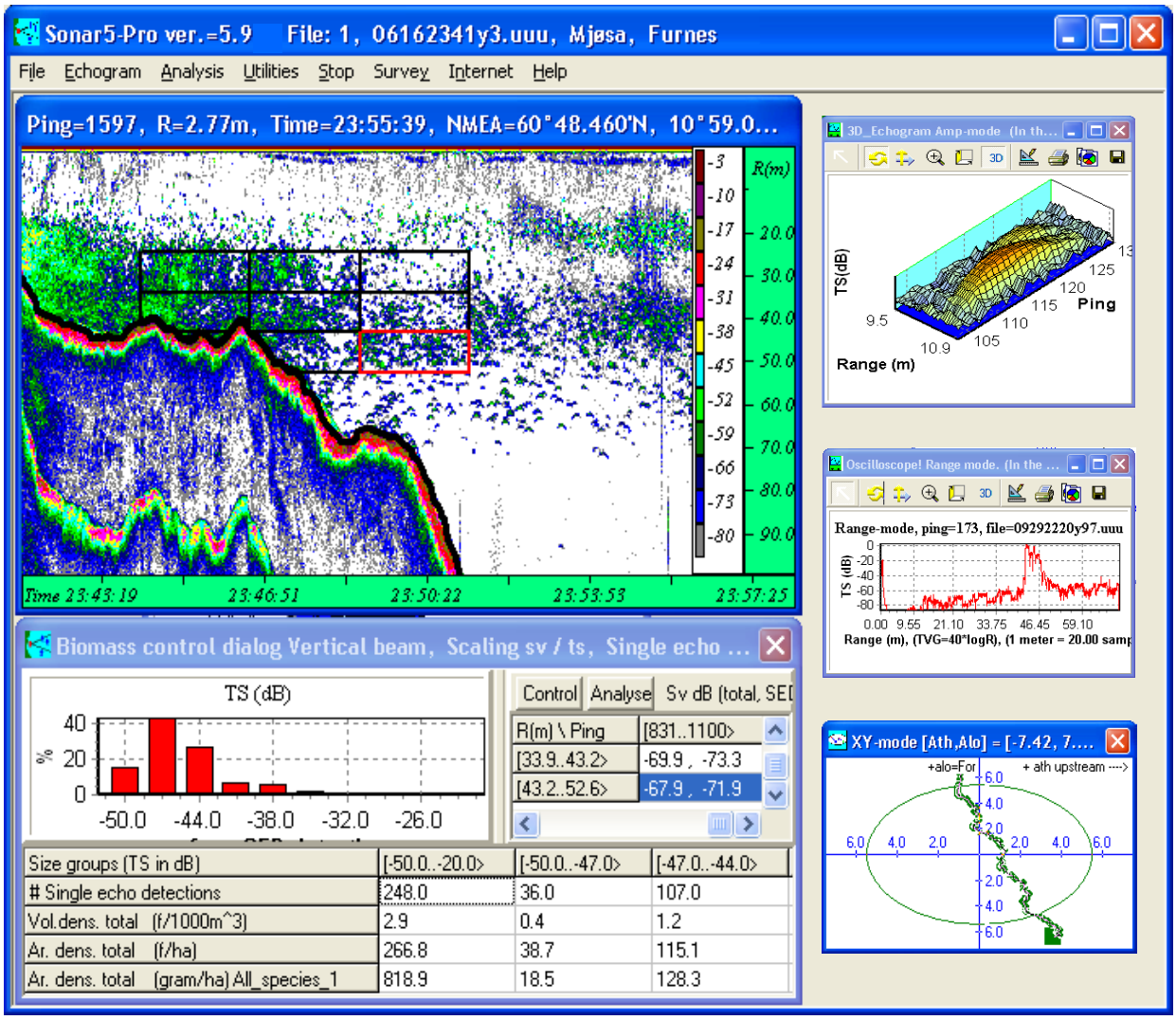
Sonar4 and Sonar5-Pro

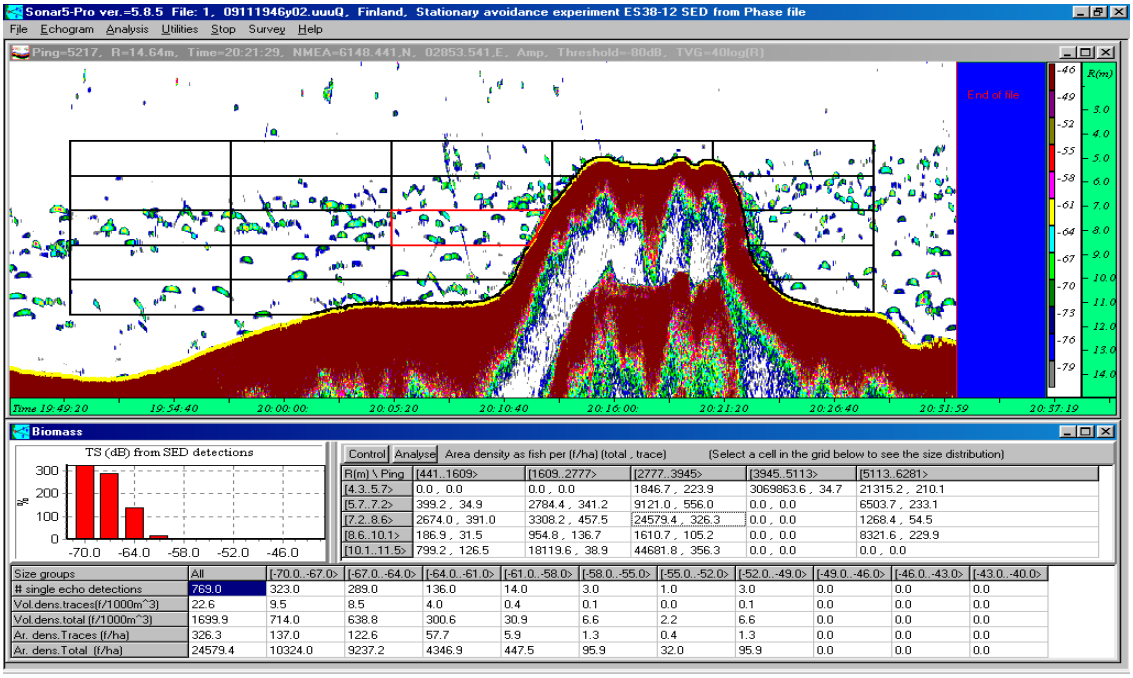
Post processing systems

Made by Scientists - For Scientists

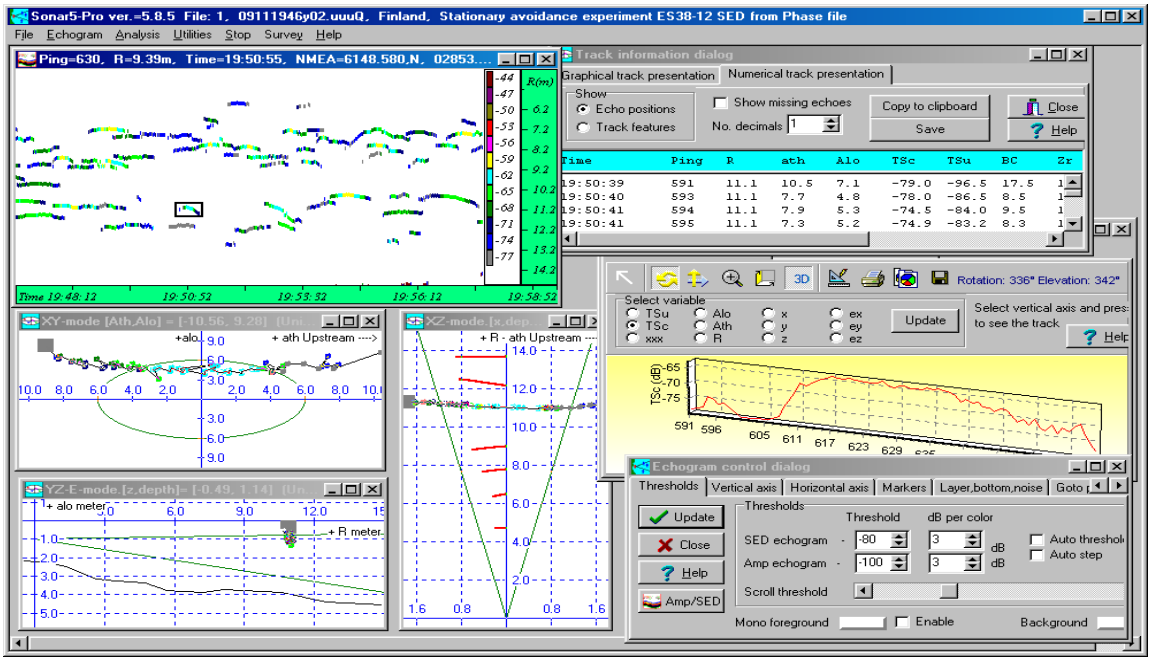


Biomass estimation, Tracking, Macrophyte, Multi freq. Multi beam, Dynamic sound profile, Data insight, Classification, Statistics, Maps, Pictures, Crossfilter, Single echo, Bottom and water current detection, Fish sizing, Oscilloscopes, 3D-Amp and phase diagrams, Ray tracing, Transducer position prediction.....

