



Northeast
Sustainable Agriculture
Research and Education

How do you find those oyster cages on your deep water farm?

The application of side-scan technology for visualizing cages on the bottom

Dale Leavitt



Rationale

- Oyster farms are moving from shallow water (<2 feet depth) to deeper water (>20 feet depth) as local nearshore areas become limiting
- The technology to properly manage those deeper water cages is lacking
 - For example in placing cages on the bottom with
 - The proper cage orientation (sitting upright on supporting runners)
 - In a distribution pattern that optimizes space use on the farm

Rationale

- Regulatory agencies are getting more concerned with the presence of vertical lines used to mark bottom cages
 - Just ask any local lobsterman!
- For example, on my deeper water farm, NOAA/Army Corp review conditioned us to
 - Reduce the number of vertical lines by one-half
 - i.e. run our cages in trawls of 20 rather than 10
 - Insert 600 lb. breakaway links on all vertical lines

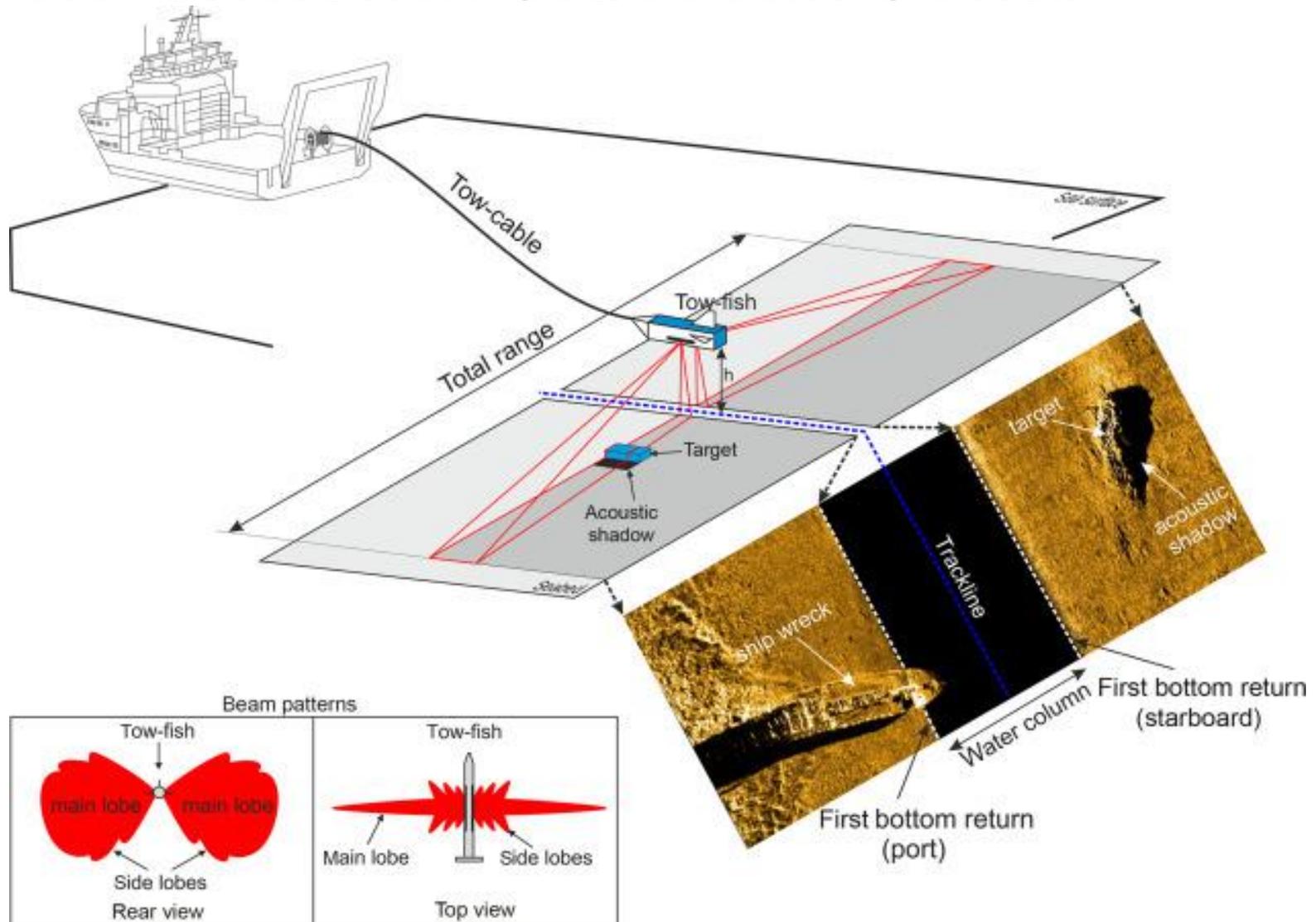


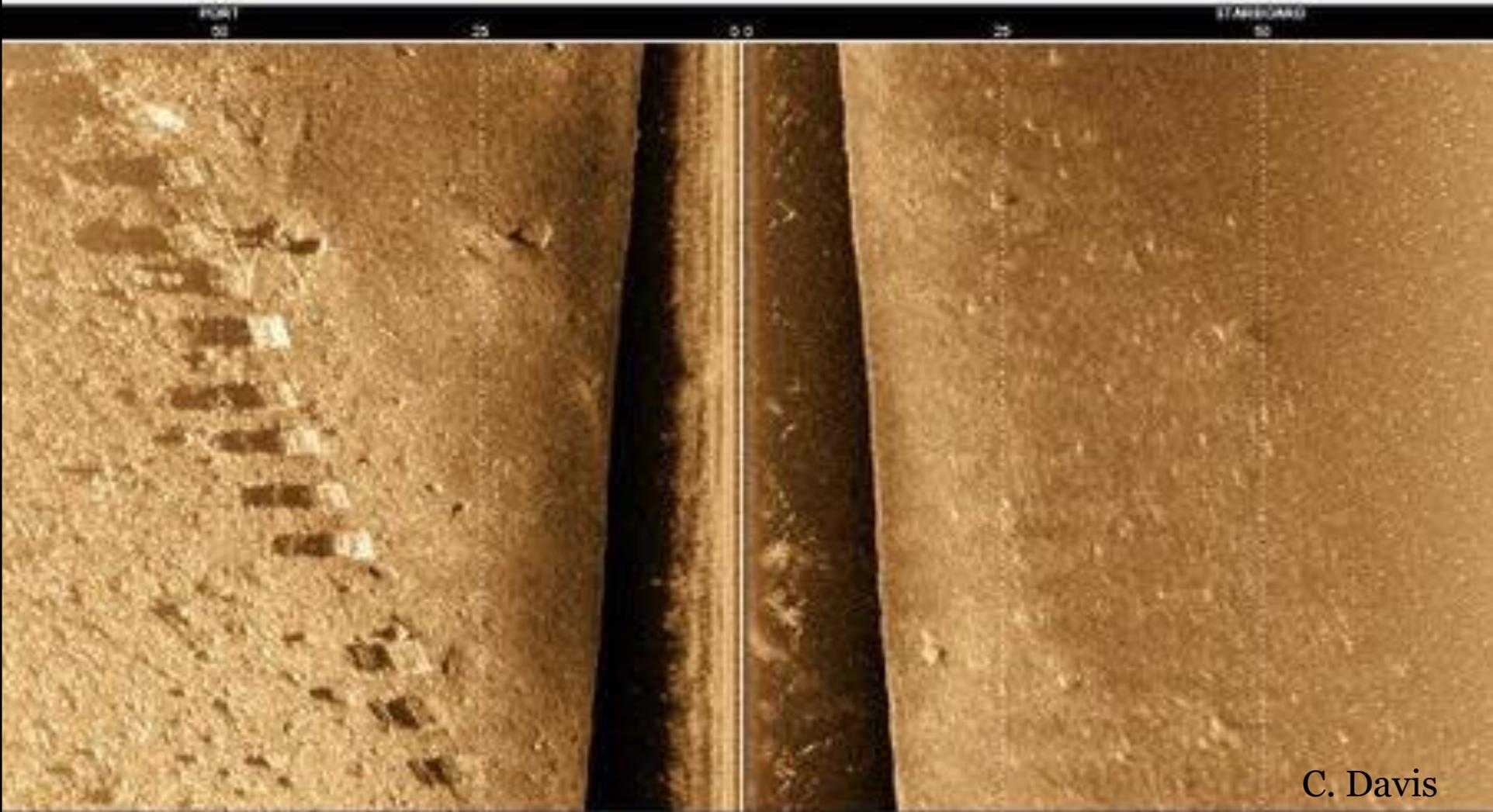
Northeast
