



# **SAMM**

***Stand Alone Mosaicking Module  
for Forward-Looking and Side-Looking Sonar***

## **Acquisition Tutorial**

*This tutorial shows you how to connect a sonar, monitor connection status, troubleshoot, enter the sensor offsets and tune image quality in SAMM. Please refer to the User Manual for detailed instructions and the playback tutorial for prerequisite information.*



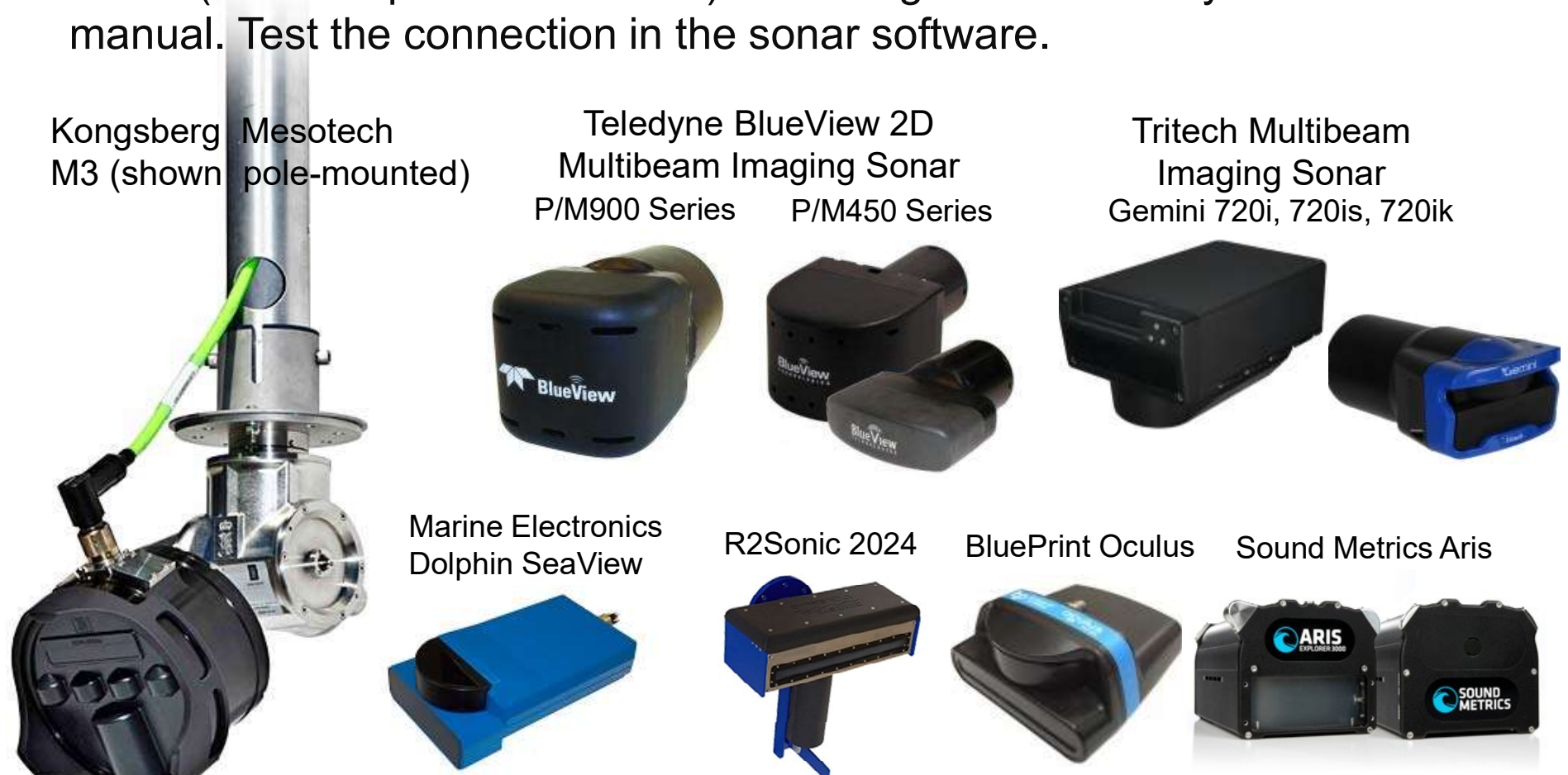
# Getting Started

- Before you sea-test the software, we suggest you:
  - install SAMM to make sure the disc and dongle work;
  - play with SAMM in playback mode using the demo data and the playback tutorial to get familiar with creating projects, mouse navigation, swath rendering settings and marking targets (we assume knowledge of the playback material in this tutorial);
  - start a new project, measure and enter survey offsets;
  - SAMM needs position and heading to mosaic accurately, we suggest you:
    - check that your GPS is set to the WGS 1984 datum;
    - SAMM owners using serial heading and navigation sources, make sure that your sensors output NMEA streams. You need either a system providing both position & heading such as the Hemisphere VectorGPS, or separate pos & heading sources connected to separate serial ports.
- While you have internet connection, we suggest you:
  - download updated navigational charts and populate SAMM's chart database, i.e. put them in c:\Charts\;
  - update your video driver;
  - BlueView owners, make sure you have [ProViewer™](#) Version 4.3.0.9526 or later. Please contact your BlueView sales representative for updates.



# Attach a Forward Look Sonar

1. Attach the SAMM host computer to one of the supported sonars pictured below (linked to product Website) according to the sonar system owner's manual. Test the connection in the sonar software.

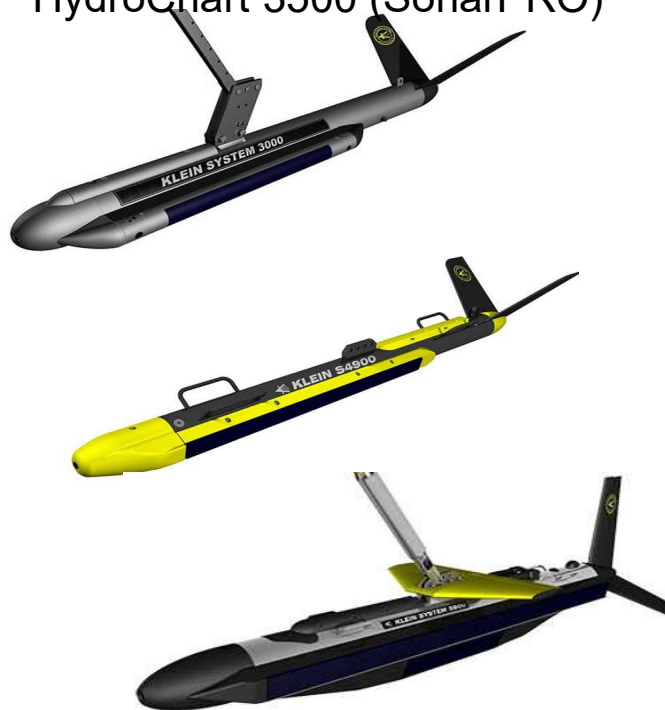


2. **Gemini/Oculus/R2Sonic/Dolphin users**, SAMM replaces the native sonar software. SAMM interfaces directly with the Gemini/R2Sonic/Dolphin sonar heads and the navigation and heading sources, so the sonar software doesn't need to be running. **Aris, M3 and BlueView users**, SAMM must run in parallel with the native sonar software, receiving data streams via real-time socket connections with host software.

# Attach a Sidescan Sonar

1. Attach the SAMM host computer to one of the supported sidescan sonars pictured below (linked to product Website) according to the sonar system owner's manual. Test the connection in the sonar software.

Klein Sonars: 3K, 4K, 5K and HydroChart 3500 (SonarPRO)



EdgeTech (4125, 4200, 6205)  
(Discover)



Tritech Starfish or others



2. Then connect SAMM to the sonar system socket connection (usually 127.0.0.1) For details see SAMM manual, individual sections on each sidescan system.



# Interface with an M3

1. ← In the M3 software, go to **Setup** > **System Configuration**.

2. Under **Sensors Setup** tab, add 3 devices: set one each to GGA, HDT and ZDA. Set the baud rate and com port settings. →

3. Start the M3 software and verify NMEA input. →

MAX Range 150 m

0.4 m MIN Range

KONGSBERG

21.27715630°N  
157.70554972°W  
327.7°  
225.302 m

Output Messages Window  
To run the sonar, go to the Setup menu and press Connect Head.

Host Messages Head Messages

GeoTiff Disk Space:2% free Inactive

System Configuration

Devices Deployment

Sonar Setup **Sensors Setup** Rotators Setup Data Input Setup

Sensor Devices:

#	Name	Protocol	Port	
1	Sensor1	GGA	PC COM 3	Add Device
2	Sensor2	HDT	PC COM 3	Remove Device
3	Sensor3	ZDA	PC COM 3	Test Device

Device Properties:

Name	Sensor1
Protocol	GGA
Port Location	PC COM
Port#	3
Baud Rate	38400
Data Bits	8
Parity	None
Stop Bits	1
Interface	RS232

Port Monitor:

Close

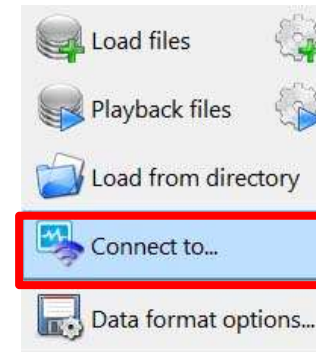


# Interface with an M3

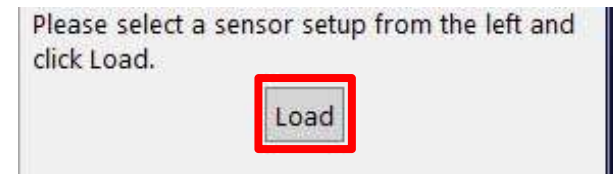
4. Launch SAMM, create a project and click the **Add data** icon.



5. Click **Connect to...** from the dropdown menu.



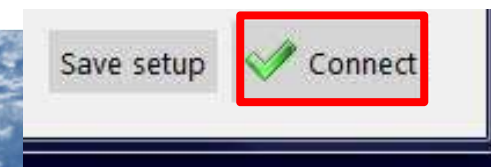
← 6. Click **Kongsberg M3** then **Load**. →



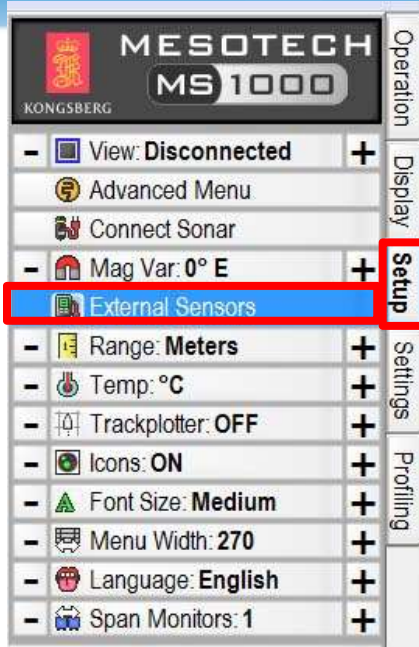
7. If the M3 Software is running on the same computer as SAMM, IP address should be 127.0.0.1 (default). If the M3 Software is running on a different computer than SAMM, change IP address to which the M3 is connected using these dialogs. →



8. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data.

