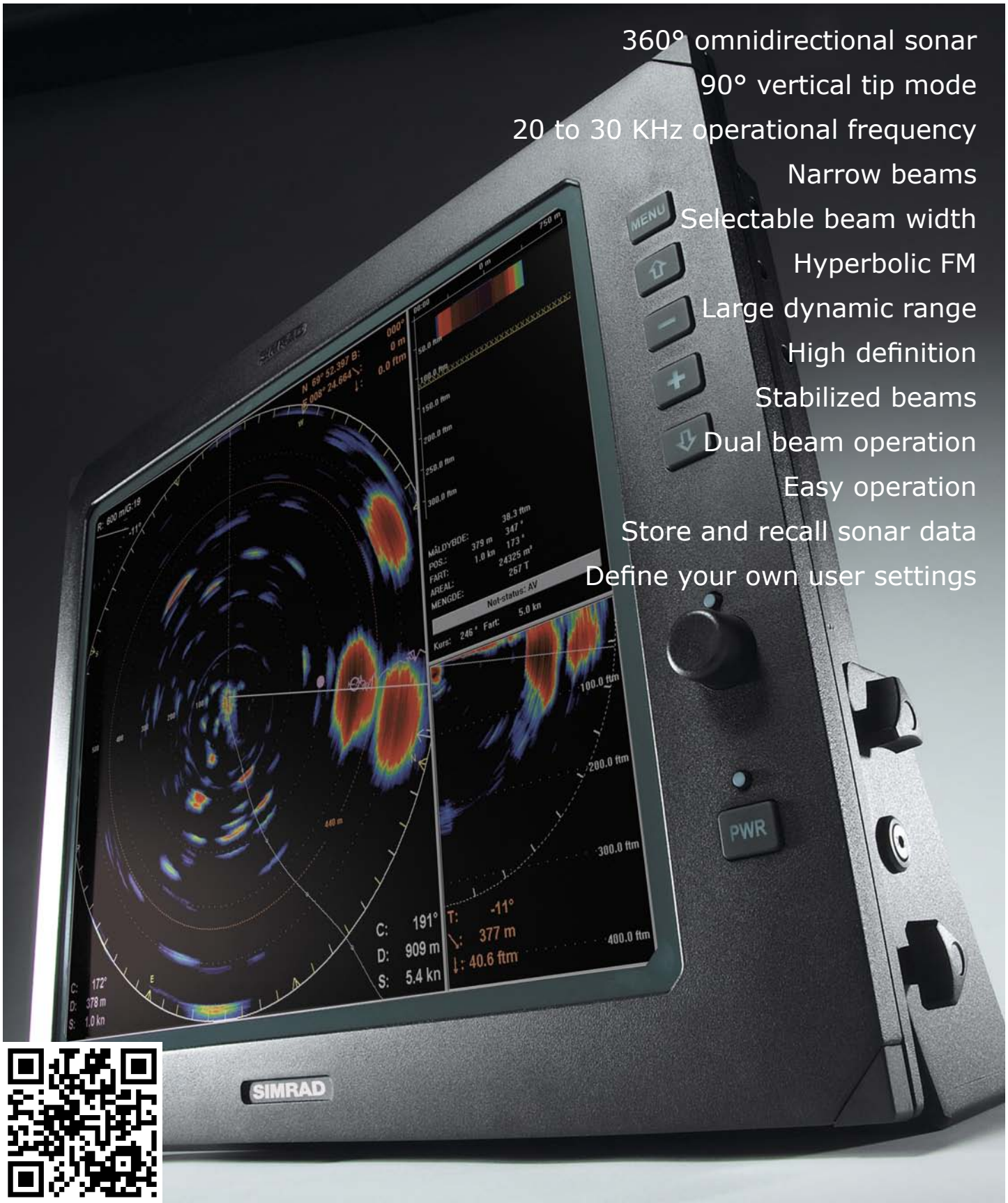
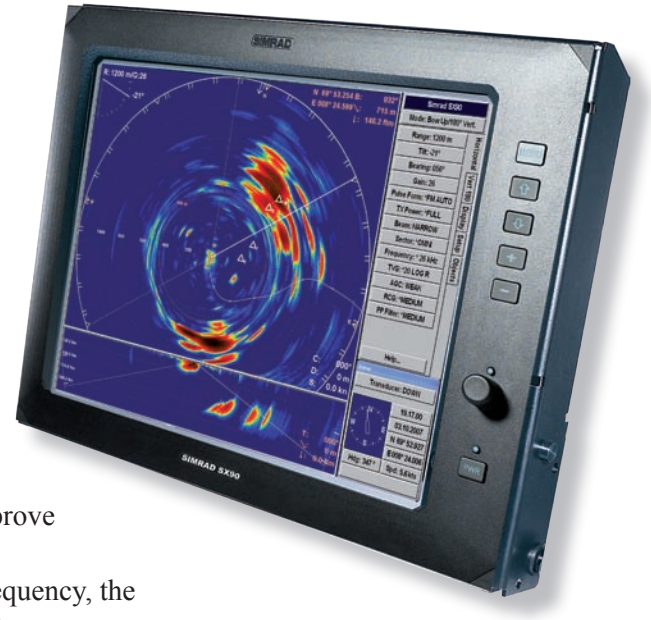
Simrad SX90