Sustainable Agriculture
Research and Education

Farmer's Grant

- Develop a method to visualize the orientation and placement of cages on the bottom using commercially available “fish finder” technology
- With the application of side-scan sonar, can one observe a three-dimensional representation of the array of cages on the bottom with fine enough resolution to monitor
 - overall placement relative to other cages
 - the orientation of the cage as it lands

Conventional Sidescan Sonar





Sidescan sonar image of an series of oyster bottom cages in the Damariscotta River (ME). Image produced by a Starfish Sidescan Sonar (Chris Davis – Pemaquid Oyster Farm).

Starfish 452F

- Conventional sidescan sonar
- Towed fish provides acoustic signal
- Return signal interpreted by computer



Conventional Sidescan

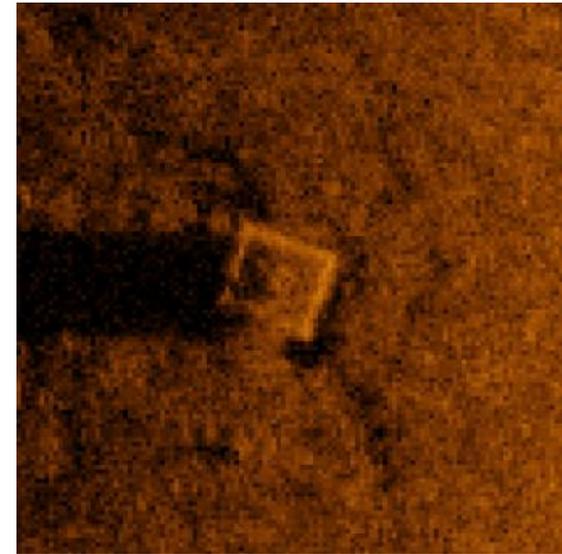
- Towed “fish”
 - May need special winch and davit to tow properly
 - Challenging to tow fish among a array of buoyed lines
- Requires separate laptop attached to operate
- Cost
 - Starfish 452f = \$7,000
 - “Ruggedized” Laptop computer = \$2,000-\$4,000

