Echoview Software is pleased to present Echoview 13, our biggest and most exciting release ever.

Echoview 13 is all about you and our commitment to supporting your hydroacoustic data processing experience with valuable functionality and the latest technologies. Read on to discover the many new features that will empower you to streamline your workflow and extract the best results from your data.

Echoview 13: powerful, intelligent, efficient.

Echoview 13 is available to all license holders with an up-todate Maintenance and Technical Support (MATS) plan or an active subscription or lease.

Please contact info@echoview.com to discuss your options for accessing Echoview 13.

## Machine learning

Echoview Software is pleased to debut machine learning in Echoview 13. This capability makes standard data processing steps faster and easier through automatic identification of features in your hydroacoustic data.

In collaboration with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Oceans and Atmosphere in Hobart, Australia, Echoview 13 includes a trained inference model that detects a bottom exclusion line in single beam echograms. The model was trained using manually defined bottom exclusion lines for 38 kHz Sv data recorded by Simrad ES60 and ES70 systems, with a focus on strong fish schools in close proximity to the seafloor.



A comparison of the Best Bottom Candidate Line Pick algorithm results (upper line) to the new Trained Model Bottom Exclusion results (lower line) when strong schools are closely associated with the seafloor. Overheads for manual line editing are greatly reduced, or even removed, when using the new approach.

If you'd like to collaborate with us to develop trained models for other features of interest, please get in touch.

#### Support for new hardware

You can process even more types of hydroacoustic data with Echoview 13, as we've added compatibility for:

Blueprint Subsea Oculus series multibeam imaging sonar data



Oculus imaging sonar data kindly shared by Blueprint Subsea.

- R2Sonic Sonic series multibeam raw water column data recorded by Qinsy or HYPACK
- Teledyne Reson s7k data files containing record 7042 multibeam compressed water column data
- Simrad SU90, MF90, CS90, ST90, SX90 and SY50 omni sonar, and SN90 fishery sonar data recorded to the ICES SONAR-netCDF4 convention



Simrad MF90 omni sonar data kindly shared by Kongsberg Maritime AS.

 NORBIT Winghead and WBMS multibeam sonar data recorded to the s7k format



- Teledyne Odom MB2 multibeam echosounder data recorded to the s7k format
- Nortek Signature NMEA and ANPP GPS measurements recorded alongside echosounder data
- Boolean data in CSV files

These additions build on our already extensive list of compatible systems with Echoview now supporting data from over 75 echosounders and sonar models from 17 brands.

# Easy, publication-quality images

You now have complete control over the creation of echogram images to rapidly generate pictures for use in presentations and publications, to train your own machine learning models, or for quick and easy data review via scripting.

Single images or multiple images (split by ping number or time) can be exported. Images can be saved as several different formats, and now include the color legend and other echogram elements, such as grid lines and regions, when they are visible.



Exported images now include the color legend, grids and their labels, lines, regions, and more.

## Performance boosts

Echoview 13 includes multithreading support for all virtual variables that take acoustic data as input. You'll see a boost in performance and usability for the 17 operators that were not yet multithreaded, which will be especially beneficial for those detecting and tracking targets in imaging sonar data.

There are improvements to the performance of EVD, NetCDF, and analysis exports, as well as CSV data file reading, particularly when working with large quantities of data.

We've also expanded the range of processes that can be canceled whilst in progress: school detection, data exports (e.g., echograms) to CSV, MATLAB, EVD, or georeferenced CSV files, and the wideband frequency response export can now also be canceled while calculating.

# Dataflow toolbox

A new toolbox is available for the Dataflow window, which provides an easy way to drag-and-drop new virtual variable, line, surface, scene, transducer, and sticky note objects into your workflow.

You can pin favorite objects to the top of the list, find helpful information about each, and see which subset of new objects can be created using a selected object as input.



## New automation capabilities

It's now possible to script the creation of new virtual lines using the AddVariable method.

We've also added the new methods ClassifyRegionAll to avoid MATLAB syntax issues with ClassifyRegion, and Regions.DeleteAll to remove all regions of a specific class.

The Command Interface (EvApp.Exec) can now more easily enable or disable individual items in large lists (such as export variables in the EV File Properties dialog).

The Console window now includes contextual color coding.



#### Noise removal and estimation

Echoview 13 includes a variety of new virtual variables for use across many applications, with a particular focus on data noise.

We've added the Transient Noise Ping Removal operator, which is an inversion of the existing Attenuated Signal Removal operator algorithm to identify and mitigate pings affected by transient noise. Alongside this, the existing Transient Noise Removal operator is renamed to Transient Noise Sample Removal, to help distinguish the algorithmic differences between the two operators that tackle similar data problems.



