducer to the water surface or can be calculated by subtracting the digitized depth from the depth of the bar.

Select "Next" when the draft has been entered.



		14:30 27/03	 71%	 47%	 31		 ?	Timeout: 12 s
Bar Check Wizard 								
<div><div>Shallowest depth (m)</div><div>Enter draft (m) of transducer</div><div><input type="text" value="0.33"/> </div></div> <div><div>Digitized Depth (m)</div><div>2.77</div></div>								
Annul.								Vlnd

During the second step the bar check bar or plate should be held at the greatest possible depth at which the plate can still be detected by the echosounder (but not deeper than the maximum depth of the survey area). The depth measured by the echosounder is displayed under **Digitized Depth**.



Enter the depth of the bar or plate. Also enter the initial sound velocity.


Next, the Bar Check Wizard will calculate the sound velocity based on the measured depth to the bar or plate.


The calculated sound velocity should be entered in the echosounder settings in the app or in the echosounder itself when the setting cannot be changed in the app.




14:30
27/03

71%48%

31



?

Geen meting PDOP:1.0

Bar Check Wizard

Deepest depth (m)

Bar Depth (m)
3.00

Digitized Depth (m)
2.77

Enter initial sound velocity (m/s)
1500

Calculated sound velocity (m/s)
1450

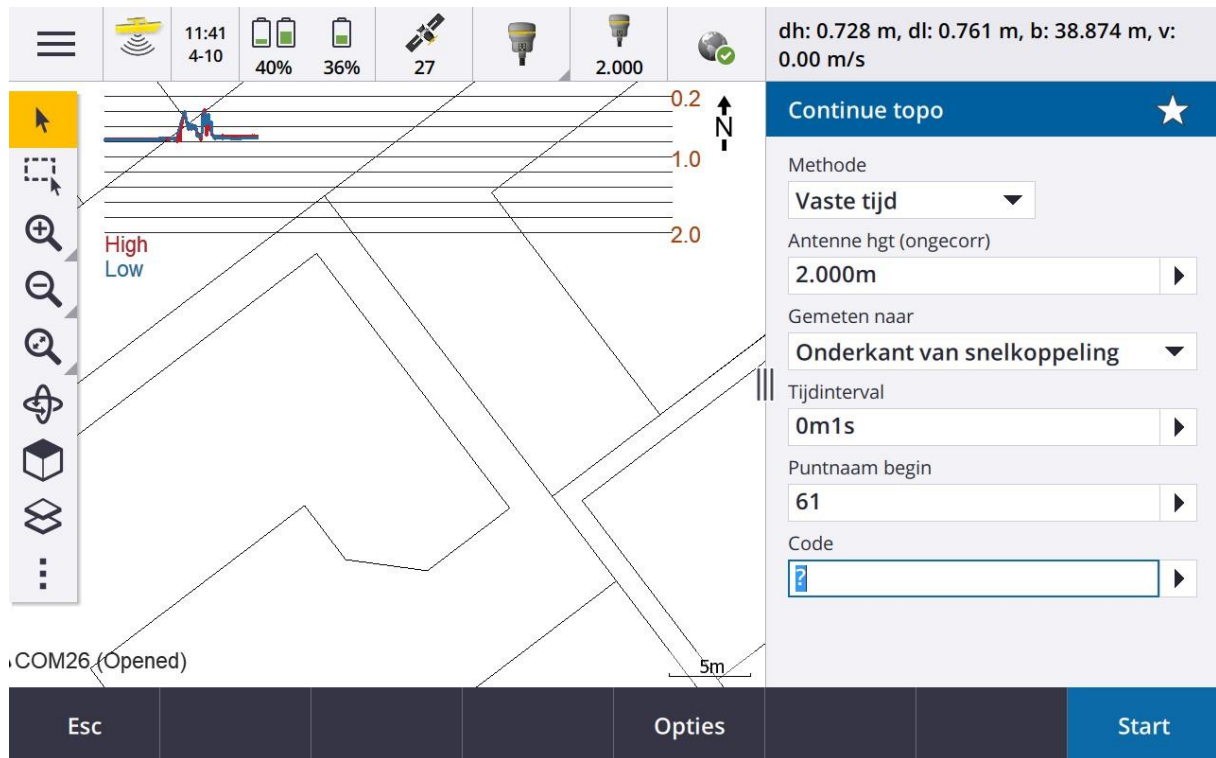
Calculate

Terug

Opslaan

9. Depth graph

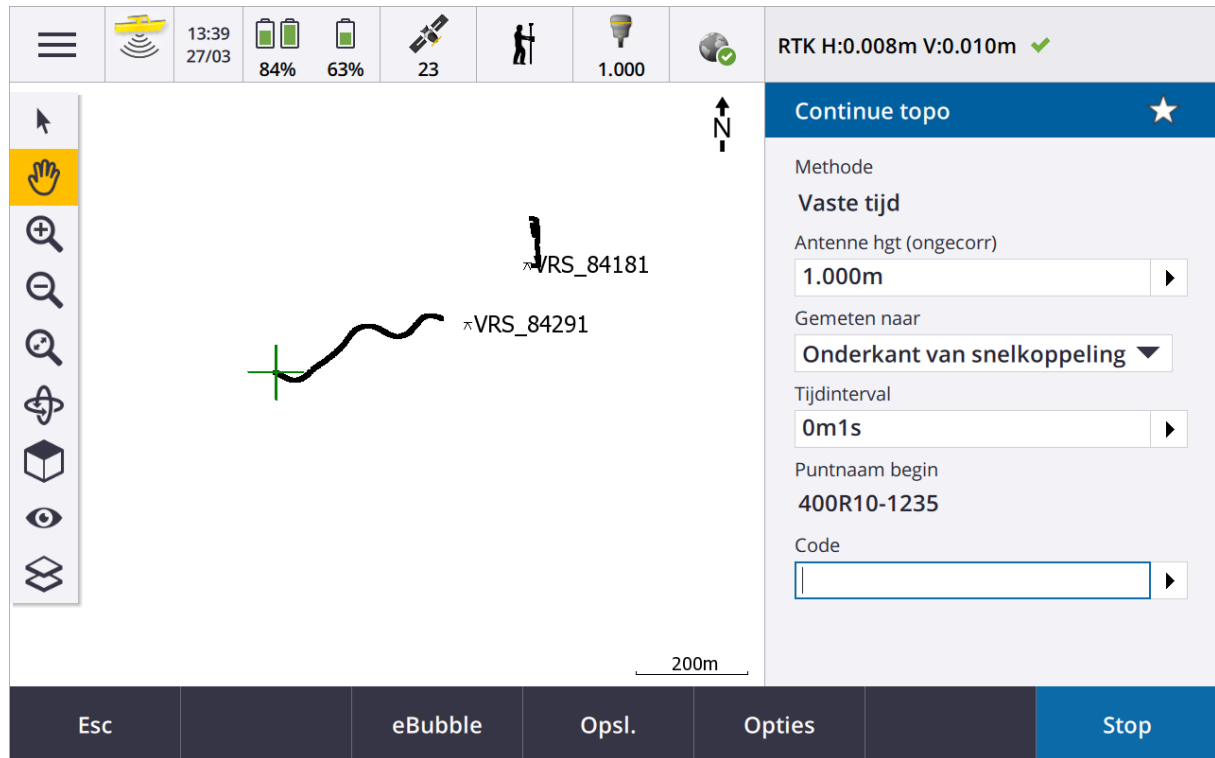
The map view shows an echosounder profile display in the top of the screen. **Touch and hold** in the map view to show or hide the depth graph.



The depth graph also shows the high frequency (red) and low frequency (blue). When a single frequency echosounder is being used, the graph will show only a red profile.

10. Recording data

When the **record** button in the online window is selected, a survey style can be selected after which a continuous points measurement will be started. When a Total Station is used a station setup should first be performed, after which a continuous points measurement will be started.



