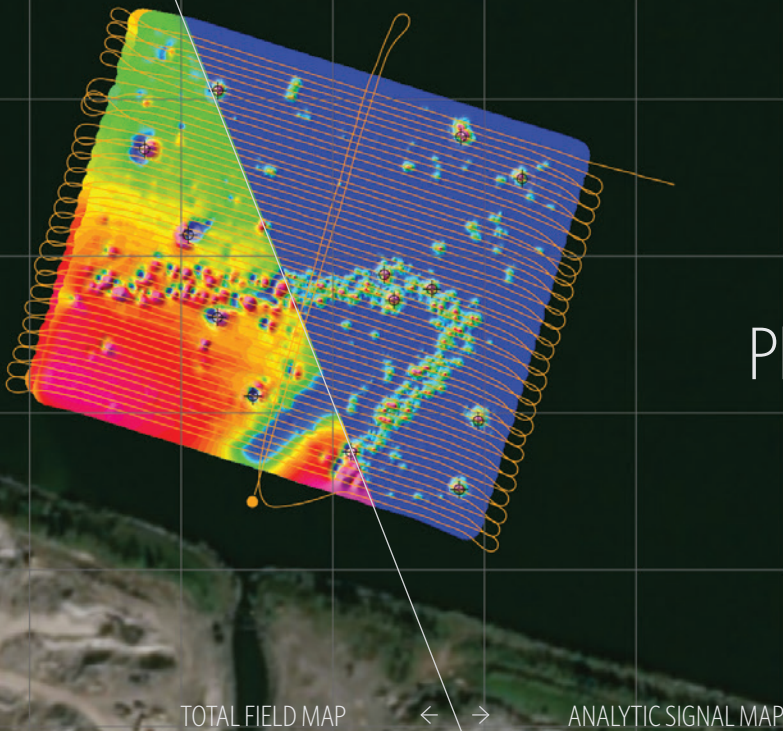


# BOB

## Magnetometer Survey Planning, Data Acquisition & Visualization Software



### Features

#### Intuitive Assisted Setup

Connect your computer, mag and GNSS through COM or USB Port guided by BOB's simple Setup Assistant.

#### Mag Monitoring and Control

BOB monitors your connection and mag status, alerting you to signal strength, sample rate, sync, depth, altitude (above the seabed). Detailed diagnostic panels and terminal access facilitate troubleshooting & issue resolution.

#### (Fully) Review Plot in Time and Space

Magnetic field data rescales based on your level of magnification.

The interactive Survey Overview gives you instant access to any part of your survey.

#### Live Layback Correction

BOB calculates mag Layback in real-time to pin-point the mag's position even when making turns.

#### Data Portability

BOB's (robust, stable, secure & flexible) MS SQL database technology lets you:

- Store and move between multiple surveys naturally.
- Say goodbye to loose files. BOB automatically packs survey settings, setup parameters, and collected data.
- Annotate, export, archive and restore files.

And you can copy incoming mag and position data to an additional data-logging computer through a COM port.

### Latest Features

#### Added Survey Type: AUV + Explorer

Import and process mag data from AUV surveys.

#### Enhanced Survey Planning

Create, save and import Guide Grids

for future survey planning.

#### NavAssist

Take the pain out of planning surveys and accurately piloting your vessel with BOB's Guide Grid tool and Navigation Assistance.

## BOB Analysis Module (BAM)

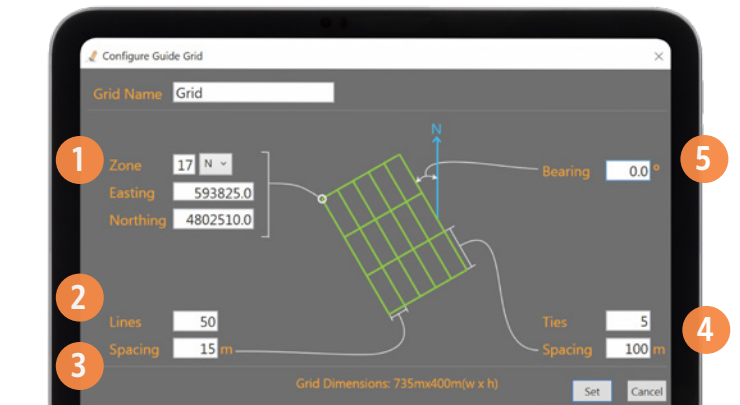
The new BAM add-on puts the ability to make Analytic Signal Maps quickly and intuitively in the hands of experts and amateurs alike.