What we needed:

- Simple to operate
- Contained in one integrated unit
 - No separate laptop
- Portable between different boats
- Reasonable cost

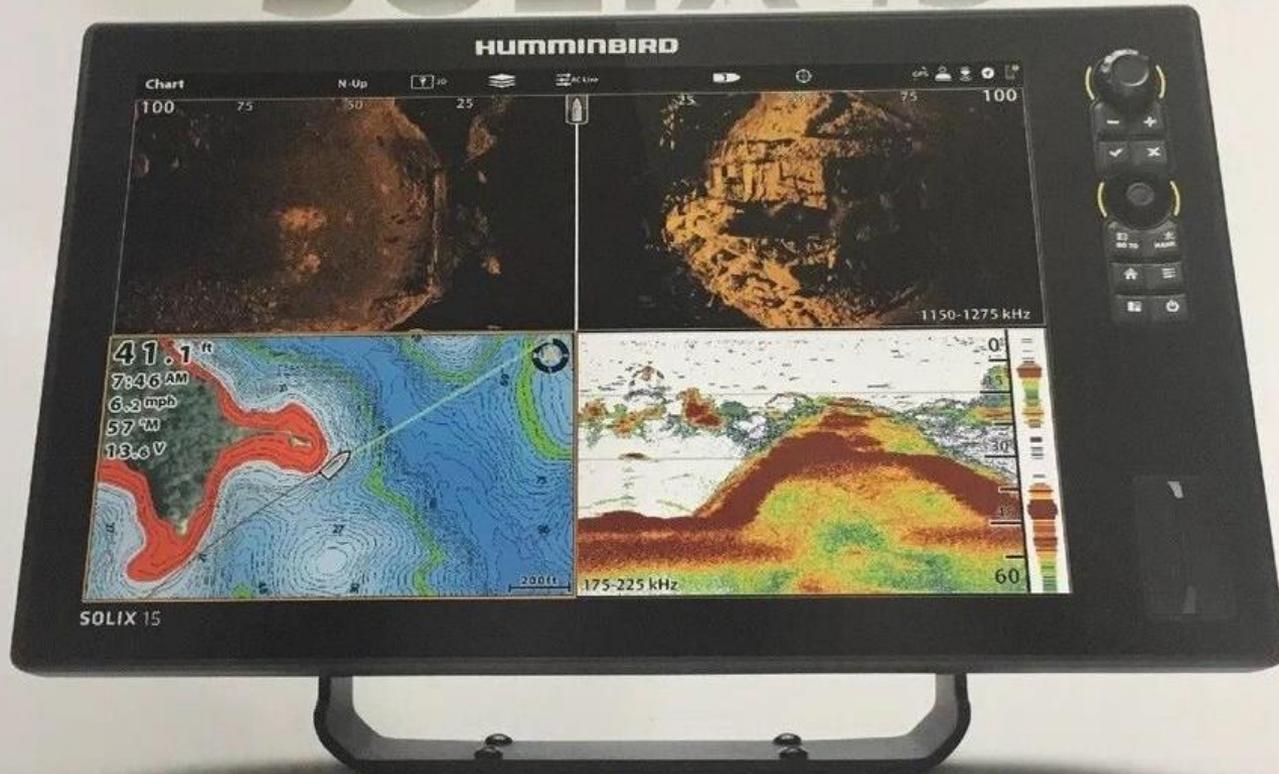
A better option?

- In 2019, I became aware of a project in Delaware retrieving derelict crab pots using a fishfinder to visualize traps on the bottom
- Crab traps = oyster cages?
- Communicated with Kate Fleming (DE Sea Grant) and Art Trembanis (U Del) to get more info on their technology
- They referred me to Vince Capone of Black Laser Learning Inc. for more details



