Seafloor™ EchoBoat-240™

Uncrewed Survey Vessel

User Manual

Table of Contents:

Seafloor™ EchoBoat-240™

Uncrewed Survey Vessel

Thank you for your recent purchase of the Seafloor EchoBoat-240 Uncrewed Survey Vessel or "USV". EchoBoat-240™ allows users to integrate robust equipment payloads and obtain professional-grade survey results remotely. It is ideal for launching from a trailer or cart in areas where a manned boat is not feasible. Live props reduce weed entanglement, and the SVP is encapsulated in the bow. The wave-piercing hull was designed to efficiently collect data and save time in the field. It can also be lowered via davit from a survey boat to be used as a force multiplier, working alongside the main vessel.

The EchoBoat-240's multi-payload ability makes owning and operating this remote control survey vessel convenient to all in the Hydrographic Community.

Parts List

Number	Description	QTY
1	EchoBoat-240	1
2	Fast Charger	1
3	Shore Side Antenna	1
4	Shore Side POE w/10' ethernet cable	1
5	Transmitter w/USB cable charger	1
6	Long Range Module w/Battery and Charger	1

Tools List

1	Hatch Wrench	1

EchoBoat-240 Safety and Cautions

Always practice caution when working with electricity in water by avoiding exposed wires and electrical circuits. Keep body parts away from the props to avoid injury.

When shutting down, always power down the boat using the main power switch before shutting down the remote control. Again, it is recommended to shut down the remote control last when powering down to reduce potential loss of control.

Do not operate the thrusters for an extended period outside of the water. The motors are cooled by the water.

The thrusters can handle saltwater and sandy environments, however, to avoid damage, refrain from sucking debris into the thruster by avoiding plants, weeds, and other aquatic debris.

When powering on the EchoBoat-240, always turn on the remote control unit before powering on the boat. Failure to do so could cause the receiver on the boat to not detect a controller signal, and unexpectedly enter a fail-safe mode.

Improperly installed instruments can cause water ingress. Never try to operate the EchoBoat-240 without properly installed instruments verified by Seafloor Systems.

EchoBoat-240 Specifications

- Vessel weight 350lbs
- Survey speed 1m/s (1.94knots)
- Max speed 2.06m/s (4knots)
    - ❖Survey speed endurance is 10hrs with T50 at full power
    - ❖6hrs at max speed with T50 at full power
- Cargo capacity 150lbs
- Impact resistant HDPE
- Length 8 ft. (2.4m)
- Width 3ft (.91m)

IMPORTANT EchoBoat-240 Limitations

To limit potential damage to the EchoBoat-240, Seafloor Systems doesn't recommend using the USV in the following conditions.

- Above Sea State 3
- Operational Air Temperature Range: 14 – 113F (-10 – 45C) Batteries
- Operational Water Temp Range: 28.4 – 96.8F (-2 – 36C) T50 Transducers
- Range: 2km Line of Sight Maximum (Greater than 2km without advanced Comms kit)
- Survey Duration: See Battery Chart
- Lithium Batteries: Minimum voltage is 21V – **DO NOT DISCHARGE BELOW 21V**. Battery shuts down at 21V.
- Towing: Advised to avoid towing for safety. If towed, keep speed below 5 knots and mount tow rope high on towing vessel.
- Charging: On land only. No protections for on water charging.
- Weather Conditions: Do not use USV in adverse weather. Thunderstorms, lightning hurricanes, monsoons, extreme heat, strong current, strong winds, heavy rain, etc.

IMPORTANT EchoBoat-240 Maintenance

- Monthly:
    - Lube deck hatch seals with O-Ring grease
    - Trailer:
        - Tire pressure
        - Check bolts are tight
        - Check bearings are greased
            - Add grease as needed
- Yearly:
        - Change water filter

IMPORTANT EchoBoat-240 Storage

- Store indoors with all hatches open to air out
- Battery storage charge range 22.6-24.2V
- EchoBoat Payload is dry

IMPORTANT EchoBoat-240 After Each Use

- Inspect for leaks
- Full freshwater wash down. Do **NOT** directly spray main hatch seal. Do **NOT** pressure wash sonar components.
- Dry out and let air out with hatches open, if able.
- Re-wind SmartCast rope

Battery Safety

Torqeedo Battery Safety

DANGER

This symbol warns about risks of injury to yourself and others.

The product is designed to operate safely and reliably as long as it is used according to the operating manual. Please read this manual carefully before starting the battery. Non-com-pliance with these instructions may cause property damage and/or bodily injury. Torqeedo assumes no liability for damage caused by any activities contrary to the present operating manual.

To ensure safe operation of the battery:

- Before every use, check the condition and functionality of the battery.
- Only let adults run the battery who have been instructed on operation of the latter.
- In case you don‘t use the battery with Torqeedo products and cable sets, please use suitable cable cross-sections for connecting the equipment (risk of fire).
- Torqeedo cable sets always contain a main switch and suitable fuse. In case you should not use Torqeedo cable sets for electrical installation, always use a main battery switch approved for switching current and equipped with a fuse.
- Voltages of up to 60 V may occur on contacts. Avoid contact with hands.
- Even though Power 24-3500 meets requirements of IP 67 protection class (protection against temporary immersion in water), it should not be exposed to long-term moi-sture or placed in water in order to prevent risks of short-circuits in case of untight housings.
- Secure Power 24-3500 to prevent slipping and tilting. Only mount battery in a horizon-tal position, grips directed upwards.
- Before the first use, charge the battery completely in order to calibrate the charge level readout.
- The Torqeedo Power 24-3500 can only be stacked for storage, it must not be stacked in operation.
- When connecting more than one Power 24-3500 battery to form a battery bank:
    - Batteries connected in series and in parallel must imperatively have the same state of charge. Thus only use same type of batteries for interconnection (same capacity, age, manufacturer and state of charge) and fully charge every battery separately with the charger before their interconnection. Differences in state of charge may induce extre-mely high compensating currents overcharging cables and connectors or the battery itself. In extreme cases even fire or injury may be the result.
    - Incorrect interconnection of lithium batteries induces much higher short circuit cur-rents than it is the case for lead batteries. Although Power 24-3500 is protected against high compensating currents, we urge you to have interconnection of multiple Power
        - 3500 batteries performed by specialized staff.