Long range high definition sonar system



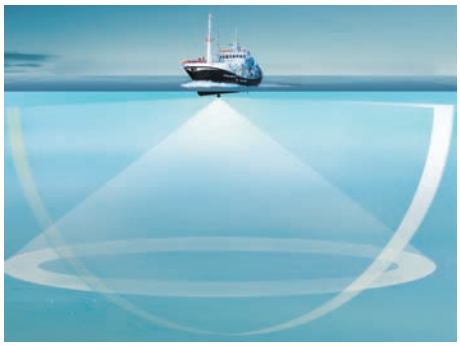
- 360° omnidirectional sonar
- 90° vertical tip mode
- 20 to 30 KHz operational frequency
- Narrow beams
- Selectable beam width
- Hyperbolic FM
- Large dynamic range
- High definition
- Stabilized beams
- Dual beam operation
- Easy operation
- Store and recall sonar data
- Define your own user settings

Longer range with better resolution - same high resolution on all operative ranges



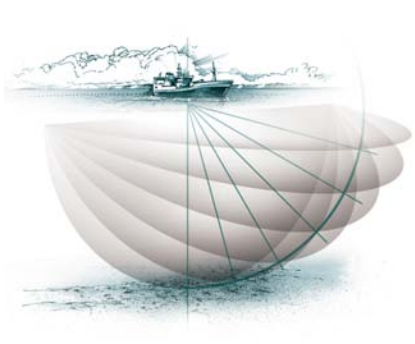
The Simrad SX90 is a low frequency, high-definition; long range sonar, designed for vessels where long detection range is important.

- Eleven user selectable frequencies from 20 to 30 kHz prevents interference from other vessels.
- Fast moving objects like mackerel and tuna are detected further away than with CW (continues wave) using the Hyperbolic FM mode.
- In areas with hard bottom, longer detection range is accomplished by combining a narrow transmitter beam with a special designed narrow receiver beam. This removes most of the disturbing bottom echoes from the side lobes, commonly seen on other sonar models.
- The receiver's wide dynamic range easily identifies schools with different densities. It also separates hard from soft bottom.
- Selectable Narrow, Medium and Wide beamwidths tied in with long, medium and short range settings improve close range detection.
- At 30 kHz operating frequency, the beam width is only 6.7°.
- A new 180° vertical view tiltable down to 90° is specially designed for pelagic trawlers.
- New and faster full circle beam stabilization ensures better fish detection in poor weather and/or when fishing close to the surface.
- The long range and higher definition of the SX90 improves your catching abilities, and helps you to make better use of your time at sea.



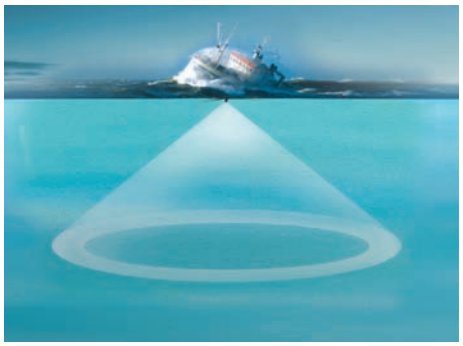
Horizontal and vertical beams

The combination of vertical and horizontal presentations show you the schools of fish both from above and from the side at the same time. It is not necessary to go over the target to see the vertical distribution on the echo sounder.



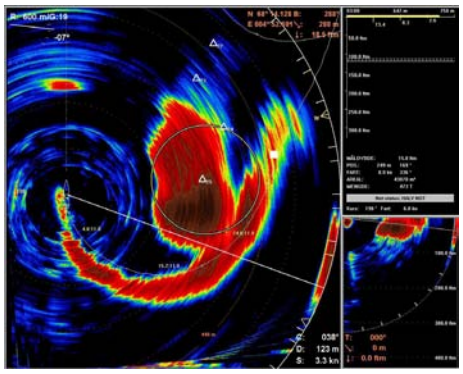
Bow up/180° vertical

The vertical slice is made "tippable", and by selecting a 60° tip angle (or less), a full 180° coverage is obtained. The tip angle can be adjusted from +10 to -90°. This mode is ideal when you are trawling for fish on deep water.



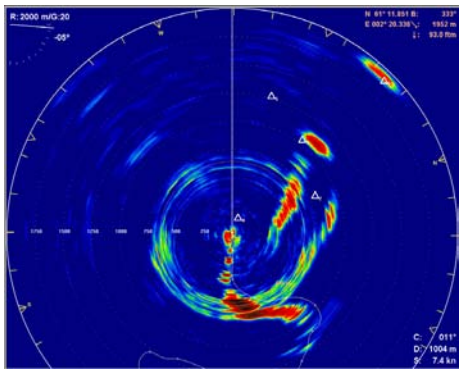
Beam stabilization

When the beam stabilizer is activated, both the horizontal and vertical beams are electronically stabilized for roll and pitch. The full circle beam stays on the target independent of the vessel movement, even in rough seas.



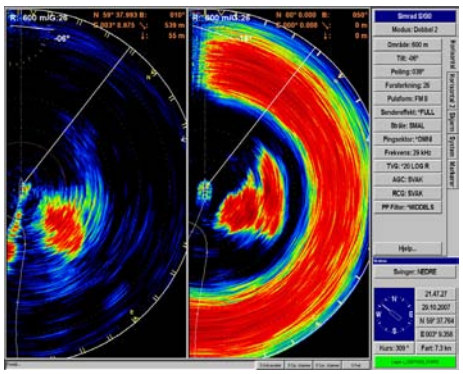
Off center presentation

Offset the vessel to any screen position and enlarge the echoes for more detailed information.



