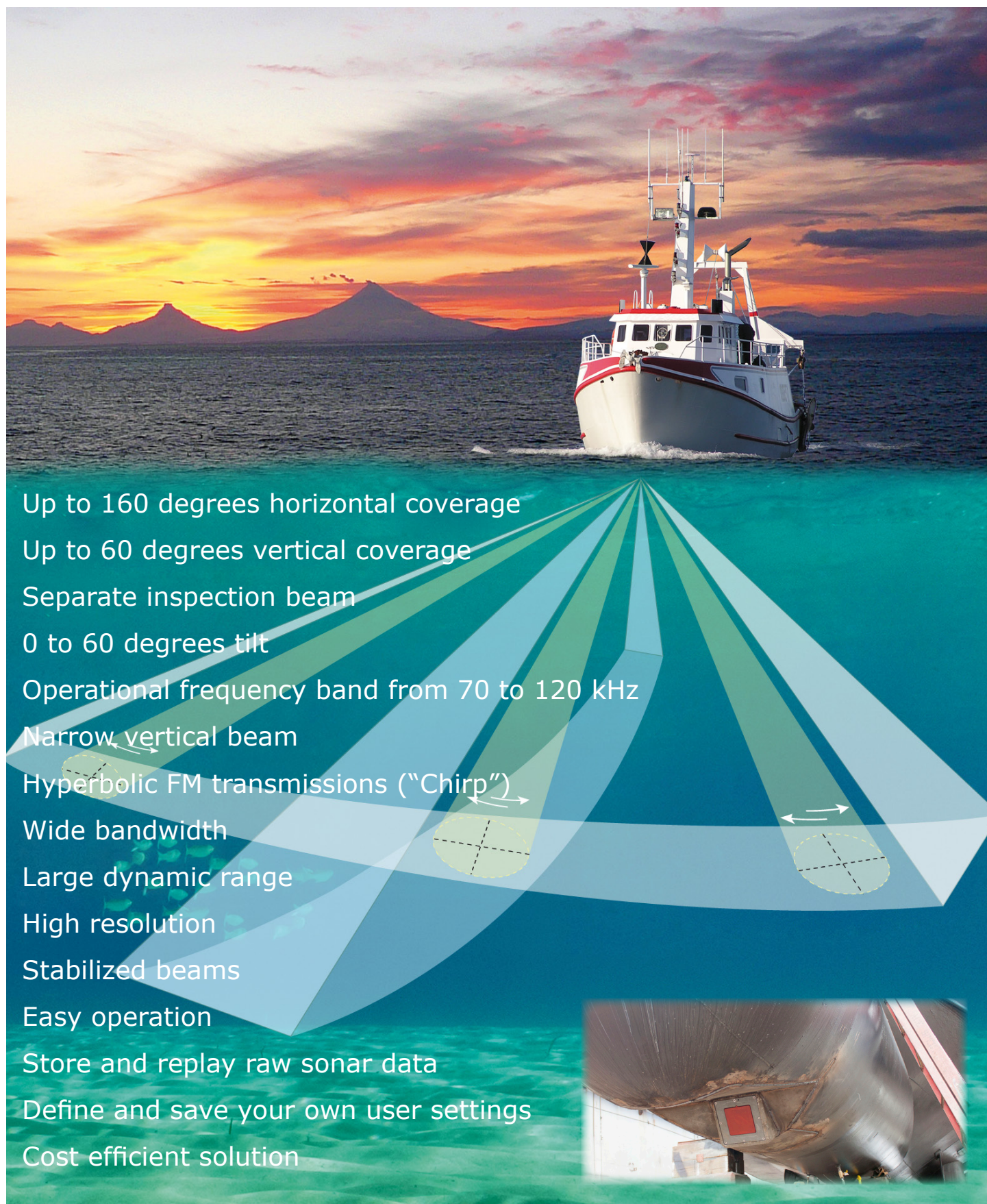



Simrad SN90

Wide bandwidth sonar for trawlers



Up to 160 degrees horizontal coverage
Up to 60 degrees vertical coverage
Separate inspection beam
0 to 60 degrees tilt
Operational frequency band from 70 to 120 kHz
Narrow vertical beam
Hyperbolic FM transmissions ("Chirp")
Wide bandwidth
Large dynamic range
High resolution
Stabilized beams
Easy operation
Store and replay raw sonar data
Define and save your own user settings
Cost efficient solution



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TECHNOLOGY FOR SUSTAINABLE FISHERIES