- Never open battery housing. Protect battery against mechanical damage. In case battery housing has been damaged:
  - Neither use nor charge battery any more. There is a risk of fire.
  - In case any electrolytes should leak from damaged battery, avoid skin contact and direct inhalation of gases. In case your skin or eyes have come into direct contact with electrolytes leaking from the battery, rinse them thoroughly with clear water. Immedi-ately contact a doctor. Contact Torqeedo service center for information upon disposal of the damaged battery.
- Absolutely avoid wearing metallic jewelry when working on or staying beside bat-teries. Do not place metallic tools on the batteries either as this may induce court-circuits. Only use insulated tools.
- Only charge battery on a non-flammable surface under supervision of an adult.
- Only charge battery at ambient temperatures of between 0°C and 45°C / 32°F and 113°F.
- Keep battery away from fire.
- Please note that since 2009, lithium batteries with a capacity of >100 Wh may no longer be carried as luggage in passenger planes. This battery exceeds said threshold and may therefore neither be transported as hand luggage nor in the hold of passen-ger planes.
- Battery is declared as hazardous good according to UN Class 9. In case of transpor-tation of the product by transportation companies, original packaging must be used. Private transport is not affected by this ruling. In case of private transport, make sure that battery housing is not damaged.
- For the event that shipping should become necessary at a later moment, keeping of original packing is recommended.
- Beside these selected warnings, please observe complete operating manual.
- The battery may be transported only while disconnected from the power supply. The battery can either be switched off manually for that purpose or will switch off automa-tically within 48 hours after use.
- Make sure to check the charge status of the battery regularly during long-term sto-rage. Recharge if necessary.

WATCH OUT

This symbol warns about possible risks of damage caused to or injuries caused by the battery.

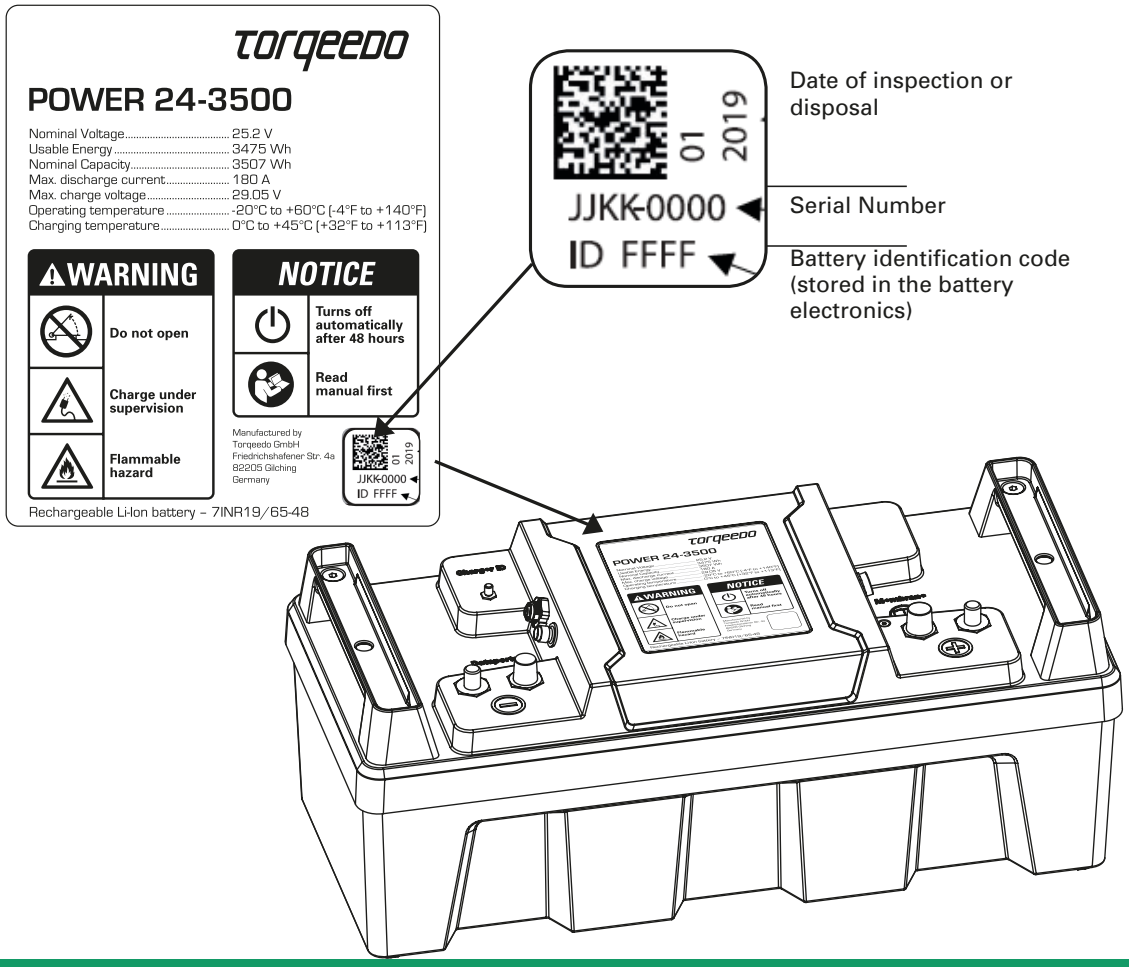
In the following, please find a selection of the most important instructions for operation of Power 24-3500 battery. Beside these, please also observe complete operating manual to prevent any damage to the battery.

- Only use equipment that does not draw more than 180 amps from one battery (at nominal voltage corresponding to 4,660 watts). In case of batteries connected in parallel you may draw 180 amps from each connected battery (in case of 2 batteries connected in parallel, this corresponds to a withdrawal of 360 amps or 9,320 watts). Higher con-sumption will trigger the electronic fuse. After elimination of overload, battery may be switched on again.
- Insure correct polarity when connecting equipment and chargers.
- You will extend battery‘s service life if you do neither expose it directly to the sun nor to high ambient temperatures longer than necessary. When stored for a longer period of time, battery should have a residual charge of 20-40 %. Regularly check voltage so that it is always higher than 21 V in order to prevent total discharge. Drawing on page 52 will help you to precisely define your checking intervals.
- Ideal battery storage temperature is between 5° and 15°C / 41°F and 59°F.