HUMMINBIRD

SOLIX 15



CHIRP · MEGA SI · GPS

HD
15.4" DISPLAY

Bluetooth

NETWORK

NETWORK

SONAR

MEGA Side Imaging

MEGA Side Imaging

CHIRP

CHIRP Digital Sonar

QUANTUM PLOT

IF

COMPATIBLE

COMPASS

COMPASS

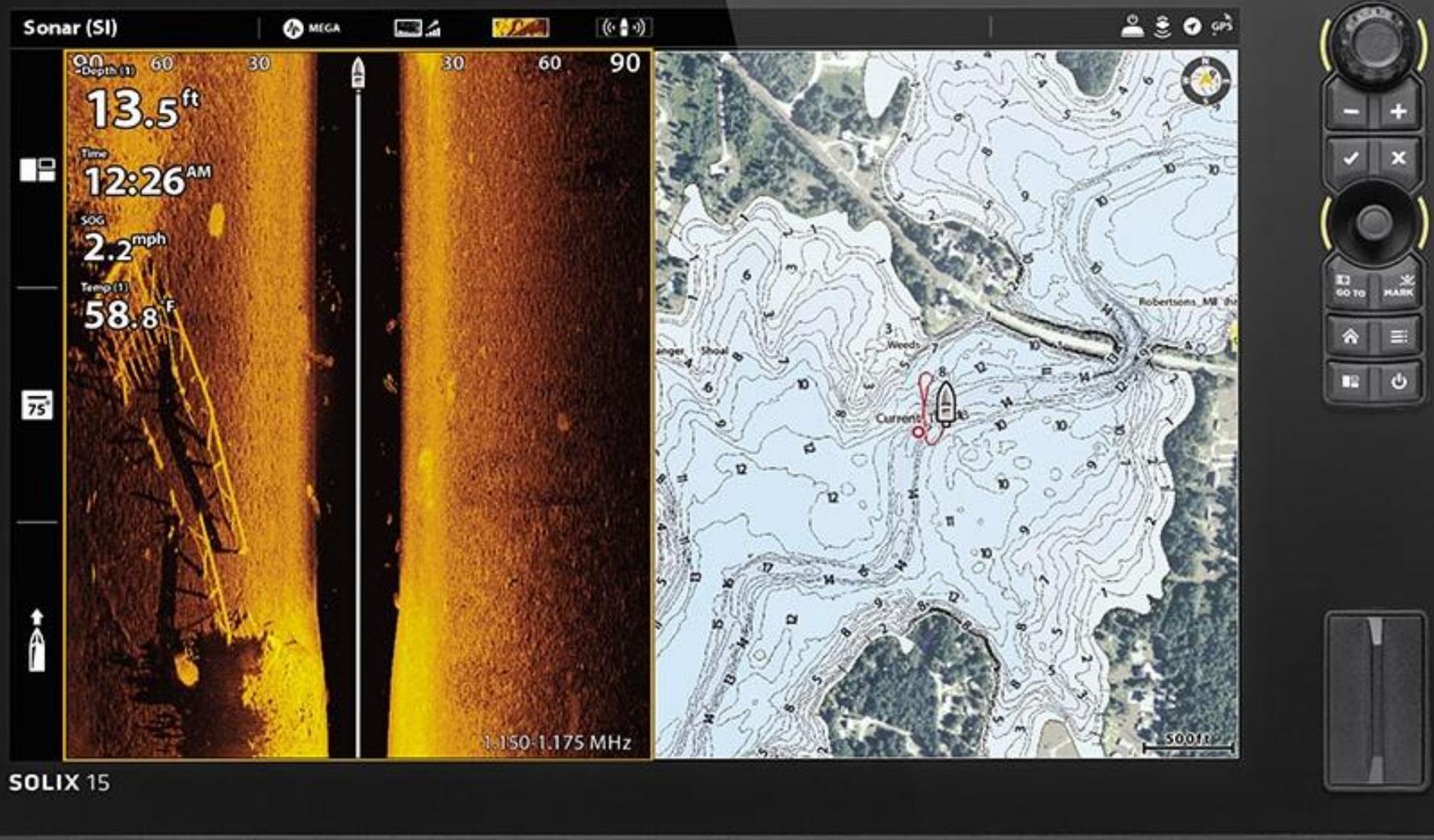
CHARTS

AC

AutoTrack

COMPATIBLE CHARTS

HUMMINBIRD



Example of a sidescan image (left side) and navigational aid (right side) in a split plot display on a Humminbird Solix 15 Fish Finder



Humminbird Solix 15
Size Dimension
16.53" (L) x 4.83" (W) x 10.46" (H)

Details of the side of a Humminbird Solix 15 Fish Finder

Humminbird Solix 15

Size Dimension

16.53" (L) x 4.83" (W) x 10.46" (H)

**Universal Sewing Machine Hard
Carrying Case For Frearm Style**

Portable Machine

Inside Dimensions

17.5" (L) x 8" (W) x 13.5" (H)

**Details of the transport
case purchased for the
Humminbird Solix 15.**





The Humminbird Solix 15 installed in the unopened carrying case



The Humminbird Solix 15 installed in the opened carrying case



The Humminbird Solix 15 powered by transportable 12 vdc deep cycle battery.



The transom-mount transducer required for the Humminbird Solix 15.

The transom-mount transducer
mounted on a 6' removable pole



ProControl EZ Mount II



The fiberglass reinforced electric trolling motor replacement mount modified to accept the transducer mounted pole

The transom-mount
transducer attached to the
work-skiff gunnel



The fiberglass reinforced electric trolling motor mount with transducer mounted pole clamped to the bow of our 19' Carolina Skiff





Humminbird Solix 15
Fish Finder in place
on the farm work skiff

Sonar (SI)

