
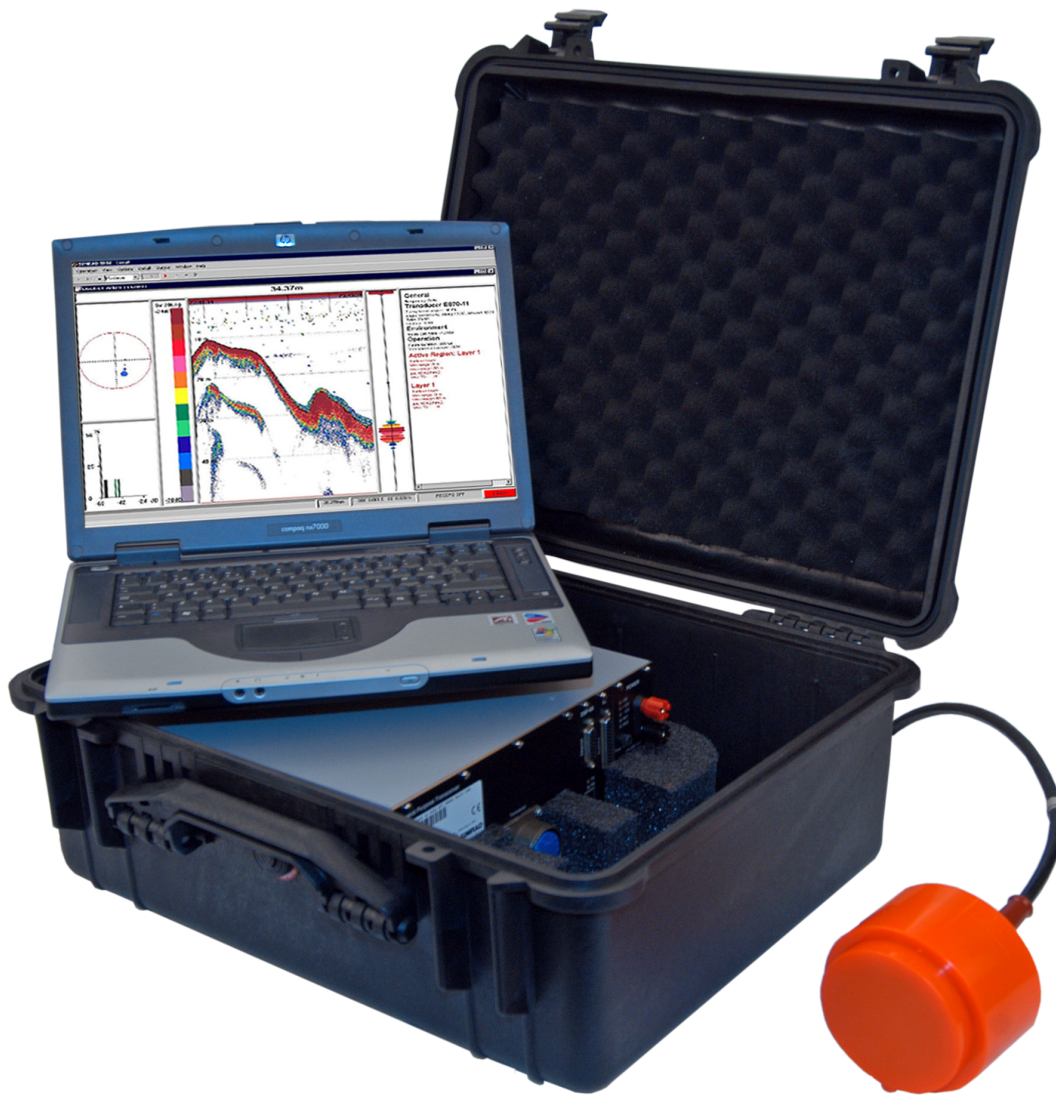


Simrad EY60

Portable scientific echo sounder

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- High dynamic range
 - Multi frequency application for species identification
 - Plug and play
 - All in one case
 - Built-in calibration
 - Remote control
 - Low self noise
 - High ping rate
 - Short pulse length offers high vertical resolution
 - Raw data recording
 - Application specific third party post-processing software available
 - Store and reload of personal settings



Description

The portable Simrad EY60 is specifically designed for scientific applications related to fresh water surveys in lakes and rivers. Put to use with third part post-processing software, the EY60 provides biologists, scientists and technicians with a robust and reliable biomass assessment and fish tracking tool.

