

# SAR HAWK Surveyor

Quick-Start Guide  
June, 2019



# SAR HAWK SURVEYOR

SAR HAWK SURVEYOR now available for commercial release – June, 2019

Dedicated playback and target analysis software for Humminbird® side-look sonar data and bathymetry from altitude.

Reads SOLIX, HELIX, ION and all older formats

Provides a waterfall for data review and target marking plus a “map-view” window showing the sonar and bathymetry data placed on a chart or satellite imagery, ready for export and reporting.

New features:

- Automatic and manual bottom tracking.

- XYZ file export and import.

- Real-time bathy contour line generation.

- XYZ file background chart



# SARHAWK Installation

Launch the installer and follow the prompts to install SARHAWK. Upon successful installation, you may launch SARHAWK directly from the installer.



# SAR HAWK folder Configuration

- On initial startup, SARHAWK, will begin in /Users/yourname/Documents/sarhawk\_project
- If you want to save your SARHAWK projects elsewhere, set the path on the startup screen. As an example, we often just use C:/SARHAWK to make things easy to find.
- This is up to the user, and does not change an behavior, just personal preference.



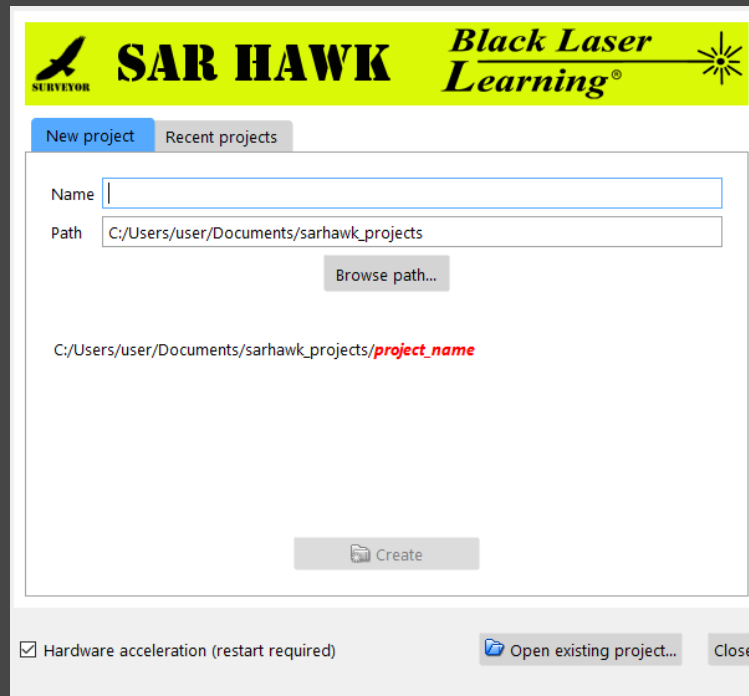
# SAR HAWK Charts Configuration

- If you have an internet connection, you can instruct SARHAWK to look for imagery and charts on the internet (covered below).
- If you have your own charts, you can tell SARHAWK where to find them.
- On the install disk we have provided a folder called “CHARTS”. Drag this to the C drive, then as covered below tell SARHAWK to look in C:\Charts, and it will browse the folders there. You can later add your own charts to the same location

# SAR HAWK Data Configuration

- SARHAWK reads Humminbird® files from your disk drive. It expects one “.DAT” file (as example, R00018.dat) and a folder named for that file (R00018) containing the associated “.son” and “.idx” files (i.e. B001.idx, B001.son, B002.idx, B002.son, B003.idx, B003.son, etc.)
- On the install disk we have provided a folder called “DATA”. Drag this to the C drive, then as covered below tell SARHAWK to look in C:\Data, from which you can browse to the files you want. You can later add your own data to the same location
- Good luck, and enjoy.

# SAR HAWK Walk-through: Launch SARHAWK from desktop icon

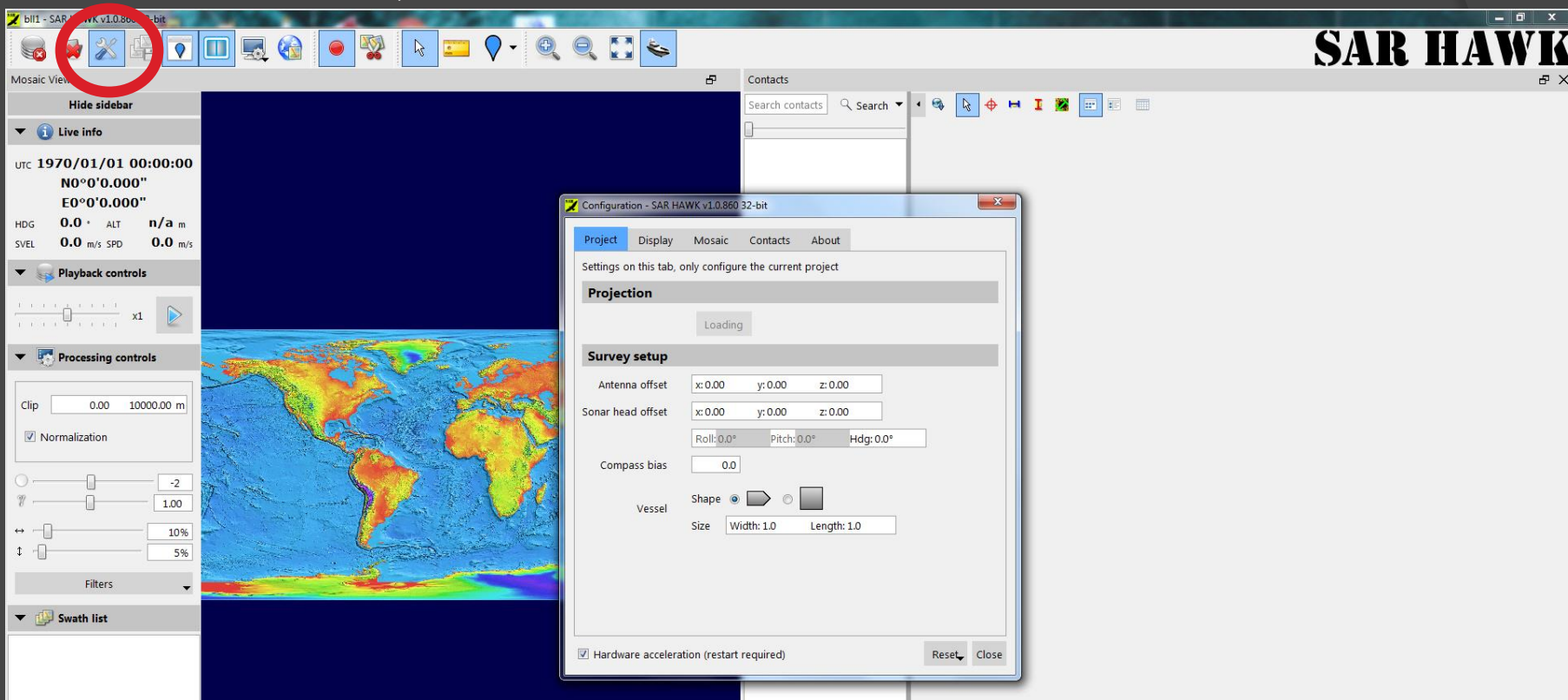


Here you can select the working directory (or use what SARHAWK provides by default) and name/select your project. Provide a project name (Demo1) and select "Create". On splash-screen, if you have a good graphics card, select "Hardware Acceleration" (and s/w will restart)

# SAR HAWK Walk-through:

Preliminaries (and not necessary, just nice to know):

From the Tools Icon, you can define any sensor/GPS offsets  
note, these would be from center of boat.



As an example, if you know your antenna was in the bow of the boat and your sonar in the stern, you could measure their offsets and type them in. Not mandatory, just increases quality of SARHAWK target location estimates.

# SAR HAWK Walk-through:

Preliminaries (and not necessary, just nice to know):

You can also specify your color palettes, and Units preferences

The screenshot shows the SAR HAWK software interface. The main window displays a SAR image of a coastal region. A configuration dialog box is open, showing settings for the display and processing. The dialog box has tabs for Project, Display, Mosaic, Contacts, and About. The Display tab is selected, showing the following settings:

- General:** Dark UI (unchecked)
- Swath colormap:** Mosaic in progress (Goldenrod), Completed (Goldenrod)
- Units of measure:** Easting/Northing (Meters (m)), Longitude/Latitude (Degree minute second (DD°MM'SS.SSS")), Distance (Meters (m)), Vertical distance (depth/altitude) (Meters (m)), Speed over ground (Meter per second (m/s)), Sound speed (Meter per second (m/s)), Temperature (Degrees celcius (°C))
- [Reset to International Standard defaults \(SI\)](#)
- Hardware acceleration (restart required)
- Buttons: Reset, Close

The main window also shows a toolbar with various icons, a sidebar with 'Live info' and 'Playback controls', and a status bar at the bottom with file information and navigation buttons.

# SAR HAWK : work flow

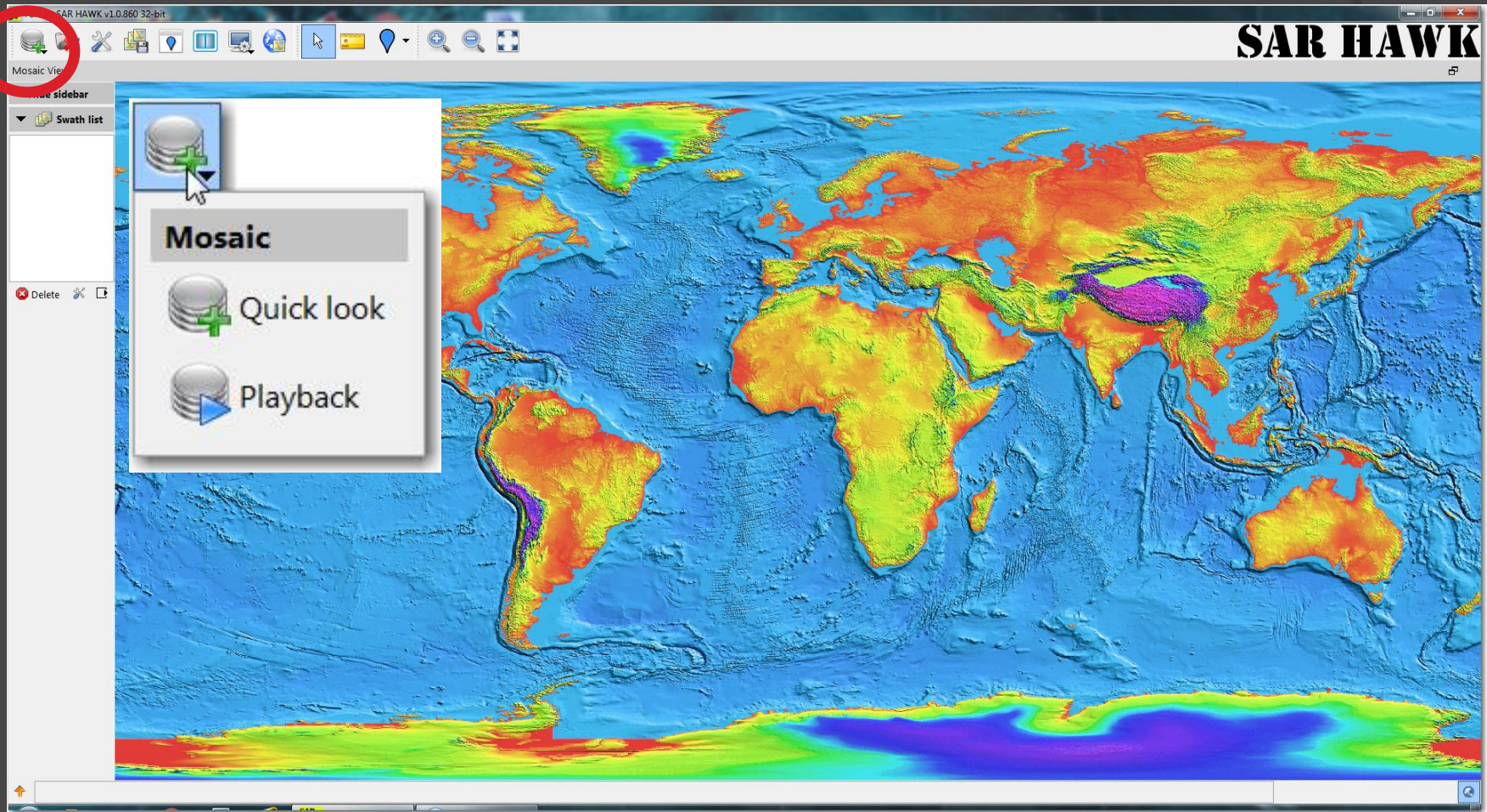
We envision the user would take one of two paths:

Quick–look: just select your files, specify offsets / limits and press “GO”; SAR HAWK creates a mosaic in the background, and presents it on top of whatever pretty chart/photo it could find. Export for reports. This mode is not interactive, but it gives you the quickest look possible at your data, geo-coded over a chart or air/satellite photo, so you can see where you went, and what you covered. The resulting images and maps can be exported at user-specified resolution and format, ready for reporting or display in Google Earth/ArcGIS.