Full screen presentation

In full screen presentation, the echo presentation will be extended to cover the entire display area.



"Two sonars in one"

In the dual mode, each sonar presentation can be set up as if you were using two different sonars simultanously. Individual frequencies, tilt angles, ranges, gain and filters can be used.

Operating panel

A dedicated operating panel provides fast and easy access to the most frequently used functions.

A Main switch: Power the sonar on (and off), lower the transducer

B Symbol: Control the target markers providing exact latitude and longitude positioning.

C Mode: Select your favourite display mode or user setting with the push on a button.

D Gain: Separate gain control for vertical and horizontal sonar presentation.

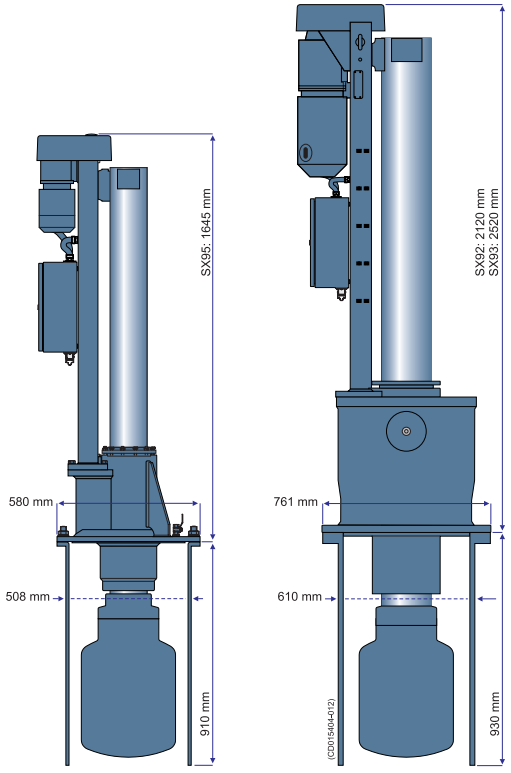
E Range: Separate range control for vertical and horizontal sonar presentation.

F Cursor: Menu and cursor control.

G Tilt: Easy control of the sonar's tilt angle, or start automatic search program.

H Various: Store interesting screen captures, and zoom in on details.

I Train: Manual control of beam training, start automatic search and tracking programs.



Hull units

Three hull units are available:

- **SX92** will extend the transducer 1200 mm. Maximum speed with transducer lowered is 24 knots.
- **SX93** will extend the transducer 1600 mm. Maximum speed with transducer lowered is 20 knots.
- **SX95** will extend the transducer 1000 mm. Maximum speed with transducer lowered is 12 knots.

The Simrad SX90 sonar uses the ultimate of modern technology to detect targets under difficult conditions.

360° Omnidirectional sonar

The SX90 transmits a narrow vertical beam 360° around the vessel. The horizontal resolution is as narrow as 8.5° making sharp edges around the school during evaluation of different targets.

90° Vertical Tip

This a new feature on our sonars. We transmit a narrow forward-looking fan-shaped 180° wide beam. The fan beam can be tilted from +10° and down to -90°. This feature is specially designed for pelagic trawlers.

20 to 30 kHz

The SX90 sonar can operate on 11 different frequencies from 20 to 30 kHz. Lower frequency give less absorption and wider beam for long range in deep water, where range is limited by salinity. The higher frequencies provide narrower beams for use in shallow waters were range is limited by reverberation. You will also avoid interference from other sonars in the area

Narrow sound beams

Unlike other sonars, the SX90 both transmits and receives with narrow beams. Narrow beams are important in order to avoid false unwanted echoes from bottom and surface, this limits the detection range. At 30 kHz the transmit beam is only 6.7° wide. The receiver beam is only 7.4°.

Selectable beam width

With a narrow beam you continuously need to operate the tilt to keep the beam on the school. During the busy catching time, two wider vertical beams can automatically be selected. Target tracking is then made less dependent on the tilt angle.

Hyperbolic FM

This is another unique Simrad feature. The SX90 sonar transmits a long pulse with a continuously variable frequency. The receiver listens for an echo with the same frequency variations. Echoes with different frequency signatures are vastly reduced. The actual fish echoes are enhanced, and fish detection is made easier under difficult conditions. Hyperbolic FM gives you 30 times better range resolution than common CW transmissions.

Large dynamic range

Picking the right school is important. Dynamic range means that you can tell the difference between a scattered school providing a weaker echo, and a dense school giving a stronger echo. Looking at the bottom echo, you can easily tell smooth from rough bottom. This is important when purse seining in shallow water, and during pelagic trawling where the footrope can touch the bottom.

Stabilized beams

The SX90 sonar is vertically stabilized evenly 360° around the ship, both for the horizontal as well as the vertical beams. The stabilized sonar beams enhance fish detection in poor weather making searching still possible in situations you earlier gave up.

Dual mode

Conditions may sometimes change very quickly even within a few hours. With the dual mode feature you can set up two different sonar pictures on the monitor. One picture shows your normal settings, while the other is used to test new settings, filters, modes, pulse lengths, frequencies, tilt and other parameters in order to achieve better performance. If you find better setting, you save the new one settings as a new personal setting.

Store and Recall

The SX90 sonar can store display presentations manually or automatically, and you can recall these later for further studies. All the pictures in this document are screen captures from actual situations on the fishing grounds from vessels already using the SX90 sonar.