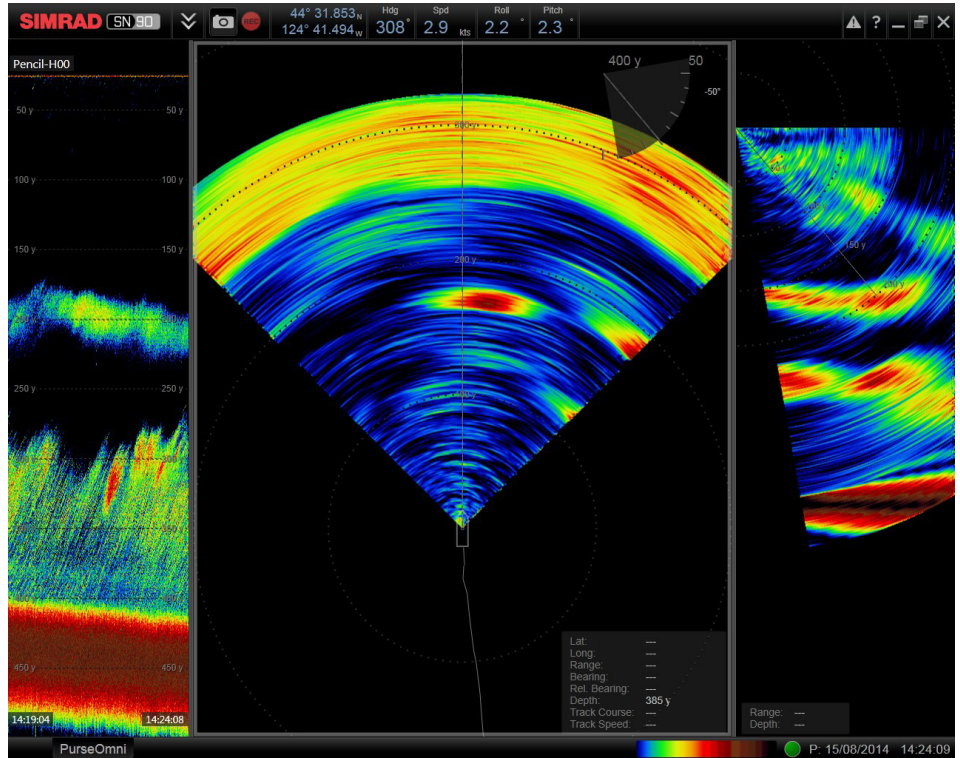
SIMRAD

The Simrad SN90 introduces a new and efficient search tool for trawlers. The forward looking transducer is mounted on the vessel's bow, well protected against acoustic noise from hull, machinery and propellers. The high resolution and long range allows you to detect and investigate single fish and schools - even those close to the bottom - from a distance of several hundred meters.

The Simrad SN90 is a directional high frequency fish finding sonar. Due to the high resolution and long range, a forward looking SN90 is a very efficient tool for trawlers during the search phase. Since the transducer is placed in the vessel's bow, the SN90 will not suffer from the acoustic noise generated by the hull, machinery and propellers.

Trawlers have for many years relied on high resolution echo sounders - such as the Simrad ES70 - to find and estimate their catch. The disadvantage with echo sounders is the fact that they look straight down. The SN90 offers the high resolution of an echo sounder, but also a large horizontal range that allows you to find fish - even close to the bottom - from a distance of several hundred meters.

The physical installation angle of the transducer must be determined based on the depth in the vessel's normal fishing waters. Even with a fixed installation angle, the SN90 will serve well in other waters too due to the swath and tilt functionality.



This screen capture is taken from a trawler on the coast of Oregon. From left you can see the Inspection beam view, the Horizontal view and the Vertical view.

The large frequency bandwidth makes the SN90 ideal for species like pollock, cod and saith.

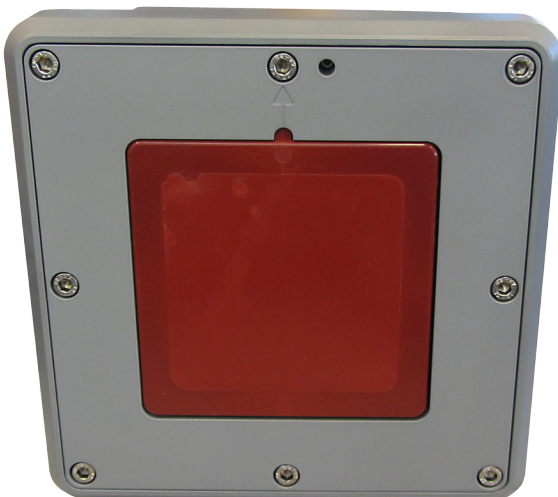
The Simrad SN90 is a unique sonar, both in design and functionality. The composite transducer and the transceiver each uses 256 individual

channels for transmission and reception. A large frequency bandwidth is supported, as the SN90 allows you to choose an operational frequency bandwidth from 70 to 120 kHz. The frequency bandwidth can be set up individually for each sonar view.