Playback – interactive mode. Again, select files – the .dat file – and press the start arrow. The waterfall starts, the mosaic starts, and you can control playback/processing and enjoy the view – zoom, mark targets, pause, measure, etc. Still makes mosaics. Use scissors to cut out turns (break swaths) and improve mosaics. Export. Create target reports, etc.

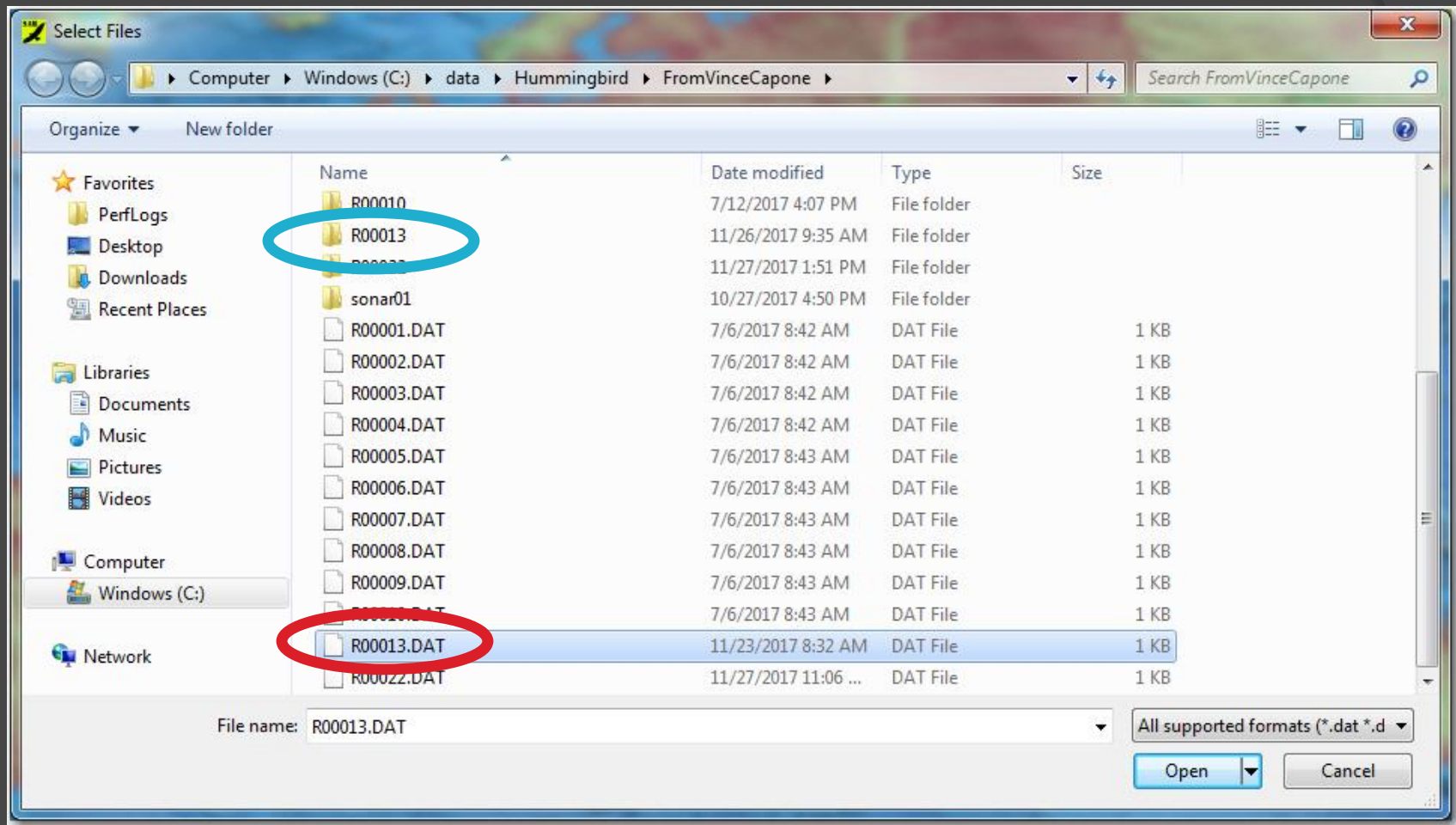


# SAR HAWK : Adding Data



To load data, select the “Add Data” icon on the toolbar, and choose either Quick Look (for a coverage map mosaic) or Playback, to scroll through your data

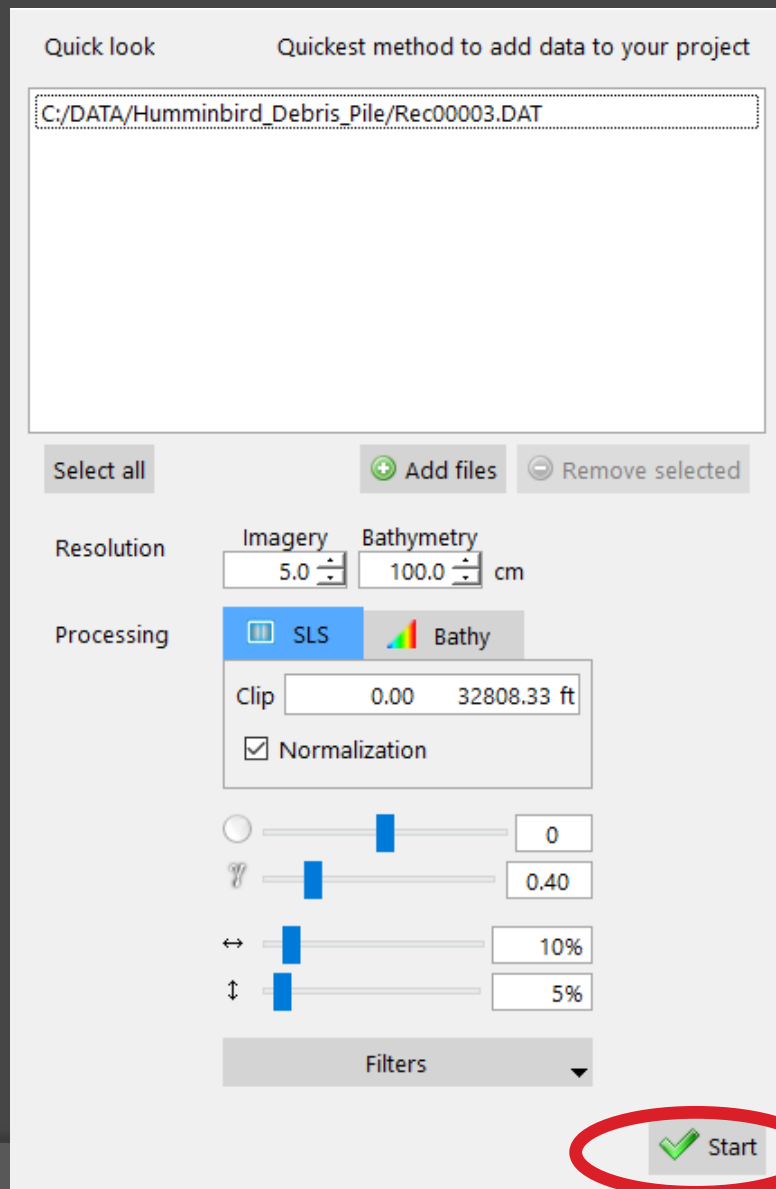
# SAR HAWK: Adding Data



For both Quick Look and Playback, you start by selecting the Humminbird® “DAT” file (circled in red). This should point to a similarly named folder (circled in blue) containing your .IDX and .SON files



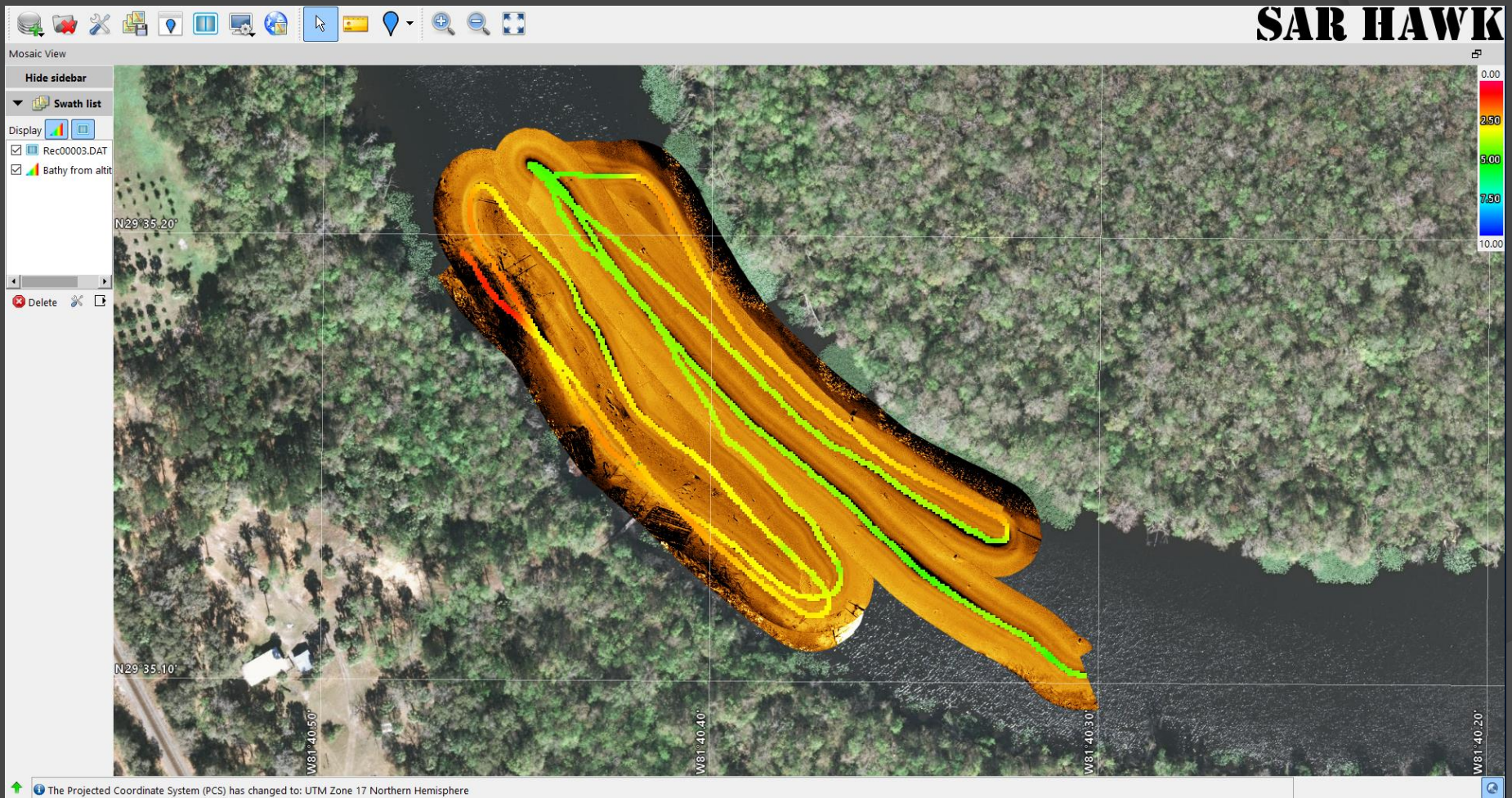
# SAR HAWK: Adding Data



The Quick Look settings dialog allows you to add or remove files for review, adjust properties including mosaic resolution, beam width, swath clipping, normalization, contrast and feathering, plus navigation smoothing filters. These tools are all available interactively in playback. Default values usually work just fine, but feel free to experiment. More details available in the manual.

Click the START button to see your mosaic.

# SAR HAWK: Quick-Look Mosaic



SAR HAWK reads your data files, applies any specified smoothing and creates a mosaic, automatically supplying any background imagery it found in the Charts folder or over your internet connection.





# SAR HAWK: Quick-Look Mosaic

The screenshot displays the SAR HAWK software interface. The main window shows a SAR mosaic of a forested area with a large, irregularly shaped feature highlighted in yellow and green. The interface includes a toolbar at the top with various icons, a sidebar on the left with a 'Swath list' and 'Display' options, and a status bar at the bottom indicating the coordinate system (UTM Zone 17 Northern Hemisphere). A dialog box titled 'Chart Display Options - SAR HAWK v1.3.1099 64-bit (OIC detected)' is open in the center. The dialog box has a table with columns for 'Description', 'Type', 'Scale or area', and 'File path'. Below the table, there are sections for 'Charts', 'Load by raster/vector', 'Load by chart type', and 'Legend'. The 'Online world imagery (Internet connection required)' checkbox is checked and circled in red. The 'Legend' section shows a color key for 'Loaded' (green), 'Loading' (orange), 'Within vicinity' (yellow), and 'Hidden or missing' (grey).

Select the “Chart Background Options” icon on the SAR HAWK toolbar to access the charts dialog. Use the Advanced dialog to check the “Online world imagery” box to auto-search images and charts on the web; select “Folders” to search local disk drive for your charts. Uncheck unwanted charts/images to get the background you want.



