

# DABGRAF

## User Guide

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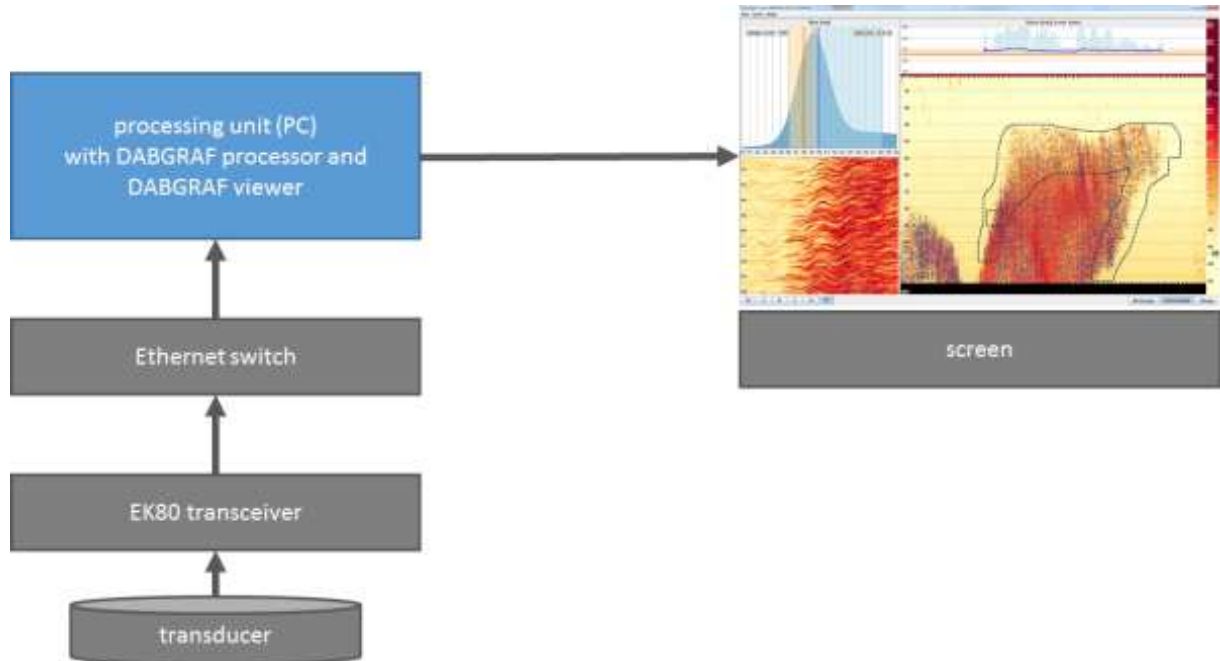






## DABGRAF

DABGRAF is a postprocessing tool for size-estimation from broadband acoustics. The software consists of two applications, the DABGRAF processor and the DABGRAF viewer. The diagram below illustrates a typical system setup.



In its current version, the software supports sizing atlantic herring (*Clupea harengus* L.) and atlantic mackerel (*Scomber scombrus* L.).

## Working with DABGRAF

The aim of DABGRAF is to provide the user with a tool that allows to remotely assess the size distribution in a fish school. To this end, the user has to select the appropriate fish species in the configuration dialog and a region of the echogram in the echogram view. The estimated size distribution is then presented to the user in the size estimation view.

# Views

This chapter gives a description of the DABGRAF data views.

The display is composed by three different types of data views.

- Echogram view: This view shows the target strengths in each ping at a certain depth. This view is found in the center of the main display.
- Size distribution view: This view shows the distribution of fish sizes in the of a certain data portion and is found in the upper left corner of the main display. The selection of the data to be uses in the size distribution estimation is performed in the echogram view
- Zoom view: This view shows a enlarged view of the area underneath the rectangular area confined by a black and white stippled line visible in the echogram view
- Average size per ping view: This view shows the temporal evolution of the median fish size in the pings containing selected data and the spread (interquartile range) of the fish sizes in the ping. The average fish size view is found in the top of the main display.

## Echogram view

The echogram view displays the target strength recorded by the echosounder at a distance to the transducer for several consecutive pings.

## Data representation

The different target strengths are represented by color. Right clicking on the color scale on the right border opens the dialog for setting the parameters for this mapping. The range to be displayed and other advanced setting can be adjusted in the configuration dialog, that is brought up by right-clicking on the echogram view.

## Navigation

The most recent pings are found to the right of the echogram view, with new pings streaming in from the echosounder. The user can navigate through the recorded pings using the buttons in the lower left corner. It can be paused, played in forward and backward direction at recoding speed (single arrows), or increased speed (double arrows). Pressing the home button reassumes the streaming by jumping to the most recent ping available.

## Data selection

There are three different data selection modes available, selectable by clicking the corresponding buttons in the lower right corner.