Information

Identification and technical data

Please find type plate exhibiting complete product description at the spot shown in the figure.



Technical data

General characteristics		
Capacity	3,507 Wh	
Nominal voltage	25.2 V	
Final charging voltage	29.05 V	Reversible protected mode*
Final discharging voltage	21.0 V	Reversible protected mode*
Nominal charge	139.2 Ah	
Maximum discharge rate (A)	180 A	Safety function, not a starter battery
Maximum discharge power (W)	4,660 W	
Weight	25.3 kg / 55.8 lbs	
Dimensions	577.5 x 218.5 x 253.5 mm / 22.7 x 10 x 8.6 inches	
Volume	32 l	
Battery chemistry	Li-NCA	
Benchmark information		
Energy density (Weight)	138 Wh/kg / 63 Wh/lbs	
Energy density (Volume)	110 Wh/l	
Power density (Weight)	180 W/kg / 81.8 W/lbs	
Power density (Volume)	141 W/l	
Lifetime data		
Cycle lifetime	800 cycles at 100% deep discharge at 25 °C / 800 cycles at 100% deep discharge at 77 °F	Results in approx. 25% capacity loss
Average capacity loss per year	Ca. 4% at 25 °C ambient temperature /Ca. 4% at 77 °F ambient temperature	Depending on utilization and environmental temperature
Usage information		
Cell operating temperature	-20 °C to +65 °C / -4 °F to +149 °F	
Cell charging temperature	0 °C to +45 °C / 32 °F to +113 °F	
Storage temperature	-30 °C to +55 °C / -30 °F to +131 °F	
Typical storage time at 50% charge	1 year	
Max. Connections	2S8P or 1S16P	For larger battery banks refer to Torqeedo
Max. quick charge	100 A	Charging time < 1.2 hours
Protection class	IP 67	Waterproof, can be submerged up to 1 meter for 30 minutes without damage

Battery composition		
Number of cells	336	
Cell housing	Steel cylinder safety cell	
Capacity per cell	2.875 Ah	
Nominal voltage per cell	3.6 V	
Cell connection	7s48p	
Battery management system and safety		
On-Off switch	Yes	
Cell-Balancing	Yes	Increases the lifetime of the battery
High current and short circuit protection	Yes	4 level safety cut-off mechanism to pro-tect against short circuit and overcurrent
Deep discharge protection	Yes	Cutoff at < 18,9 V Charge protection at < 16 V
Protection against incorrect charging	Yes	3 protection levels against overcharging
Protection against wrong polarity connection	Yes	
Individual cell voltage monitoring	Yes	
Current Interruption Device for each cell	Yes	
Safety vent for each cell	Yes	
Cell temperature monitoring	Yes	
PCB temperature monitoring	Yes	
Automatic shutdown in case of submersion of the batterie	Yes	
Information system		
Interface	RS485	
Electronic battery identification	Yes	Important for connection of multiple batteries into battery banks
Data logging	Yes	Important for warranty information

Reversible protected mode* Some values are secured, as indicated, via a reversible protected mode. When operated beyond given value range, battery switches off automatically. This is not a malfunction. As soon as values are again within given range, battery may be turned on again. It will then be fully operable again.

Charging via charging channel

General remarks

- Only use chargers approved by Torqeedo. • Do not use any third party chargers, especially no chargers for lead-gel or AGM batteries.
- Only charge battery on a non-flammable floor under supervision of an adult.
- Only charge battery at ambient temperatures of between 0°C and 45°C / 32°F and 113°F.
- During charging process protect battery from water contact.
- Note instructions in charger operating manual.

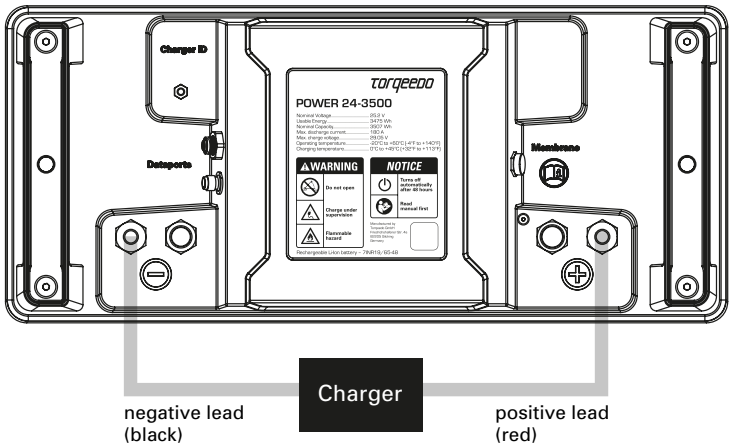
- In case you don‘t succeed in recharging a totally discharged battery, take battery and charger to Torqeedo service for inspection.

Connecting charger to Power 24-3500

- Turn off T50, Inverter, PC, and Aux switches
- Connect charger connector to EchoBoat charging connector.
- Connect charger to the wall socket.
- Charging process will now start and end automatically as soon as battery will have been fully charged.

- During installation make sure that all of equipment has been switched off.
- Avoid contact between the two ring eyes.
- Connect charger with correct polarity.
- Only plug charger into wall socket after it has been connected to battery.
- Observe instructions in charger operating manual.

In case of excess heating of battery or charger (for instance due to exposure to the sun), charging time may increase.



Charging operation for batteries connected in parallel

Torqeedo recommends use of one charger per battery. However, one charger may be used for two batteries connected in parallel. Charging time will be twice as long.

ECHOBOAT-240™

Start Up

1. Center all switches and joysticks.
2. Hold Power button until all four loading process dots appear on the screen.
3. If “Switch Warning” appears, ensure all switches are turned off or centered (Winch Knob center), auto switch is set to Manual and arming is set to Disarm.

Arm EchoBoat-240™

1. To arm EchoBoat's AutoNav, toggle arming switch to Arm then hold Arming Toggle Switch up for 3 seconds. You will hear the EchoBoat AutoNav chime when arming is complete.
2. To Disarm, switch the Arm switch to Disarm and hold arming safety switch for 3 seconds. The AutoNav will chime when disarmed.