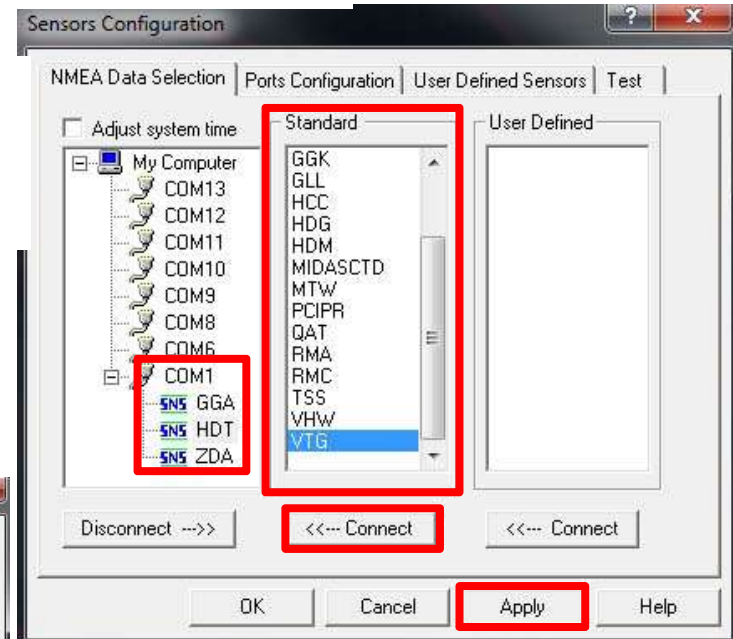


# Interface with an MS1000

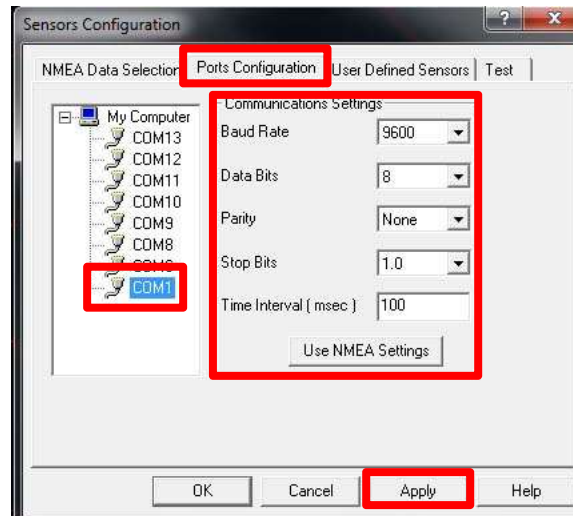


1. ← In the MS1000 software, go to **Setup > External Sensors**.

2. Choose a com port, and connect GGA, HDT and ZDA. →



3. Go to ports configuration tab, and set the port baud rate and other settings. →



4. Start MS1000 software, and verify data and navigation is coming in.

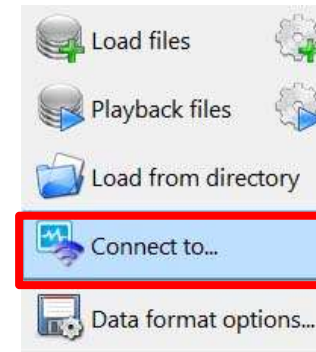


# Interface with an MS1000

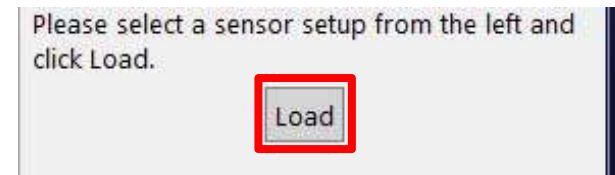
4. Launch SAMM, create a project and click the **Add data** icon.



5. Click **Connect to...** from the dropdown menu.



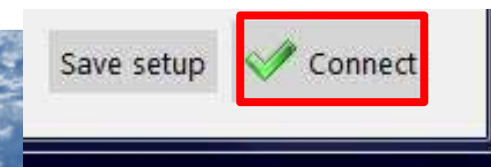
← 6. Click **Kongsberg M3** then **Load**. →



7. If the MS1000 Software is running on the same computer as SAMM, IP address should be 127.0.0.1 (default). If the MS1000 Software is running on a different computer than SAMM, change IP address to which the MS1000 is connected using these dialogs. →



8. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data.





# Interface with a BlueView

In ProViewer4...

1. Click the Application settings icon.

2. Click the AppEx tab.

3. Uncheck the XY images box and check the RTheta Images box.

4. Click the Connect to Sonar icon.

5. Proviewer will search and find your sonar. Click on Connect to start the sonar. →

Sonar	Head	IP Address	Firmware	
M900-2250-130 (M9)	MDF2250-130	192.168.1.45:1149	9446	Connect

SAMM is compatible with ProViewer Version 4.3.0.9526 and later. If that's not your version, please update ProViewer. ↓

Build 9526

# Interface with a BlueView

Connected to 192.168.1.45 - ProViewer4

← 6. Click the Application settings icon.

7. Click the NMEA (GPS) tab. →

8. Select the com port and baud rate settings for your NMEA input, then check GGA, HDT and ZDA. →

9. Click **Add Current** then **Start All** to have ProViewer take in NMEA. →

Port	Baud	Data Bits	Parity	Stop Bits	Flow Control
COM1	9600	8	None	1	None

NMEA Sequences

- GGA
- GLL
- RMC
- HDG
- HDT
- DBS
- DBT
- ZDA
- HDM
- Use RMC Heading

Buttons: Add Current, Start All

Reset All Settings / 2017  
time (UTC): 22:58:05.0  
rate: 15.4 Hz  
Build 9526

# Interface with a BlueView

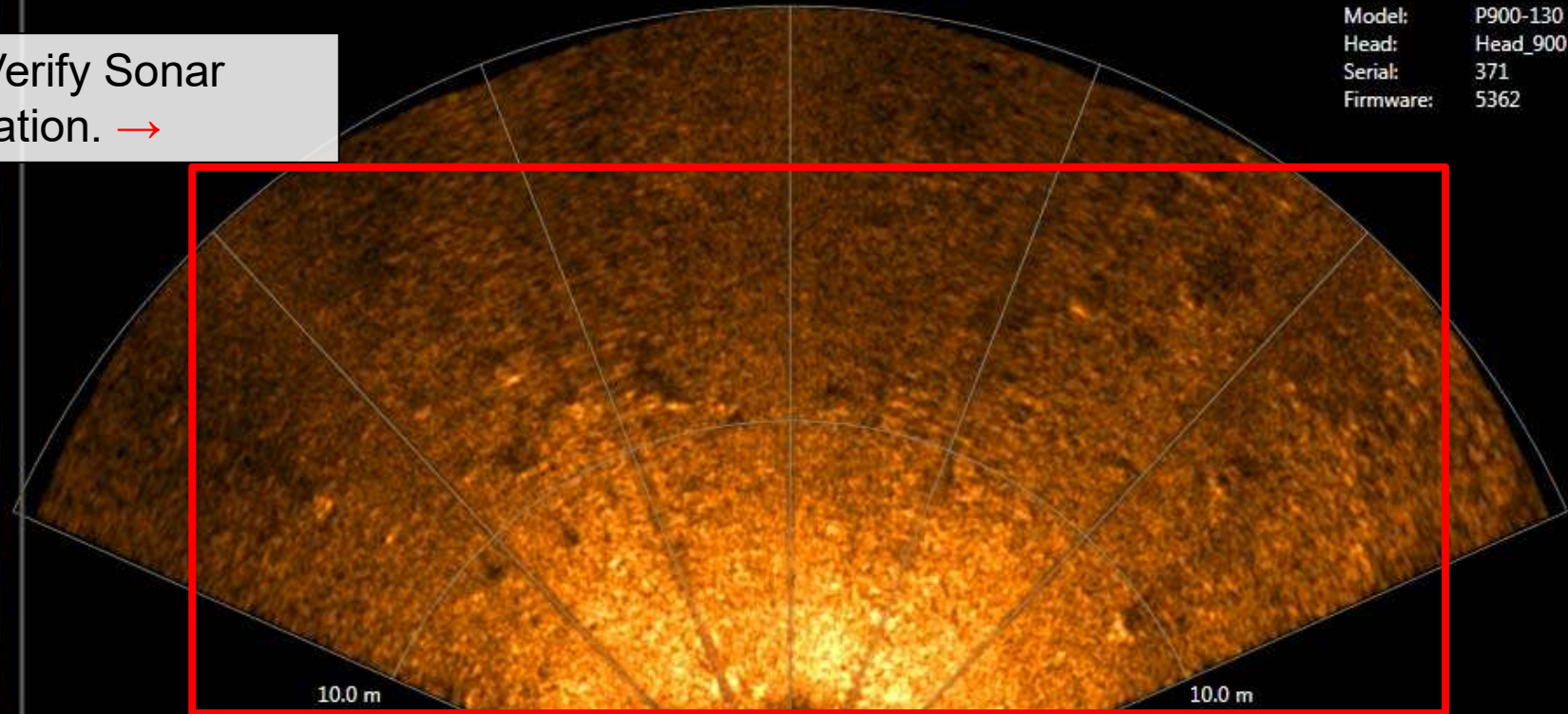
C:\Users\randyc\Desktop\BV.000.2013.093.205712.son - ProViewer4



9. Click the Appex Broadcast icon.

10. Verify Sonar operation. →

100.0 m



Model: P900-130  
Head: Head\_900  
Serial: 371  
Firmware: 5362

11. Verify NMEA values. →

Ping  
number: 31  
date: 04/03/2013  
time (UTC): 20:57:15.3  
Latitude: 21°16'48.8"  
Longitude: 157°42'31.4"  
Heading: 124.9°

0  
31



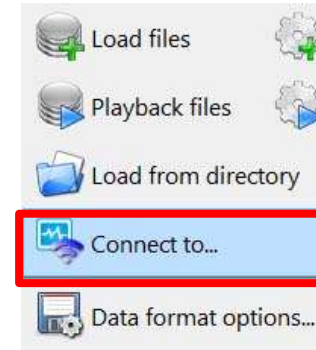
Build 9526

# Interface with a BlueView

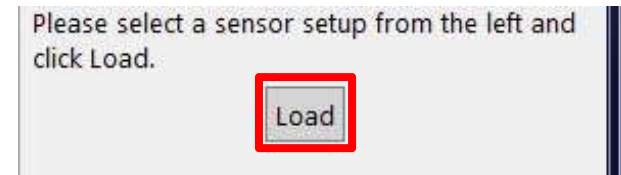
1. Launch SAMM, create a project and click the **Add data** icon.