# BOB Workflow

Plan, Collect, Clean

## 1. Plan Your Survey

### Specify Survey Parameters

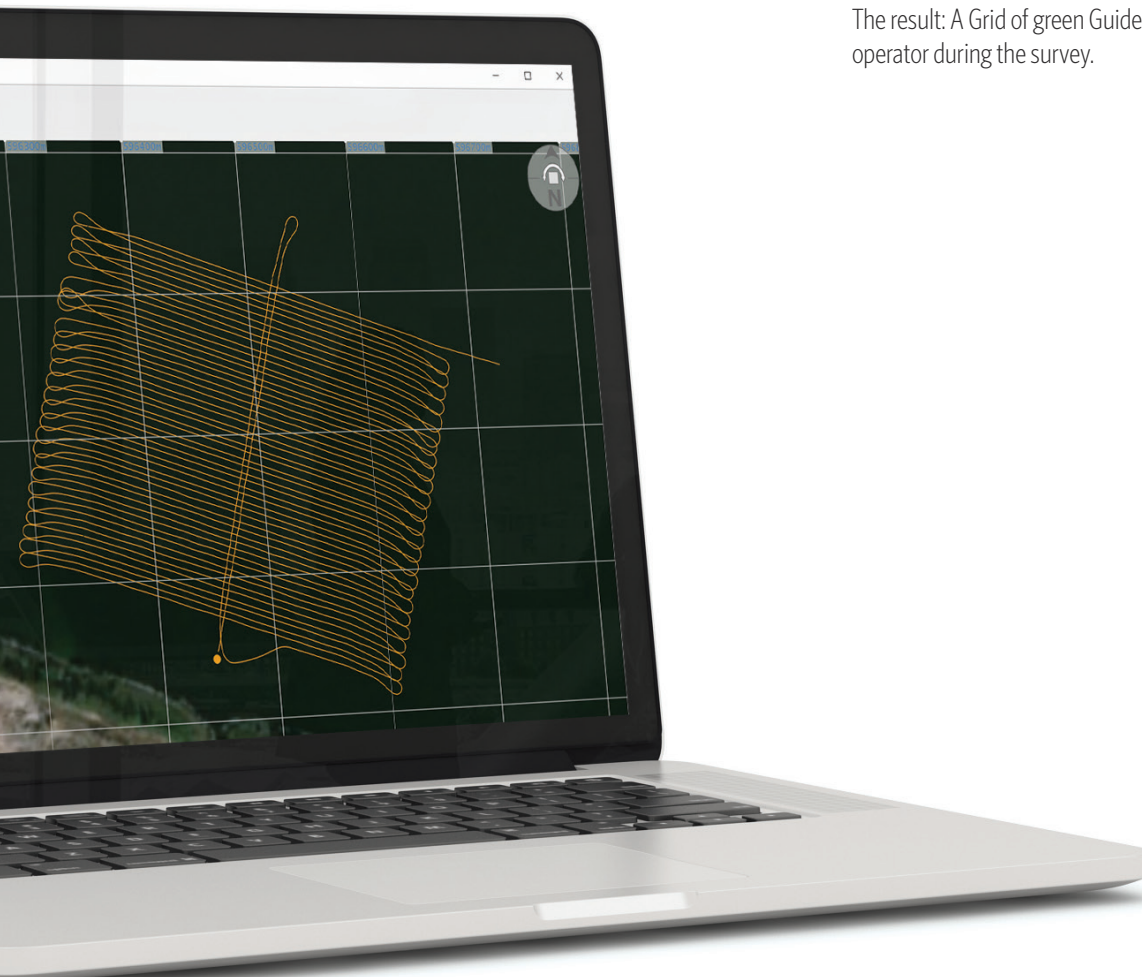


Specify Area and Guide Lines by defining the:

- Location of your Grid <sup>1</sup>
- Number of Survey Lines <sup>2</sup>
- Line spacing <sup>3</sup>
- Cross/tie lines (if needed) <sup>4</sup>
- Angle/bearing of the lines, if not North-South <sup>5</sup>

The result: A Grid of green Guide Lines NavAssist uses to guide the boat operator during the survey.