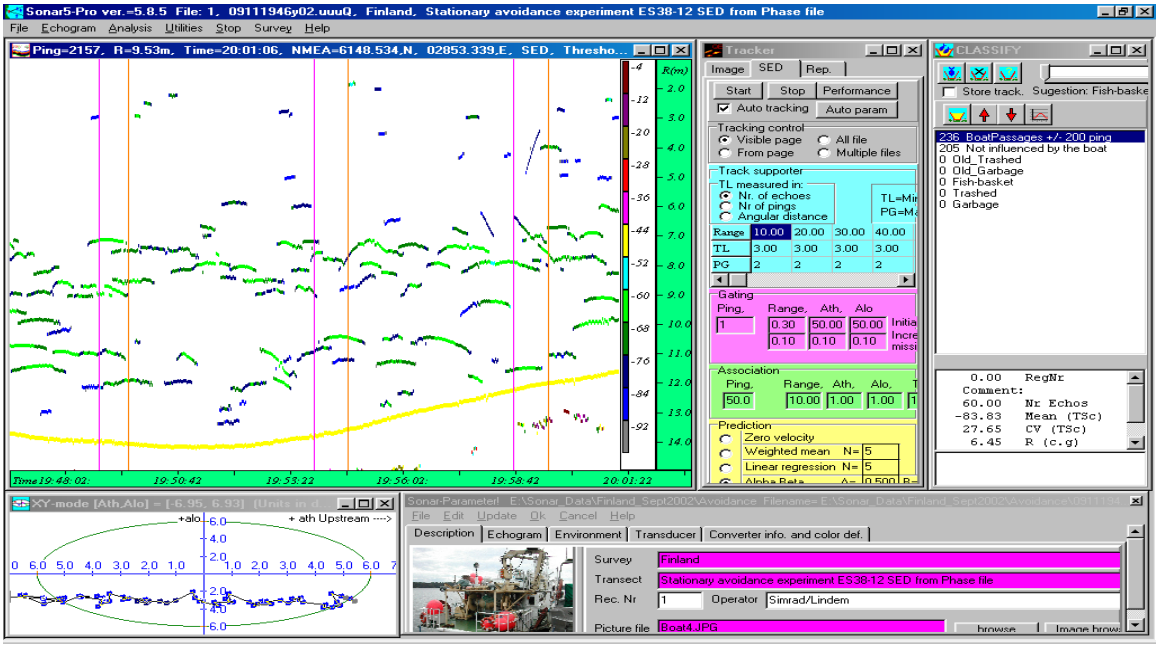
Balk and Lindem 2010
NORWAY



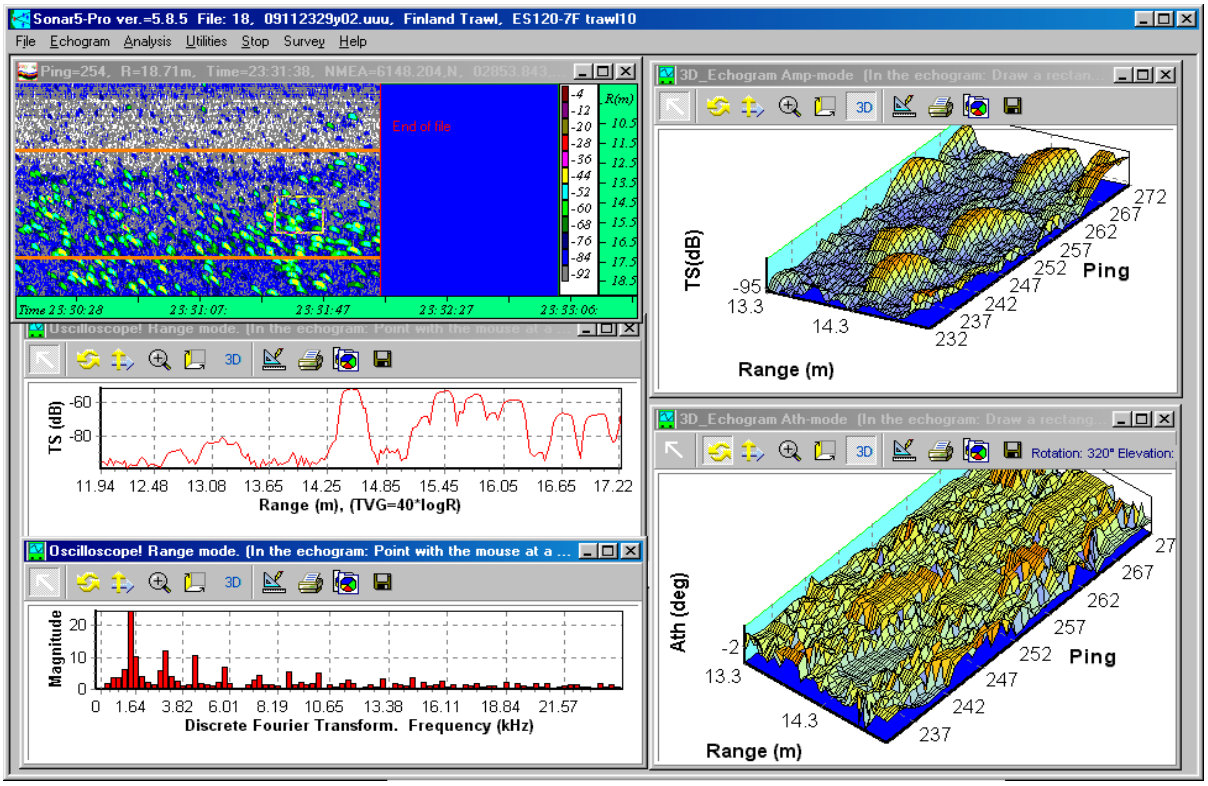
SonarX. Default setup for biomass estimation as described in chapter 8.