The portable Simrad EY60 can be delivered in a rugged transport case. The transceiver, a portable computer and a transducer are then provided for easy setup and transportation. The only external connection required is AC or DC power. In the field, many users simply connect the EY60 system to a car battery.

You can choose from a large range of small and highly efficient composite split-beam transducers. Simrad's transducers are particularly suitable

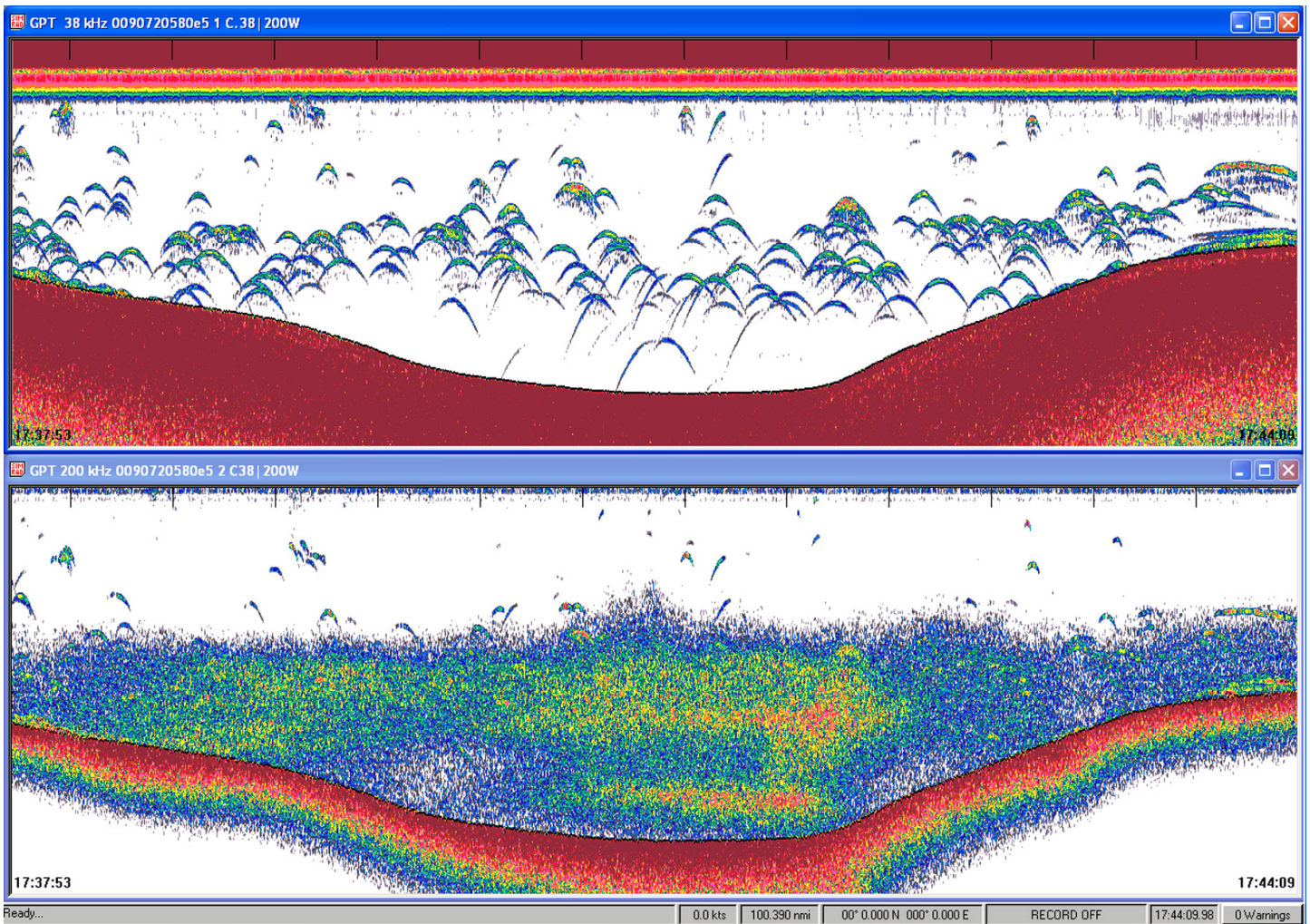
in shallow water environments due to their low sidelobes. This is an important feature, since reflection of sidelobes from the surface and the bottom is a common problem in shallow water surveys. Several operational frequencies are available depending on the operational requirements related to depth and range.