User settings

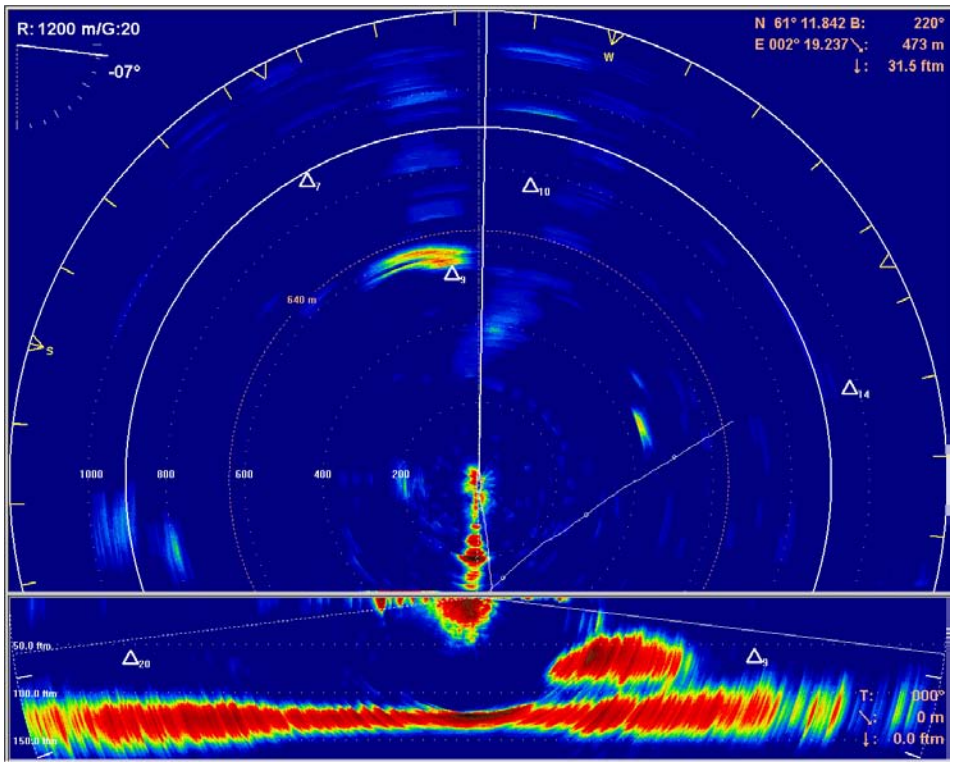
The sonar can store an unlimited number of user settings for different fishing conditions and different operators. Sonar settings are often personal, and most captains have favorite settings for different types of fishing, species, time of day etc. On the SX90 you can have your favorite settings stored and named just as you like.

Noise filter

The noise filter will suppress propeller noise, interference from other acoustic systems on your own vessel or on other vessels near by.

Mackerel detection

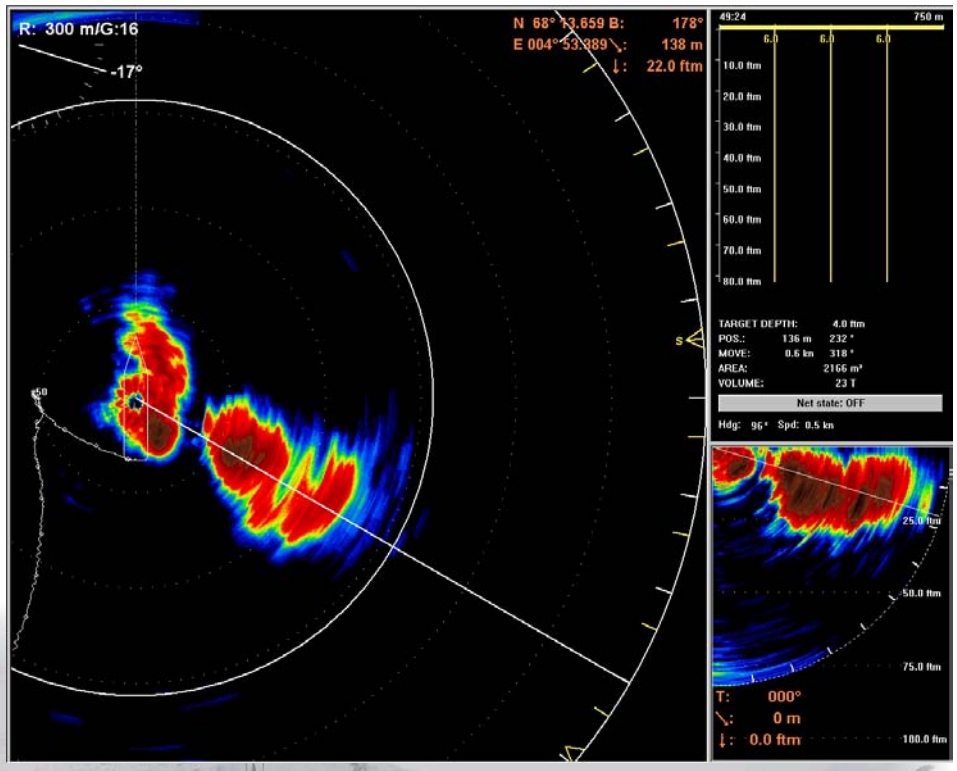
The school of mackerel is dead ahead of the vessel. It can not bee seen in the horizontal view, only in the vertical view. The tilt indicator shown in the vertical picture tells you that you need more tilt in order to see the school in the horizontal view. The school is clearly shown in the vertical view at about 200 meter away from the vessel. The vertical view is primary used to measure the depth of the school. This view is provided so you do not need to sail directly over the school. This would scatter the fish, and break up the school in several smaller parts. The vertical view thus makes it easier to catch the fish. Operational frequency is 30 kHz using Hyperbolic FM transmission.