MEGA

OFF



Depth
12.5⁸ ft

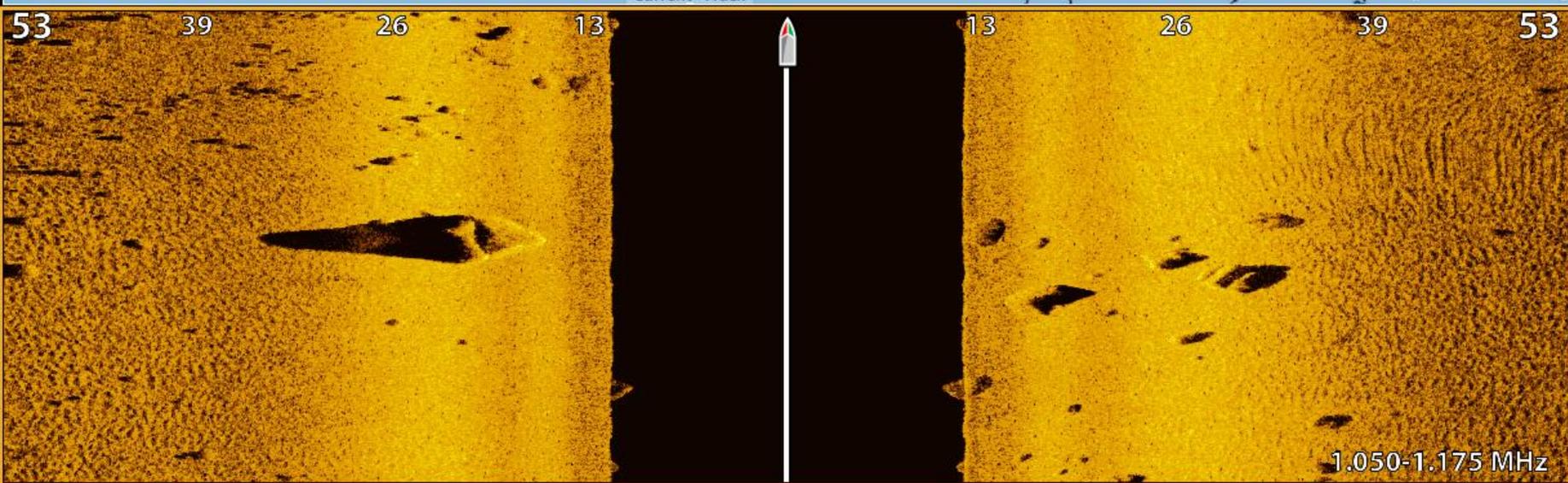
Time
10:47

GPS SOG
2.7 mph

Temp (1)
50.6⁶ °F



75°



1.050-1.175 MHz

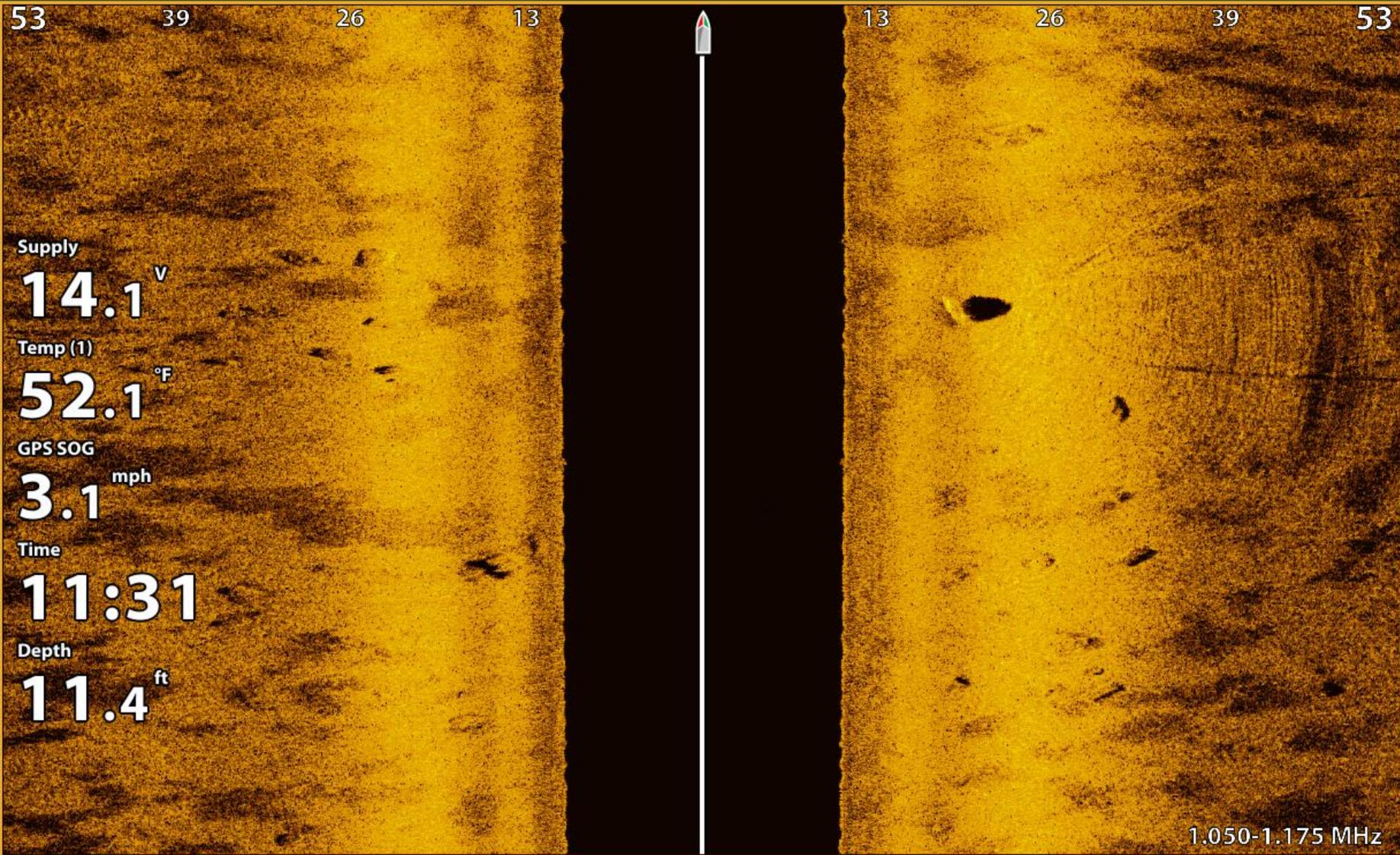
Sonar (SI)