Multiplexing

With the multiplexer two transducers using the same frequency can be connected to the same transceiver. A typical application is mobile surveys in lakes with one transducer pointing vertically, and the other horizontally. With this setup you can cover the entire water column from the surface and down to the bottom.

Wireless control and data transfer

Many scientists, both in freshwater and marine environments, have chosen a wireless solution for data transfer and echo sounder control. Commercially available communication devices are then put to use. Once the echo sounder and transducer(s) are mounted and the communication has been established, you can conduct an entire survey from your office.



This screen capture shows the echogram from a dual frequency Simrad EY60 echo sounder monitoring the habitat in a lake. Observe the nature of the echoes from the two frequencies, and how fish and zooplankton can be distinguished.

The Simrad EY60 is based on more than 60 years of experience

The Simrad EY60 Portable scientific echo sounder combines well proven electronic hardware with a commercial laptop computer running the Windows 7 operating system. The echo sounder software is the same as used in the Simrad EK60 scientific echo sounder for marine research. The Simrad EY60 offers facilities for accurate echo sounding, data storage, data analysis and reporting results. All main communication is made using Ethernet lines. This provides installation flexibility, and allows for easy access to the data provided – even for multiple simultaneous users.

The EY60 provides an instantaneous dynamic range of more than 150 dB. Combined with a very low self noise and unlimited range compensation (TVG), this ensures correct measurements

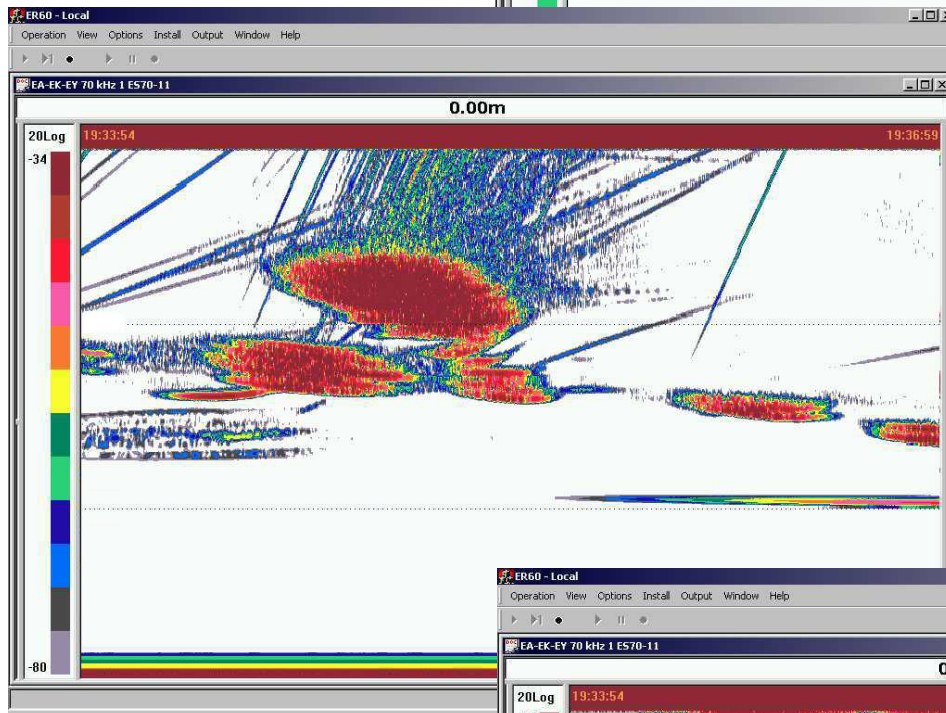
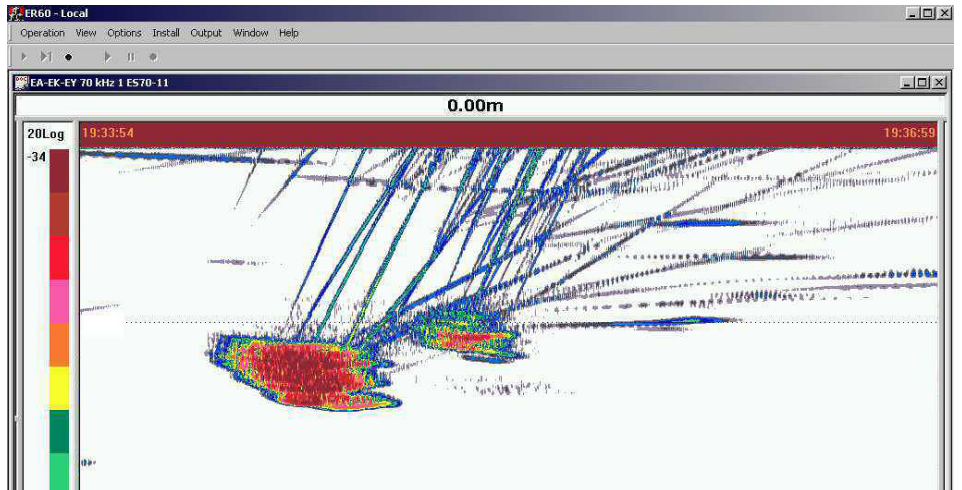
of all targets, from zooplankton to a dense school of fish. In a maximized configuration, the EY60 can operate seven frequencies simultaneously for comparisons of fish reflectivity in the frequency range from 18 to 333 kHz. An important feature of the EY60 is its ability to observe the horizontal position of individual fish within the sound beam, enabling the scientist observes fish behaviour. Various types of processed data and sample data can be stored on the hard disk of the control processor.