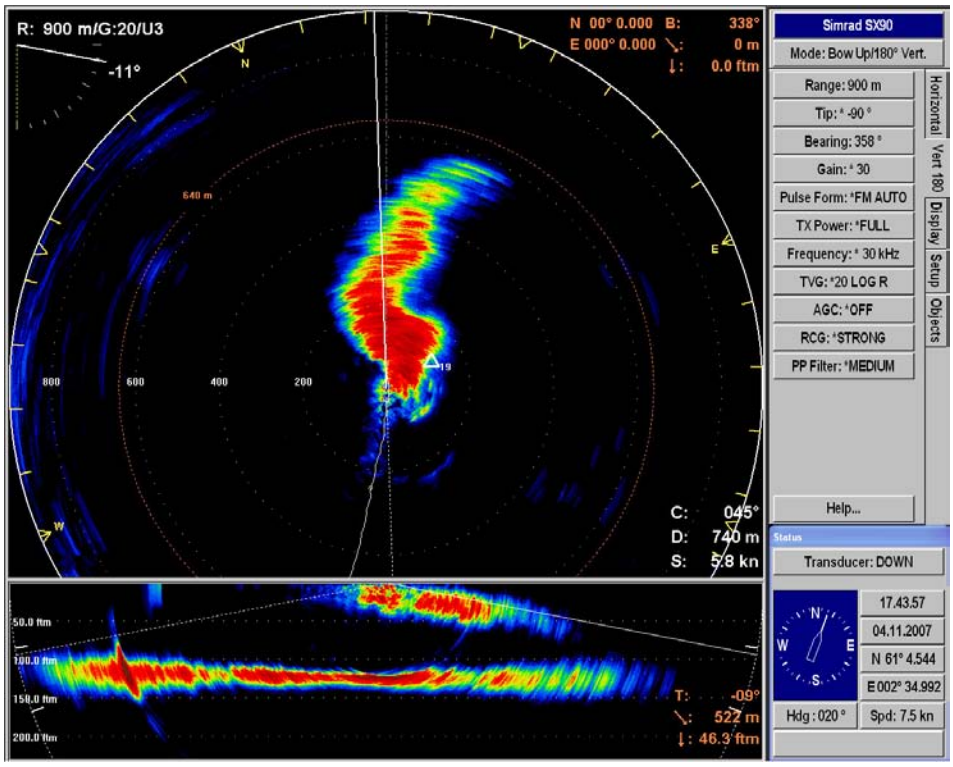


Looking into the seine

"Off centre" mode is selected to obtain better resolution in the direction of the school in horizontal and vertical views.

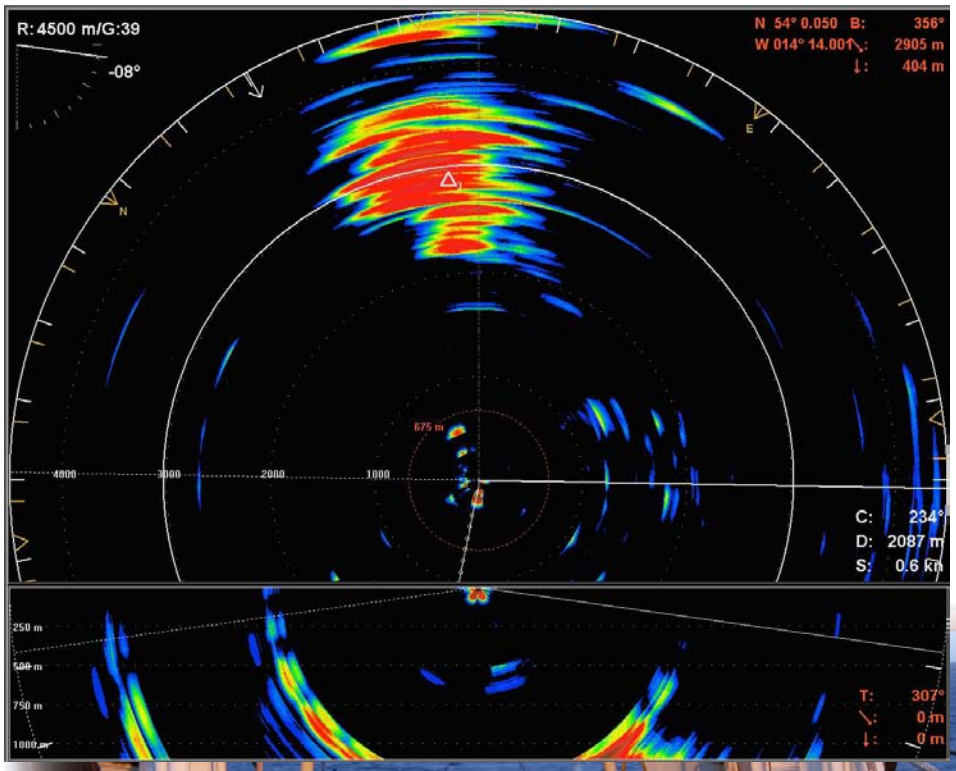
The SX90 has a superb short range detection. In this screen capture the sonar is operated with a 300 meters range setting, and the fish is no more than 50 meters from the vessel, as clearly seen in both the horizontal and the vertical presentation. In the top right hand corner all PI depth sensors are fully marked down to 80 fathoms.