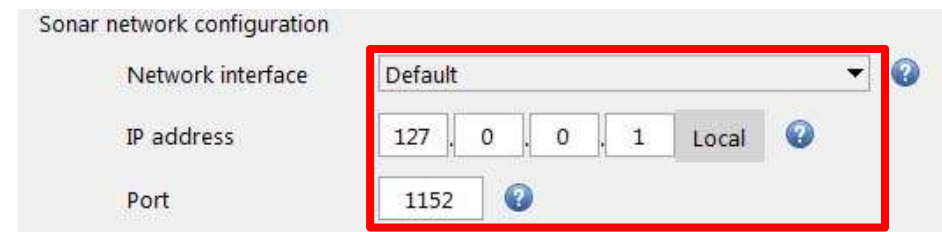
2. Click **Connect to...** from the dropdown menu.



← 3. Click **BlueView ProViewer** then **Load**. →



4. If ProViewer is running on the same computer as SAMM, IP address should be 127.0.0.1 (default). If the ProViewer is running on a different computer than SAMM, change IP address to which the BlueView is connected using these dialogs. →



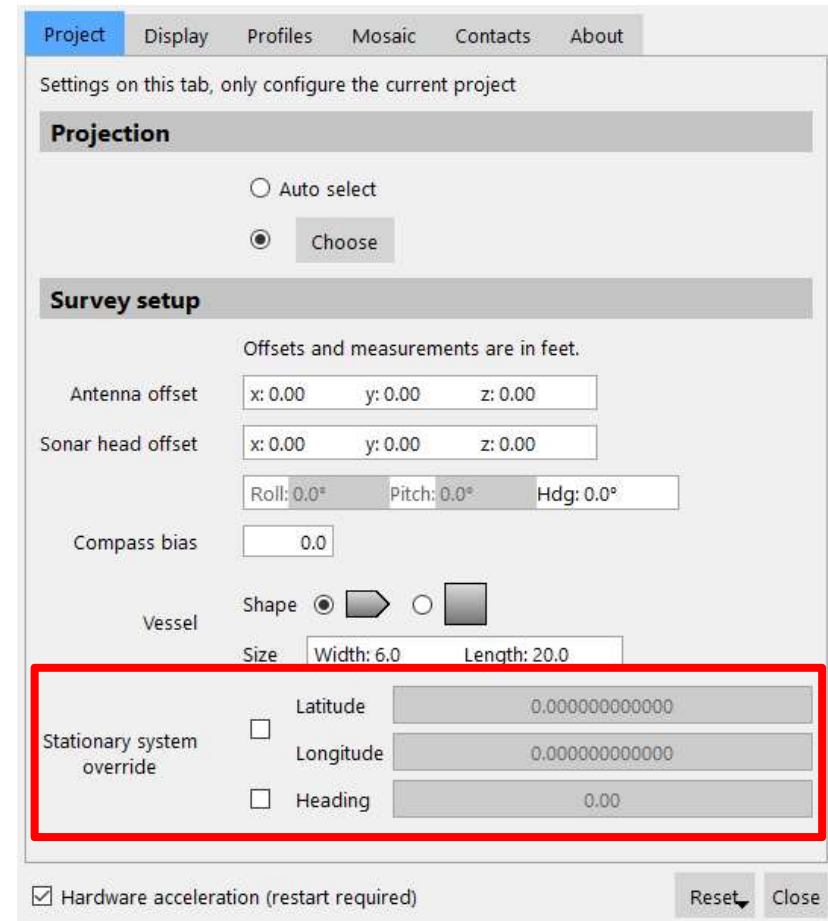
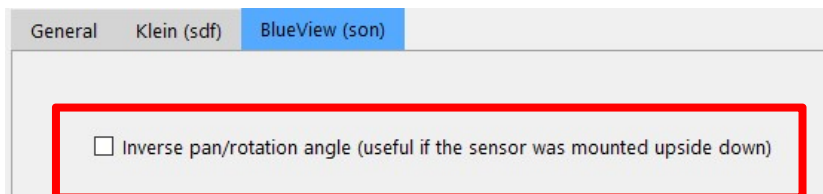
5. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data.



# Rotational Scans with BlueView

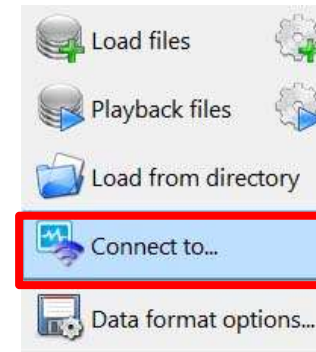


1. To mosaic rotational scan data you must enable the Stationary system override. Click the configuration icon to open the project configuration window.
2. Check the two boxes and input valid values for lat/lon and a starting heading.
3. Connect to Proviewer to begin mosaicking rotational scans.
4. If the Pan and Tilt unit was installed on a vessel (and hence inverted), invert the pan values by clicking on Add Data>Data format options, then going to the BlueView tab.

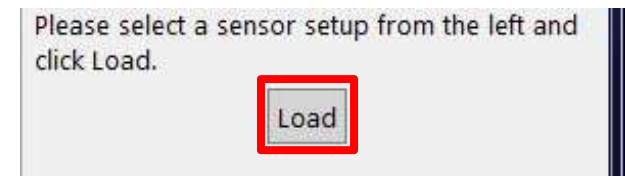


# Interface with a Gemini

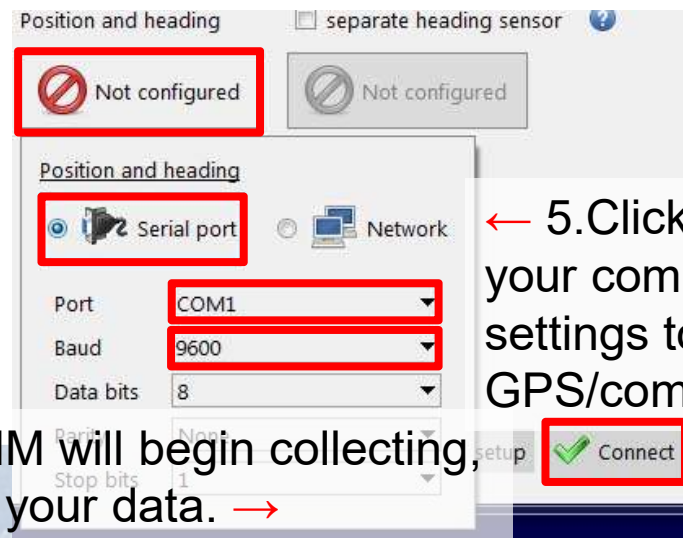
1. Make sure the Gemini sonar software is **NOT** running. Launch SAMM, create a project and click the **Add data** icon.
2. Click **Connect to...** from the dropdown menu.



- ← 3. Click **Tritech Gemini** then **Load**. →



4. Click **here** → to set your NMEA input.



- ← 5. Click **Serial port** then set your com port and baud rate settings to match your GPS/compass.

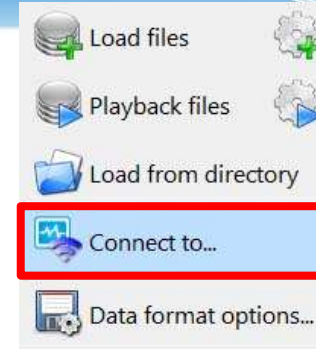
6. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data. →

# Interface with a Dolphin SeaView

1. Make sure the Dolphin SV sonar software is **NOT** running. Launch SAMM, create a project and click the **Add data** icon.

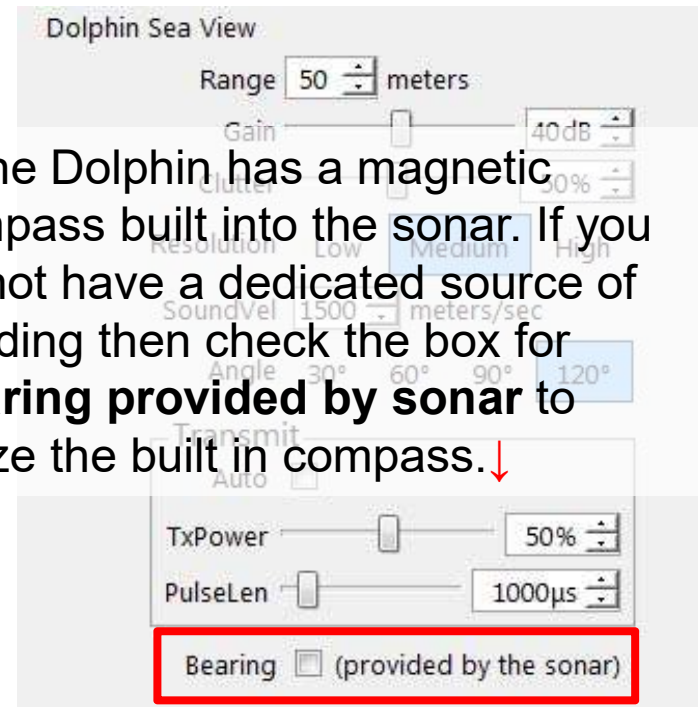


2. Click **Connect to...** from the dropdown menu.

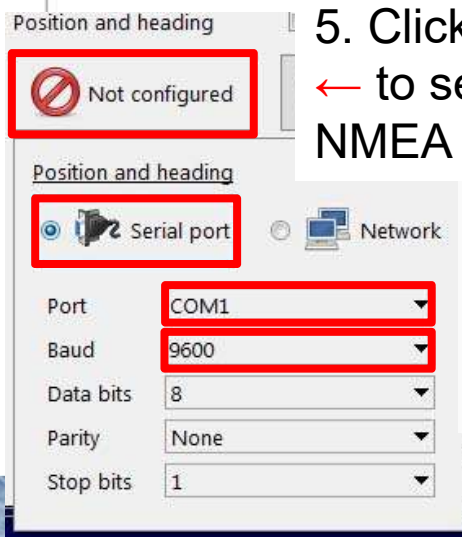


← 3. Click **Dolphin Sea View** then **Load**.

4. The Dolphin has a magnetic compass built into the sonar. If you do not have a dedicated source of heading then check the box for **Bearing provided by sonar** to utilize the built in compass. ↓



5. Click **here** ← to set your NMEA input.

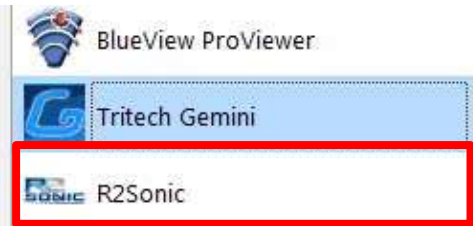
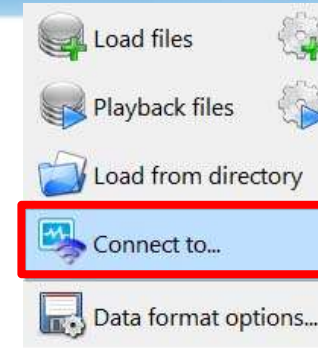


← 6. Click **Serial port** then set your com port and baud rate settings to match your GPS/compass.