With the EY60 you have full freedom in investigating the target strength from the echoes, this is possible both on-line and off-line. The split-beam transducer will find the position of individual targets in the transducer beam, compensate for the beam pattern, and calculate corrected

target strength values. The unique receiver concept combined with floating point arithmetic provides an echo integrator with virtually unlimited dynamic range. Saturation with resulting under estimation never happens in the EY60. Integration of echo levels are performed in surface or bottom locked layers, with individual parameter settings for each layer.

Bottom mounted transducers

Bottom mounted transducers are ideally suited for studies of the natural behaviour of undisturbed fish. Interesting information can be obtained on vertical distribution, swimming activity and even physiology.



These three echograms show echoes from patches of fish ascending towards the surface of a lake at dusk. The blue lines between the fish and the surface are echoes from gas bubbles released from the swimbladders.

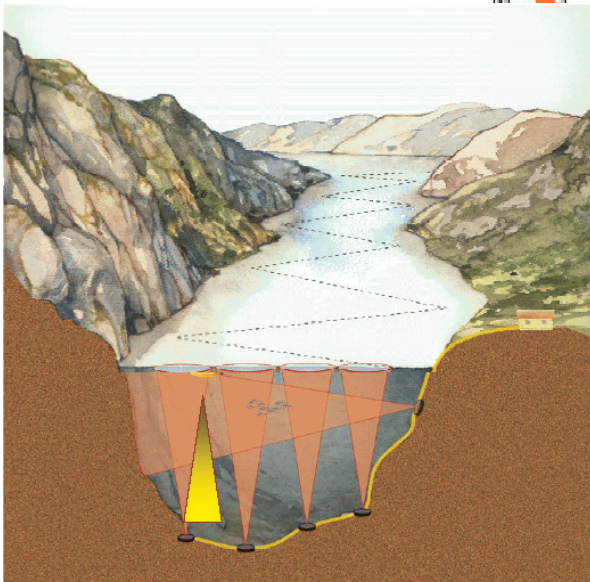
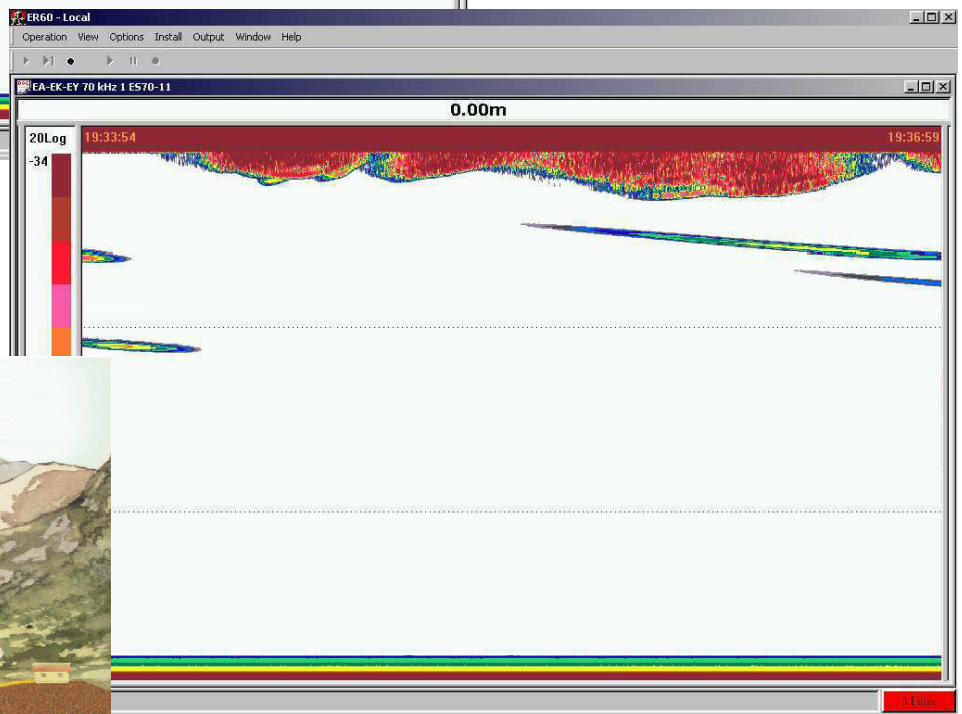
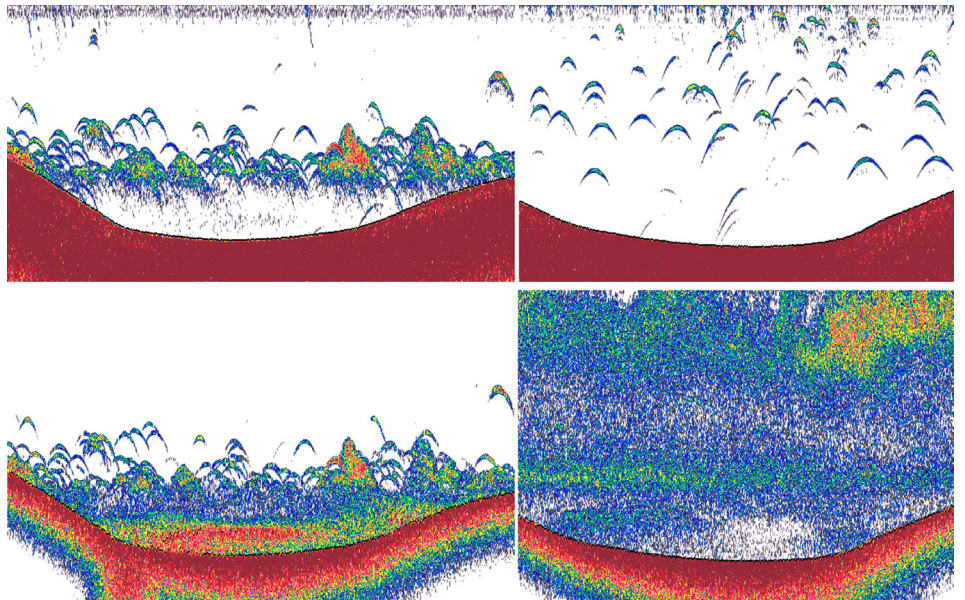


Illustration of the an acoustic fence in the Ofoten Fjord in Norway.