**Below:** Resulting boat path after survey completion.



## 2. Collect Magnetometer Data

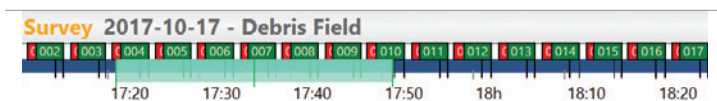
### Plot, Record and View Data



Sensor readings plot as you survey.

- Scale X <sup>1</sup> and Y <sup>2</sup> axes to find the patterns.
- Shift individual traces up and down for comparison.
- Move the cursor in the Plot to see readings highlighted <sup>3</sup> in the Log Table below.
- Terminal Tab: <sup>4</sup> See and send raw communication directly to the mag (if you know the codes).
- Layers Panel: <sup>5</sup> Select which sensor's data to display.
- Review Pane: Drag the Review/Real-Time Splitter Bar <sup>6</sup> to inspect data collected earlier while monitoring real-time data.

### Zoom and Scroll Through the Survey Timeline



Navigate easily; the Survey Timeline lets you know what part of the survey you're viewing at-a-glance.

### Geo Plot



The Geographic Plot shows paths of the GNSS/vessel and the towfish on a coordinate grid, as Latitude/Longitude format or in UTM projection with WGS84 datum. See the precise location of your readings, Markers and Survey Lines.

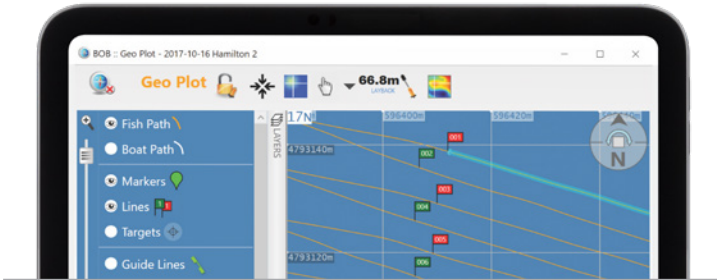
- Click on the mag's path to see the data at that location.
- See and edit Markers & Survey Lines directly on the map.
- Set background chart or map by importing geo-referenced images in GeoTiff format.
- 10Hz GNSS support provides unprecedented accuracy.
- BOB automatically interpolates between GNSS and mag sampling rates and tags readings with geographic coordinates.
- See NMEA GNSS information on-screen in real-time. This data is stored independently from the magnetometer data stream.

**BOB's NavAssist feature** presents useful survey parameters to the vessel navigator during the survey in a panel on the Geo Plot window, including:

- Distance from the current Guide Line <sup>1</sup>
- Vessel bearing and speed <sup>2</sup>
- Magnetometer depth and altitude in the water column <sup>3</sup>

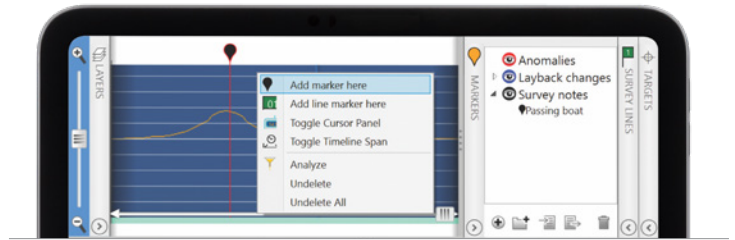
## 3. Clean Your Data

### Create and Edit Survey Lines



- Mark your Survey Lines on the Geo Plot on-the-fly by dragging your mouse.
- Fine-tune the location of the Flags any time.
- Select a survey line from the GeoPlot or from the Survey Lines panel, to display its profile.