- **Recangle mode:** The area confined by a black and white stippled line defines the selection for the size estimation and zoom view. The selection can be adjusted by dragging the rectangle or changing its size by dragging its edges or corners.
- **Accumulation mode:** If the accumulation mode is activated, the user can draw a arbitrary region by moving the rectangle around. The area traversed by the rectangle is than added to the selection. All of the selected echogram is used for the size estimation, while the rectangle itself defined the area shown in the zoom view.
- **Range mode:** In the range mode the user can define a certain distance range to be used for the size estimation. The range can be adjusted by dragging the two horizontal lines defining minimal and maximal distance or setting the values in the configuration dialog. The rectangle has the sole purpose of defining the area shown in the zoom view.



## Size estimation view

The size estimation view displays the estimated distribution of fish sized in the data, based on size estimated from single fishes, the uncertainty of the single estimation and the assumed fish species. The median of the estimated. fish size distribution is shown in the top right corner together with the fish species. The number of fishes the size distribution estimation is based on, is displayed in the top right corner of the view.

## Data representation

The user can choose between two representations of the size distribution a classical histogram and a probability density. The histogram uses the estimated size of the single fish in the selected region, while the probability density also accounts for the uncertainty of the single estimation. The probability density is estimated making use of the so-called kernel density estimation. The median of the probability distribution is marked by a thick vertical blue line. The light blue area around shows the interquartile range, i.e. the central 50 percent of the fish sizes in the selection. The thick red vertical line and the orange area around show the targeted size plus minus 10 percent. Data representation, targeted size, and other display options can be change in the configuration dialog.

## Data navigation

The view is linked to the echogram view, and navigable accordingly. For further information confer the section **data navigation** in the echogram view documentation.

## **Zoom view**

The zoom view shows a magnified view of the echogram underneath the rectangular region confined with a stippled line visible in the echogram view. It is possible to change the shown region by panning and changing the zoom level using the mouse wheel.

## Average size per ping view

The average size per ping view displays the temporal evolution of the median fish size for a single ping and the variability of fish sizes in the ping for several consecutive pings in the region selected in the [echogram view](#)

### Data representation

The dark blue line represents the median fish size, the light blue area spans horizontally the interquartile range of the fish sizes in a single ping. A broad light blue area indicated a large variability in the estimated sizes. The red horizontal line and the yellow area around indicate the targeted fish size plus minus a certain percentage. The targeted fish size can be changed in the [configuration dialog](#).

### Data navigation

The view is linked to the echogram view, and navigable accordingly. For further information confer the section **data navigation** in the [echogram view documentation](#).

## Dialogs

This presents the main configuration dialogs of DABGRAF:

- Setup dialog: Contains various dialogs for setting up the main processing parameters for DABGRAF.
- Configuration dialog: Dialog for the configuration of the size estimation algorithm and the different views. Amongst others, the fish size, the depth range to be displayed and the ping sampling rate can be set. Furthermore, a night mode for a better display readability when working in low light conditions can be selected.

## Setup dialog

The setup dialog allows to change the in- and output folders for the preprocessing.

## Processing

- **Input folder:** Sets the path for the folder where the processor picks up the raw data files coming from the echosounder.
- **Output folder:** Sets the path for the folder where DABGRAF picks up the data to display, as well as the folder where the processors saves the processed data.

The OK button saves the paths currently displayed and reloads the display (NB: even if no effective changes are made), while CANCEL discards all changes. Changes will take effect immediately, also for running processing.

## Configuration dialog

The configuration dialog allows to change the size inversion and display settings for the DABGRAF viewer. Changing this parameters has not affect on the processing.

### Night mode

The night mode adjusts the color scheme for better readability while working under low light conditions. Both the color scale of the echogram, background color of the displays, and the text color are changed.

### Track visible

Toggles the display of the single fish tracks picked up by the preprocessor.

### Track line width

Specifies the vertical width of single fish tracks. Only visible if **track visible** is checked.

### Subsampling

The subsampling parameter has to be integer and in the range from 1 to 20. If set to a number n grater than 1, only every n-th sample in the ping will be displayed, thus reducing the vertical resolution.

### Selection range

Sets the range used for data selection in the range selection mode selectable in the echogram view. If another selection mode is active, these settings have no effect.

### Size as histogram

Switches between the two data representations, histogram and probability density, in the size distribution view.

### Histogram bin size

Sets the bin size in cm for the histogram in the size distribution view. Changing this parameters has no effect if the data representation chosen in the size distribution view is not the histogram.

### Size range

Sets the range of the x-axes in the size distribution view and the y-axis in the Average size per ping view.

## **Target size**

Sets targeted fish size in cm, displayed as red vertical and horizontal line in the size distribution view and the average size per ping view, respectively.

## **Target size spread**

Sets acceptable spread around the target size in percent. The spread is displayed as yellow vertical and horizontal band in the size distribution view and the average size per ping view, respectively.

## **Target species**

Sets fish species assumed in the size estimation algorithms.

## **Minimum range**

Sets the distance from the transducer at which the echogram view starts.

## **Range**

Sets the distance range the echogram view covers. The maximal distance displayed in the echogram view is the minimum range plus the range.

## Reference

This section contains more advanced reference material.

- [kernel density estimation](#)



## **Kernel density estimation**

Confer kernel density estimation on [Wikipedia](#).