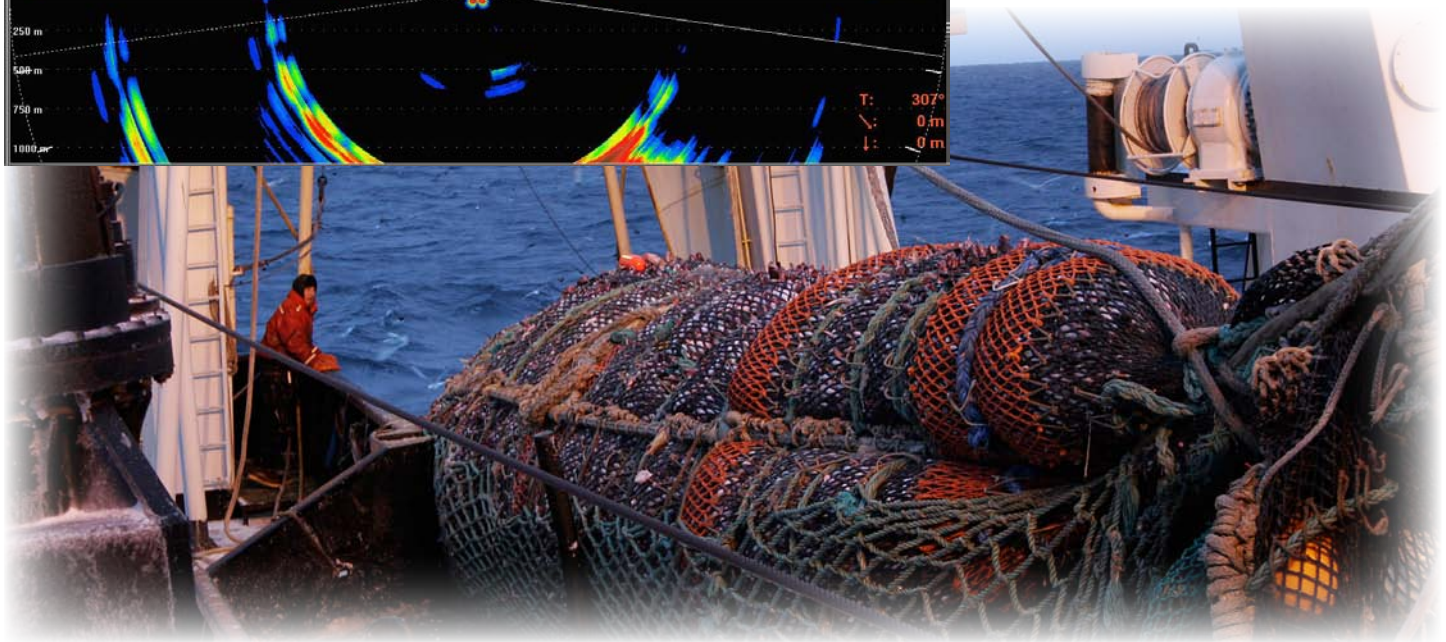
Scattered mackerel detection

The SX90 sonar is operated at 30 kHz. This upper frequency is selected because it will provide the narrowest beam. At 30 kHz, no other sonars can interfer with the performance of this sonar, even with mulitple similar sonars were operating in the area. The mackerel can be seen as a long “stripe of fish” ahead of the vessel in both horizontal and vertical views. The water depth is 100 meter, and the echo from a pipe line can be seen in the vertical presentation behind the vessel.