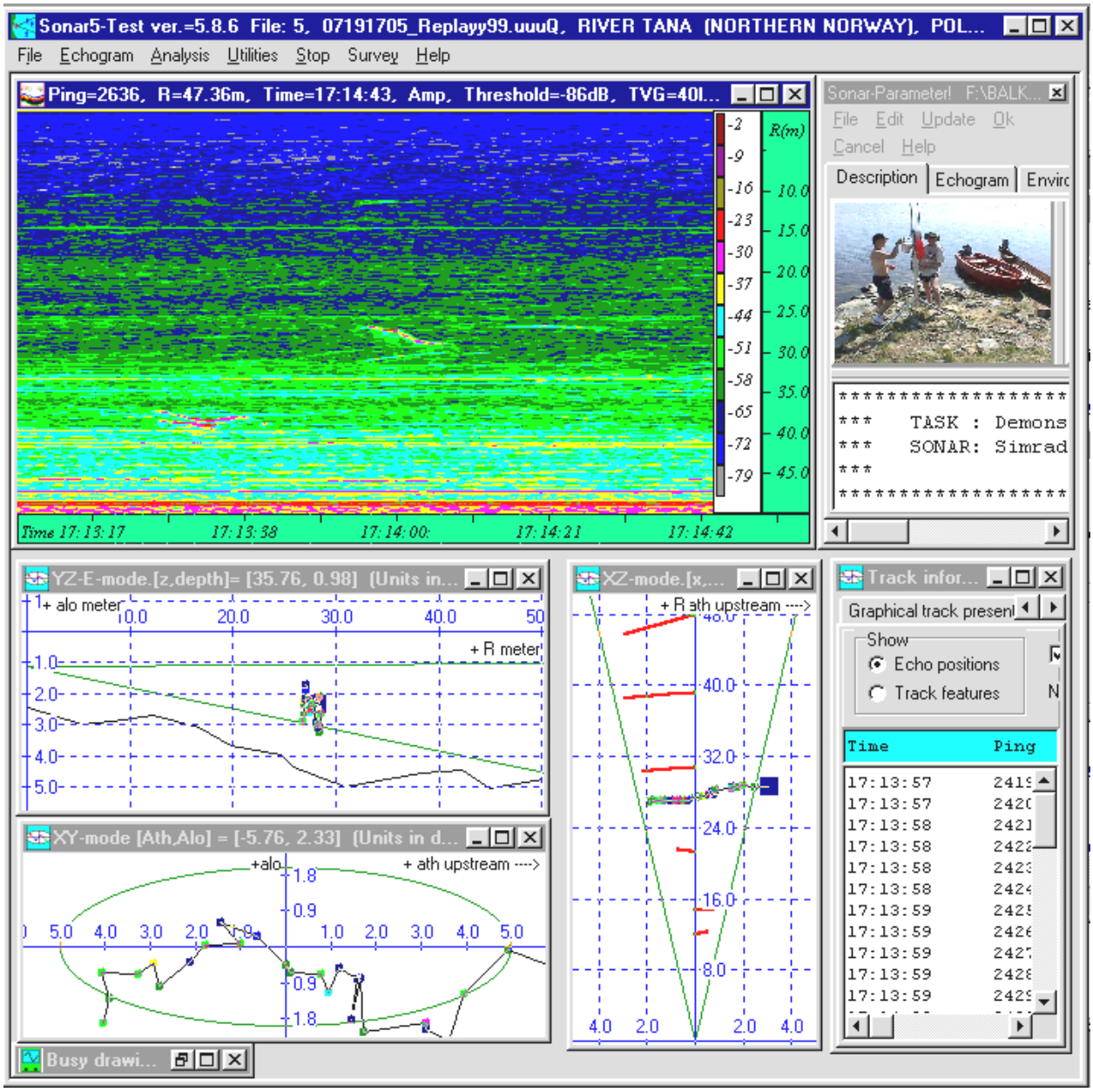
SonarX. Horizontal approach. Simple tracking setup with additional windows added from the Analysis->1-Setup menu (chapter 4 and 12). The track's exact positions relative to the bottom profile and the river surface is seen in the lower left position diagram. The position diagram in the lower center part display the sound beam as seen from a bird's view. Red lines indicate the direction and strength of the water current. The chart to the right can display all the tracks features as a function of time. At the moment the echo intensity is displayed. Stable TS values are seen within the -3 dB beam while erroneous off-axis compensation is observed outside the beam.