The beams have a horizontal coverage area of maximum 160 degrees, and the vertical beam width is typically 6 degrees. The

beams can be tilted from 0 down to 60 degrees. In addition to this, an adjustable split-beam inspection beam of typically 5 x 5 degrees can be used for a more detailed study of a school of fish, such as observing fish behavior, target strength and biomass.

The absence of a hull unit allows for easier and less space demanding installation, and the transducer is either mounted flush with the hull plating, or in a streamlined blister. The transducer installation removes the chance to get tangled up or damaged by wires, and greatly reduces the risk of being damaged by objects in the water.



The transducer

Three views

The SN90 presents the echo data using three separate views. All information from one single ping is shown in all three views simultaneously. Each view can operate with any operational frequency in the available range.

Horizontal view (A)

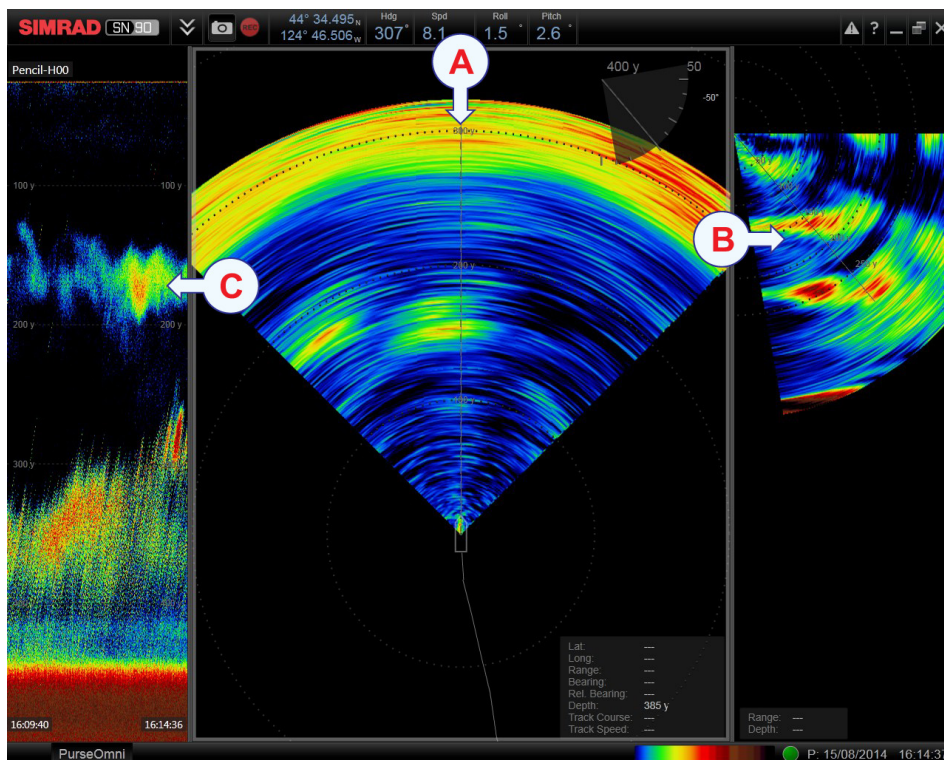
This view covers a large horizontal area. You can adjust the swath between 160 and 90 degrees, and tilt it from 0 down to -60 degrees. The actual tilt will depend on the fixed installation angle of the transducer.

Vertical view (B)

This view shows you a “vertical slice” of the echo data. The slice covers a vertical area from 0 to -60 degrees relative to the installation angle of the transducer. You can train the slice within the currently selected swath width.

Inspection beam view (C)

If you need to investigate certain targets in more detail, a dedicated



inspection beam is available. The information from the inspection beam is presented in its own view. The tilt of the beam follows the tilt you have selected in the Horizontal view.

You can train the beam within the currently selected swath width.

Performance specifications

The performance specifications summarize the main functional and operational characteristics of the Simrad SN90.