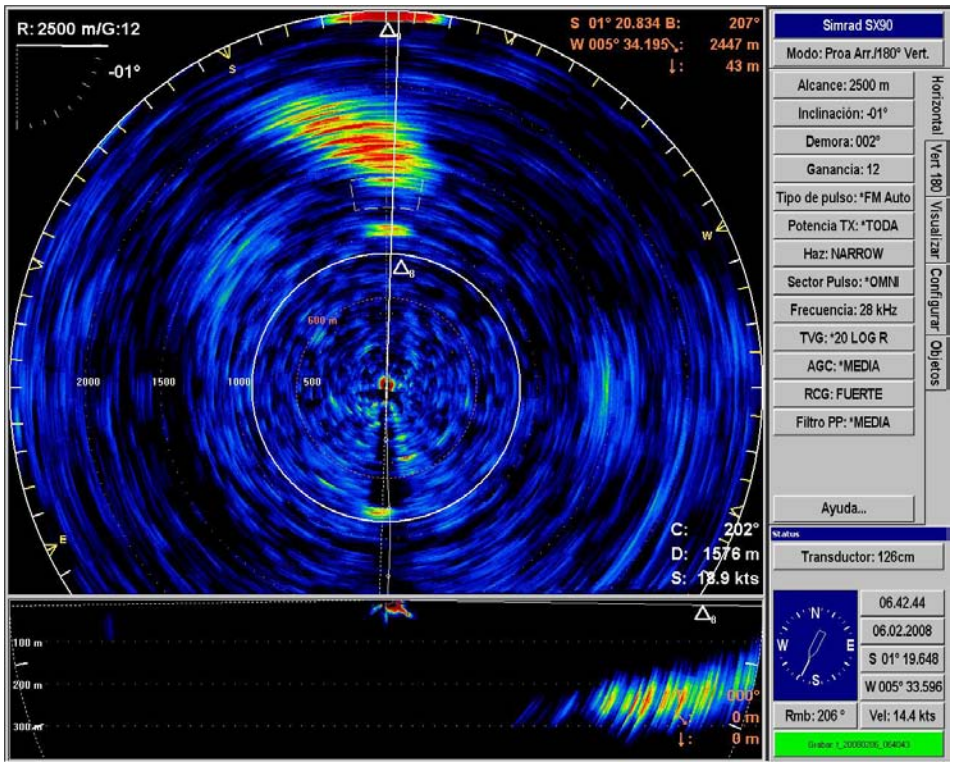
Blue Whiting

This screen captures shows how the SX90 has detected a school of Blue Whiting. The range is set 4500 meters, and the sonar detects the Blue Whiting all the way out to the end of the range.



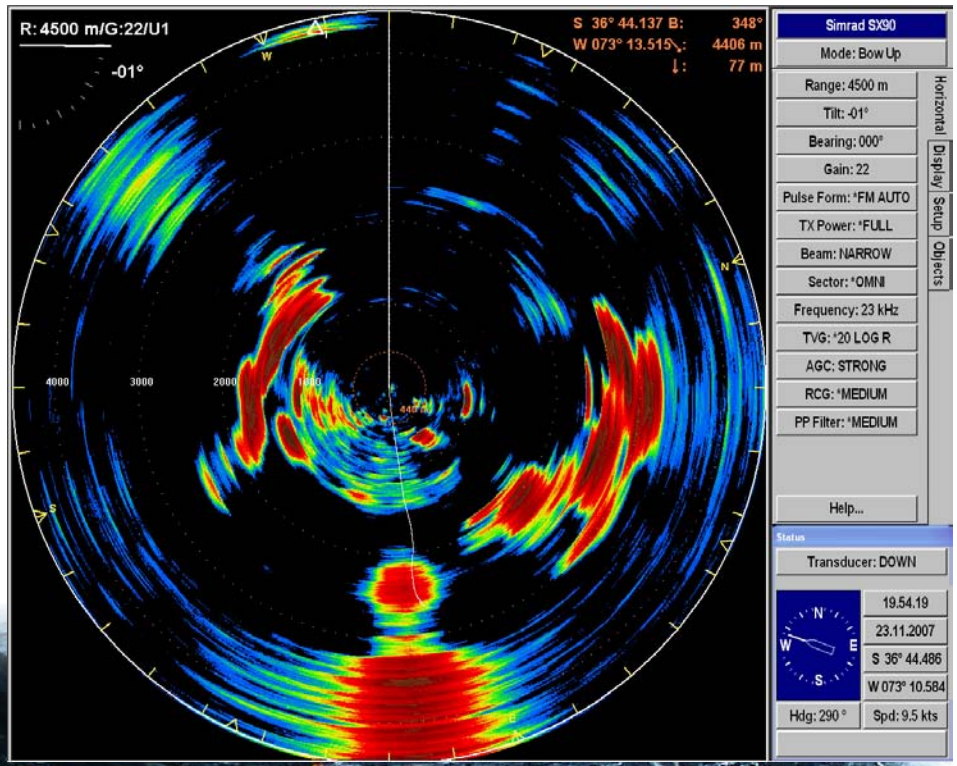
Tuna

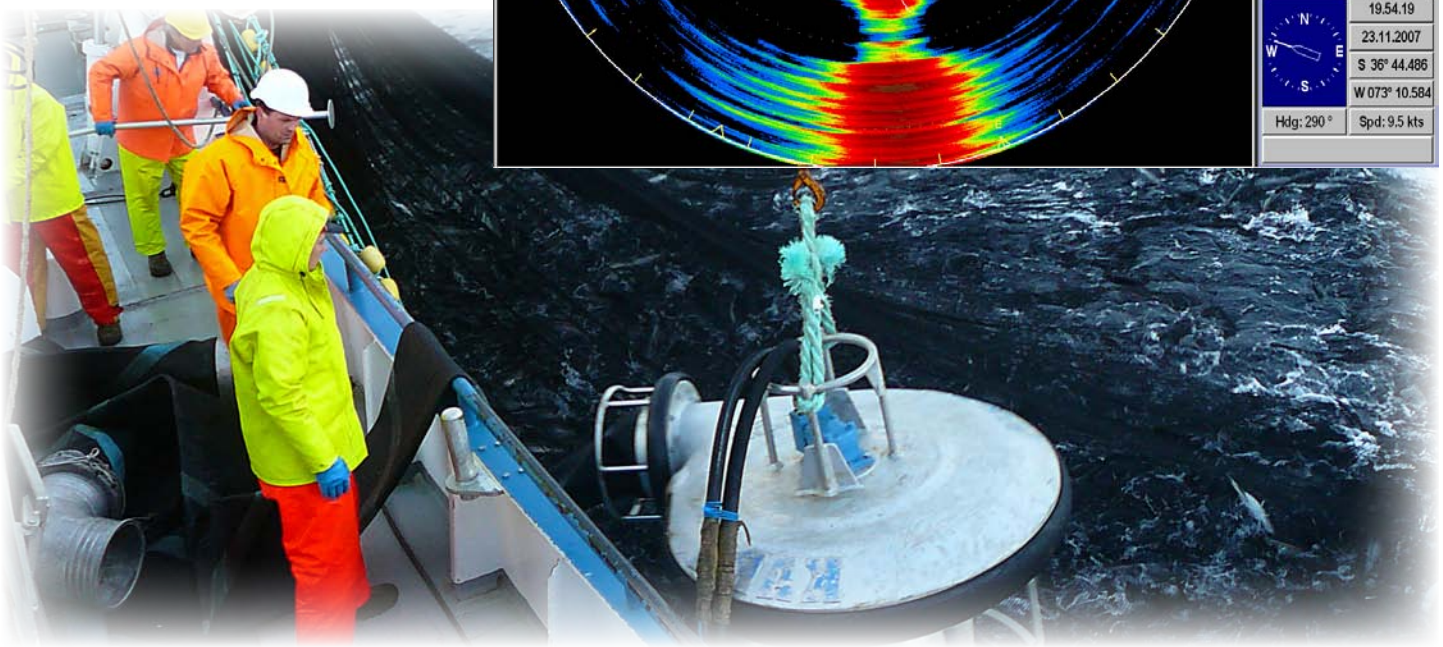
This sonar presentation shows a school of tuna. It has been detected all the way out to 2500 meters. In the vertical view you can also see a plankton layer at about 150 meters depth. Such layers can in some cases disturb the range detection capabilities, and create unwanted echoes as the horisontal beam hits the layer at one point in range. The SX90 overcomes this problem by means of its efficient filtering capabilities, and masks out the plankton layer in the same manner as unwanted surface echoes.