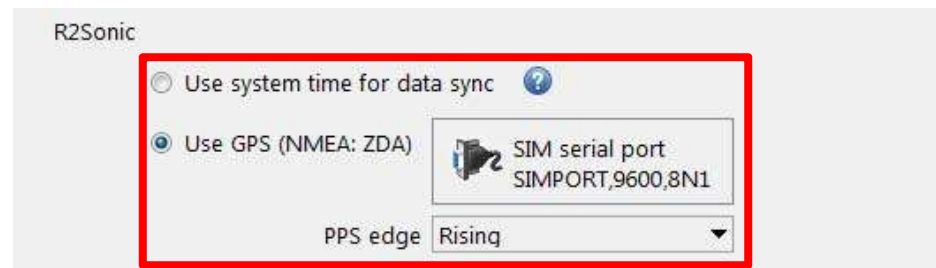
← 7. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data.

# Interface with an R2Sonic

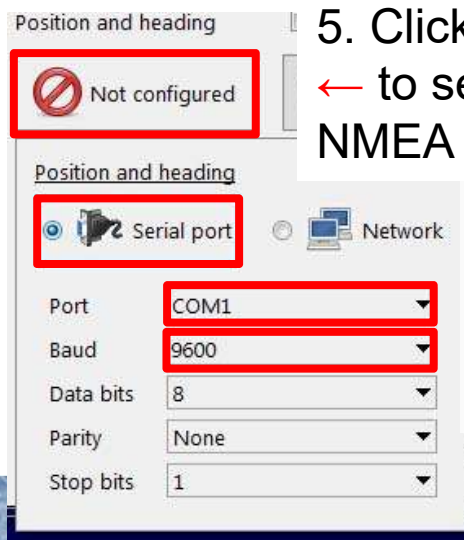
1. Make sure the R2Sonic sonar software is **NOT** running. Launch SAMM, create a project and click the **Add data** icon.
2. Click **Connect to...** from the dropdown menu.



← 3. Click **R2sonic** then **Load**.



4. Set your time source for data sync: ZDA and PPS brought in via the R2Sonic topside box, or system time of the acquisition computer.



5. Click **here** ← to set your NMEA input.

← 6. Click **Serial port** then set your com port and baud rate settings to match your GPS/compass.



← 7. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data.

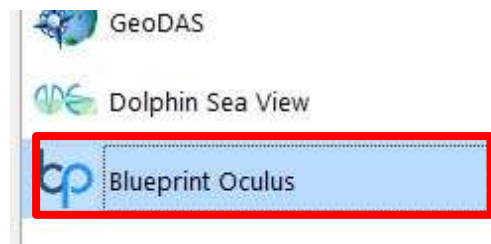
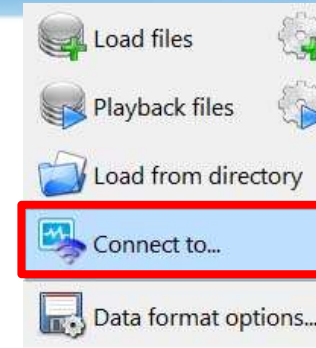


# Interface with Blueprint Oculus

1. Make sure the Oculus sonar software is **NOT** running. Launch SAMM, create a project and click the **Add data** icon.

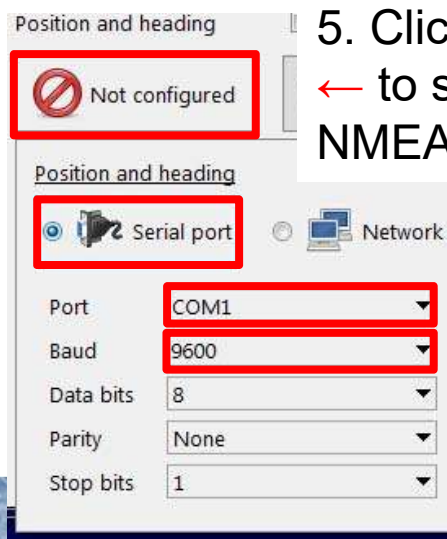
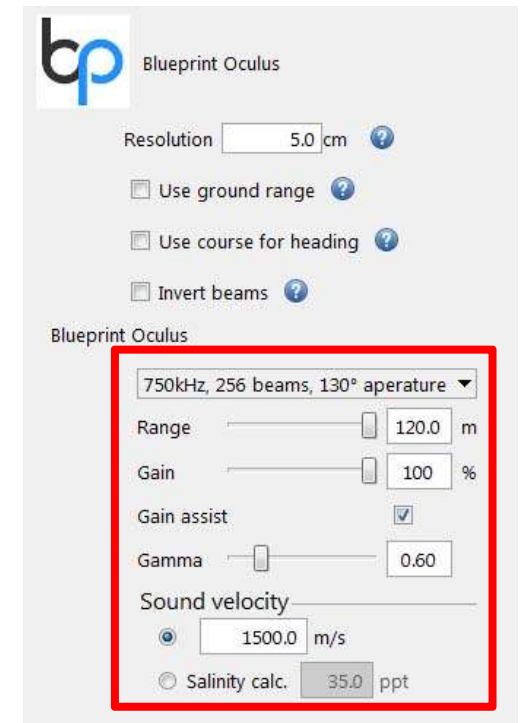


2. Click **Connect to...** from the dropdown menu.



3. Click **Blueprint Oculus** then **Load**.

4. Set the frequency, range, gain, gain assist, gamma, and sound velocity settings. We recommend gain assist off.



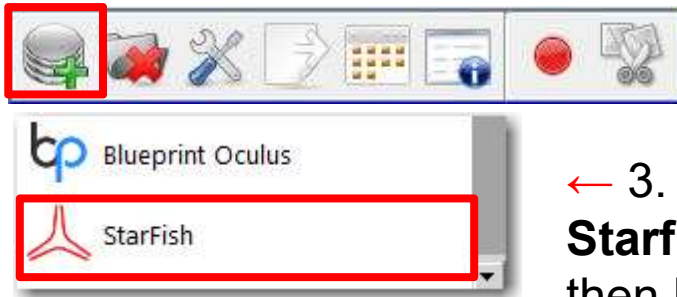
5. Click **here** ← to set your NMEA input.

6. Click **Serial port** then set your com port and baud rate settings to match your GPS/compass.

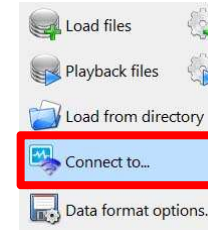
7. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data.

# Interface with Tritech Starfish

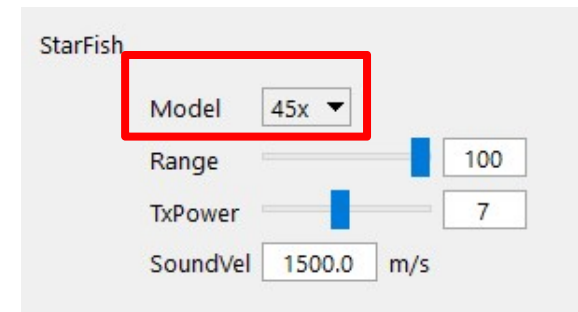
1. Connect Starfish to interface box, and box to SAMM computer. Supply power. Launch SAMM, create a project and click the **Add data** icon.



2. Click **Connect to...** from the dropdown menu.

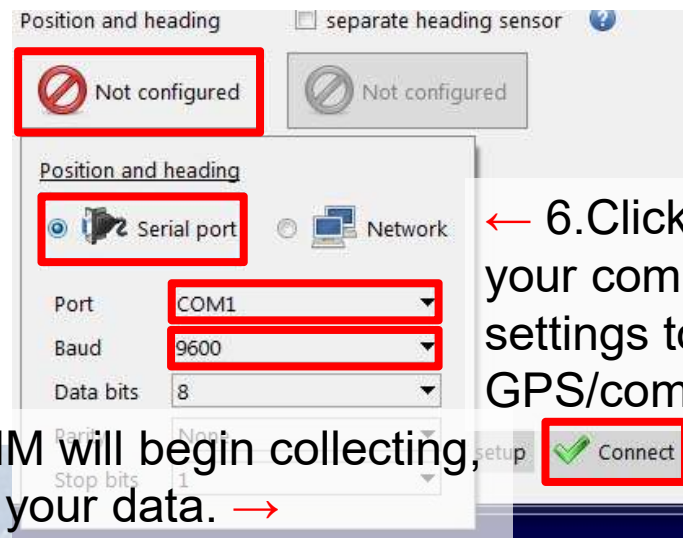


4. Set your Starfish model: 450, 452, 990



← 3. Click **Starfish** then **Load**.

5. Click **here** → to set your NMEA input.

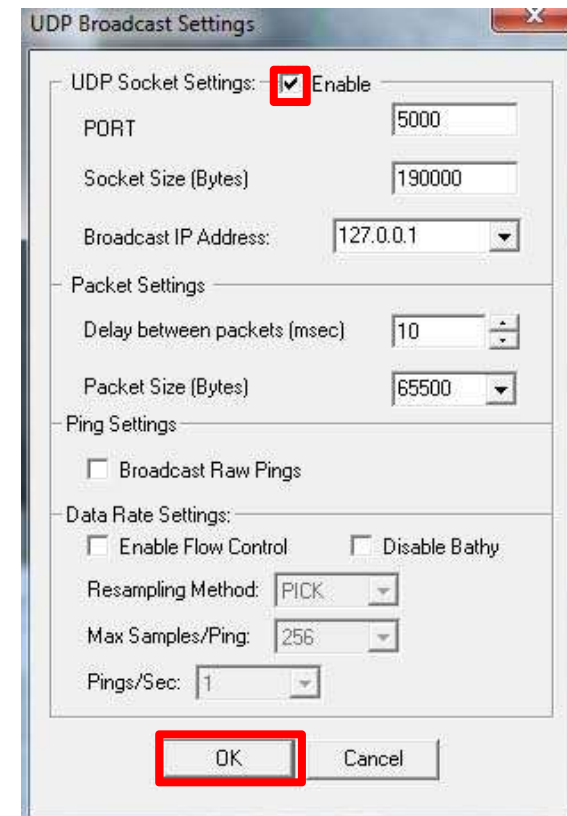
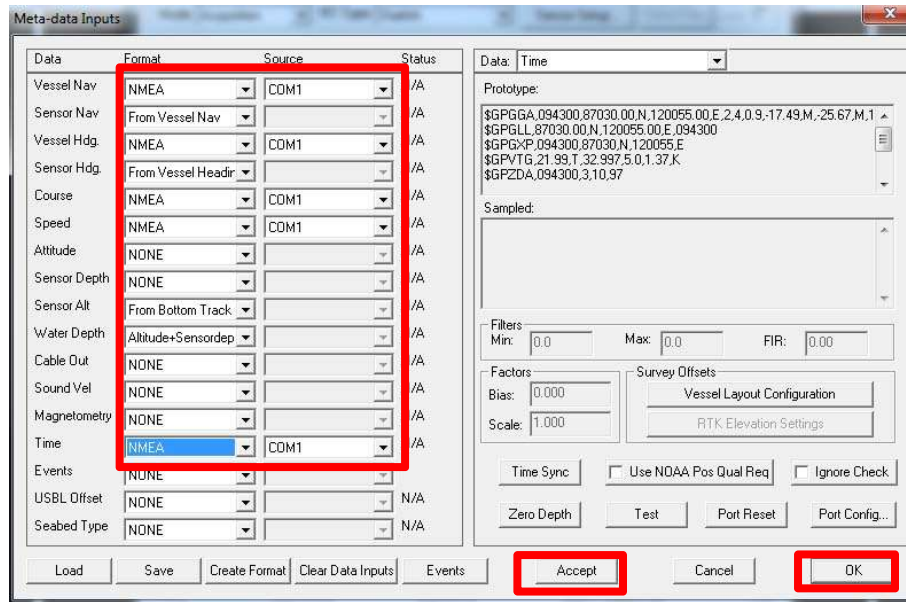
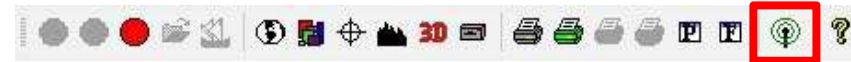


← 6. Click **Serial port** then set your com port and baud rate settings to match your GPS/compass.

7. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data. →

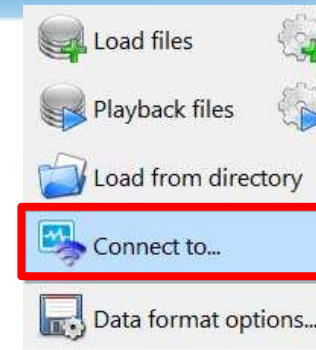
# Interface with GeoDAS

1. Launch GeoDAS, set Mode to Acquisition, sensor Starfish; Configure NMEA inputs, start GeoDAS and connect to the Starfish sonar.
2. Once connected and Data and Navigation are properly received, enable broadcast.



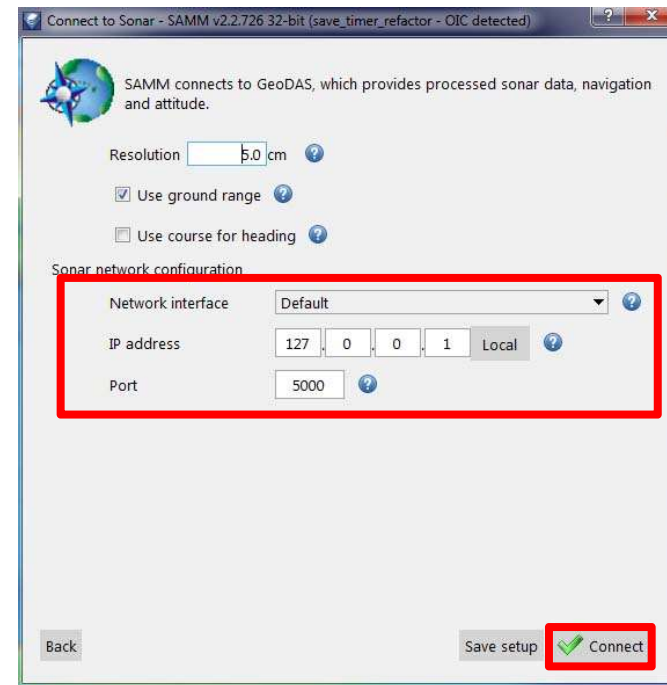
# Interface with GeoDAS

1. Make sure GeoDAS is running and broadcast is enabled. Launch SAMM, create a project and click the **Add data** icon.
2. Click **Connect to...** from the dropdown menu.

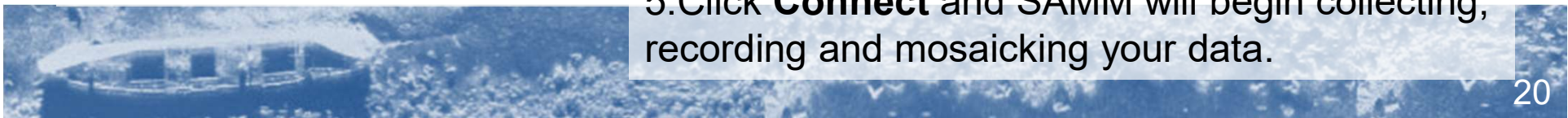


- ← 3. Click **GeoDAS** then **Load**.

4. If GeoDAS is running on the same computer, then 127.0.0.1 is the correct address to use, otherwise, enter the IP address of the GeoDAS computer here. Also be sure to match the port setting that was used in GeoDAS. 5000 is default.



5. Click **Connect** and SAMM will begin collecting, recording and mosaicking your data.



# Monitor Connection and Images

▼ **i** Live info

UTC **2014/02/01 01:15:02**  
**N21°16'44.487"**  
**W157°42'26.071"**

HDG **128.4 °** ALT **n/a m**


SND **1534.4 m/s** SYNC **1.334 s**

Live info feed looks accurate

## On SAMM: All Good

10.9 MB/s Pos:GGA Hdg:HDT

Status bar shows good connection

Image is present in PPI  
(click  to display)

## Troubleshooting Time

Troubleshoot in the sonar software first

- a. Dialog shows missing data types;
  - b. No live info;
  - c. Status bar shows no connection;
- Check connections, baud rates and cables.

▼ **i** Live info


UTC **1970/01/01 00:00:00**  
**N0°0'0.000"**  
**E0°0'0.000"**

HDG **0.0 °** ALT **n/a m**

SND **0.0 m/s** SYNC **0.000 s**


SAMM v2.0.636 32-bit (refs/tags/sa...

Device status

 BlueView ProViewer  
The socket has started establishing a

Data required for mosaicking

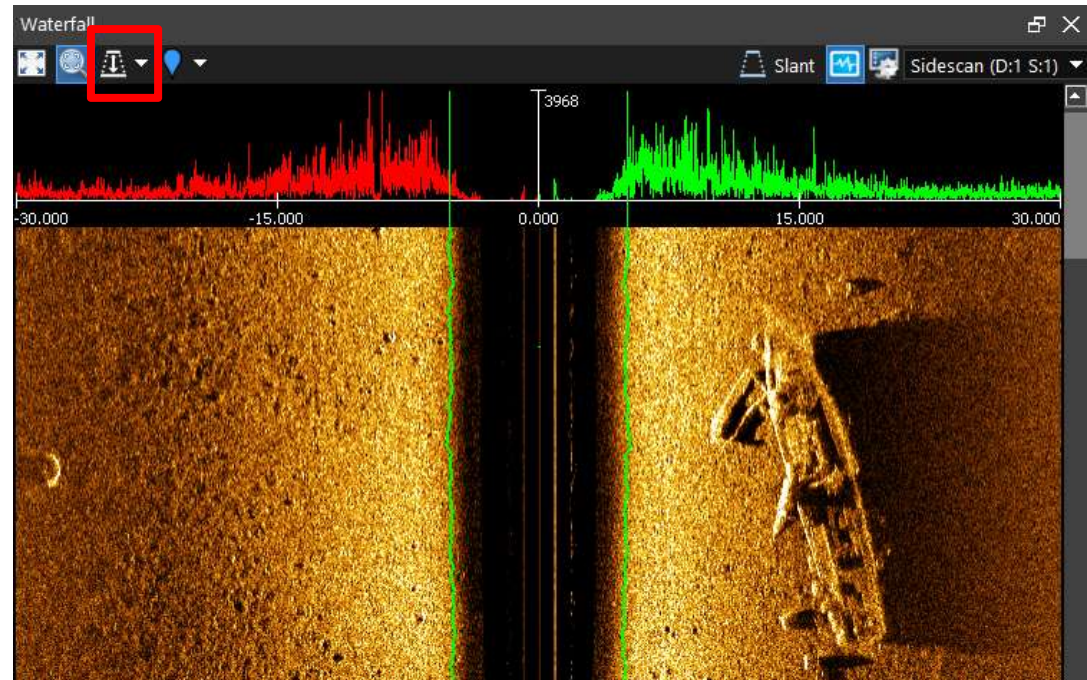
-  Latitude/Longitude
-  Heading
-  Sonar data

Disconnected  5.0cm Scanning inputs

## Sidescan data in SAMM

Open the waterfall window and review the oscilloscope, imagery, and bottom tracking.

SAMM now offers manual bottom tracking, for sidescan data. To track the first return from the bottom, select the “bottom-tracking” icon on the oscilloscope (highlighted in red) and then left click where you see the first return on the port or starboard data. You will have to click again if the bottom changes.

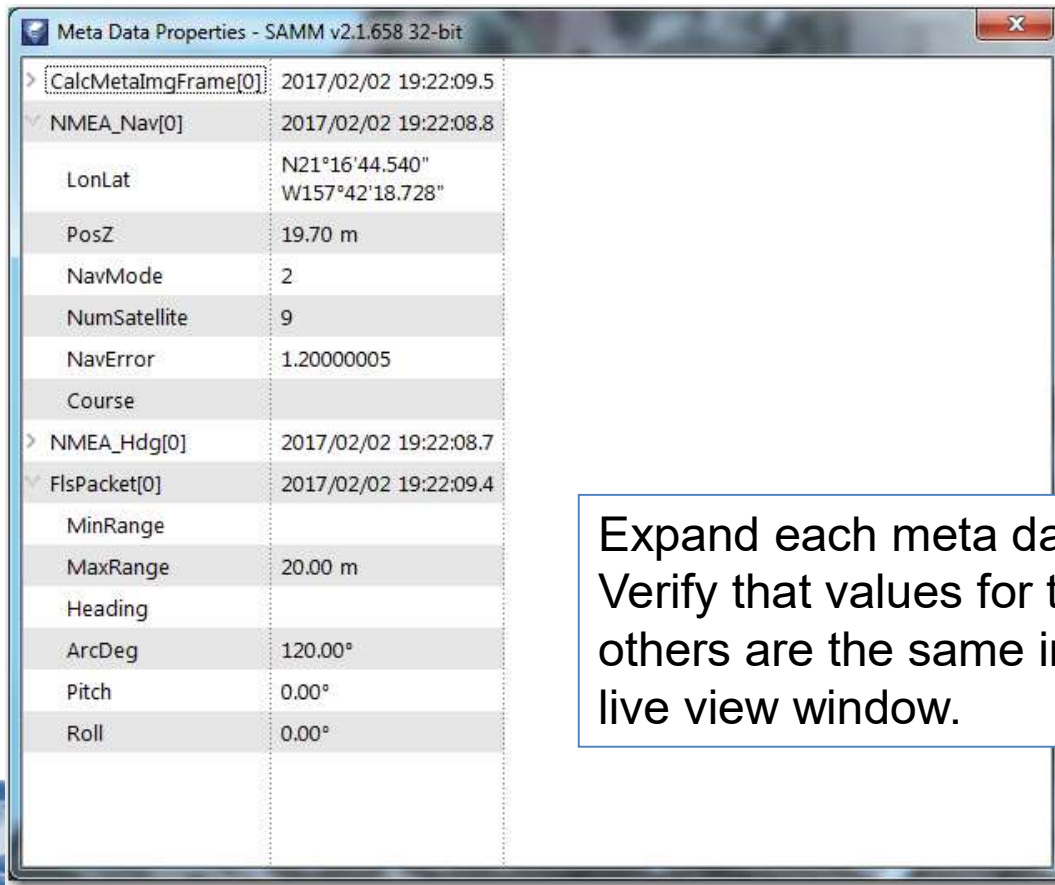


# Monitor Connection and Images

## Double check meta-data properties



Click on the meta data properties icon.