# SAR HAWK: Quick-Look Mosaic

The screenshot displays the SAR HAWK software interface. The main window shows a SAR mosaic of a forested area with a yellow bounding box around a specific region. The interface includes a toolbar at the top, a sidebar on the left with a 'Swath list' and 'Display' options, and a color scale on the right. An 'Export Dialog' window is open, showing the following details:

- Path: C:/Users/randyc/Documents/sarhawk\_projects/demo9/export
- Name: export.kmz
- Type: GoogleEarth
- Coverage:  User specified
- Resolution: 5 centimeter(s)
- Background color:  Transparent
- Export area is 307.82 x 282.28 meters
- Approximate uncompressed size on disk: 139.0 MB

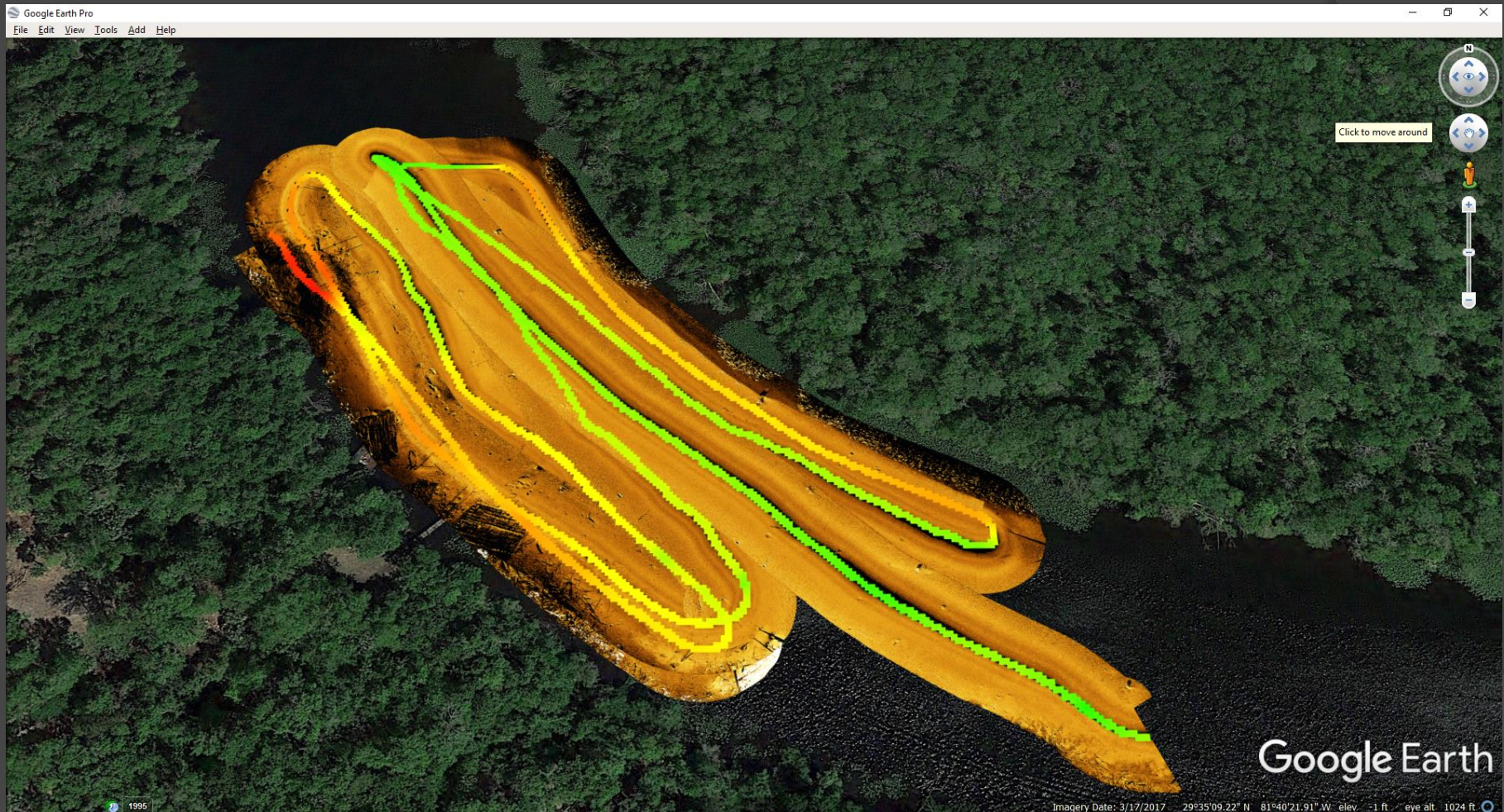
The status bar at the bottom indicates: 'The Projected Coordinate System (PCS) has changed to: UTM Zone 17 Northern Hemisphere'.

On completion of your quick-look mosaic, you can pan and zoom, mark targets (just snippets from the mosaic) and export imagery to GeoTIFF, ArcGIS or Google Earth (select Export icon on toolbar). Adjust the resolution to get the chart size you want, or change the coverage. You can also select to include the background images or leave it blank.





# SAR HAWK: Quick-Look Mosaic

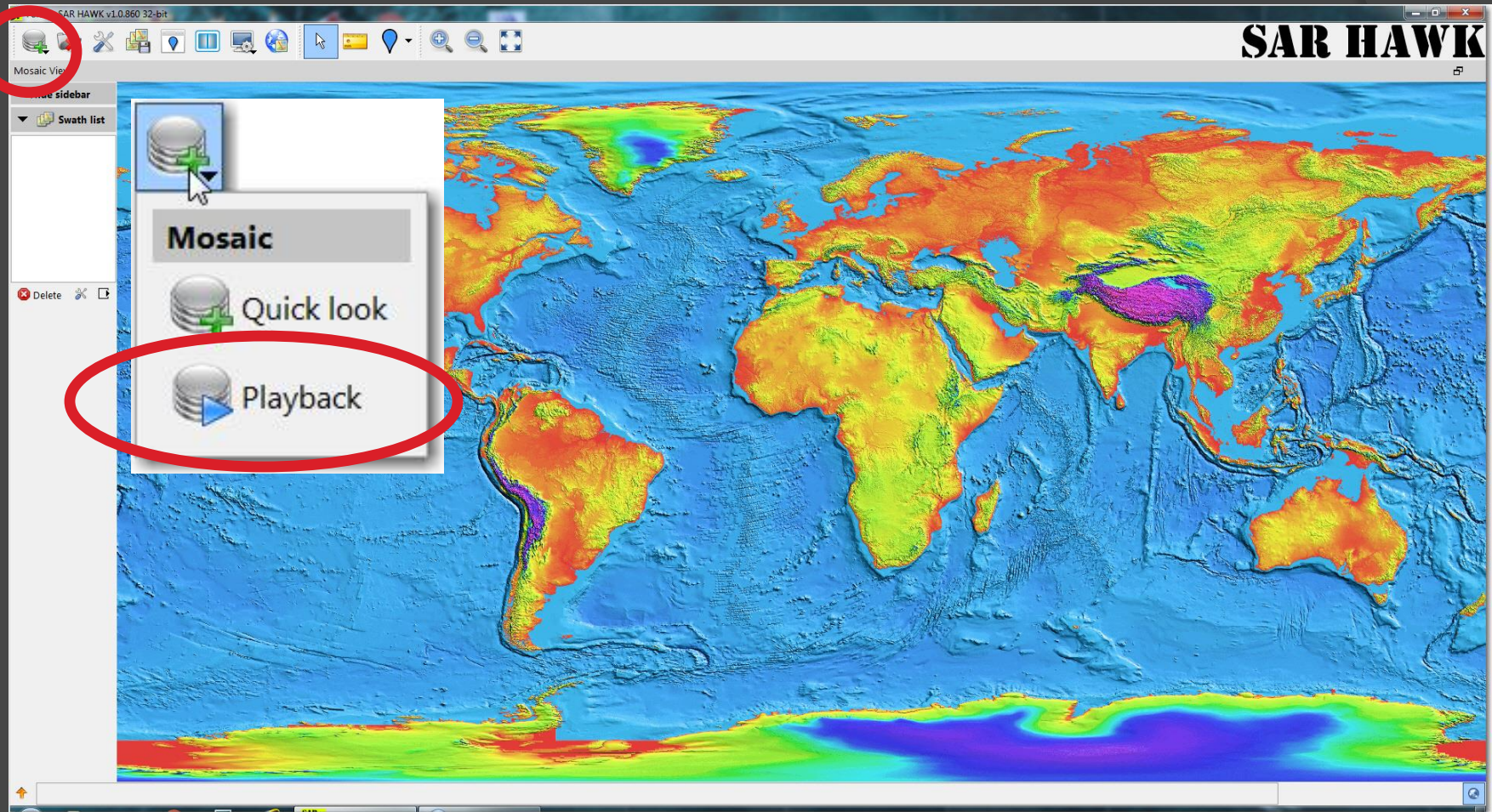


SAR HAWK quick-look mosaic exported to Google Earth  
(transparent background, 1 meter resolution)





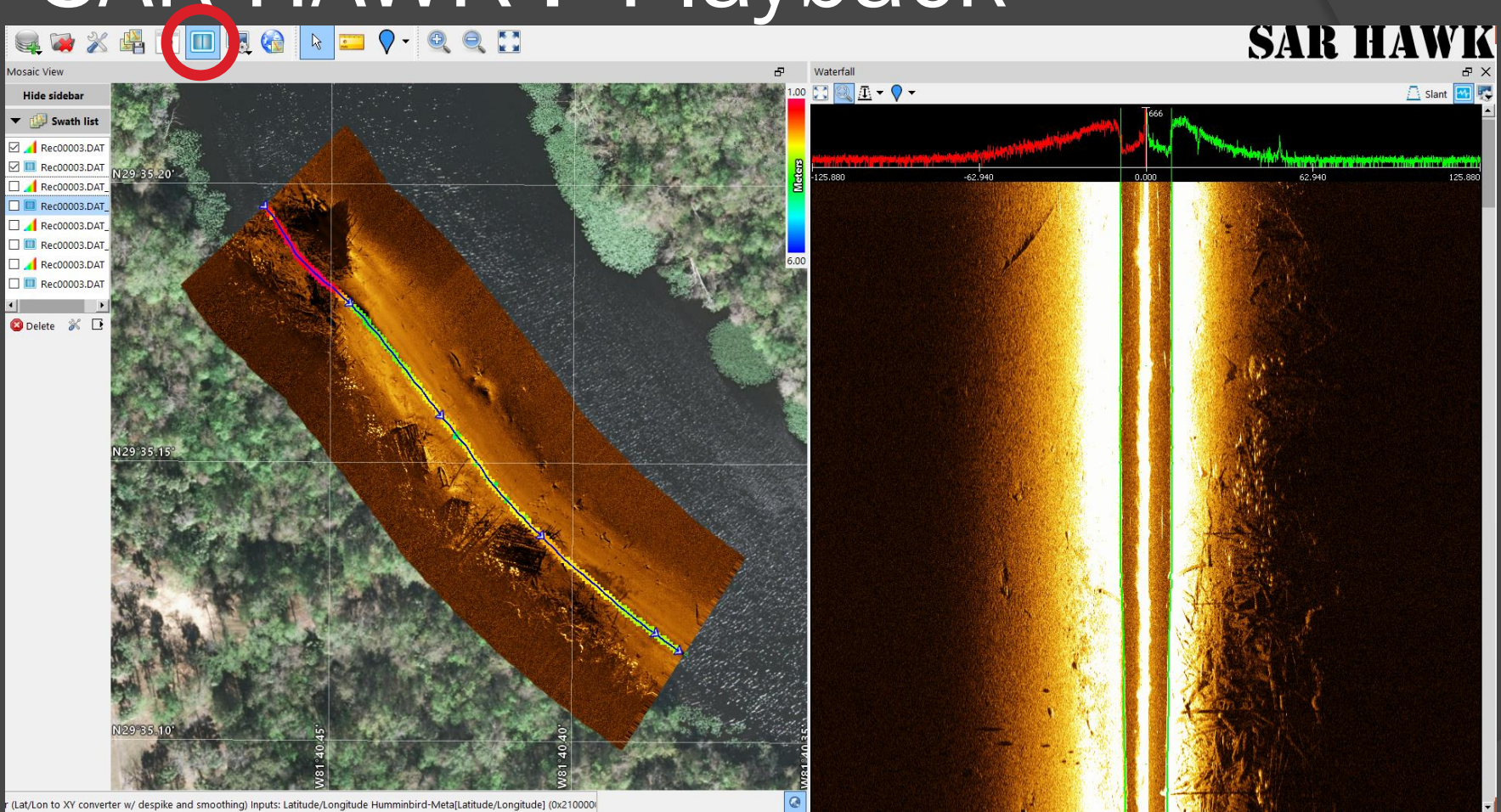
# SAR HAWK : Playback



For a more interactive experience with the data, use the Playback mode. Again, you select the “\*.dat” (data) file, and it must point to the folder with the .son and .idx data.