MEGA

OFF



Wi-Fi, GPS



75°



1.050-1.175 MHz

Sonar (SI)

MEGA

OFF



GPS

53 39 26 13 13 26 39 53



75°



Supply

14.1^V

Temp (1)

52.3^{°F}

GPS SOG

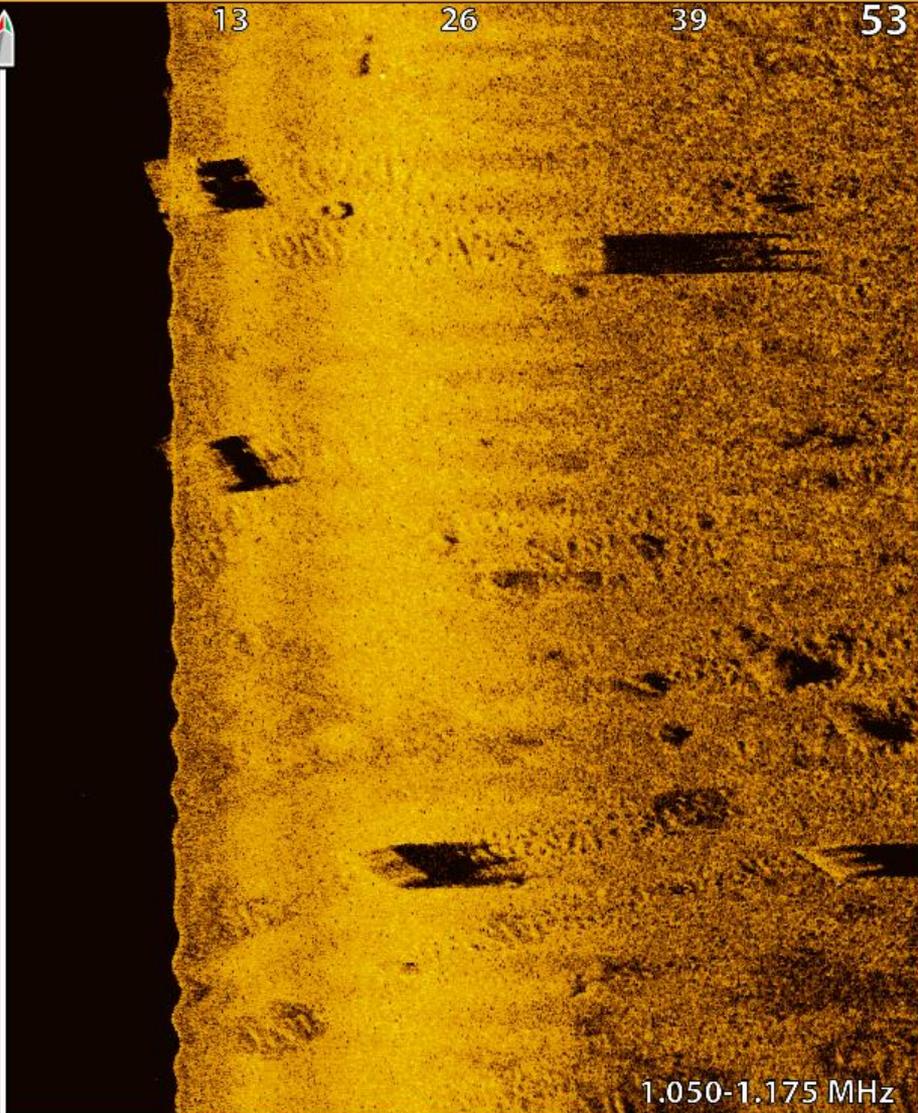
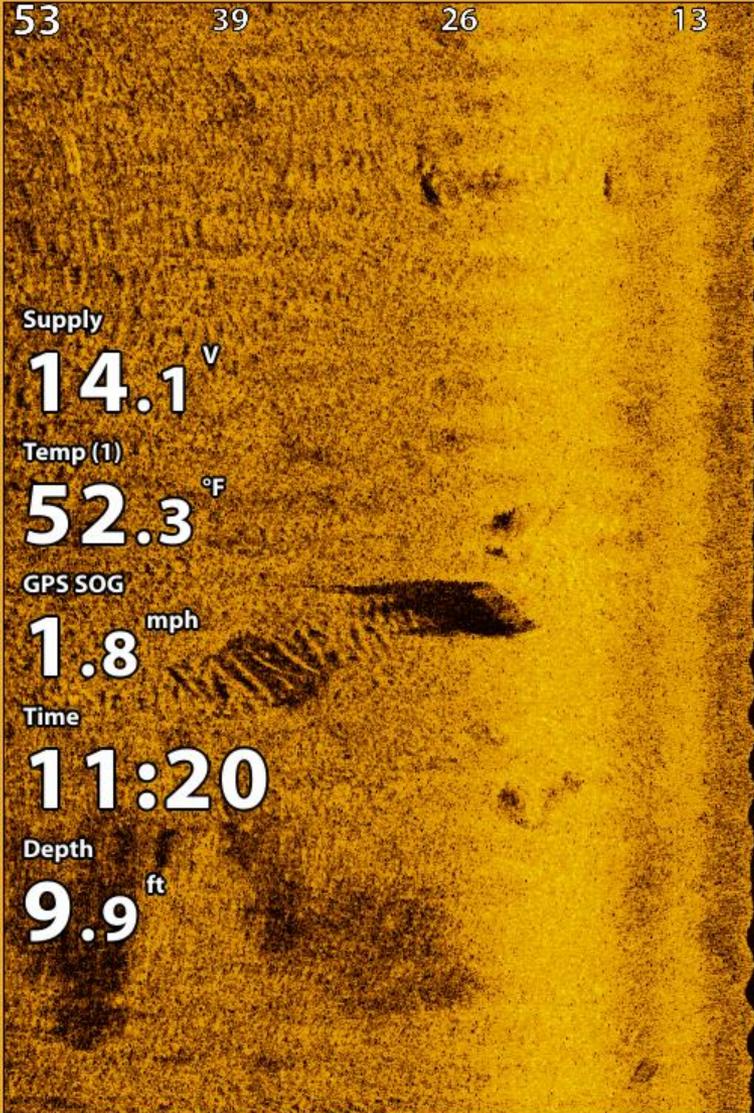
1.8^{mph}