Optional Long Range Module

1. Install R9M with antenna on the back side of the remote.
2. Plug in external 2s battery to the R9M.

Powering On EchoBoat-240

Power on the remote-control. Ensure the remote-control battery is fully charged. Power on the Echoboat by pressing the main power button. Arm the AutoNav shown on the previous page.

Testing Thruster

Before launching the EchoBoat-240 check the thrusters for proper operation. These thrusters are cooled by water. Do not run thrusters for more than a few seconds out of the water.

Refer to propulsion system calibration procedures (On Pg# 44) if you notice the thrusters are not spinning evenly, or if the propulsion system does not operate as outlined in the test below.

Perform these tests if you think you are experiencing a loss of power from one thruster.

Forward Thrust Test: While holding a piece of paper approximately 6 inches aft of each thruster, slowly push joystick(s) straight forward. The paper should be pushed away from the thrusters, that is, the thrusters blow air aft of the boat. This indicates forward thrust of the boat.

Reverse Thrust Test: While holding a piece of paper approximately 6 inches aft of each thruster, slowly pull joystick(s) straight backwards. The paper should be pulled toward the thrusters, that is, thrusters blow air toward bow of boat. This indicates reverse thrust of the boat.

Launching and Retrieving the EchoBoat-240

Before launching the EchoBoat-240, ensure the bow hatch is secure.

Power up the EchoBoat-240 (Refer to Pg #15)

Check that the remote-control joysticks are in the center position prior to launching the EchoBoat-240

The EchoBoat-240 should be launched stern first. This will protect the thrusters from accidental grounding and possible damage.

Thoroughly familiarize yourself with the way the EchoBoat-240 responds to the controls before deploying in moving water. When the EchoBoat-240 is traveling away from you it will respond to control signals as expected. When the EchoBoat-240 is inbound (traveling toward you) the controls will be the same but can cause confusion. Please practice in calm water, close to shore until you are familiar with how the controls respond when the EchoBoat-240 is traveling towards you and away from you.

I. Action items while in storage or prior to transit from storage

- Battery banks charged
  - Payload charger can charge 100-240VAC.
- Remote control battery charged/operational
  - USB Charger port on the bottom of the transmitter.
  - Long range battery charged

- **Sensor installation prior to deployment (Dry)**

- Wifi Antenna
- GPS Antenna
- T50 Projector (mounted on standoff)
- T50 Receiver
- INS-20 IMU
- AML 1

Ensure that all communication/power couplings to sensors are properly lubricated and connected prior to deployment

III. Component power up procedures prior to deployment (Dry)

- **SWITCH ON** Transmitter
- **SWITCH ON** Payload power via main Torqeedo button
- **SWITCH ON** Inverter
- **SWITCH ON** T50-R power

IV. Remote Desktop connection and software initialization (Dry)

- Connect to on-board PC with host PC/laptop using Remote Desktop app

Configure host PC/laptop network properties as follows:

Internet Protocol Version 4 (TCP/IPv4)

IP Address: 192.168.1.4

Subnet Mask: 255.255.255.0

- Remote Desktop IP 192.168.1.8
- Once network connection established, user will be prompted to enter log in information

Username: EchoBoat

Password: Seafloor (case sensitive)

- Open Mission Planner (autopilot)
  - COM x 115,200 baud rate
- Open Microsoft Camera App
- Open Seafloor Smartcast App
  - Com x baud rate 57600
- **Remote Control configuration (Dry)**

- Arm AutoNav
- Check thrusters and servos respond

- **Deploy EchoBoat-240 (Wet)**

- Launch EchoBoat
- Activate water pump
- Transit to mapping site

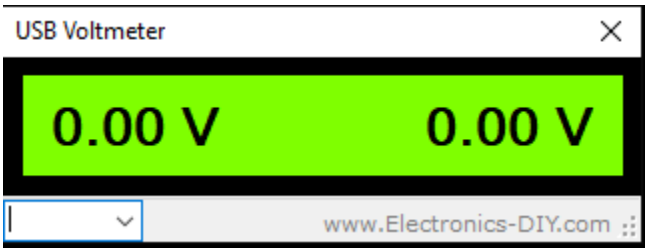
When all mapping is complete and all associated software closed, power down PC with Windows shut down procedure*

VII. EchoBoat recovery

- Turn off T50 transmit power before removing from water.
- Once secured on trailer turn off T50-R
- Power off EchoBoat-240 by holding Torqeedo Power button until red LED ring lights up
- Turn off transmitter

USB Voltmeter

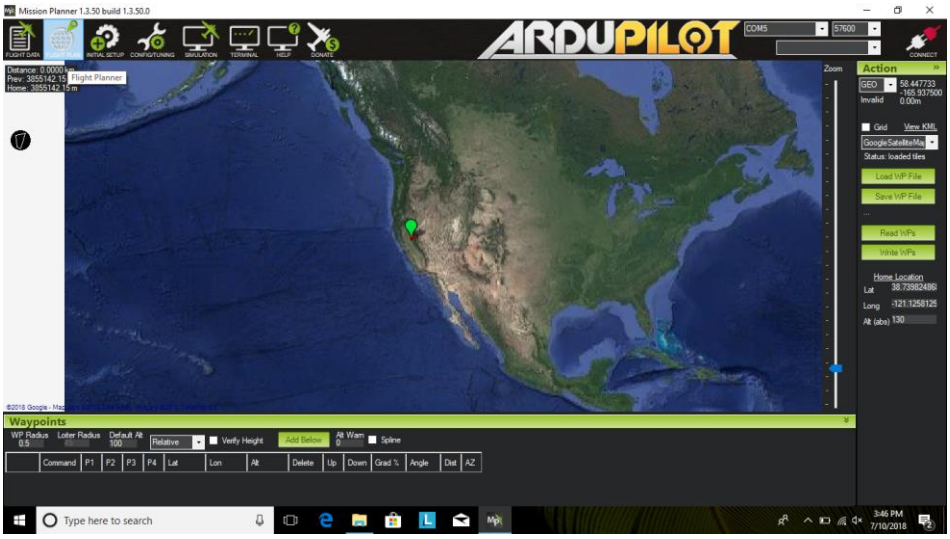
1. Navigate to the desktop of the PC.
2. Double-click on the USB Voltmeter program; the following box will open on your screen. Next, you will go to the windows search bar in the bottom left of your screen type in “Device Manager” and open it.