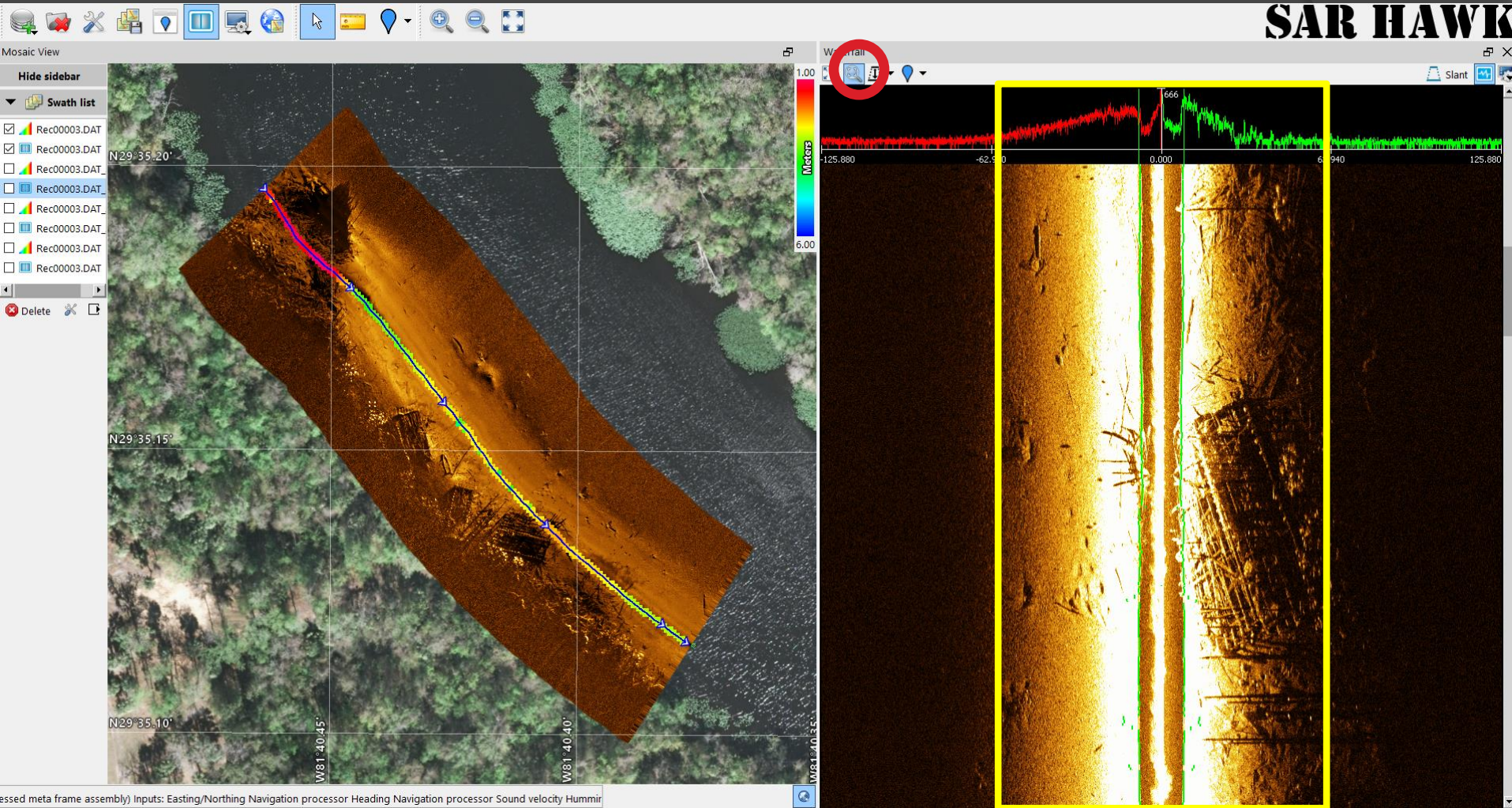
# SAR HAWK : Playback



This is the INTERACTIVE mode. Selecting the “Playback” option offers the user a waterfall, and the ability to adjust brightness and contrast, zoom in, mark targets and plot them on the mosaic and background image. If you don’t see the waterfall at first, just click left on the waterfall icon on the toolbar, circled in red above.



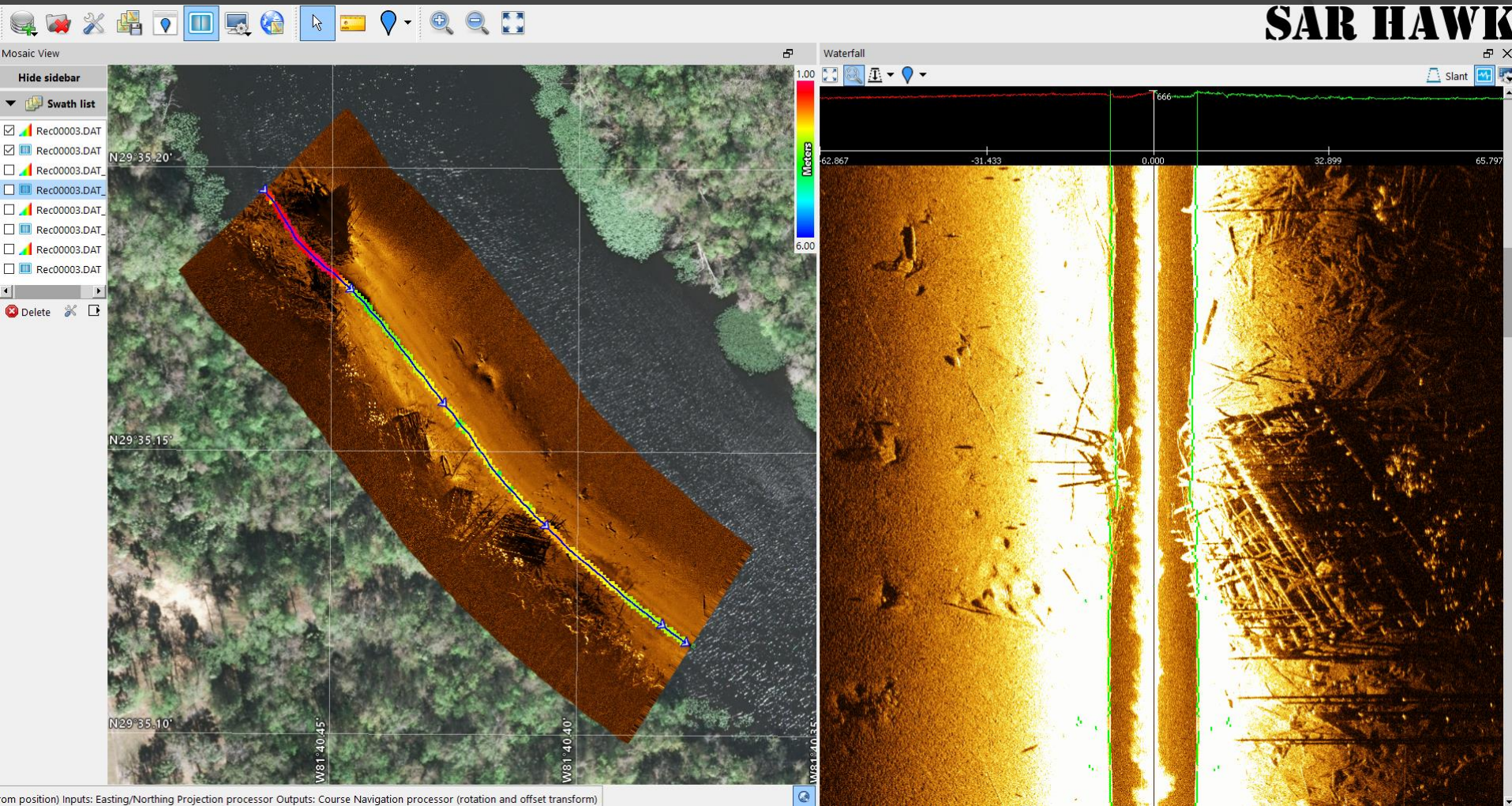
# SAR HAWK : Playback zoom



SAR HAWK allows you to “ZOOM IN” on your waterfall to focus only on meaningful data. Select the waterfall zoom icon (circled in red) then drag a box through the oscilloscope and waterfall.



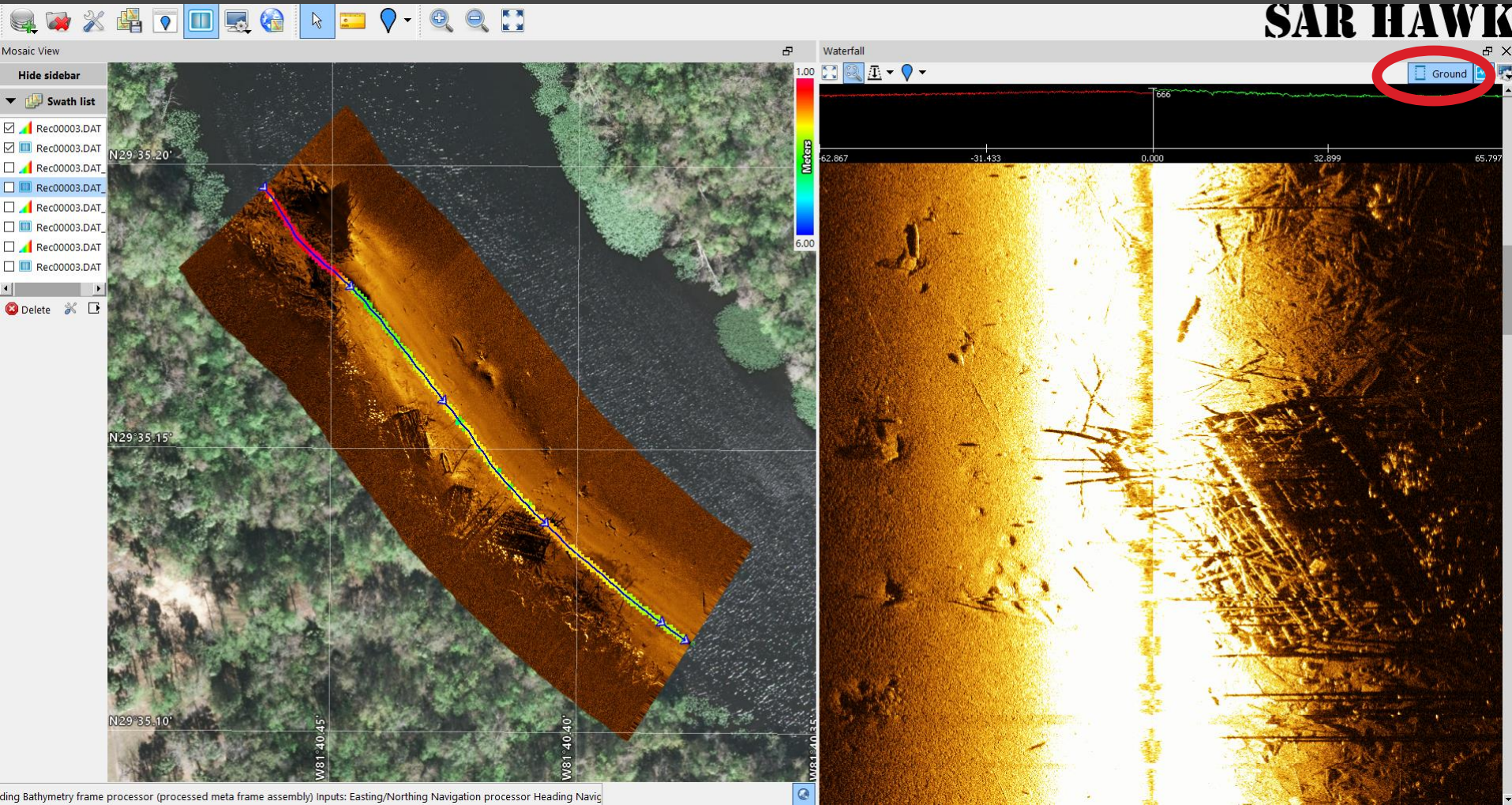
# SAR HAWK : Playback zoom



SAR HAWK will zoom in on both the oscilloscope and waterfall, allowing you to see targets better. This is independent of any clipping and trimming in the mosaic.



# SAR HAWK : Playback zoom



If you want to remove the water-column and see the data in ground range, just select the slant/ground toggle at the upper right of the waterfall toolbar (circled in red).