Time

11:20

Depth

9.9^{ft}



1.050-1.175 MHz

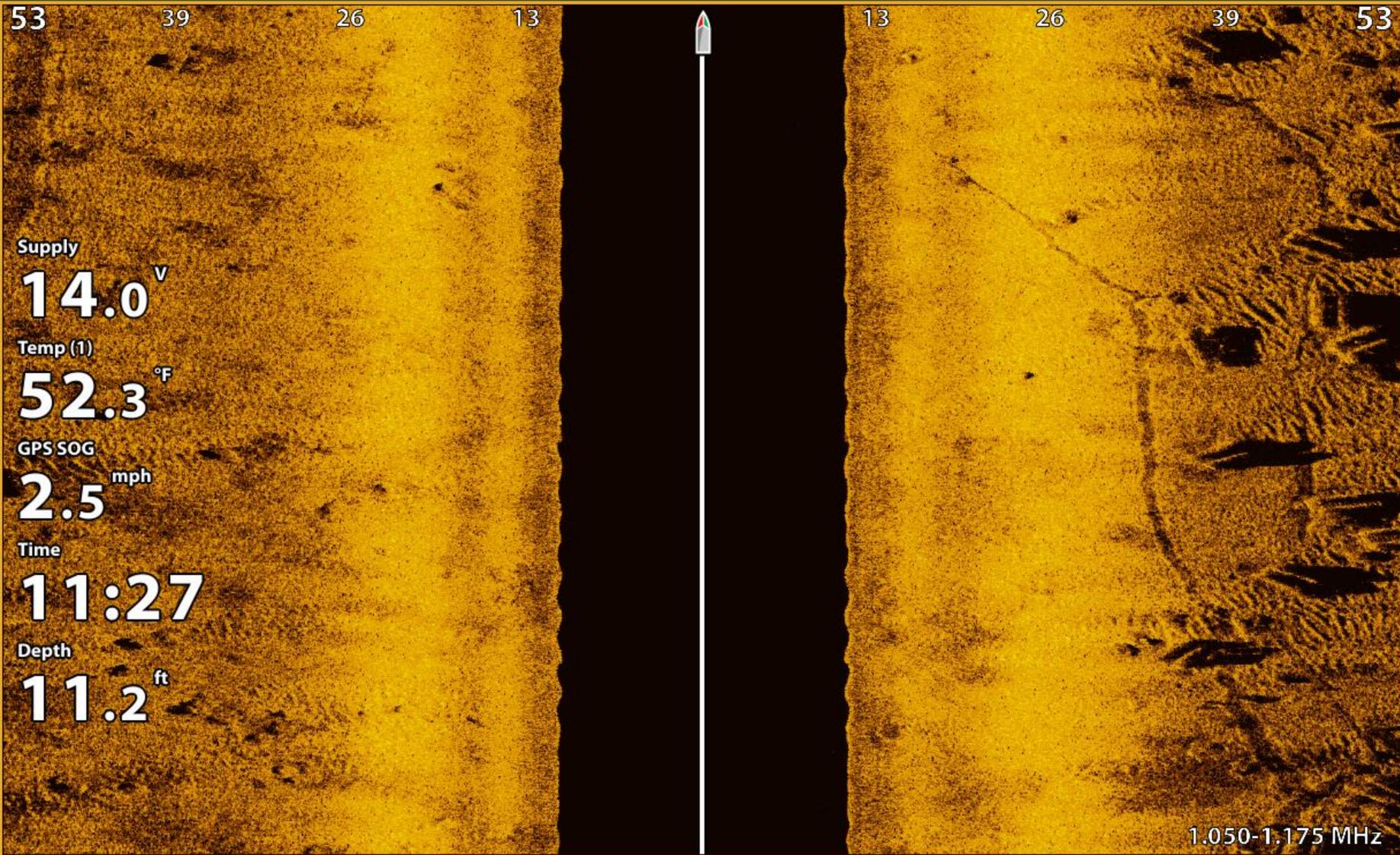
Sonar (SI)