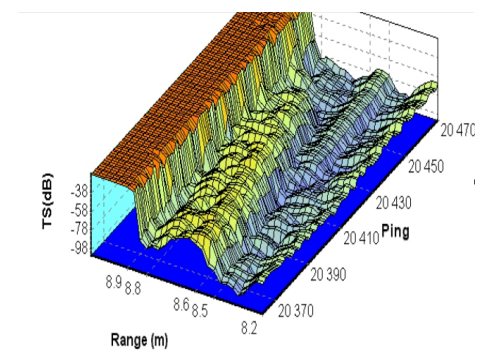
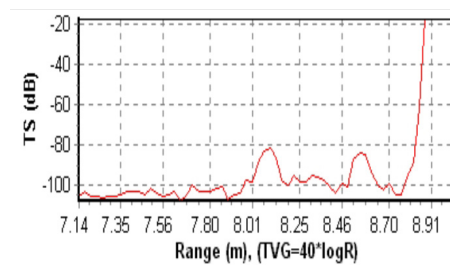
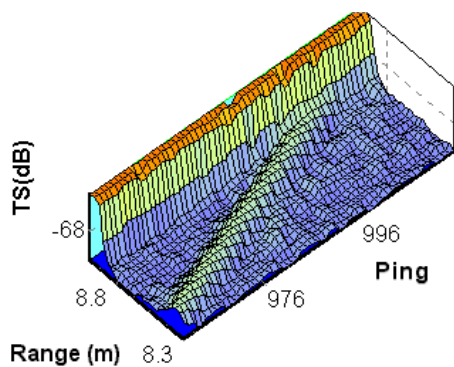
The illustration is used with kind permission from the Institute of Marine Research (IMR), Norway.

Raw data post-processing

The raw data format used by the Simrad EY60 to store echo data is available to end users and to third party software developers. The format was developed in close cooperation with the scientific community, and it has been accepted as a de facto world standard. Some customers have chosen to develop their own post-processing utilities. While most users prefer to buy commercially available applications, Simrad can upon request include the data processing system of your choice.



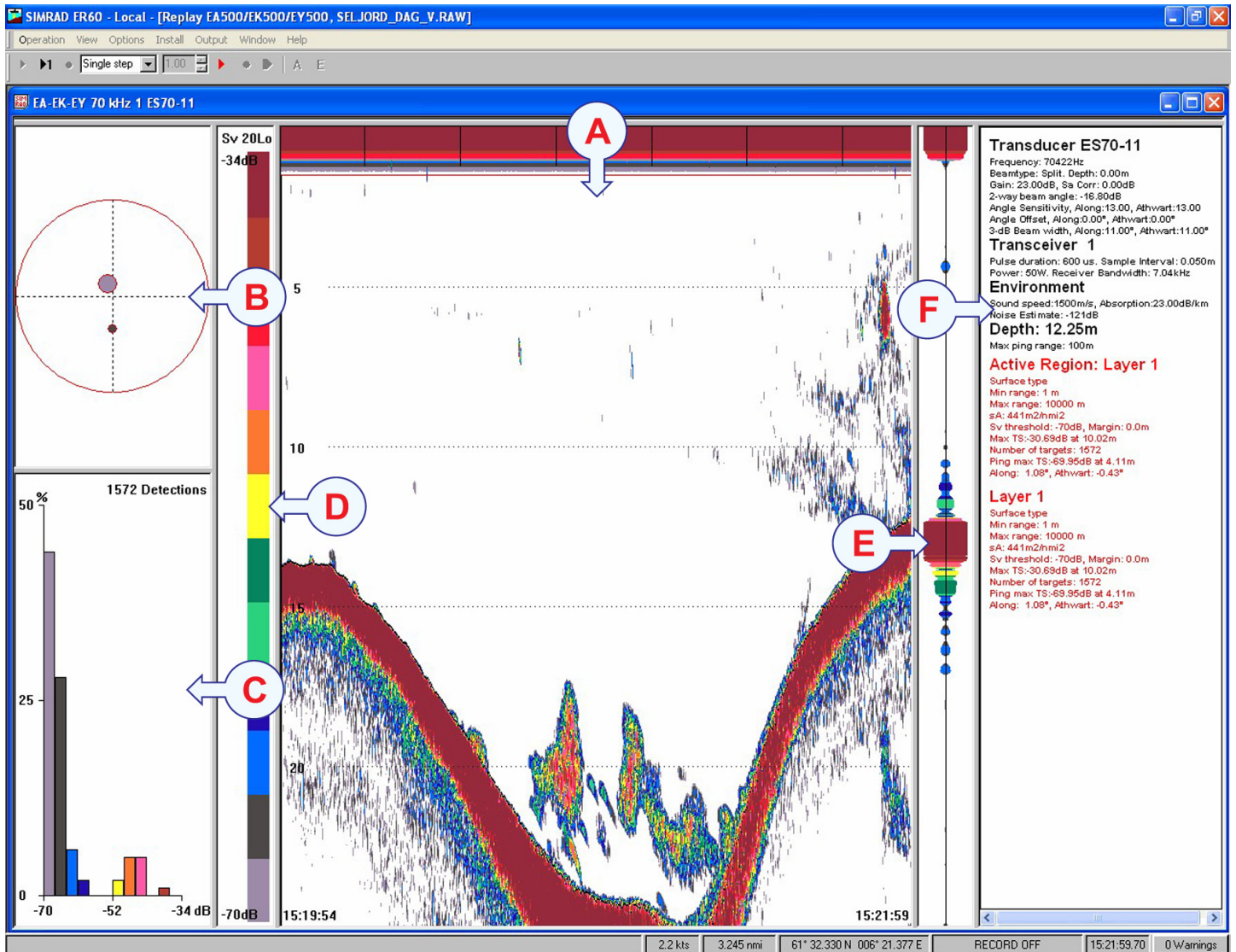
Screen captures from the Simrad EY60 showing vertical soundings made during daytime and nighttime using 38 kHz (left) and 200 kHz (right) transducers