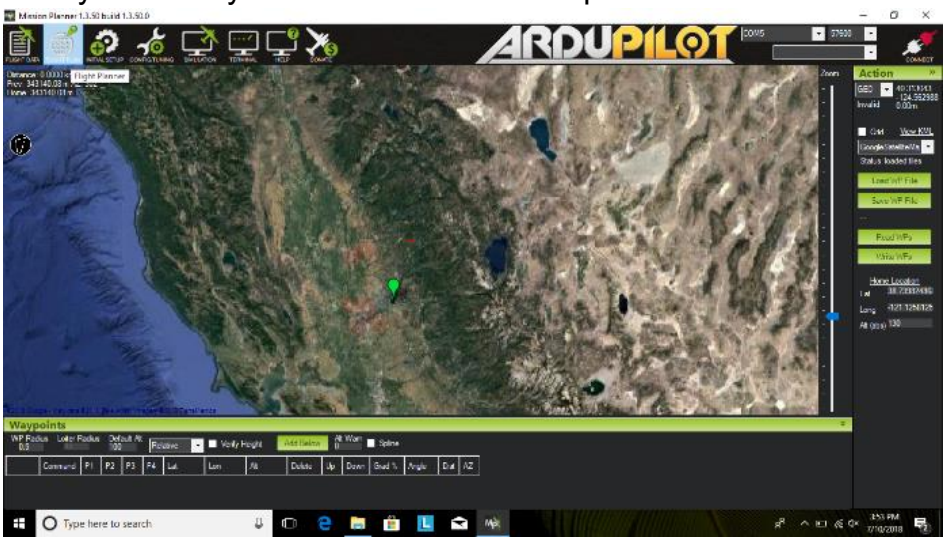
3. Navigate to “Ports (COM & LPT)” and look for a COM port labeled “USB Serial Device”. Enter this number into the USB Voltmeter program in the bottom left of the box.