Attention

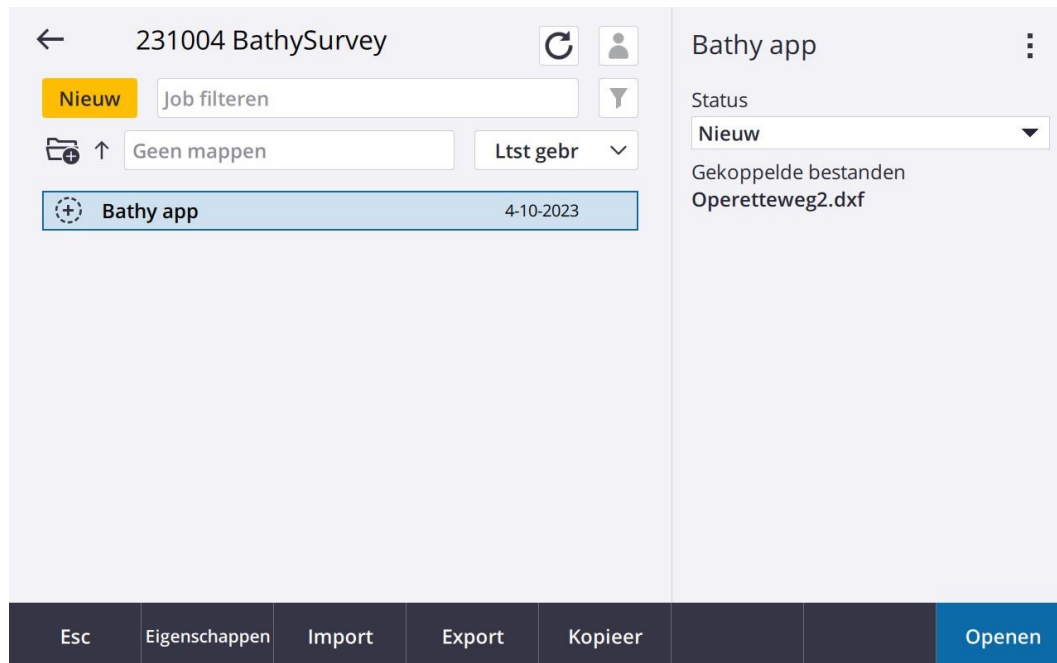
When the draft is set in the echosounder, the antenna height should be measured to the waterline.

When no draft is set in the echosounder, the antenna height should be measured to the bottom of the transducer.

When using the Bathysurvey app, the GNSS antenna or prism must be installed vertically (on a pole) above the echosounder. This is needed to prevent a horizontal offset between measured depths and positions.