Stream Name	Timestamp	Value
[CalcMetaImgFrame[0]]	2017/02/02 19:22:09.5	
NMEA_Nav[0]	2017/02/02 19:22:08.8	
LonLat		N21°16'44.540" W157°42'18.728"
PosZ		19.70 m
NavMode		2
NumSatellite		9
NavError		1.20000005
Course		
NMEA_Hdg[0]	2017/02/02 19:22:08.7	
FIsPacket[0]	2017/02/02 19:22:09.4	
MinRange		
MaxRange		20.00 m
Heading		
ArcDeg		120.00°
Pitch		0.00°
Roll		0.00°



Parameter	Value	Parameter	Value
UTC	2017/02/02 20:42:06	ALT	n/a m
	N21°16'46.887"		
	W157°42'29.152"		
HDG	129.6 °	SYNC	0.665 s
SND	0.0 m/s		

Expand each meta data stream and view in real-time. Verify that values for time, position, heading and others are the same in the meta data streams as the live view window.

# Monitor Connection and Images

The screenshot displays a software interface for monitoring and processing data. The main window shows a map with a grid overlay. A large, semi-circular PPI (Plan Position Indicator) image is overlaid on the map, showing a textured, brownish-gold area. The PPI is aligned over the background imagery. The interface includes a taskbar at the bottom showing a connection speed of 5.9 MB/s and a window titled 'er\_2017-01-18\_T23-43-12\_000.msk' with a connection speed of 4.3 MB/s. The software interface has a sidebar on the left with sections for 'Live info', 'Processing controls', and 'Swath list'. The 'Live info' section shows UTC time 2013/04/03 20:57:31, coordinates N21°16'48.183" W157°42'30.810", HDG 131.5, ALT n/a, SND 1500.0 m/s, and SYNC 0.000 s. The 'Processing controls' section has tabs for FLS and SLS, and various sliders and checkboxes for Arc, Rng, Ground range, Invert beams, and Course. The 'Swath list' section shows a checked item 'Swath\_0'. The main map area has a grid with coordinates N21°16'49.0", N21°16'48.0", and W157°42'30.0".

**All Good**

← Live info feed looks accurate

↓ Image is present in PPI

↑ PPI is aligned over background imagery

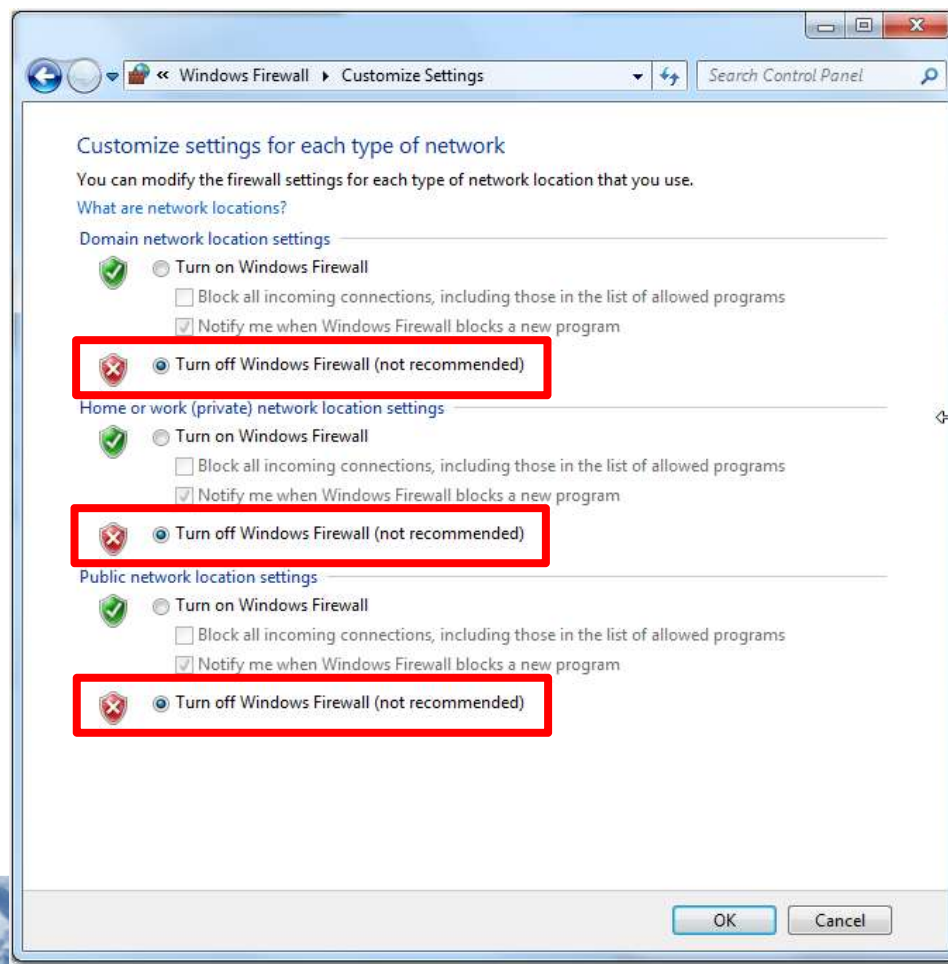
↓ Taskbar shows good connection



# Troubleshooting

If your sonar software sees the sonar, nav and heading sources, but SAMM doesn't:

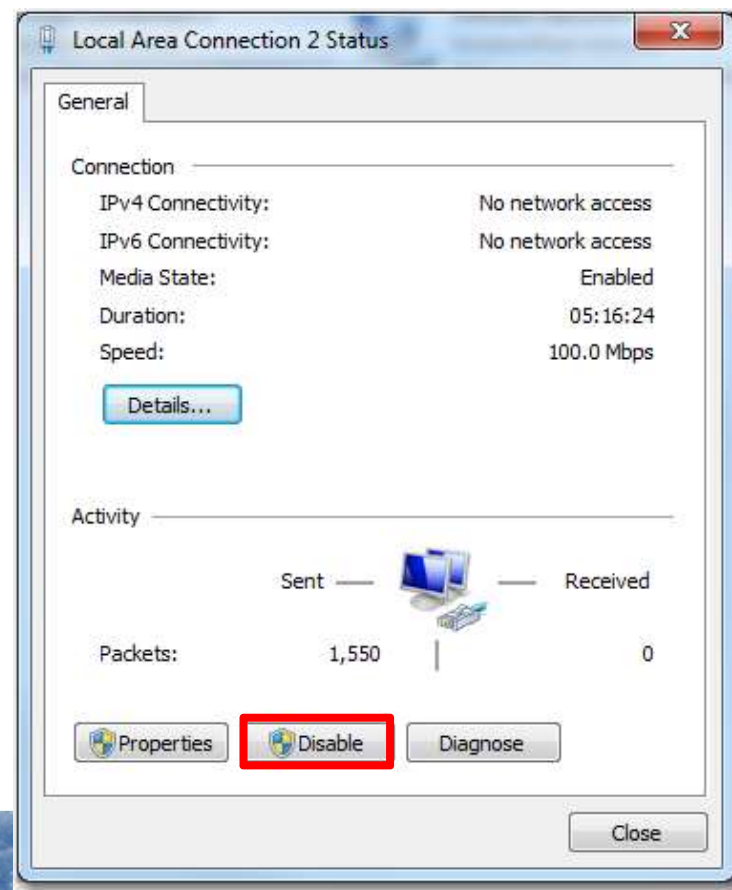
1. Turn off your firewall from the Windows Firewall customization screen (Control Panel). Disable or set SAMM exceptions in all other firewalls.



# Troubleshooting

If your sonar software sees the sonar, nav and heading sources, but SAMM doesn't:

2. Disable all network adaptors other than the one hosting the Ethernet port to which the sonar is connected. From the Control Panel in the Network and Sharing Center, double-click on the network (Windows 7 pictured).



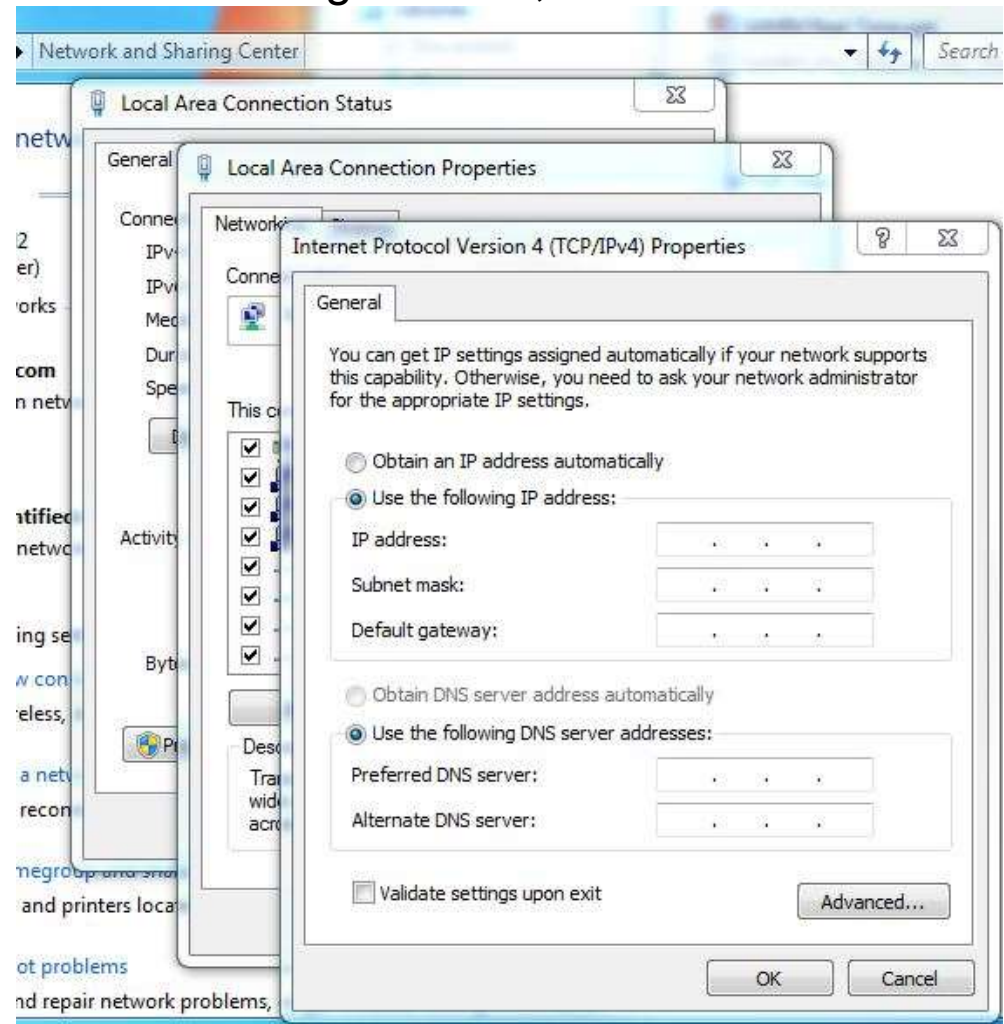
# Troubleshooting

If your sonar software sees the sonar, nav and heading sources, but SAMM doesn't:

3. If you are running SAMM on a different computer than the sonar software host computer, check that the SAMM computer is on the same network as the sonar and sonar software host computer. From the network and sharing center, open the local area connection properties. Open the TCP/IPv4 Properties (double-click on Windows 7) and choose **Use the following IP address**. Match the first three sets of numbers to the sonar and sonar host computer numbers, then for the fourth set, use any number OTHER THAN the sonar and sonar host computer IP addresses. Set the Subnet mask to 255.255.255.0.