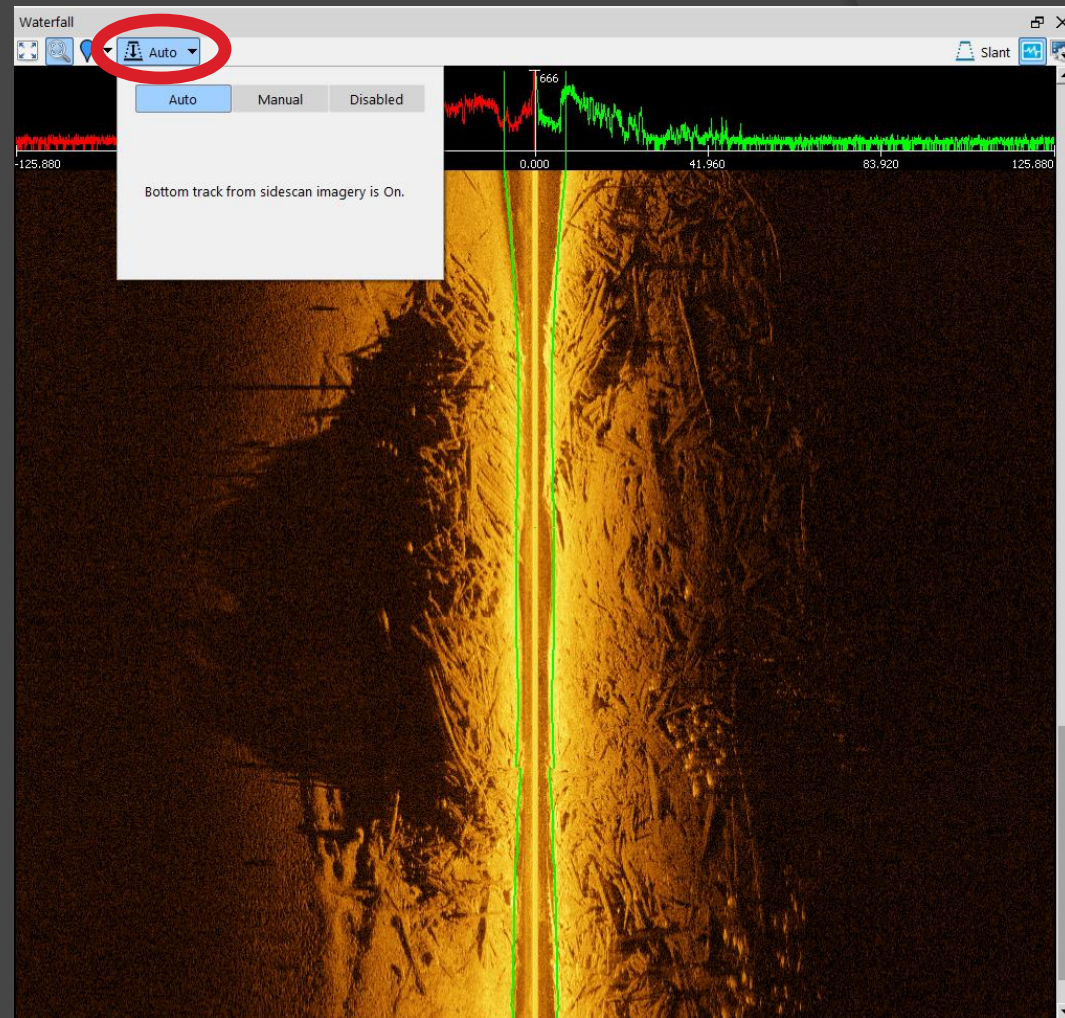
# SAR HAWK : Bottom Tracking

Bottom tracking options are Auto, Manual, and Disabled.

When Disabled, Sarhawk uses existing altitude data to track the bottom.

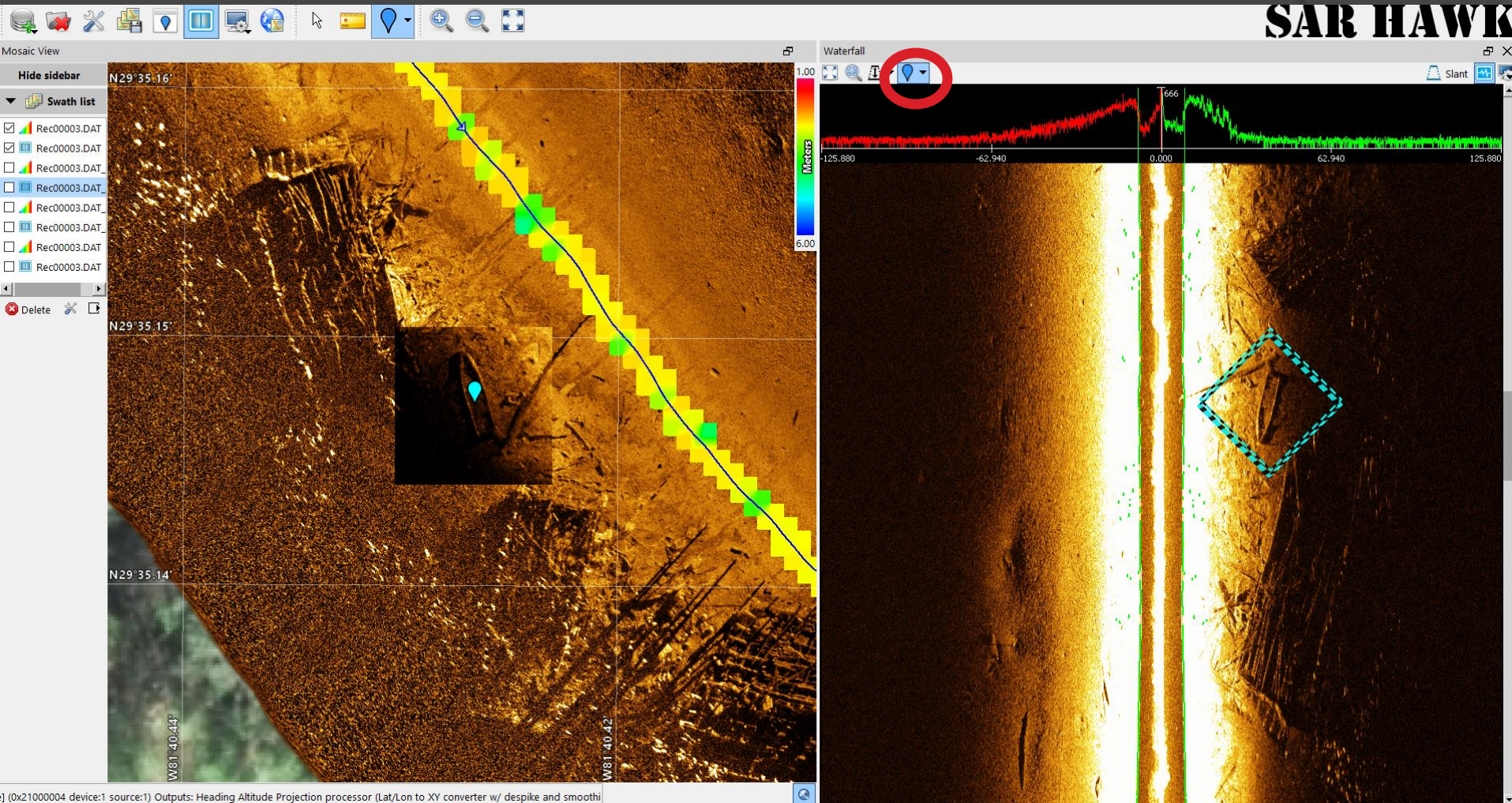
When set to Manual, the user may manually set bottom tracking by clicking within the oscilloscope window.

When set to Auto, Sarhawk uses sophisticated bottom tracking algorithms to do automatic bottom tracking!





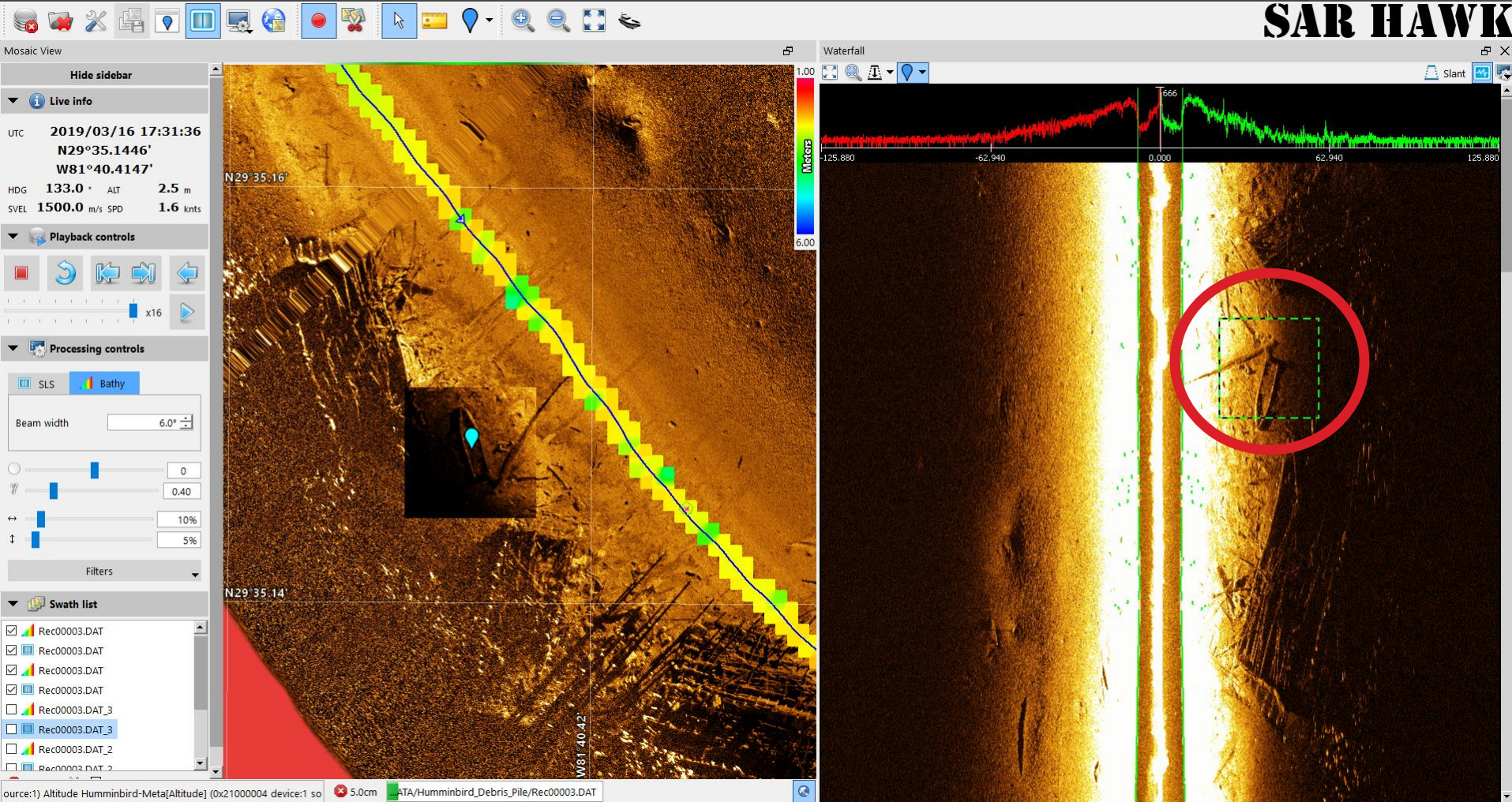
# SAR HAWK : Targeting



Select the Waterfall Target tool for target marking in the waterfall. Specify box size and comments, then left click on targets as they pass; a “diamond” appears on the waterfall, and a target mark on the mosaic.



# SAR HAWK : Targeting



If you pass over targets you have marked before, SAR HAWK will alert you to where you marked them before with a dashed green box.



# SAR HAWK : Targeting

The screenshot displays the SAR HAWK software interface. The top toolbar features a 'Mosaic Properties' icon circled in red. The main window is split into two panels: 'Mosaic View' on the left and 'Waterfall' on the right.

**Mosaic View:** Shows a SAR image mosaic with a color scale from 1.00 to 6.00 meters. A blue line with a red arrow points to a target. An inset shows a zoomed-in view of the target. The interface includes a 'Live info' panel with the following data:

- UTC: 2019/03/16 17:32:01
- N29°35.1361'
- W81°40.4056'
- HDG: 131.0 • ALT: 2.2 m
- SVEL: 1500.0 m/s SPD: 1.6 knts

Below the live info are 'Playback controls' and 'Processing controls' (SLS, Bathymetry). The 'Swath list' shows multiple data files (Rec00003.DAT). The status bar at the bottom indicates a processing pipeline with a 5.0cm resolution.

**Waterfall View:** Shows a vertical strip of the mosaic with a red and green waveform at the top. A red circle highlights a target area, which is also marked with a green dashed box.

If you mark the target again, the new mark is posted along with the previous in the mosaic. You can adjust display of target snippets and marks in the mosaic from the Mosaic Properties icon on the toolbar.



# SAR HAWK : Targeting Modes

The screenshot displays the SAR HAWK software interface. On the left, a sidebar contains 'Live info' (UTC: 2019/03/16 17:32:23, N29°35.1290', W81°40.3969', HDG: 128.0°, ALT: 2.4 m, SVEL: 1500.0 m/s SPD: 1.6 knts), 'Playback controls', and 'Processing controls' (SLS, Bathy, Beam width: 6.0°). The main area shows a 'Mosaic View' of SAR data with a 'Waterfall' plot overlaid. A red circle highlights a 'Targeting Mini-menu' on the waterfall plot with options: Name (Auto generate name), Type (Snapshot), Size (Geo-coded, Snapshot), and Comments. A red oval highlights a 'Contacts' panel at the bottom right, showing a grid of target thumbnails labeled Contact\_5 through Contact\_9. The SAR data shows a yellow and green diagonal line across a textured background, with a blue diamond shape on the waterfall plot.