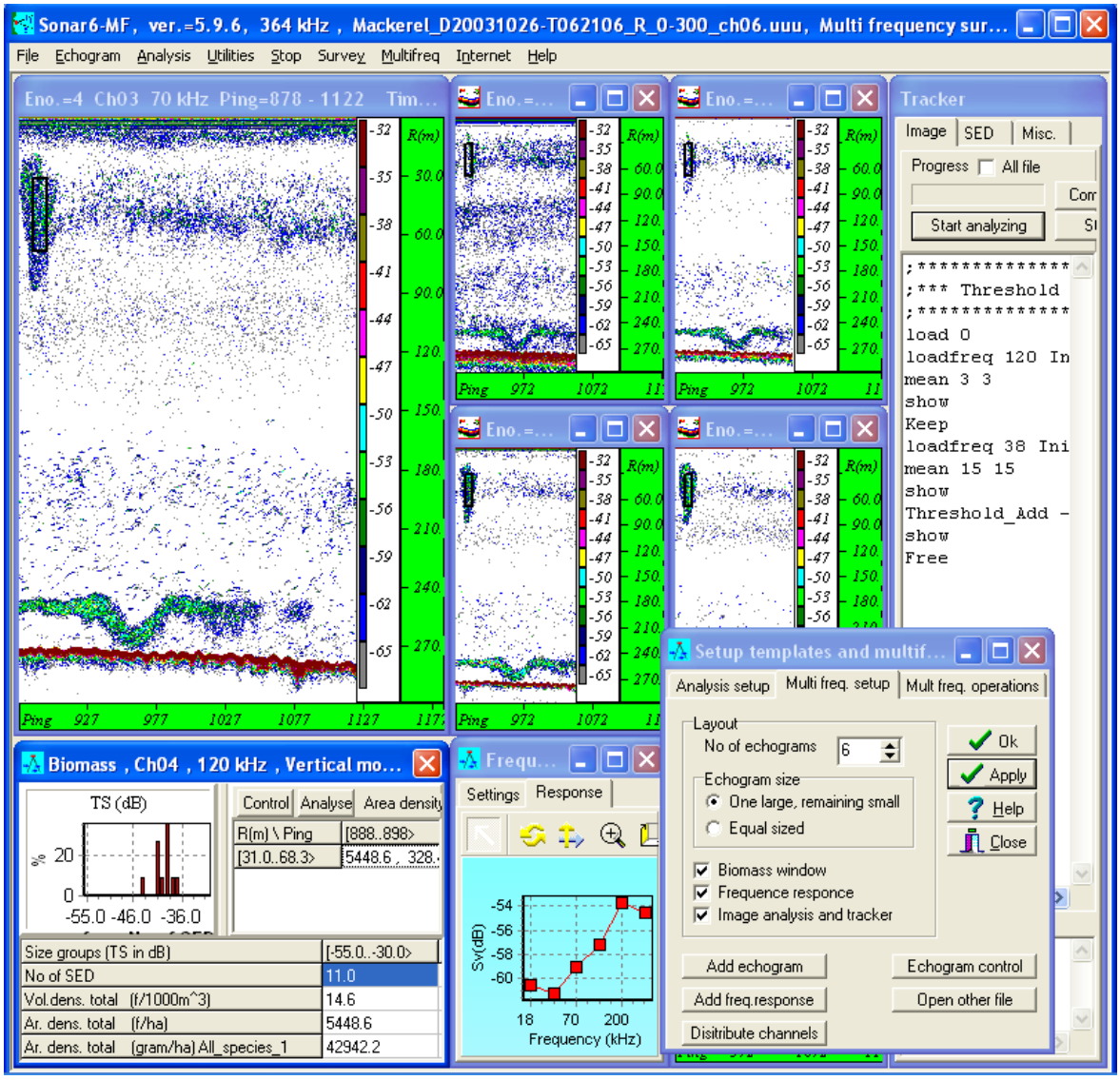
Sonar 5-Pro Setup for auto tracking as described in chapter 12. Here Echogram window in SED-display mode with Event lines, Tracker, Classification window, one position diagram and the advanced parameter dialog's description page.



Sonar 5-Pro. Study echoes in a layer with oscilloscopes (chapter 16) and the 3D-echograms (chapter 17)



Fish tracking in data from a horizontally aligned transducer in a river. The Amp echogram threshold has been set to presents the entire echo intensity in order to see background reverberation. In noisy environment the background reverberation gives important information for the interpretation of tracks. Three position-diagrams have been opened to study the tracks true position in the river relative to the bottom profile, relative to the water current and relative to the cross section of the beam. It is clearly seen that the track moves against the water current. The track info dialog in the lower right corner is set up to present the individual echo positions. The advanced parameter dialog opened at the description page is placed in the upper right corner to present pictures and text notes from the survey. Additional comments and notes can be added here during the analysis. The example file can be found in the folder: Balk_Lindem\Sonar demo files\Rivers\Tana of the installation CD.