M3: 192.168.1.xxx, not 233 or 234.

BlueView: 192.168.1.xxx, not 3 or 45



# Configure Installation

1. Click the **Configuration** icon. (You may want to also click the **Record** icon to stop logging during setup.)



2. In the Survey Setup area, enter your offsets. (These are saved between projects.)

Where are your sonar head and navigation source relative to the center of your boat?  
(measure/estimate in meters or change the unit under Display)

X = Port / Starboard (positive number = starboard, negative number = port).

Y = Fore / Aft (positive number = fore, negative number = aft).

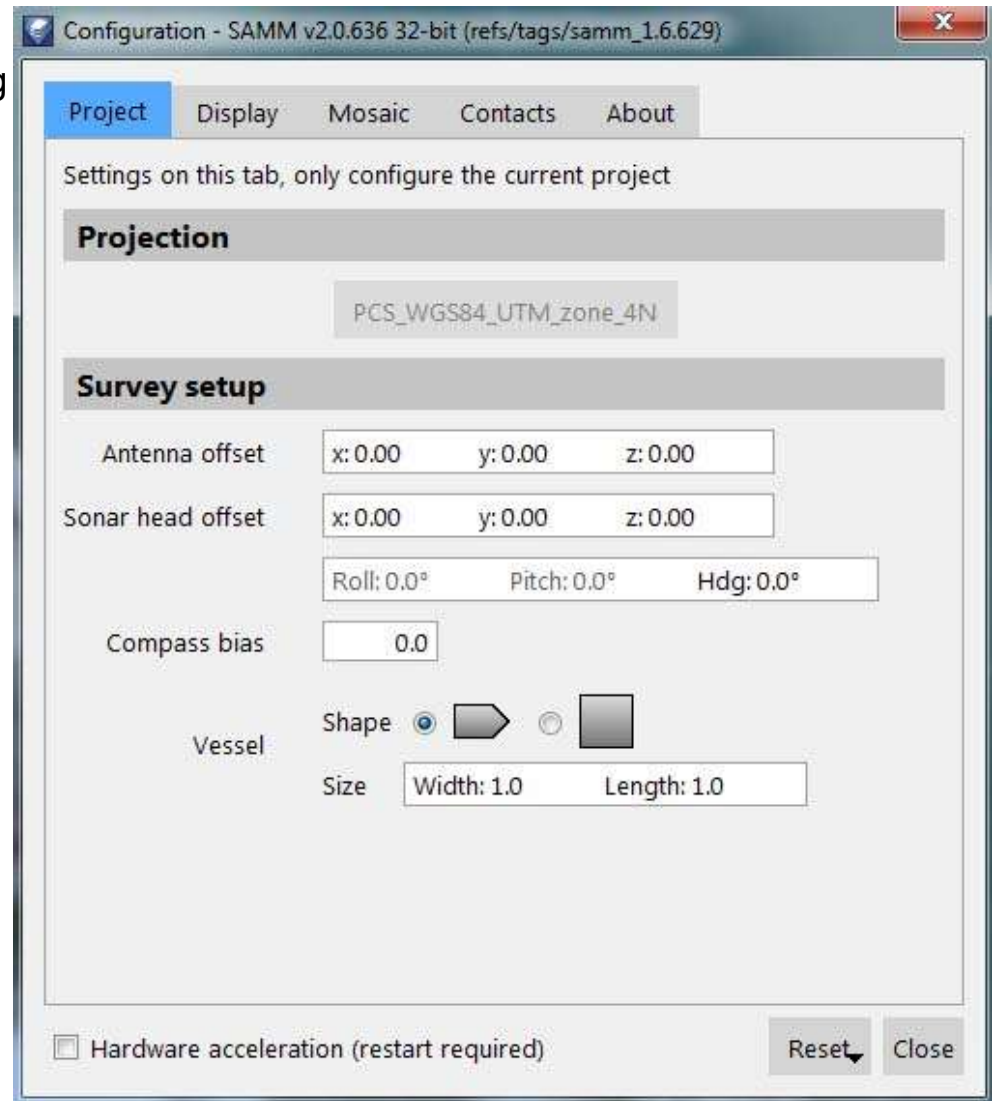
Z = Height (positive number = above reference point, negative number = below reference point).

Where are your heading source and sonar pointing in relation to where your boat is pointing?

(Use the results of a heading offset calibration or estimate the sonar head and compass mounting biases in degrees. Add the declination for your location to the compass bias if you have a magnetic compass.)

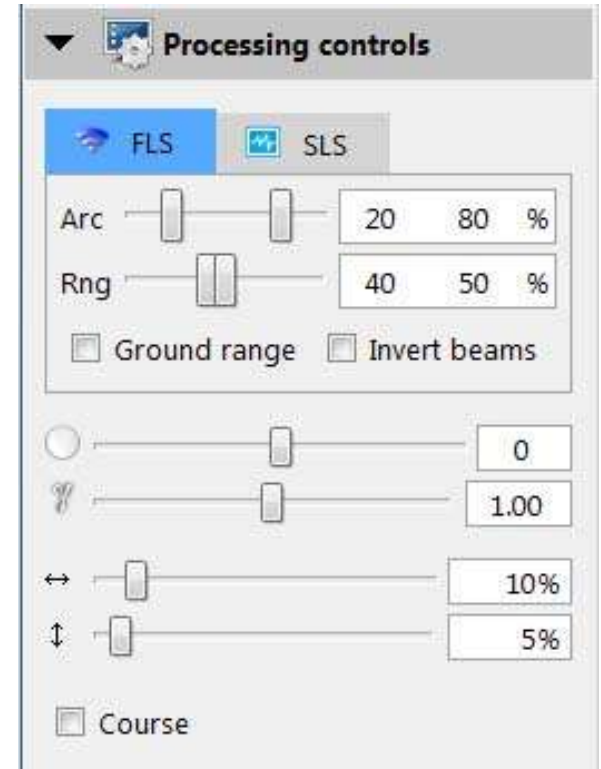
Clockwise from boat direction is positive and counterclockwise from boat direction is negative.

3. Click **Close**.



# Tune Image

1. Find the **Processing Controls** under the **Live info** panel.
2. In the **Processing Controls**, change the Arc and Range sliders to trim which portion of the PPI is mosaicked.
  - The best values depend on where the best image is in the PPI.
3. Change the Brightness and Gamma sliders to change the image contrast.
  - The best values depend on the survey.
4. In the **Feathering Panel**, change the Horizontal and Vertical sliders to set across-track and along-track blending in the mosaicked images.
  - This adjusts the blending along-track and track to track.
5. Check the “Course” box to use course if heading is not present.



# Modes of Operation

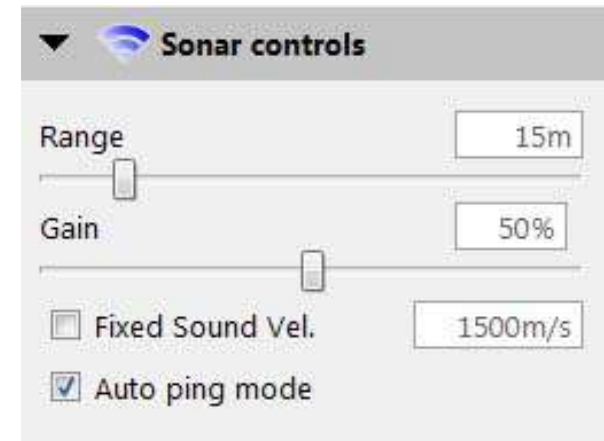
- For Starfish, M3 and BlueView control sonar range and gain in GeoDAS or the native sonar software, using recommended settings
- For Oculus, Tritech Gemini, Marine Electronics Dolphin and R2Sonic, use the controls in SAMM.
- Examples are shown below.



# Control Gemini

ADJUSTING THESE CONTROLS AFFECTS THE RAW DATA!

- Range and Gain are the same as in the Gemini sonar software.
- Fixed sound velocity should only be checked if you have reason to believe your sound velocity probe is faulty. 1500m/s is standard.
- Auto ping mode should be checked unless your computer is having trouble keeping up with the sonar (SAMM seems slow). By default, SAMM lets the sonar ping as quickly as it can send out the last received ping. Unchecking this box gives SAMM control of when the sonar pings. SAMM will send a command to the Gemini when it has processed the last ping sent from the sonar.



# Starfish Sample

Mosaic view controls for  
Zooming/centering on vessel ↓



StarfishTest050218 - SAMM v2.7.931 32-bit (OIC detected)

Mosaic View

Hide sidebar

Live info

UTC 2018/05/02 22:29:30  
N21°16'47.293"  
W157°42'28.947"

HDG 321.0° ALT 0.0 ft  
SVEL 0.0 ft/s SPD 0.0 knts

Sonar controls

Model 45x  
Range 100  
TxPower 7  
SoundVel 1500.0 m/s

Processing controls

FLS SLS

Clip 0.00 311.68 ft  
Normalization Layback

Swath list

- StarFish\_2018-05-02\_T20-07-00\_000.m
- StarFish\_2018-05-02\_T20-07-00\_000.m
- StarFish\_2018-05-02\_T20-07-00\_000.m
- StarFish\_2018-05-02\_T20-07-00\_000.m
- StarFish\_2018-05-02\_T20-07-00\_000.m
- StarFish\_2018-05-02\_T20-07-00\_000.m
- StarFish\_2018-05-02\_T20-07-00\_000.m

Waterfall

Slant Sidescan (D1 S1)

↑ Click **Record toggle** to log your data. On when indented.

← Starfish sonar controls.

Display settings for  
← image tuning.

↑ We've seen this before...

↑ Status bar says it's connected, data and navigation streams are coming in.



# Gemini Sample

Mosaic view controls for  
Zooming/centering on vessel ↓



↑ Click **Record toggle** to log your data.  
It's on when indented.