### Create and Edit Markers

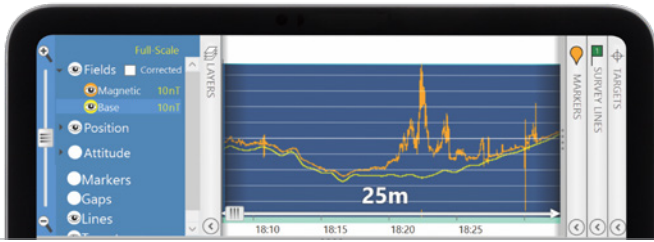


- Place Markers on Profile Plot or Geo Plot in real-time as a way of keeping notes or marking promising anomalies.
- Color-code and group marked features.
- Place and move Markers any time.
- Place Markers automatically if your GNSS emits NMEA GPEVT sentences.
- Click on a Marker in the Geo Plot to jump to its information in the Profile Plot.

**Below:** Maritime archaeologists Melanie Damour and Dr. Christopher Horrell use BOB to search for artifacts from the lost fleet of Hernan Cortes in Mexico, in collaboration with Marine Magnetics. Photo credit: Jonathan Kingston

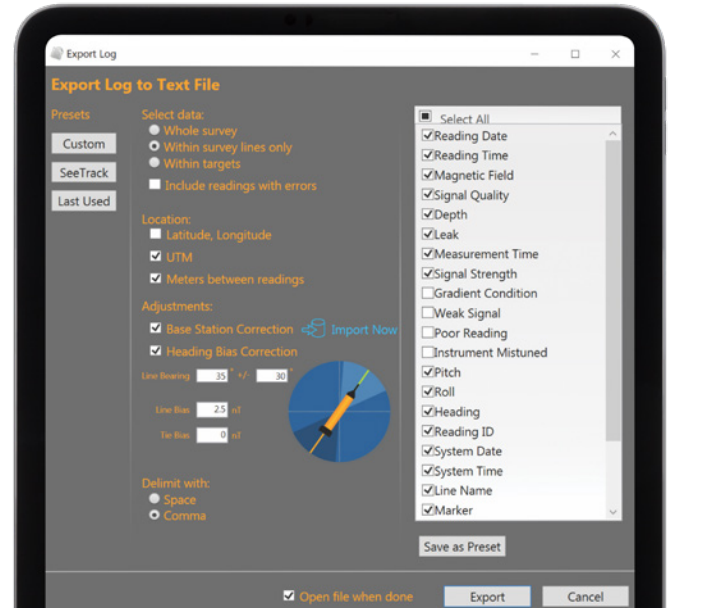


## Base Station Correction



- Import data from the Sentinel Base Station or IAGA compatible data from magnetic observatories (e.g., Intermagnet.org).
- Review base station data in profile or table format. Remove unwanted spikes and errors if needed.
- Delete regions or individual readings safely. BOB preserves your original survey data. You can always start over without the fear of data loss or corruption.
- BOB automatically calculates the corrected data set, and allows you to switch between the corrected and uncorrected profiles to review the results.

## Flexible .csv Exports



- Export your entire data set or just the lines you select to text files for other GIS systems.
- Save your favourite settings or use the SeeTrack predefined settings.

# BOB Analysis Module (BAM)

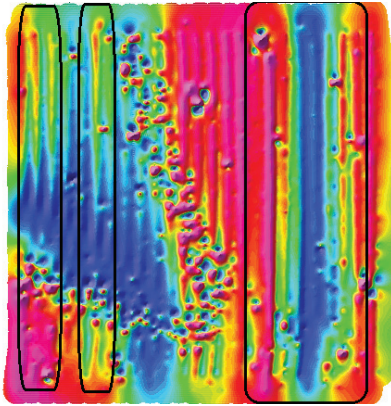
The new BAM add-on puts the ability to make Analytic Signal Maps quickly and intuitively in the hands of experts and amateurs alike.

- Create Total Field and Analytic Signal maps from your survey data.
- Targets: Activating BAM lets you mark targets on the map or the Profile Plot, label them, and see statistics to refine your analysis.
- Dive confidently armed with a list of location targets and sizes.
- Export maps as GeoTIFF. Grids can be exported numerically as Grid Exchange Format (GXF).