Sonar5 set up to work with a 6 frequency recording of herring and mackerel. The Frequency response function indicates that the analyzed school is mackerel. Each echogram can be operated individually or linked to the other echograms so that zooming in one echogram zoom the other as well. One echogram can be filtered and subtracted from another with another frequency and echograms can be applied as thresholds to other echograms. Classification maps and RGB-echograms are available as well.

Acknowledgement

SonarX would not have been what it is today had it not been for the help from many different persons contributing with suggestions for new methods and improvements of existing tools, for help with testing and for providing test data.

First of all we want to thank dr. Jan Kubecka and his team and students at the Hydrobiological Institute, Academy of science of the Czech Republic, Ceske Budejovice. Without Dr. Kubecka and his team SonarX would never have have been what it is today.

Simrad AS with their staff has been of great help with theoretical and practical support. In particular, we will like to thank Frank R. Knudsen, Haakon Solli and Helge Bodholt for their assistance.

BioSonics, Sound Metrics Corp, MacArtneyAS, and HTI have been very helpful with the development answering questions and providing background documentations for theire echosounders and data formats.

An important milestone in the development was the inclusion of the Software Guided Analysis (SGA). This work was higly supported by dr. Lars Rudstam and the Study Group on Fisheries Acoustics in the Great Lakes.

Other people who have contributed significantly are Marc Schmidt from Landesfischereiverband Westfalen und Lippe e.V. (Ge), Georg Rakowitz from the University of Vienna (Au), Karl Øystein Gjelland at the institute of aquatic biology at the university in Tromsø Norway, Jan Kemper from the Organization for the Improvement of Inland Fisheries in Netherland.

Test data have been of great importance. We have recorded data and performed experiments in the field for years. Data from other scientists have, however, played an important role in the development. Some of these data are available on the SonarX CD. We will thank every one that has contributed. Especially we want to thank Jean Guillard and Nathalie Gaudreau (Ca), Dan Yule (US), Atso Romakkianemi (Fi), Juha Jurvelius (Fi), Pia Romare (Se)

Experiments in the field

What SonarX can do

Sonar5 has all the option. For Sonar4, tools related to standard biomass estimation and simple tracking are available.

Pre-analysis

- Single echo detection
- Bottom detection. (Enhanced with image analysis)
- Max range detection
- Dynamic sound speed and alpha correction
- Passive noise subtraction
- Heave correction
- Manual noise erasing tools
- Automatic noise reduction systems, unwanted target removal
- Water current detection

Analysis

- Biomasse estimation
- Tracking and tracing
- Macrophyte
- Track statistics
- Image analysis
- Multi frequency analysis
- Synchronized echograms with DIDON movies
- Export of bathymetric data

Data insight

- 3D-echogram
- Oscilloscope
- DIDSON movie player
- Frequency response function, classification maps and RGB echograms
- TS range distribution, Size distribution,
- Integrams
- SED detections versus off axis angle

Interpretation

- Fish database
- Catch data
- TS to weight and length calculator
- Track aspect TS correction
- De convolution for estimation of size when aspect is unknown
- Ray tracing for estimation of targets and beam in hor. app.

Presentation

- Transect maps
- Tracked echoes in all aspects
- Tracks relative to surface and bottom profile (horizontal app.)
- Tracks relative to water current (horizontal app.)
- Photos, drawings and maps
- Free threshold.
- Free color per dB scale
- Time, ping number, and range
- Geographical positions and sailed ship distance.
- Zoom in and out
- Layers: Pelagic, Bottom, Free number of sub layers and sub segments

Noise

- Manual and automatic noise removal systems
- Noise filtering
- Target noise separator.
- Track filtering
- Passive noise subtraction

Editors

- Noise editor
- Bottom editor
- Text editors (txt, rtf)
- Bottom profile editor
- Water current editor
- Graphical transducer positioning tools
- Event notes editor and browser

File overview and file opening

- Simple file open dialog presenting only filenames
- Advanced file open menu presenting filenames with record number, survey description, transect description, additional text description and photos.
- Graphical presentation of transects in digital maps.
- Opening of echograms at positions selected graphically from maps
- Quick file change functions.