Operational frequency

- Selectable frequency and bandwidth from 70 to 120 kHz
- Each sonar view can be set up with an independent frequency bandwidth

Operational range

- Range steps: 50 to 2000 meters

Operational modes

- Modes: Normal, Inactive and Replay

Tilt

- Horizontal beam: 0 to -60 degrees in 1 degree steps

Transmission

- Transmission modes:
 - 160 degrees horizontally
 - 60 degrees vertically
 - 5 x 5 degrees inspection beam
- Pulse modes:
 - CW (Continuous Wave)

Hyperbolic FM (Frequency Modulation) (“Chirp”)

Reception

- Gain functions:
 - TVG (Time Varied Gain)
 - AGC (Automatic Gain Control)
 - RCG (Receiver Controlled Gain)
- Digital filters:
 - Ping-to-Ping Filter
 - Noise filter
 - FM Correlation filter

Echo presentations

- Views: Inspection beam, Vertical and Horizontal (simultaneous for each ping)
- Number of colours: 16 or 64
- Display resolution: Minimum 1280 x 1024 pixels
- Palettes: Choice of colour palettes to fit ambient light conditions

Beams

- Horizontal transmission: 160 degrees
- Horizontal reception: 160 degrees
- Vertical transmission: 60 degrees
- Vertical reception: 60 degrees (depending on physical installation angle)

Beam widths

- Vertical: 6 degrees

Stabilisation

- Roll stabilisation: Automatic, ± 20 degrees
- Pitch stabilisation: Automatic, ± 20 degrees
- Interface to optional peripheral motion reference unit supported

Interfaces

- Serial lines: Five serial lines (RS-232/RS-422/RS-485)
- Transceiver Unit: Ethernet
- Optional interfaces:
Scientific output (Ethernet)
RAW data output for scientific research (Ethernet)

Transducer

- Installation: Side-looking in blister
- Shape: Rectangular

Weights and outline dimensions

The weights and outline dimension characteristics summarize the physical properties of the Simrad SN90 system.

Transceiver Unit

- Depth: 665 mm (with shock absorbers)
- Width: 647 mm (with transducer plug)
- Height: 750 mm (with shock absorbers)
- Weight: 75 kg

Transducer

- Transducer face: 184 x 184 mm
- Weight in air: 60 kg (with 15 meter cable)

Transducer cable

- Quantity: Eight
- Length:
SN92: 15 meters
SN93: 25 meters
- Minimum bending radius:
Static: 95 mm
Dynamic: 243 mm
- Tensile strength: 3000 N
- Outer sheet: Polyurethane

System diagram

A Processor Unit
(computer)

B Display

C Operating Panel

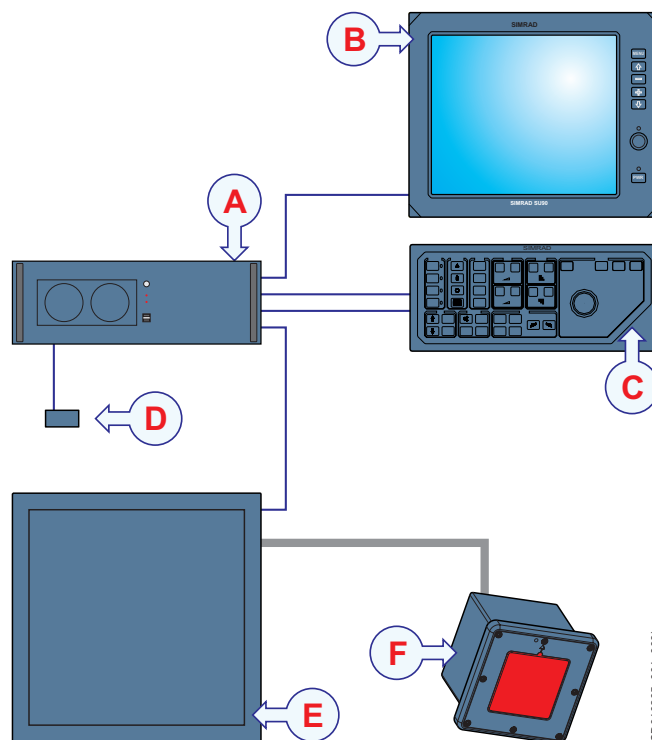
D Operating Panel

Power Supply

E Transceiver Unit

F Transducer

Note that the display is not a standard part of the SN90 delivery. This is a commercial item that can be purchased locally.



Each transducer installation must be designed to fit the vessel's hull shape and characteristics. The installation method and the cable penetration must be approved by the relevant maritime authority.



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