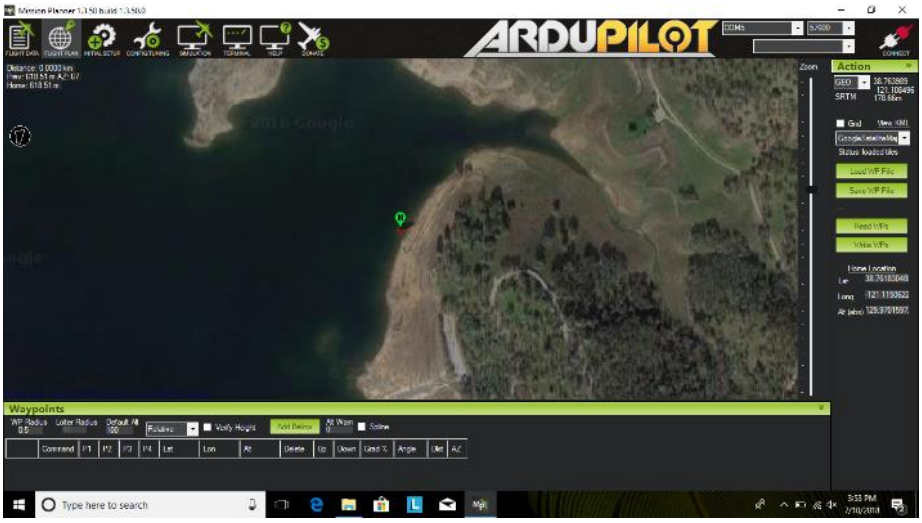
Flight Plan

1. Click FLIGHT PLAN in Mission Planner on the control bar.

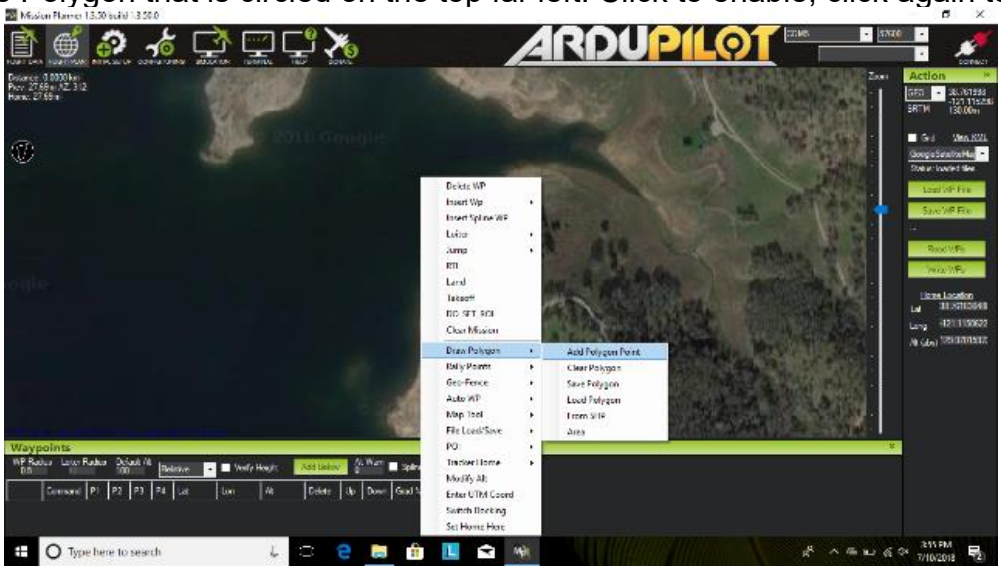


2. Find your survey area on the satellite map.

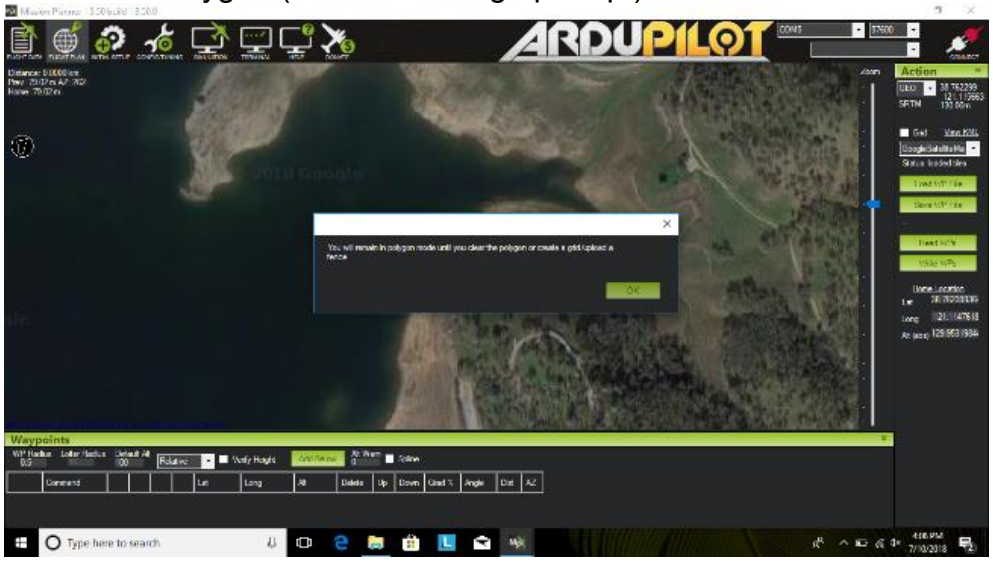




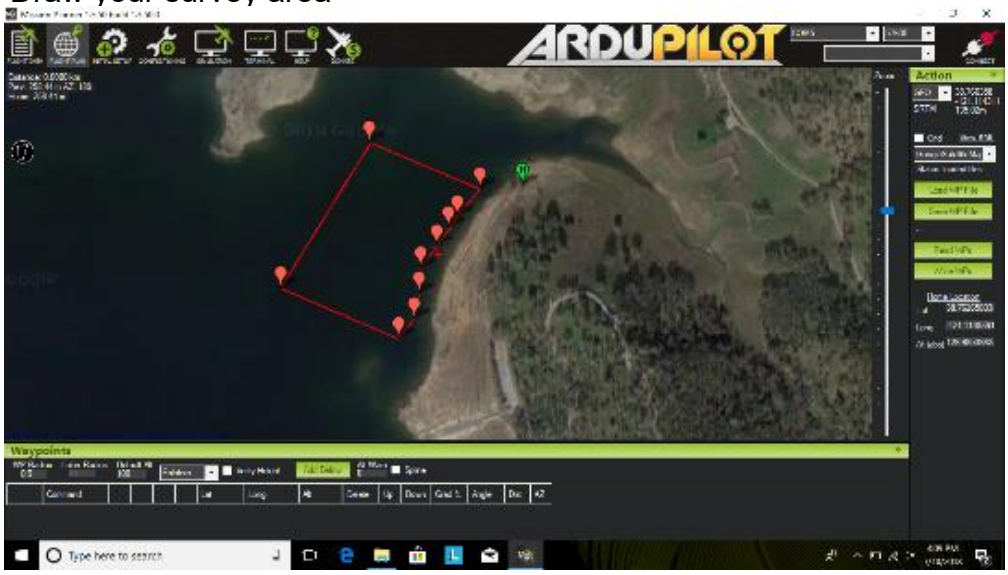
3. Right click Draw Polygon (Newer versions of Mission Planner have removed it and is now the Polygon that is circled on the top far left. Click to enable, click again to disable)



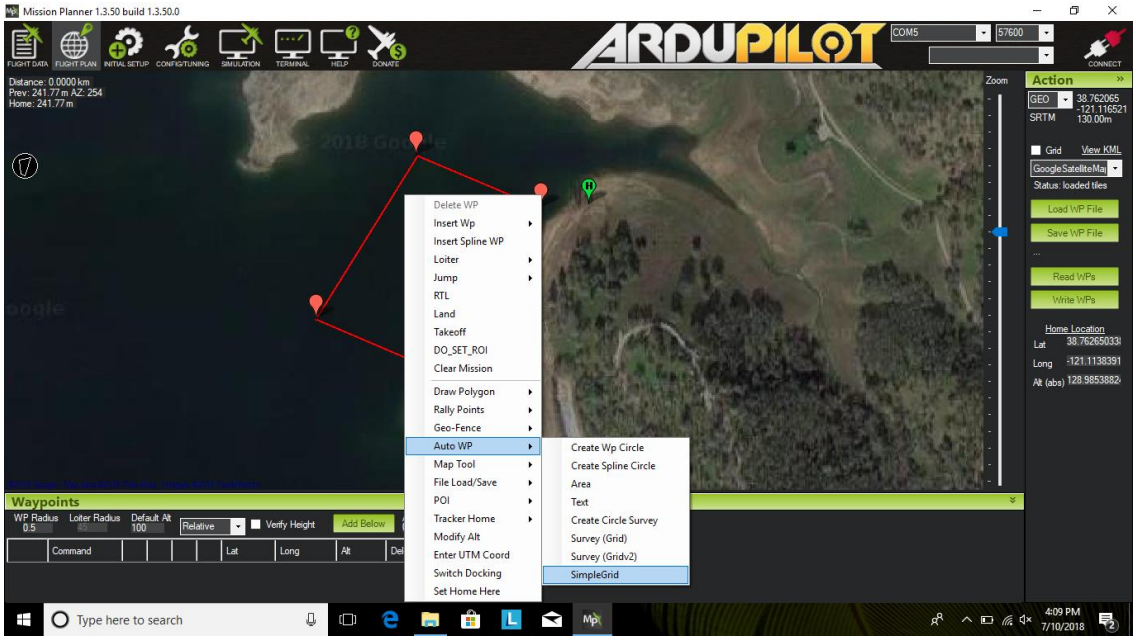
a. Click Add Polygon (click OK through prompt)