3D echogram presentations using the Sonar5 post-processing application

Key operational specifications

- Operational frequency: 18, 38, 70, 120, 200 and 333 kHz
- Operation modes: Active, Passive, Test
- Transmission power: Adjustable in steps
- Max power: Depends on frequency and transducer, typically 1 kW using split-beam transducer
- Pulse duration: Depends on frequency, ranges from 64 to 8192 μ S
- Max ping rate: 20 ping/sec
- Data collection range: 0 to 15000 m
- Receiver instantaneous dynamic range: 150 dB
- Receiver filtering: Matched digital filters
- Receiver noise figure: 4 dB
- Split beam: Complex digital demodulation
- Synchronization: Internal and external



Presentation features

A Echogram

This is a high performance, multi-frequency, long range fish finder with a large dynamic range. It offers single fish detection at more than 500 m range. It has an unlimited number of user-defined layers with analysis of biomass and target strength.

B Single target position

This field gives you detailed information about single fish.

C Single target histogram

This field offers an analysis of fish size distribution presented in a histogram.

D Colour scale

This field visualizes the mapping of echo strength into one out of 12 colours, light blue for weak signals and dark brown for strong signals.

E Scope

This field shows you the echo from ping to ping. It is a useful presentation during calibration and detailed studies of fish echoes.

F Numerical

This field offers general information on frequency used, pulse duration and output power. It also includes information about layer settings, threshold, integrator values, etc.



Applications

The Simrad EY60 portable scientific echo sounder system is readily available for a large number of various applications.

Hydropower dams

Fish protection at hydropower dams is critical. Continuous online information about the presence and behaviour of fish is needed to take necessary actions for fish protection. With the Simrad EY60 a single or dual channel single beam system can be used to monitor fish approaching water inlets.

River surveys

By employing one or more horizontally oriented split-beam transducers across a river course, the Simrad EY60 can be used to monitor fish migration. Due to the compact size and

portability, a complete scientific system is easy to transport. Using battery power with or without a small power generator the EY60 can also be efficient in remote areas.

Traditional lake surveys

The split-beam transducers provided with the Simrad EY60 offer accurate results, and it has a proven track record with more than 1000 systems sold world wide. The EY60 is widely used to establish the size of fish stocks, study fish behavior, and investigate other features of the water column.

Habitat mapping

Habitat protection is critical for preservation of fish communities in many areas. The Simrad EY60 can

monitor the distribution of vegetation and determine the height of the marine growth. In combination with actual sampling a vegetation biomass index can be established.