Wreck detection

This screen capture shows a long range detection of a sunken 35.000 ton cargo vessel. You can see it at 10° port side, it is marked with target tracking triangle. The wreck lays at about 100 meters depth. The other echoes are shallow banks in the area. The sonar is operated at 23 kHz using “FM Auto” and “Narrow Beam”. The position of the vessel, as well as time and date, is indicated in the dialog in the lower right hand corner of the presentation.



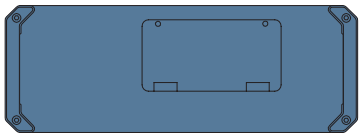


Technical specifications

- Frequency: 20 to 30 kHz
- Range scale: 50 - 4500 m
- Tilt: +10° to -60° in 1° steps
- Pulse modes: CW and FM
- Transmission modes:
  - 360° omnidirectional
  - 180° vertical
- Maximum speed: 12/20/24 knots with transducer deployed, depending on hull unit

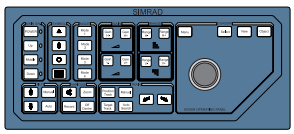
For additional and more detailed specifications, see the *Simrad SX90 Product description*. The document can be downloaded from www.simrad.com.

Processor Unit



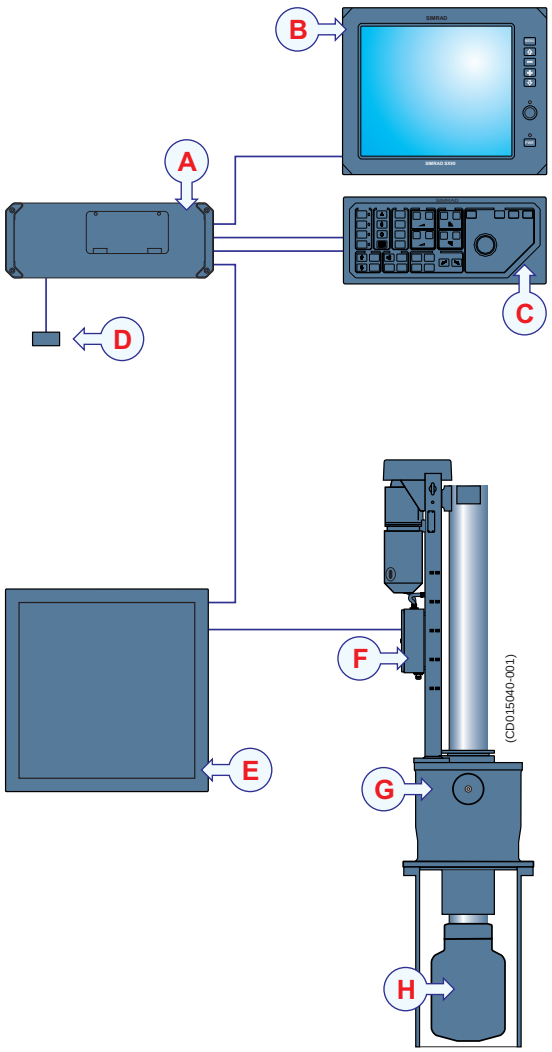
Width: 445 mm
Height (with shock absorbers): 185 mm
Depth: 365 mm

Operating Panel



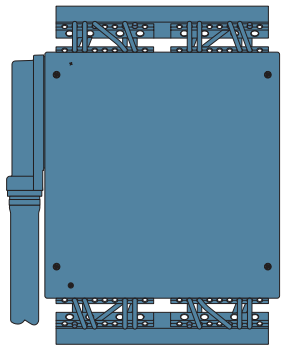
Width: 385 mm
Height: 165 mm
Depth: 51 mm

System diagram



A Processor Unit
B Colour display
C Operating Panel
D Power Supply for the Operating Panel
E Transceiver Unit
F Motor Control Unit
G Hull Unit
H Transducer

Transceiver Unit



Width: 520 mm
Height (with shock absorbers): 750 mm
Depth (with heat exchanger): 580 mm

Hull Units

See drawing on page 3.

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