Hide sidebar

Live info

UTC 2013/11/27 01:07:39  
N21°17'0.074"  
W157°42'23.299"

HDG 216.4 ° ALT n/a m  
SND 1537.6 m/s SYNC -1.066 s

Sonar controls

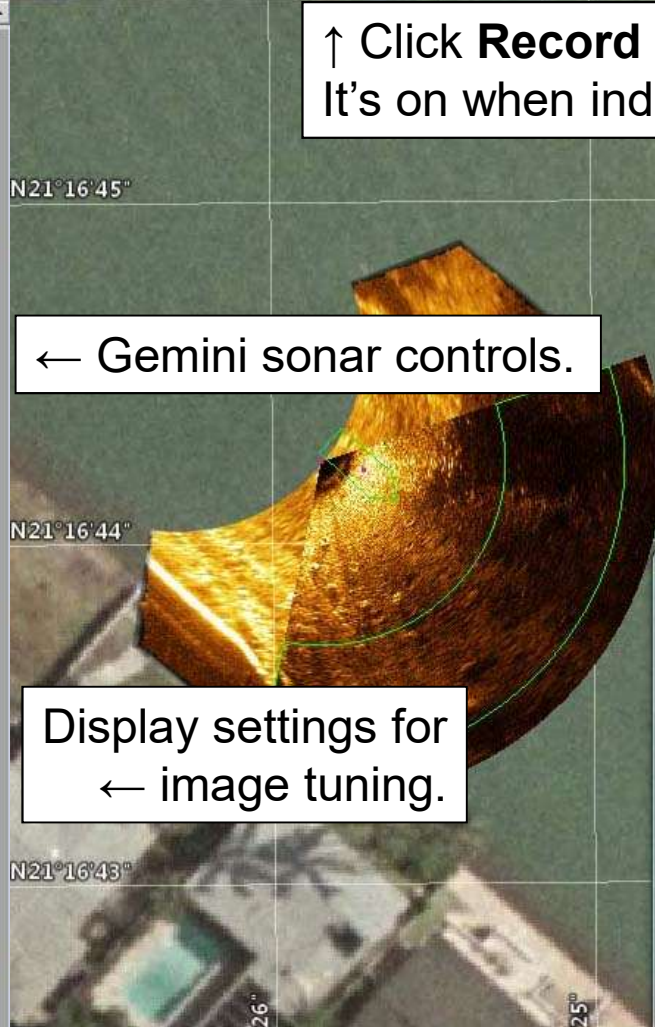
Range 15m  
Gain 50%

Fixed Sound Vel. 1500m/s  
 Auto ping mode

Processing controls

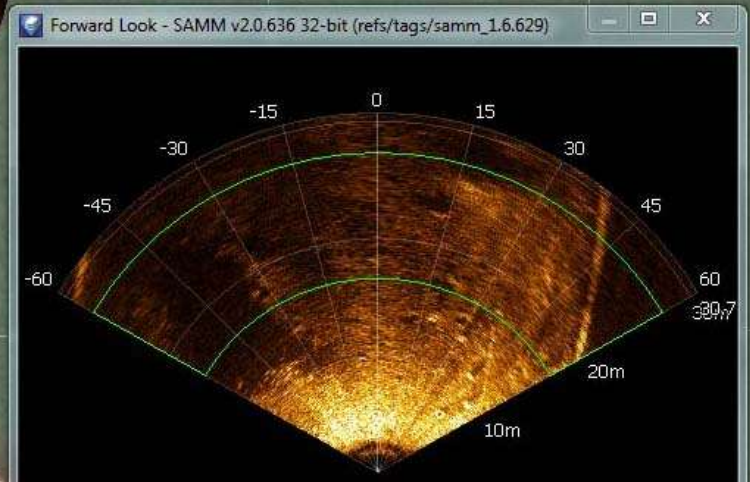
Arc 0 99 %  
Rng 50 60 %  
-5  
1.00  
0%  
0%

Ground range  
 Course



← Gemini sonar controls.

Display settings for  
← image tuning.



↓ Status bar says it's connected, data and navigation streams are coming in.

Connected Pos:GGA Hdg:HDT 5.0cm r\_2017-01-24\_T19-30-05\_000.msk 118.5 KB/s N20°0'2.917" W158°0'0.159"

# Dolphin Sample

Mosaic view controls for  
Zooming/centering on vessel ↓



↑ Click **Record toggle** to log your data. It's on when indented.

← Dolphin sonar controls.

Display settings for  
← image tuning.

↓ Status bar says it's connected, data and navigation streams are coming in.

UTC 2017/01/25 19:37:39  
N21°10'38.372"  
W157°7'45.699"  
HDG 330.0 ° ALT n/a m  
SND 0.0 m/s SYNC 36000.016 s

Range 50 meters  
Gain 40dB  
Clutter 50%  
Resolution Low Medium High  
SoundVel 1500 meters/sec  
Angle 30° 60° 90° 120°  
Transmit Auto  
TxPower 50%  
PulseLen 1000µs  
Bearing (provided by the sonar)

Processing controls  
FLS SLS  
Arc 0 100 %  
Rng 50 60 %  
Ground range Invert beams  
0 1.00 10%

4.4 MB/s Pos:GGA Hdg:HDT 5.0cm ...\_2017-01-25\_119-37-07\_000.msk 203.3 KB/s

# R2Sonic Sample

Mosaic view controls for  
Zooming/centering on vessel ↓



↑ Click **Record toggle** to log your data.  
It's on when indented.

Hide sidebar

Live info

UTC 2016/11/02 22:29:46  
N21°16'51.866"  
W157°42'35.015"

HDG 121.3 ° ALT n/a m  
SND 0.0 m/s SYNC 0.337 s

Sonar controls

RNG 100 m WIDTH 90.0 °  
BRT 30.0 dB ROT 0.0 °  
GAIN 20.0 dB PWR 200 dB  
Plen 50 μsec TX  On

Processing controls

FLS SLS

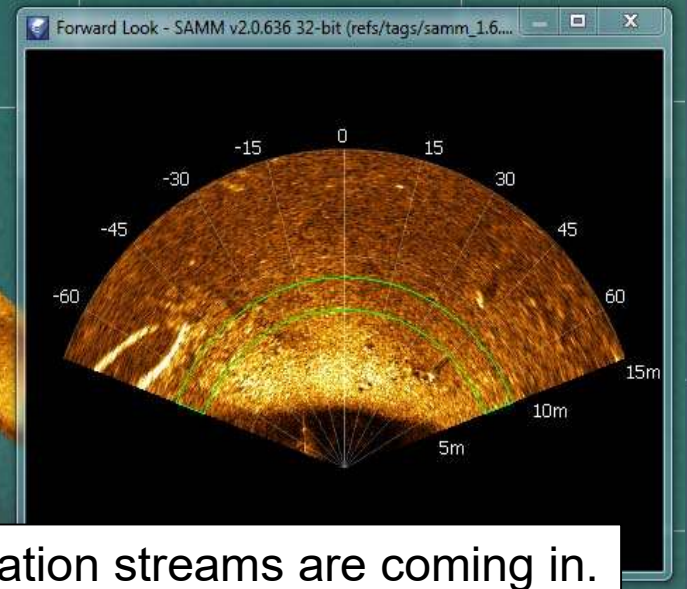
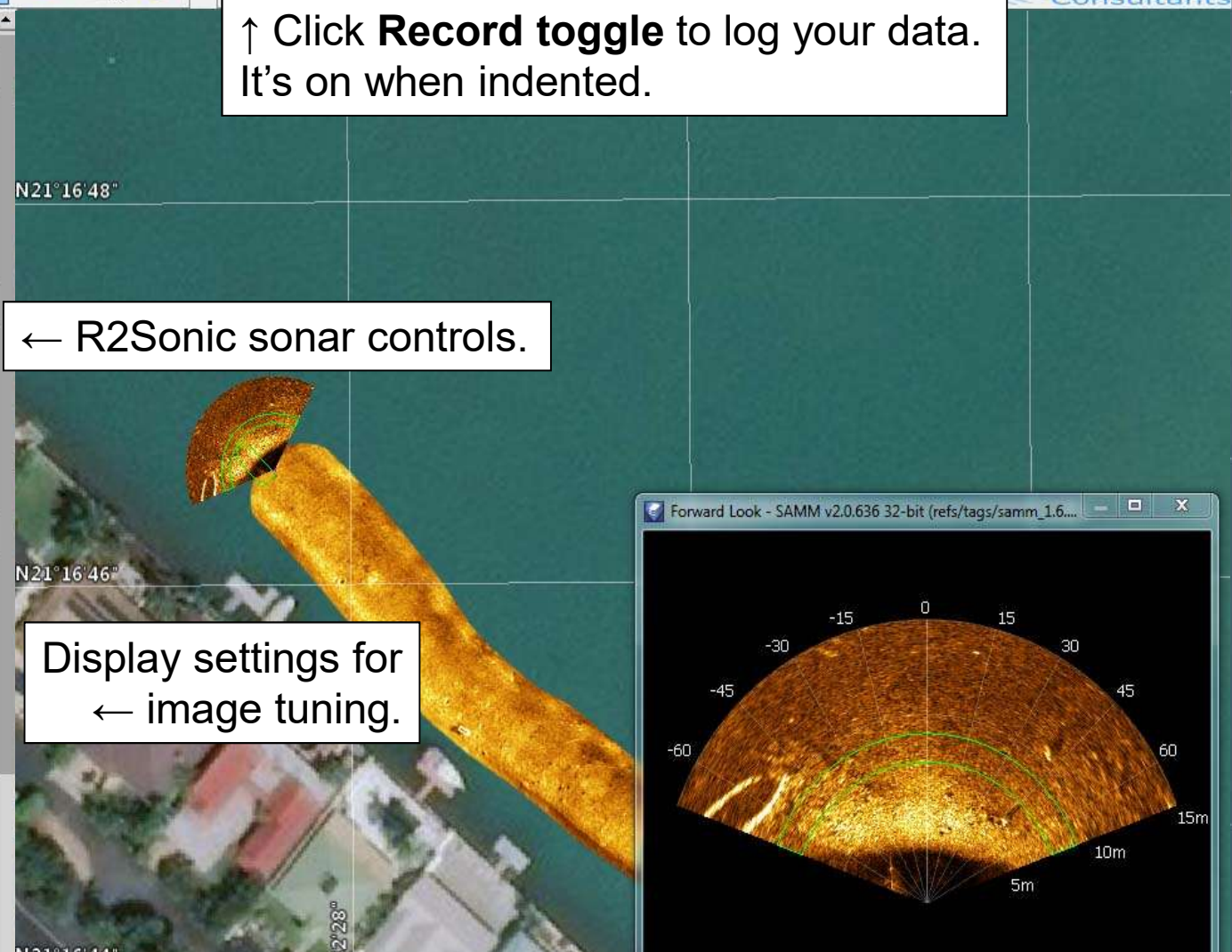
Arc 0 100 %  
Rng 50 60 %  
 Ground range  Invert beams

0  
1.00  
10%  
5%

Course

← R2Sonic sonar controls.

Display settings for  
← image tuning.



↓ Status bar says it's connected, data and navigation streams are coming in.

↑ Connected Pos:GGA Hdg:HDT 5.0cm r\_2017-01-24\_T19-30-05\_000.ms 118.5 KB/s N20°0'2.917" W158°0'0.159"