Select target mode from the Targeting Mini-menu on the waterfall.  
“Snapshot” targets are just snippets from the waterfall, so can even show objects in the water column. “Geo-coded” targets are geoTIFFs so allow accurate measurement of targets.



# SAR HAWK : Targeting modes

The screenshot displays the SAR HAWK software interface. On the left, a sidebar contains 'Live info' (UTC: 2019/03/16 17:32:23, N29°35.1290', W81°40.3969', HDG: 128.0, ALT: 2.4 m, SVEL: 1500.0 m/s SPD: 1.6 knts), 'Playback controls', 'Processing controls' (SLS, Bathy, Beam width: 6.0°, 0, 0.40, 10%, 5%), and 'Swath list'. The main display shows a SAR image with a color scale from 0.00 to 1.00 Meters. A red circle highlights a zoomed-in view of a target area. Another red circle highlights a 'Waterfall' plot showing a signal peak at 666. A third red circle highlights a 'Contacts' panel listing Contact\_5 through Contact\_9. The SAR HAWK logo is visible in the top right corner.

In this example, the target was marked in “snapshot” mode; the data are in slant range, and at native “ping and pixel” resolution (no gridding).



# SAR HAWK : Targeting

The screenshot displays the SAR HAWK software interface. On the left, the 'Live info' panel shows the date and time as 2019/03/16 17:32:23 UTC, with coordinates N29°35.1290' and W81°40.3969'. The 'Processing controls' section includes a 'Beam width' of 6.0° and a 'Swath list' with several data files. The main 'Mosaic View' shows a SAR image with a red circle highlighting a target area. A 'Waterfall' plot on the right shows a signal spectrum with a red circle around a peak at 666. Below the waterfall plot, a 'Contacts' list shows several contact thumbnails, with a red circle around a specific contact. A 'Geo-coded' dialog box is also visible, showing a 'Name' field with 'Auto generate name', a 'Type' dropdown set to 'Geo-coded', and a 'Size' dropdown set to '256x256'.

In this example, the same target has been marked in Geo-coded mode: the resulting image is a north-up geo-coded GeoTIFF snipped from the mosaic at full resolution. The data have been corrected and gridded.



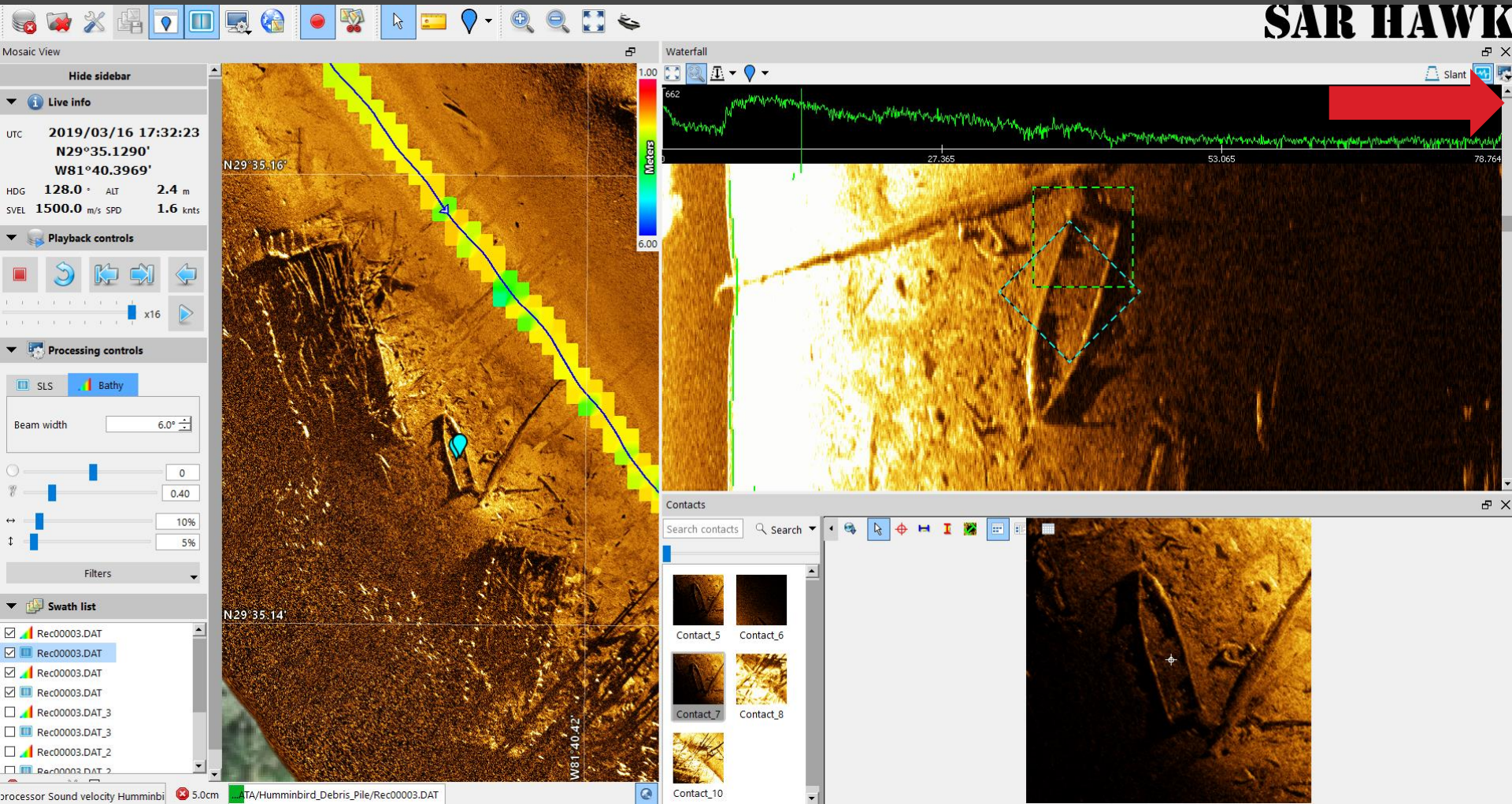
# SAR HAWK : Targeting

The screenshot displays the SAR HAWK software interface. On the left, a sidebar contains 'Live info' (UTC: 2019/03/16 17:32:23, N29°35.1290', W81°40.3969', HDG: 128.0, ALT: 2.4 m, SVEL: 1500.0 m/s, SPD: 1.6 knts), 'Playback controls', 'Processing controls' (SLS, Bathy, Beam width: 6.0°, various sliders), and a 'Swath list' with multiple 'Rec00003.DAT' files. The main area shows a SAR image with a yellow and green stepped line indicating a swath. A red circle highlights a 'Waterfall' icon in the top toolbar. To the right, a 'Waterfall' plot shows a red and green signal trace over a range from -125.880 to 125.880. A yellow box highlights a specific area on the waterfall, which is magnified in a 'Contacts' window at the bottom right. This window shows a grid of contact thumbnails labeled 'Contact\_5' through 'Contact\_10', with 'Contact\_7' selected. The SAR HAWK logo is visible in the top right corner.

You can use the Waterfall alerts to help you review data. If you see a target, select the Waterfall zoom icon (circled) then click and drag a box around your area of interest on the waterfall.



# SAR HAWK : Targeting



SAR HAWK will zoom the waterfall to your area of interest. If the waterfall stops scrolling, push the slider back to the top to re-start the scroll. You can mark targets just as before.





# SAR HAWK : Targeting

The screenshot displays the SAR HAWK software interface. At the top right, the text "SAR HAWK" is visible. The main window is divided into several panels:

- Top Left:** A toolbar with various icons. A red circle highlights the "Contacts" icon (a grid with a magnifying glass).
- Top Right:** A "Waterfall" plot showing a color-coded signal intensity over a range of values from -125.880 to 125.880. A red circle highlights a specific peak at 666.
- Center:** A large SAR image of a terrain. A red circle highlights a specific area of interest. A blue line indicates a path or boundary. A color scale on the right indicates "Meters" from 0.00 to 6.00.
- Bottom Left:** A "Live info" panel showing UTC time (2019/03/16 17:32:23), position (N29°35.1290', W81°40.3969'), heading (128.0), altitude (2.4 m), speed (1500.0 m/s), and speed (1.6 knts). Below this are "Playback controls" and "Processing controls" (SLS, Bathy) with various sliders and buttons.
- Bottom Center:** A "Contacts" panel with a search bar and a list of contacts (Contact\_5, Contact\_6, Contact\_7, Contact\_8, Contact\_10). A red circle highlights the "Contacts" toolbar icon.
- Bottom Right:** A detailed view of a contact (Contact\_7) with a measurement table.

| Name               | Contact_7                |
|--------------------|--------------------------|
| Comments           |                          |
| Tags               |                          |
| Position           | N29°35.147', W81°40.426' |
| Size               | 38.422 x 38.422 ft       |
| <b>Measurement</b> |                          |
| Width              |                          |
| Length             |                          |
| Shadow Length      |                          |
| Calculated Height  | Shadow length needed     |
| <b>Meta</b>        |                          |
| <b>Sensor</b>      |                          |
| Position           | N29°35.158', W81°40.427' |
| Heading            | 137.1°                   |
| Altitude           | 2.300 m                  |
| Depth              | 0.000 m                  |
| Range              | 63.592 ft                |

Select the "Contacts" icon on the main toolbar for the Contacts dialog, where you can select, view, zoom (+/- on keyboard) and measure your contacts. Use the Contacts toolbar tool to measure and change views.



# SAR HAWK : Targeting

SAR HAWK

The screenshot displays the SAR HAWK software interface. On the left, a sidebar shows live information for a recording on 2019/03/16 at 17:32:23 UTC, with coordinates N29°35.1290' W81°40.3969', heading 128.0°, and altitude 2.4 m. Below this are playback and processing controls, including a beam width of 6.0° and a swath list with several data files. The main window is split into three panes: a top-left SAR image with a color scale from 1.00 to 6.00 meters, a top-right waterfall plot showing a peak at 666, and a bottom-right zoomed-in view of a target with red and blue measurement lines. A 'Contacts' panel in the bottom-left shows a list of detected contacts, with 'Contact\_7' selected. A detailed measurement panel on the right provides the following data for Contact\_7:

| Name               | Contact_7                |
|--------------------|--------------------------|
| Comments           |                          |
| Tags               |                          |
| Position           | N29°35.147', W81°40.426' |
| Size               | 38.422 x 38.422 ft       |
| <b>Measurement</b> |                          |
| Width              | 4.471 ft                 |
| Length             | 20.267 ft                |
| Shadow Length      | 3.012 ft                 |
| Calculated Height  | 0.486 ft                 |
| <b>Meta</b>        |                          |
| <b>Sensor</b>      |                          |
| Position           | N29°35.158', W81°40.427' |
| Heading            | 137.1°                   |
| Altitude           | 2.300 m                  |
| Depth              | 0.000 m                  |
| Range              | 63.592 ft                |

The contact tool allows you to browse, measure and export your contacts. Here we show measurement of target length, width and height (from shadow length). This works best on geo-coded targets.



# SAR HAWK : Targeting

The screenshot displays the SAR HAWK software interface. On the left, a sidebar shows live info for a 2019/03/16 17:32:23 UTC recording, including coordinates (N29°35.1290', W81°40.3969'), heading (128.0), altitude (2.4 m), and speed (1500.0 m/s). Below this are playback and processing controls, such as a beam width of 6.0° and a swath list of data files.

The main window shows a SAR image of a terrain with a yellow and green stepped boundary. A contact is highlighted with a blue circle. A context menu is open over the contact list, with the 'Add contact(s) to staging table' option circled in red. The contact list table is as follows:

| Name       | Comments | Tags | Latitude    | Longitude   | Width (ft) | Length (ft) | Shadow Length | Calculated Heig | Sens |
|------------|----------|------|-------------|-------------|------------|-------------|---------------|-----------------|------|
| Contact_8  |          |      | N29°35.136' | W81°40.406' |            |             |               | 0.000           | N29  |
| Contact_7  |          |      | N29°35.147' | W81°40.426' | 4.471      | 20.267      | 3.012         | 0.486           | N29  |
| Contact_6  |          |      | N29°35.172' | W81°40.425' |            |             |               | 0.000           | N29  |
| Contact_5  |          |      | N29°35.147' | W81°40.427' |            |             |               | 0.000           | N29  |
| Contact_10 |          |      | N29°35.136' | W81°40.406' |            |             |               | 0.000           | N29  |

On the right, a detail view of a target shows a red line indicating its length and a blue crosshair for its position. A metadata table for this target is shown below:

| Tags | Position                 | Size               |
|------|--------------------------|--------------------|
|      | N29°35.147', W81°40.426' | 38.422 x 38.422 ft |

Below the detail view, a table lists metadata for the target:

| Measurement       | Value     |
|-------------------|-----------|
| Width             | 4.471 ft  |
| Length            | 20.267 ft |
| Shadow Length     | 3.012 ft  |
| Calculated Height | 0.486 ft  |

At the bottom right, a 'Meta' section lists sensor data:

| Meta     | Value                    |
|----------|--------------------------|
| Sensor   |                          |
| Position | N29°35.158', W81°40.427' |
| Heading  | 137.1°                   |
| Altitude | 2.300 m                  |
| Depth    | 0.000 m                  |
| Range    | 63.592 ft                |

Right click on any target in the contact view to rename, edit, annotate or delete. You can also add contacts to the “staging table” from which you can create a report, export as a CSV list or send targets to a plotter.