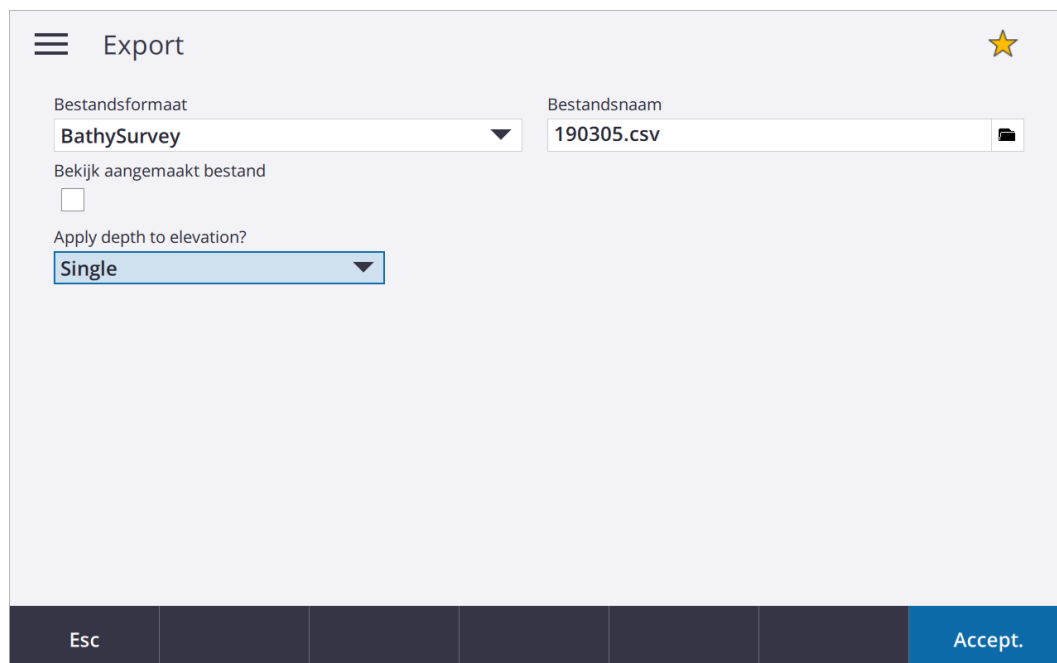
11. Export

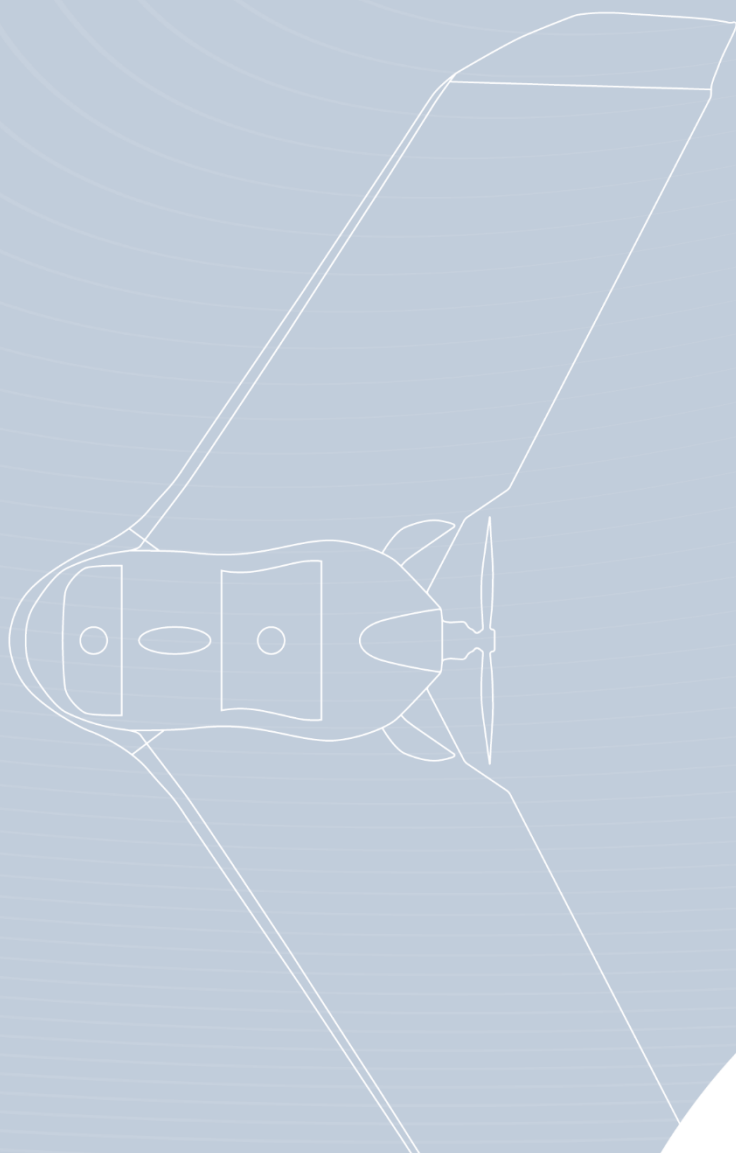
After recording, data can be exported to a CSV file.
Select a Job and select “Export” in the black task bar.



Apply depth to elevation?

When exporting data using the BathySurvey stylesheet, depth can be applied to the elevation. This will result in true heights on the vertical datum. When using a single frequency echosounder the option **single** should be selected, when using a dual frequency **high** or **low** should be selected.





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