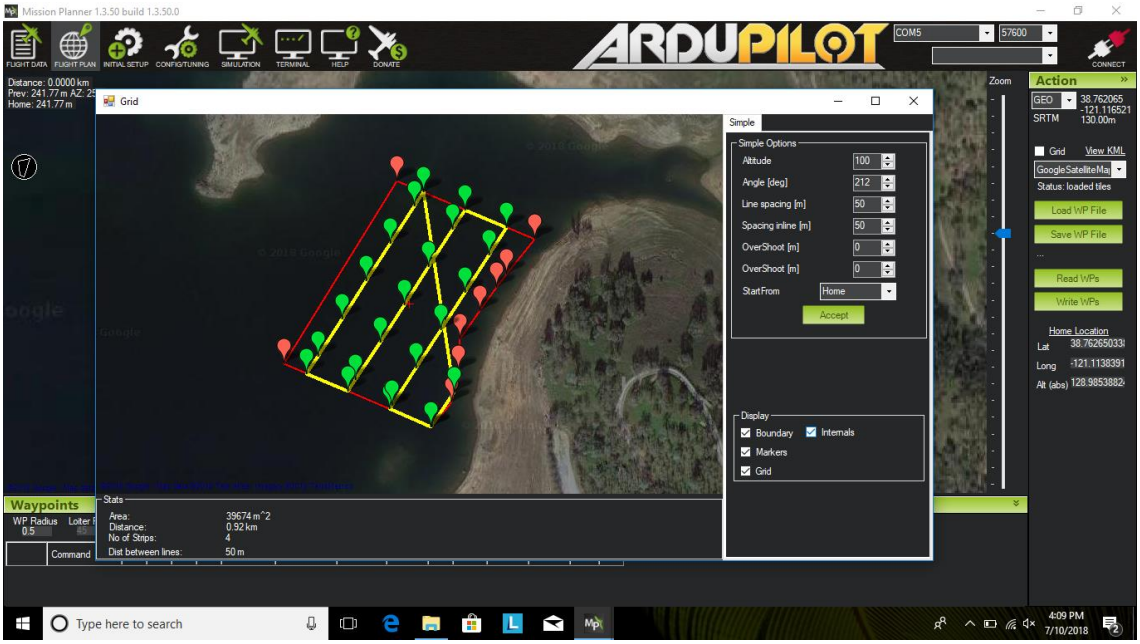
b. Draw your survey area



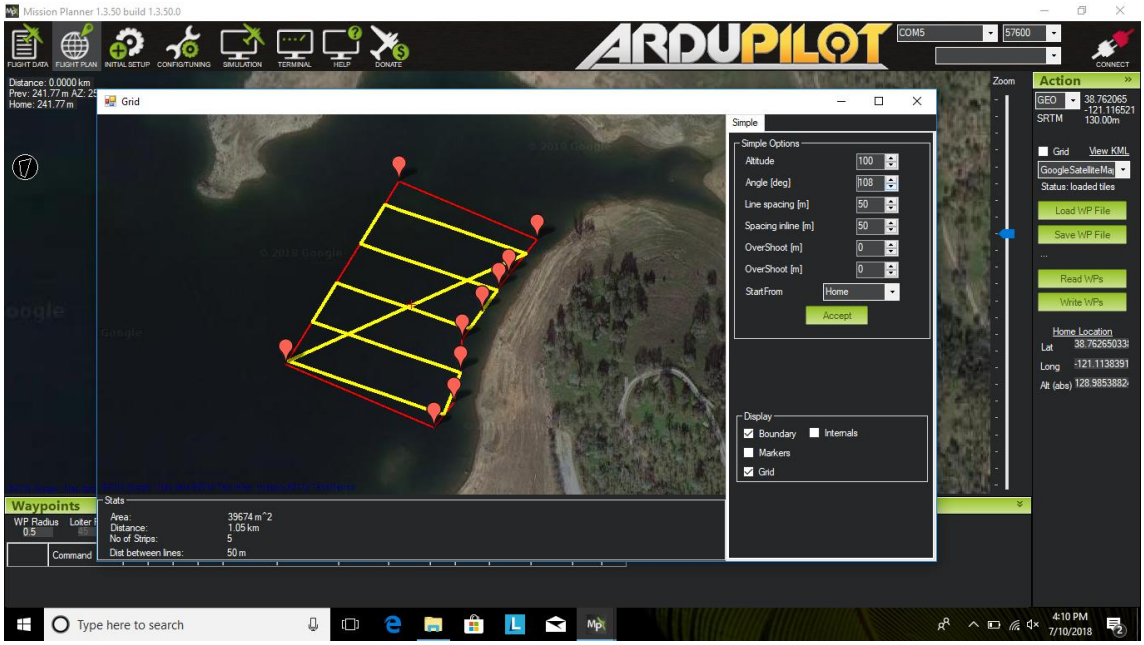
4. Right click
    a. Click Auto WP
    b. Click SimpleGrid



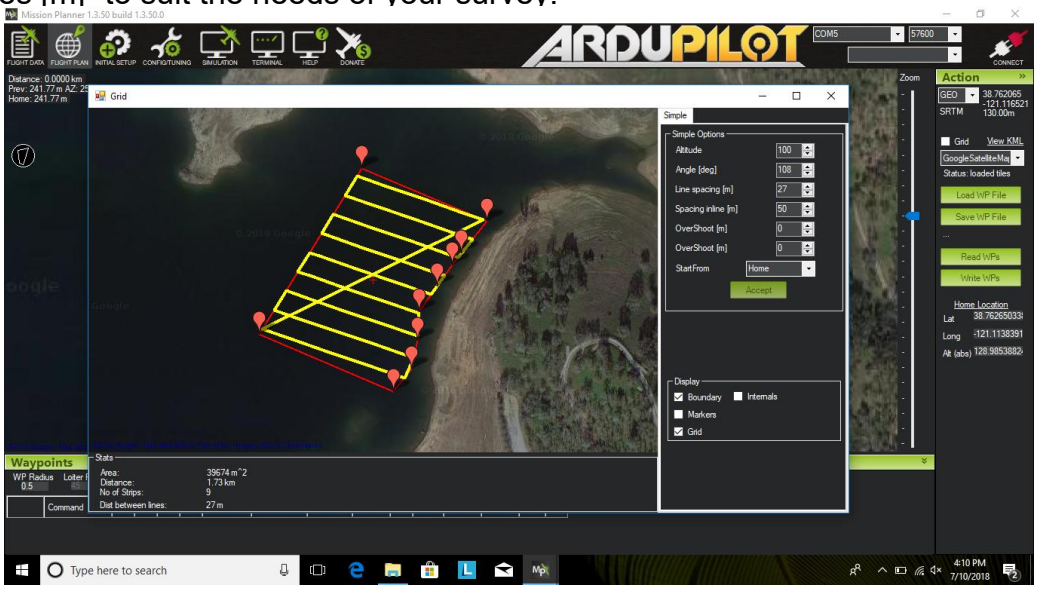
c. Under subcategory “Display”, **uncheck** boxes for Internals and Markers (while this is not a necessary step, it helps to keep the grid space visuals cleaner).



d. Under subcategory “Simple Options”, adjust the parameters for “Angle [deg]” that you wish to survey.