# BAM Workflow

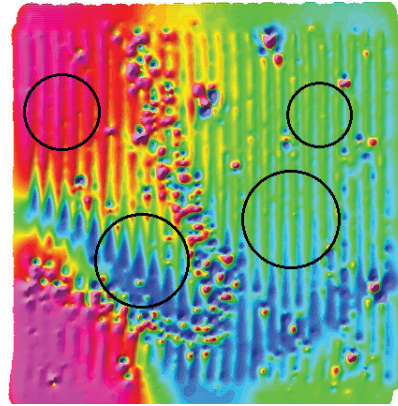
Plan, collect, and clean your survey data with BOB. Pinpoint with BAM.



## 1. Eliminate Diurnal Variation

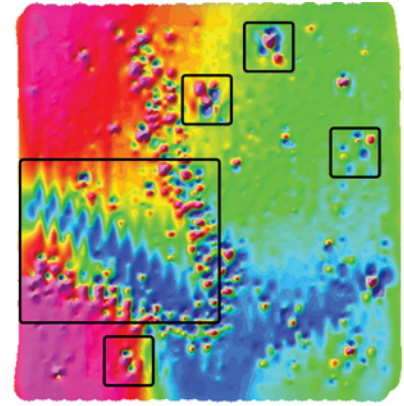
Subtle and unpredictable daily changes in Earth's magnetic field can obscure survey data or even render it unusable. Base Station Correction compensates for this effect.

*Read more about 'Base Station Correction' on the previous page.*



## 2. Correct for Heading Bias

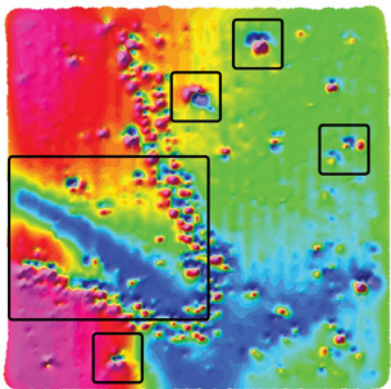
Heading Bias Correction removes 'corrugation' between lines surveyed in opposite directions. The resulting distortion, usually caused by the magnetometer being too close to the boat, is visible throughout the map.



## 3. Eliminate Layback (Lag)

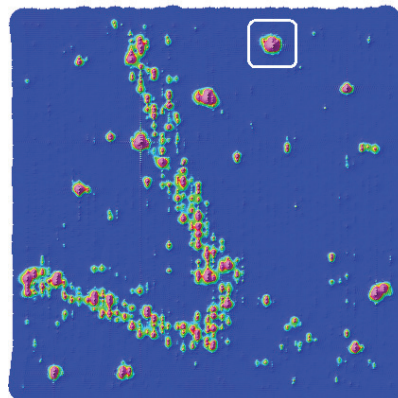
Layback Correction eliminates alignment issues between adjacent survey lines (the jagged features highlighted with a circle).

Before Layback Correction, the anomalies (indicated in the boxes) look like multiple targets. After adjusting for Layback, the anomalies present as single targets (see #4).



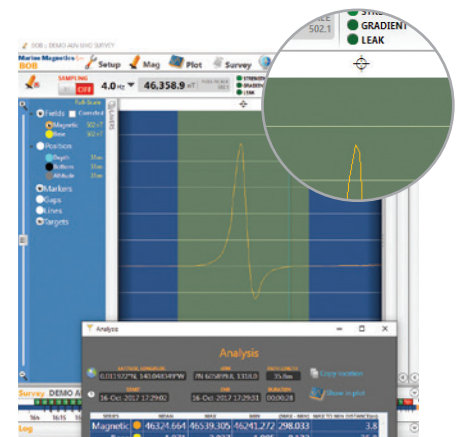
## 4. Corrected Total Field Map Reveals Anomalies

Corrections for systematic errors applied, anomalies are evident. It's time to analyze them.



## 5. Transform to Analytic Signal Map

Analytic Signal Transform eliminates distracting gradual changes caused by distant geologic sources and emphasizes near-surface targets. The transformation in data clarity is stark (and exciting).



## 6. Choose Targets to Analyze

Click on anomalies to reveal basic analysis parameters and mark targets with the (cross-hair) icon.