# SAR HAWK : Targeting

The screenshot displays the SAR HAWK software interface. On the left, a browser window shows a contact report for 'Contact\_2', 'Contact\_1', and 'Contact\_0'. The main window shows a SAR image with a red circle highlighting a contact point. A table on the right lists contact details, and a table at the bottom shows a list of contacts.

**Contact\_2 Data:**

- Range: 7.382°
- Heading: 4.142m
- Sonar Altitude: 0.000m
- Sonar depth: 0.04883984375m
- Image Resolution: 0.04883984375m

**Contact\_1 Data:**

- Range: 18.858°
- Heading: 4.158m
- Sonar Altitude: 0.000m
- Sonar depth: 0.03381640625m
- Image Resolution: 0.03381640625m

**Contact\_0 Data:**

- Range: -160.300°
- Heading: 4.078m
- Sonar Altitude: 0.000m
- Sonar depth: 0.03608984375m
- Image Resolution: 0.03608984375m

**Contact\_5 Data:**

- Position: N38°49'33.276", W104°47'58.757"
- Size: 17.791 x 17.791 m
- Calculated Height: Altitude needed
- Position: N38°49'33.621", W104°47'58.132"
- Heading: -131.1°
- Altitude: 4.075 m
- Depth: 0.000 m
- Range: 18.458 m

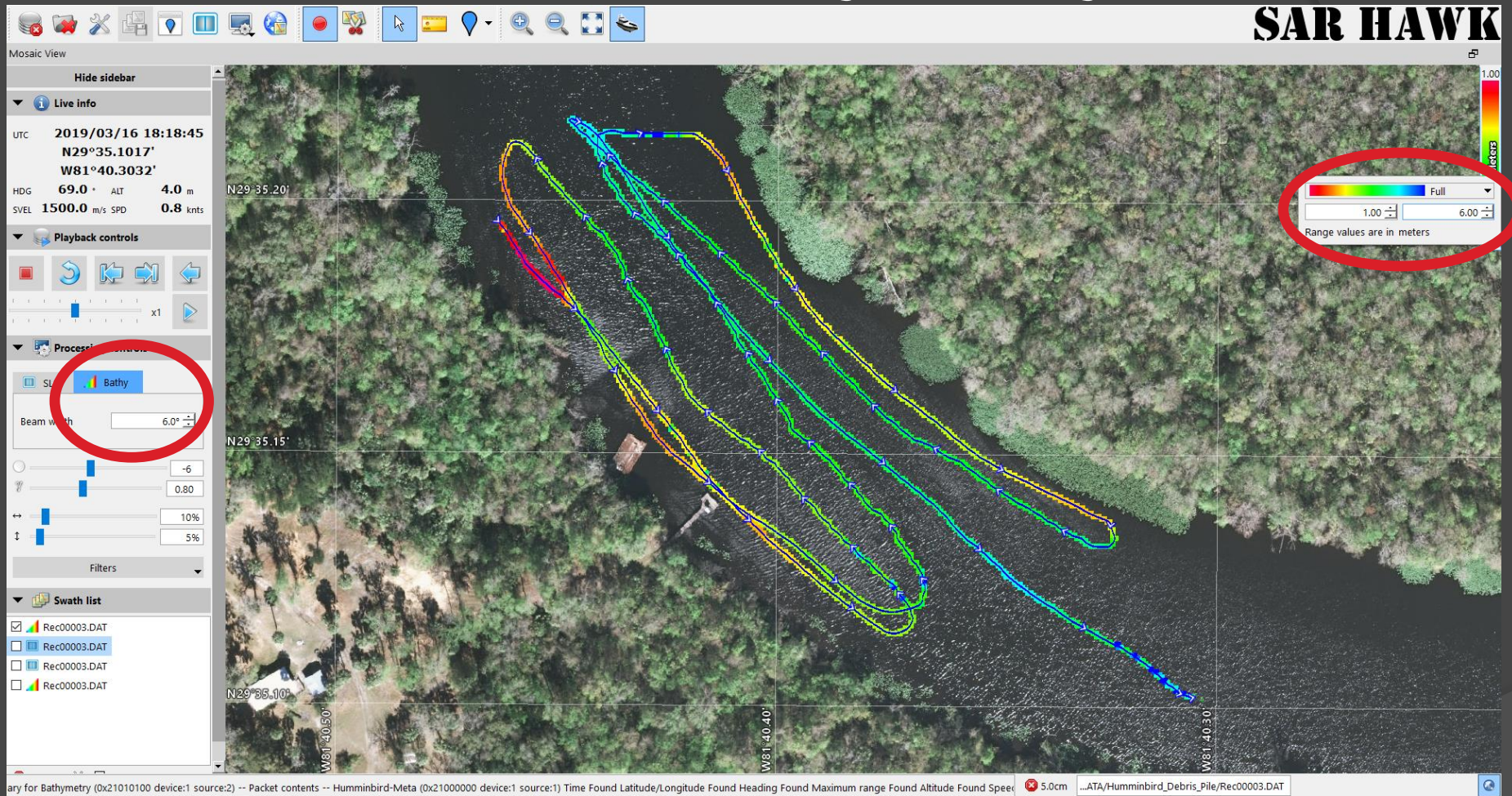
| Name      | Comments | Tags | Latitude        | Longitude     | Width (m) | Length (m) | Shadow Length |
|-----------|----------|------|-----------------|---------------|-----------|------------|---------------|
| Contact_5 |          |      | N38°49'33.27... | W104°47'58... |           |            |               |
| Contact_4 |          |      | N38°49'33.15... | W104°47'58... |           |            |               |
| Contact_2 |          |      | N38°49'31.51... | W104°47'57... |           |            |               |
| Contact_1 |          |      | N38°49'31.57... | W104°47'57... | 0.531     | 2.009      | 0.386         |
| Contact_0 |          |      | N38°49'32.04... | W104°47'56... |           |            |               |

Sample HTML contact report created from the contacts in the SAR HAWK staging table.





# SAR HAWK : Bathymetry



SAR HAWK creates single beam bathy mosaic from existing altitude data or bottom track altitude. Adjust the beam width via the processing controls. Adjust the colormap, minimum, and maximum values by clicking on the bathy legend in the top right corner.





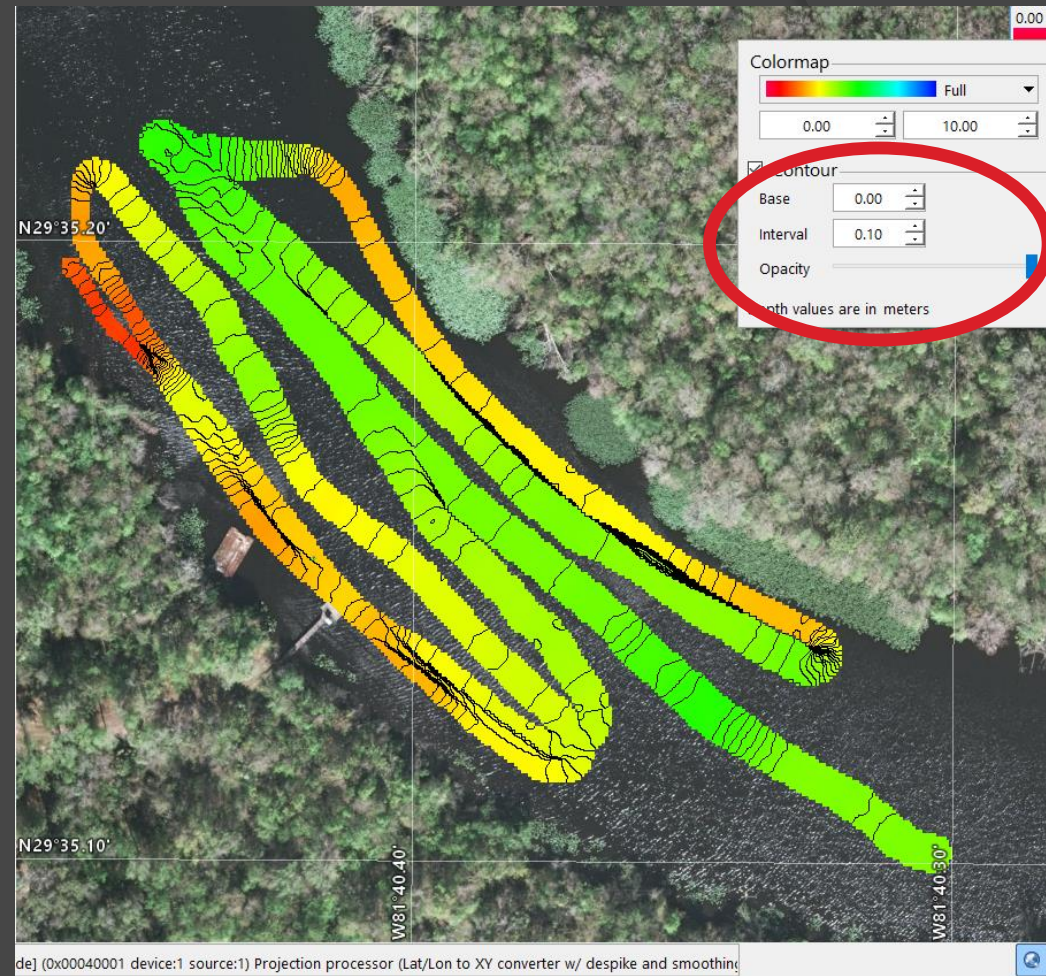
# SAR HAWK : Bathymetry

SAR HAWK now supports real-time contour generation for bathymetry created from existing altitude data collected by your depth sounder.

Click on the bathy legend to access the contour generation settings.

Click the contour checkbox to enable or disable contour lines.

Base value refers to the depth where the first contour will be generated. Interval refers to the interval at which additional contour lines are generated. Opacity adjusts the transparency of the contour lines.





# SAR HAWK : XYZ Export

The screenshot displays the SAR HAWK software interface. The main window shows a bathymetry mosaic of a river or stream, with depth contours color-coded from red (shallow) to blue (deep). A yellow rectangular selection box is drawn around a portion of the mosaic. On the right side, an 'Export Dialog' window is open, titled 'Export Dialog - SAR HAWK v1.3.1099 64-bit (OIC detected)'. The 'Path' field is set to 'C:/Users/randyc/Documents/sarhawk\_projects/demo01'. The 'Name' field is 'export.xyz', and the 'Type' dropdown menu is set to 'XYZ', which is circled in red. The 'Coverage' section has 'User specified' selected, with three coordinate fields containing the values: 3273241.6123223249, 434647.5418556099, and 3272959.3342919294. The 'Resolution' is set to 5 centimeter(s). The 'Background color' options are 'Transparent', 'Chart', and 'Color'. The 'Export area is 307.82 x 282.28 meters'. The 'Export' button is checked, and the 'Cancel' button is also visible. The software's status bar at the bottom indicates 'The Projected Coordinate System (PCS) has changed to: UTM Zone 17 Northern Hemisphere'.

Single beam bathy mosaic created from altitude meta-data or bottom-track altitude may be exported as XYZ file for use a background bathy charts or for importing into other GIS programs.