MEGA

OFF



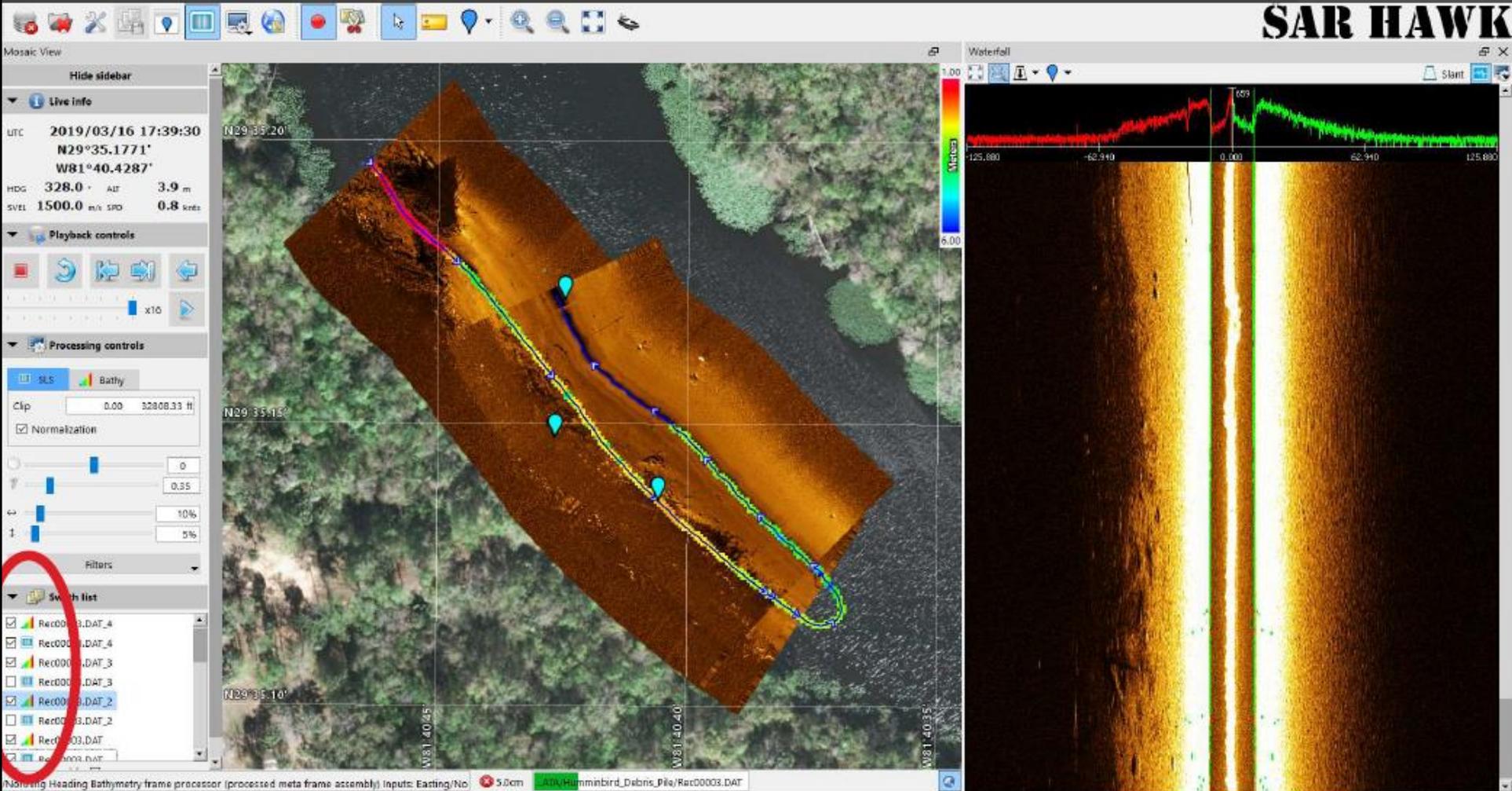
WiFi, GPS



75°



SAR HAWK : Mosaic (coverage map)



Search and Rescue software to
generate sidescan mosaic
image



The Bottom Line

- Humminbird Solix 15 = \$3,600
- Pro Controll EZ Mount 2 = \$50
- 6 feet of 1" galvanized conduit = \$22
- SAR Hawk software = \$749

Go To...



OFF



Nav Data



...Lat/Long



Supply

14.0^V

Temp (1)

52.5^{°F}

GPS SOG

3.2^{mph}

Time

11:40

Depth

11.5^{ft}

75°



26

13

13

26

39

53



Dale Leavitt
Blue Stream Shellfish
dale@bluestreamaquaculture.com
401-450-2581

1.050-1.175 MHz