Environmental monitoring

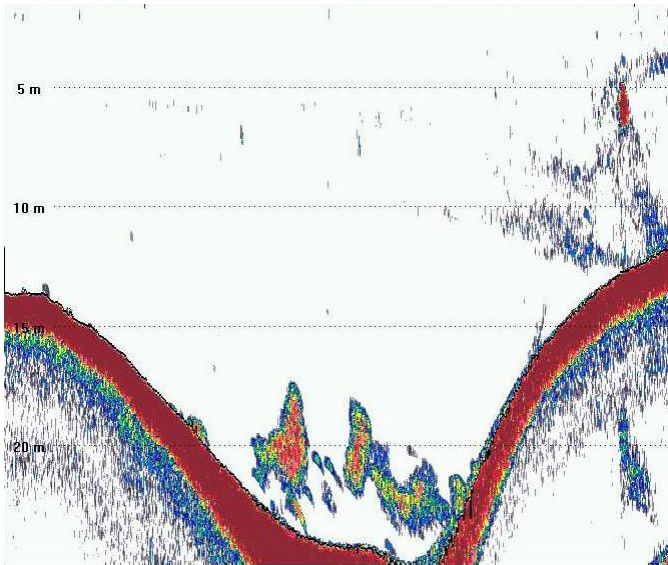
The Simrad EY60 transceiver can be adapted to fit into subsea containers. Such containers are placed at the sea floor or in the water column for long term ecosystem monitoring. The transceiver can also be fitted on other non-conventional platforms such as autonomous underwater vehicles and towed arrays.

Small in size, but large in results

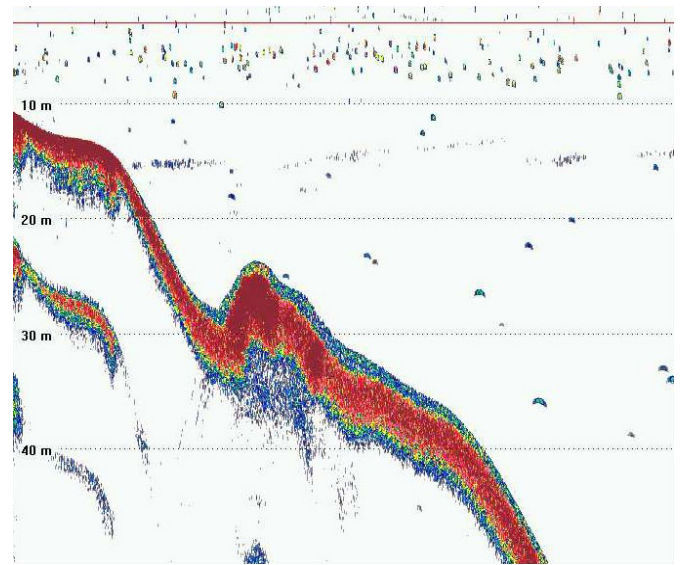
Conducting scientific surveys in lakes and rivers may frequently offer various challenges related to equipment. Makeshift solutions are often the rule, but will still be the best solutions. Even a small boat can be used to conduct a survey with the Simrad EY60.



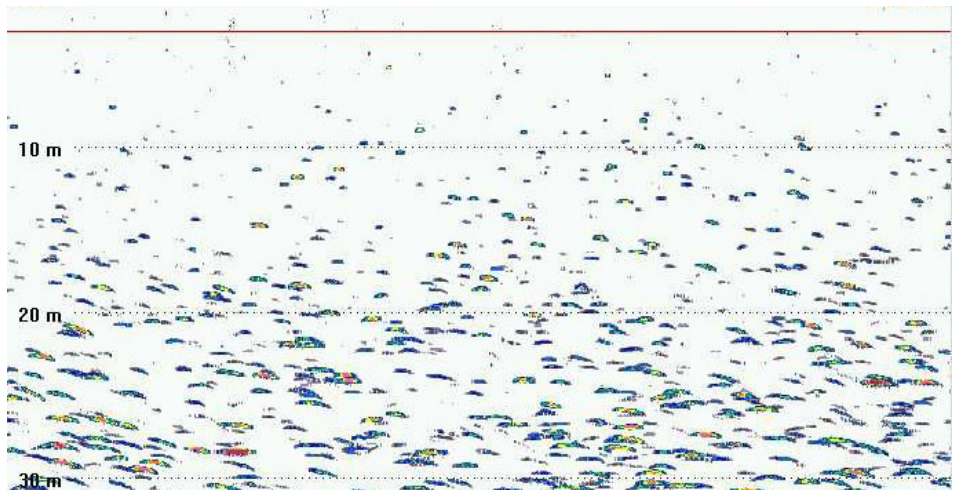
Freshwater “research vessel” with makeshift transducer mount



Daytime fish distribution using a vertical beam from a transducer mounted on a small boat



Night time fish distribution using a vertical beam from a transducer mounted on a small boat



Fish close to the surface detected by horizontal beaming at night. The transducer is here mounted on a makeshift aluminum rack transported in rugsacks and assembled on the survey site

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