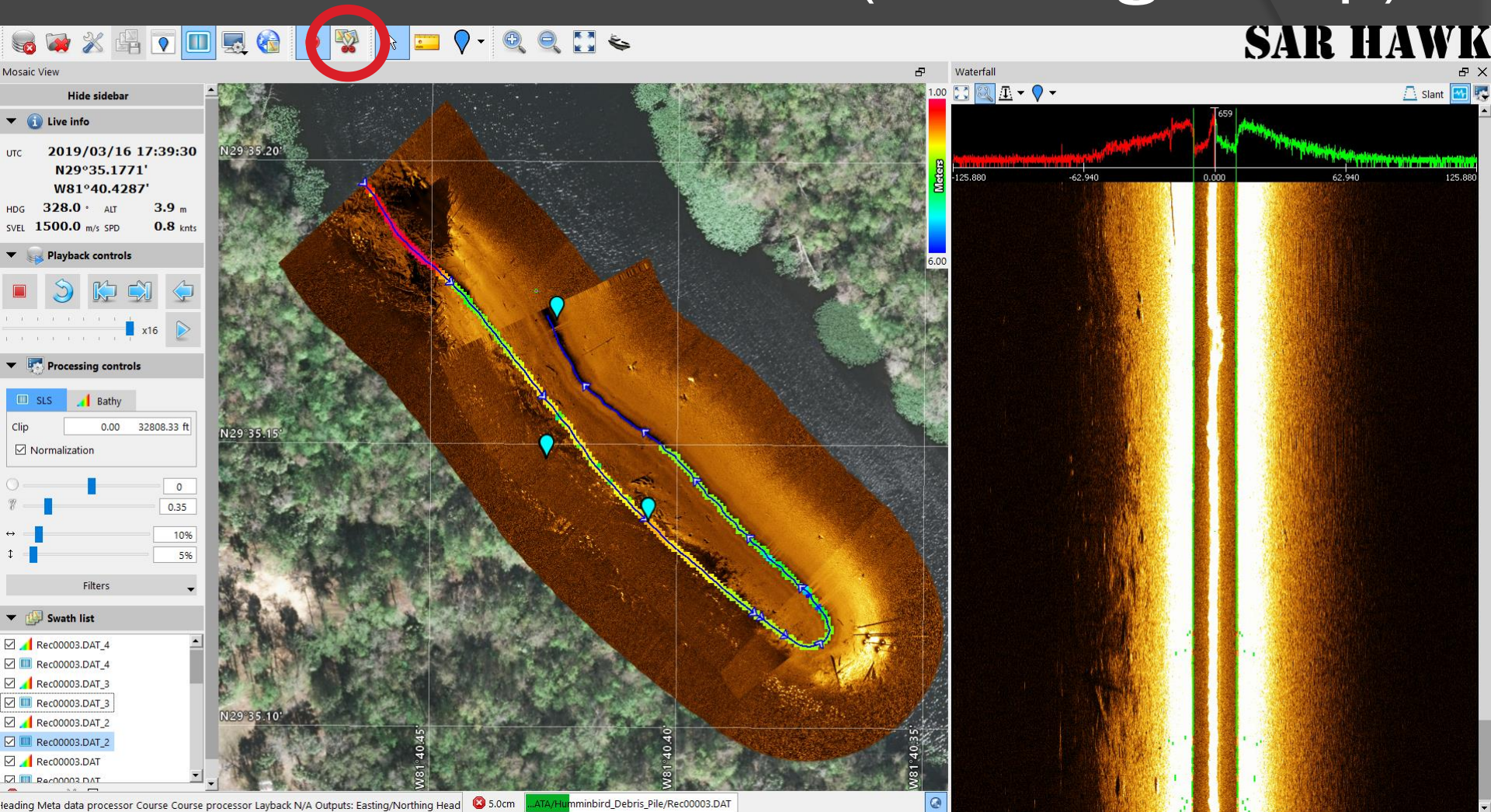
# SAR HAWK : XYZ Import

The screenshot displays the SAR HAWK software interface. The main window shows a bathymetry chart overlaid on an aerial photograph of a forested area. The chart uses a color scale from blue (shallow) to red (deep). A dialog box titled "Chart Display Options - SAR HAWK v1.3.1099 64-bit (OIC detected)" is open, showing the "Load XYZ Options" tab. The "File path" field contains "C:/Users/randyc/Documents/sarhawk\_projects/demo2/export/export2.xyz". The "Load options" section includes radio buttons for "Use current projection" (selected) and "Select projection...". The "Charts" section has a "Manual load..." button circled in red. The "Contours" section includes a "Contour line interval" of 1.0 Feet and a checked "Smooth lines" option. The status bar at the bottom indicates "The Projected Coordinate System (PCS) has changed to: UTM Zone 17 Northern Hemisphere".

Manually load a XYZ file from the chart loader to create a background bathy chart. Adjust the resulting background chart using the options in the XYZ loader. See the User manual section 5.7 for details.



# SAR HAWK : Mosaic (coverage map)

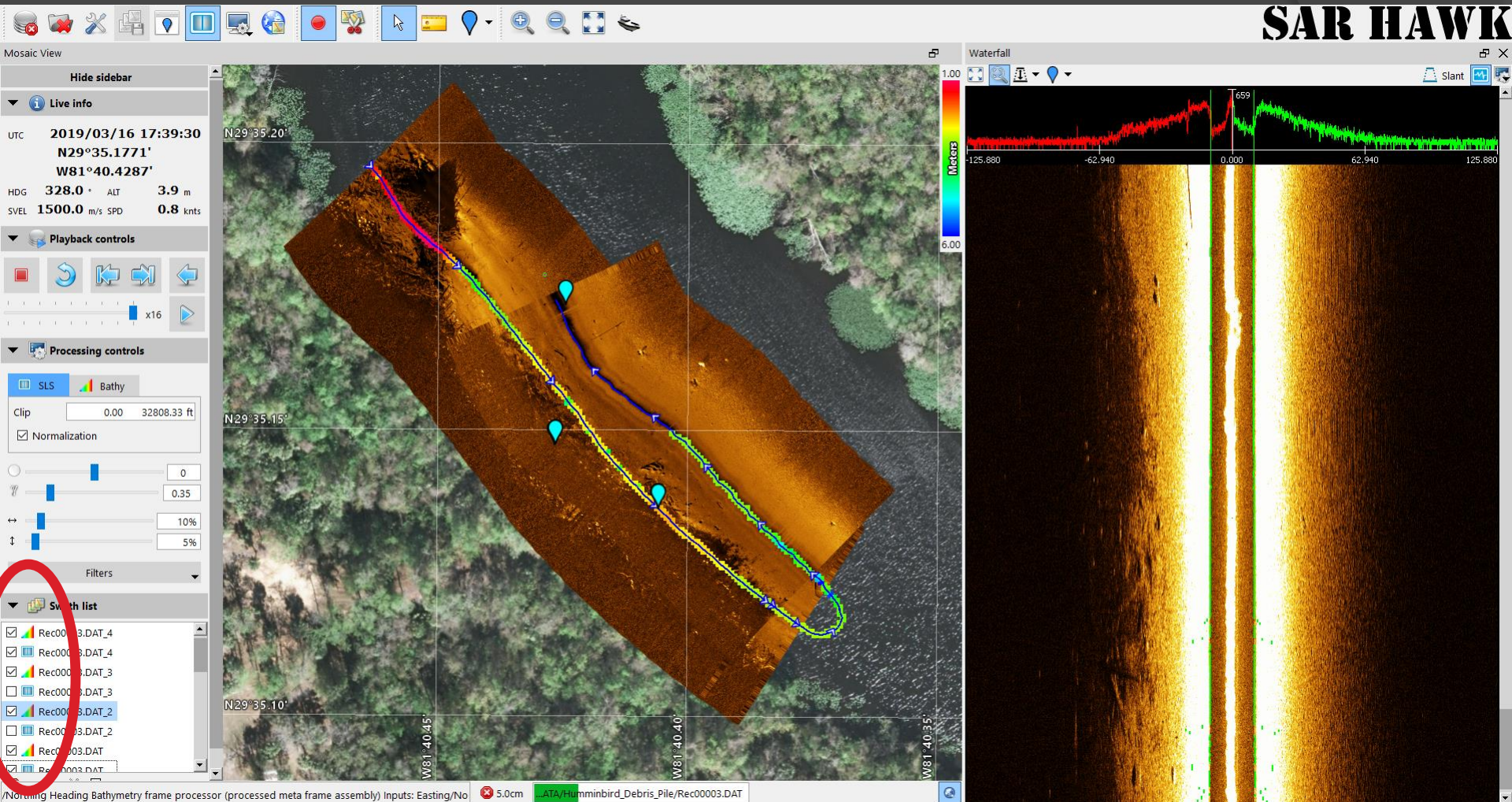


During playback, click the “New Swath” (scissors) icon in SAR HAWK to “cut” the current swath, and start a new one. This can be useful for cutting out turns, and creating separate swaths for each pass.





# SAR HAWK : Mosaic (coverage map)

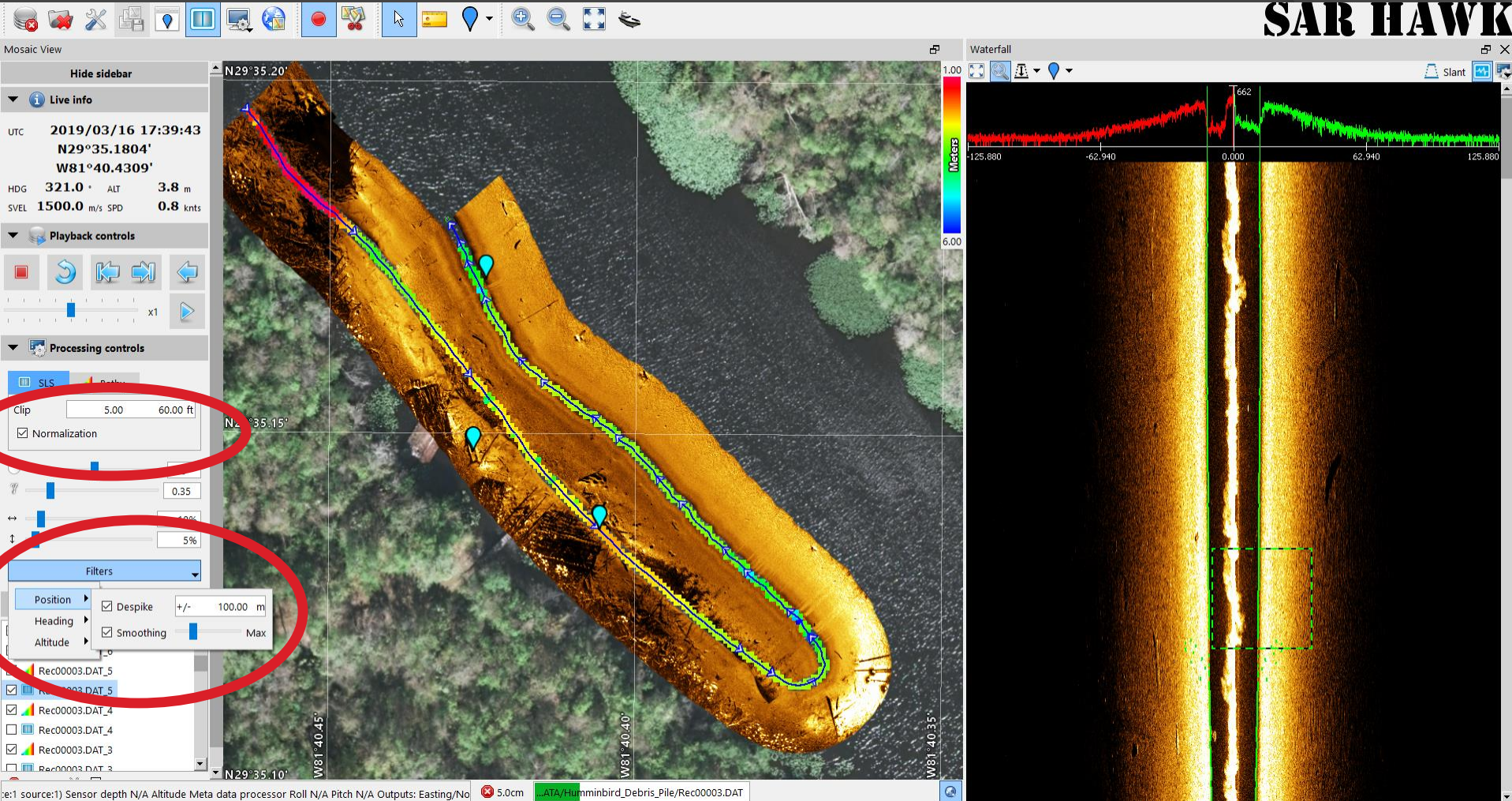


The user can “un-check” swaths in the Swath list, to hide turns. Drag the swath name up or down in the list to re-layer the mosaic image.



# SAR HAWK : Mosaic (coverage map)

**SAR HAWK**



Use the “clip” values to cut out bad data from the middle and far edges of the swath. Use the Filters menu to apply de-spiking and smoothing filters to position, heading and altitude. Position usually needs smoothing, altitude may need de-spiking then smoothing.





# SAR HAWK: Playback Mosaic

The screenshot displays the SAR HAWK software interface. The main window shows a playback mosaic of SAR data, with a yellow border and a red line indicating the playback path. A 'Swath list' on the left shows multiple recordings. A 'Waterfall' plot on the right shows the signal intensity over time. An 'Export Dialog' window is open, showing the path 'C:/Users/randyc/Documents/sarhawk\_projects/demo2/export', name 'export4.tif', and coverage options. The dialog also shows resolution (5 centimeter(s)) and background color (Transparent). The status bar at the bottom indicates the processing pipeline: '-- Bathymetry (device 1) Processing pipeline -- Meta data processor (filtering and smoothing) Inputs: Heading Humminbird-Meta[Heading] (0x21000002 device:'.

Playback mosaics are the same as quick-look mosaics, you can pan and zoom, mark targets (just snippets from the mosaic) and export imagery to GeoTIFF, ArcGIS or Google Earth (select Export icon on toolbar)



# Summary

- Single beam bathy, XYZ export/import, Automatic Bottom Tracking
- Reads all current versions of Humminbird® side-look data
- Projects can be re-opened for review, editing and addition of new data (from the same area)
- Supports target marking, analysis, export and reporting SAR HAWK SURVEYOR Manual on the disk