Pings that have been identified as containing significant levels of transient noise in raw data (top) have been converted to no data using a Transient Noise Ping Removal operator (bottom).

Echoview 13 also adds the Background Noise Estimation and Signal to Background Noise Ratio operators, which are helpful for understanding the effects of background noise on your acoustic data. These operators are based on the concepts and intermediate steps described in De Robertis and Higginbottom (2007).



Visualization of estimated background noise (center) and the ratio of signal-to-noise (right) from raw data (left).

### Wideband noise removal

The three new operators described in the previous section all accept both narrowband and wideband data as input variables — and now, so do our pre-existing operators for Impulse Noise Removal, Background Noise Removal, Transient Noise Sample Removal, and Attenuated Signal Removal. Wideband variables are now also accepted as input for the Vessel Speed at Pings operator.

Expanded operator support for wideband data as input makes Echoview 13 the best option for processing your Simrad EK80 wideband survey data.

#### Other new operators

We've added an XxYxZ Statistic operator that enables statistical manipulation of multibeam sample data in the range/beam/ping dimensions, with mean, minimum, maximum, median, percentile, standard deviation, variance, mean absolute deviation, coefficient of variation, and kurtosis calculations built in.

Echoview 13 also includes a new virtual line operator, Near-Field Depth Estimation, that creates a virtual line corresponding to the estimated on-axis range of the near field (Fresnel zone). The operator includes a setting that enables you to customize the multiplication factor for the near field, so that you can easily delineate and exclude your preferred range from your water column analyses.

Also included is a new virtual surface operator, Linear Offset, which allows you to create a virtual surface that's offset from an existing surface. This is particularly useful when a bottom surface has been detected in multibeam data, and an offset needs to be applied to exclude near-bottom signal from the water column ahead of target and school detection or other analyses.

Extra features have been added to existing operators:

- The Calibration Subset operator can be used to separate active and passive Simrad EK80 pings, via a new calibration setting that identifies the ping mode
- The Mask operator includes an option to set a custom replacement value

Mask		
Set masked data values to:	Custom	$\sim$
	Custom mask value: 3.14	



- The Region Bitmap operator allows the selection of multiple region types and classes
- The Region Statistic operator supports TS data as input, and can calculate statistics for fish track region types
- Multibeam magnitude data is accepted as input for the Processed Data, Multibeam Target Detection, Kovesi Image Denoising, and Multibeam Target Overlay operators
- Multibeam unspecified dB data is accepted as input for the Multibeam Target Detection operator
- Multibeam tilt and bearing angle values can be accessed within the Code operator

#### New and improved exports

Changes to exports include:

- Wideband complex data can be exported to MATLAB format (including via COM scripting)
- Exports to CSV and EVD files can now be automatically split into multiple files of a specified size

Export Pulse compressed complex Sv to CSV format						×
Select range to export O All measurements						
O Measurement range	From:	0		To:	19	
File options Split exported files based Target file size (MB):	d on size				200	
	Export.		Cancel		Help	

#### Other features

- The Filesets window now includes:
  - Better sorting of raw variables, and new options to filter and group the variable list
  - Easier browsing to find moved ECS files
  - Details panel support to easily see a count of data files and the applied Fileset settings
- Time grids now include options to separate data in units of hours or days

- Improved grid labeling
- Automatic region classification rules can now be applied to wideband data
- Exported Calibration Assistant reports include the date/time range of the calibration data
- Regions can be duplicated via a right-click menu option when one is selected in an echogram
- New shortcut key combinations to set the line status, and to locate next or previous line breaks
- An option to browse for any EV file to use as a template when creating a new EV file

New EV File >	<
Please choose an EV file to use as a template:	
Default=60-raw Example targets and schools Exports ICES test code operator dB differencing machine learning new settings	
OK Cancel Browse No Template Help	

- Improved default layout of objects in the Dataflow window in new EV files or when using the context menu option to Rearrange Objects
- Capability to select all variables in a Dataflow chain above a highlighted variable
- Echocheck support for Furuno FSV-30R data, the latest Simrad ME70 file format, and data files that are larger than 2 GB

#### System requirements

Echoview 13 is compatible with 64-bit Windows 8.1, 10, and 11 operating systems.

## **Getting Echoview 13**

Echoview 13 can be downloaded from our website.

A complete list of features and fixes can be found on the "New in Echoview 13" pages in the help file installed alongside Echoview 13.

Please contact <a href="mailto:support@echoview.com">support@echoview.com</a> for further information.

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