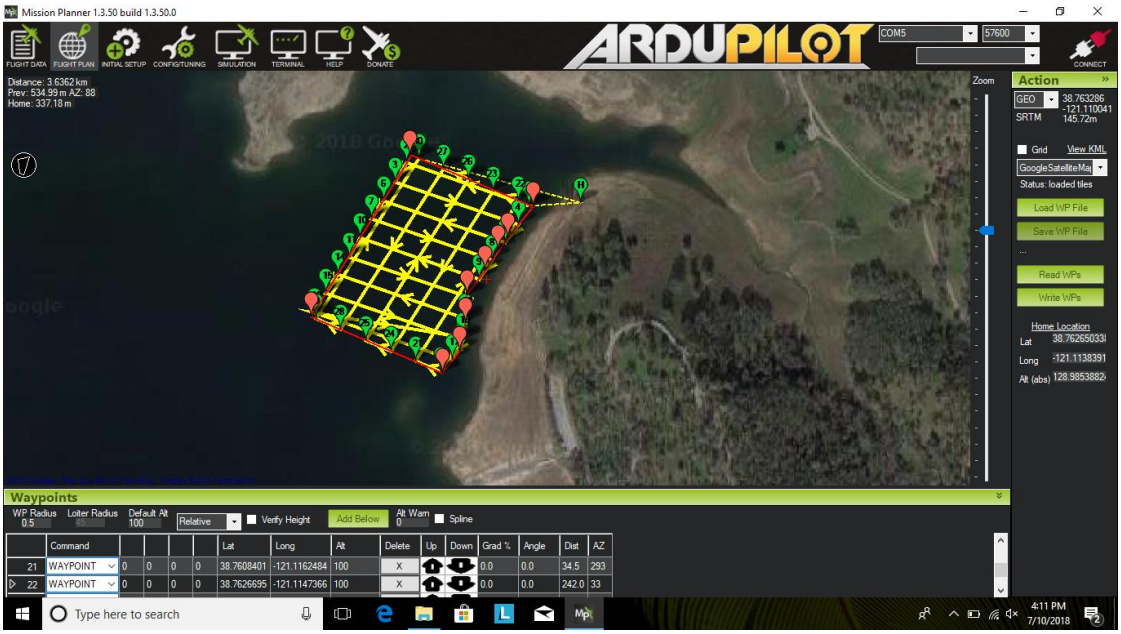


e. Under subcategory “Simple Options”, adjust the parameters for “Distance Between Lines [m]” to suit the needs of your survey.



f. Click accept.

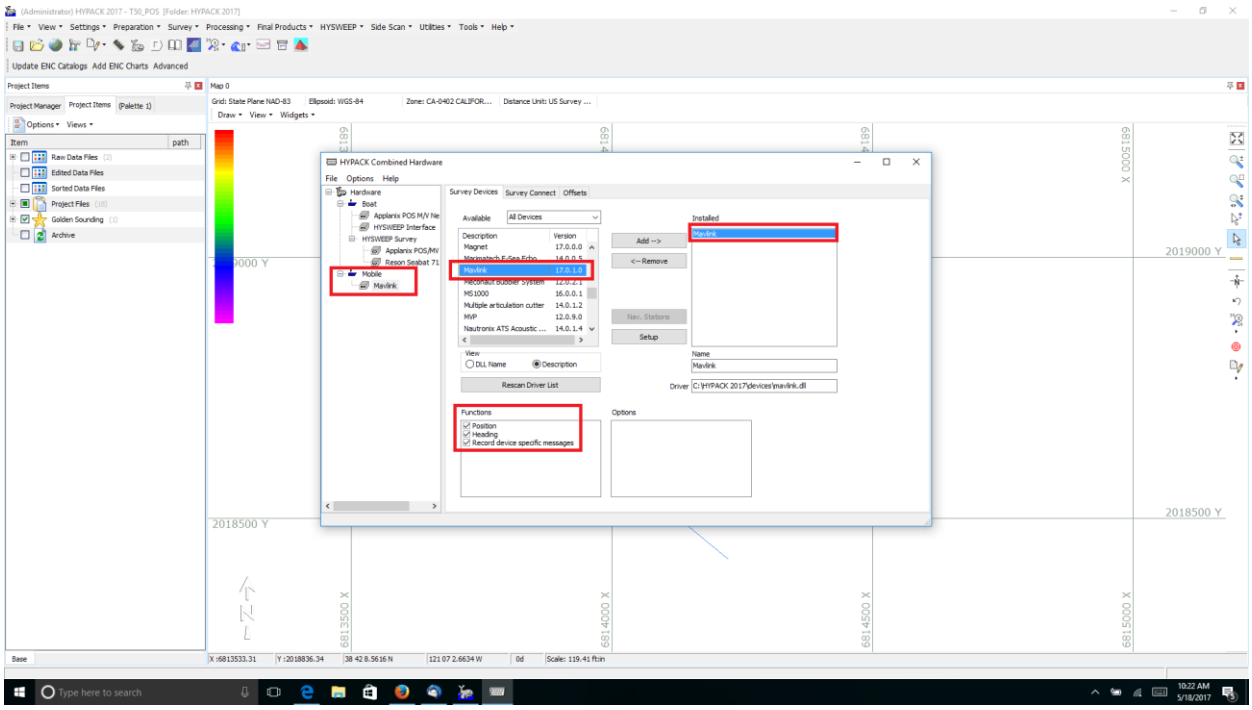
5. Creating a grid:
    a. Repeat steps 4a through 4c.



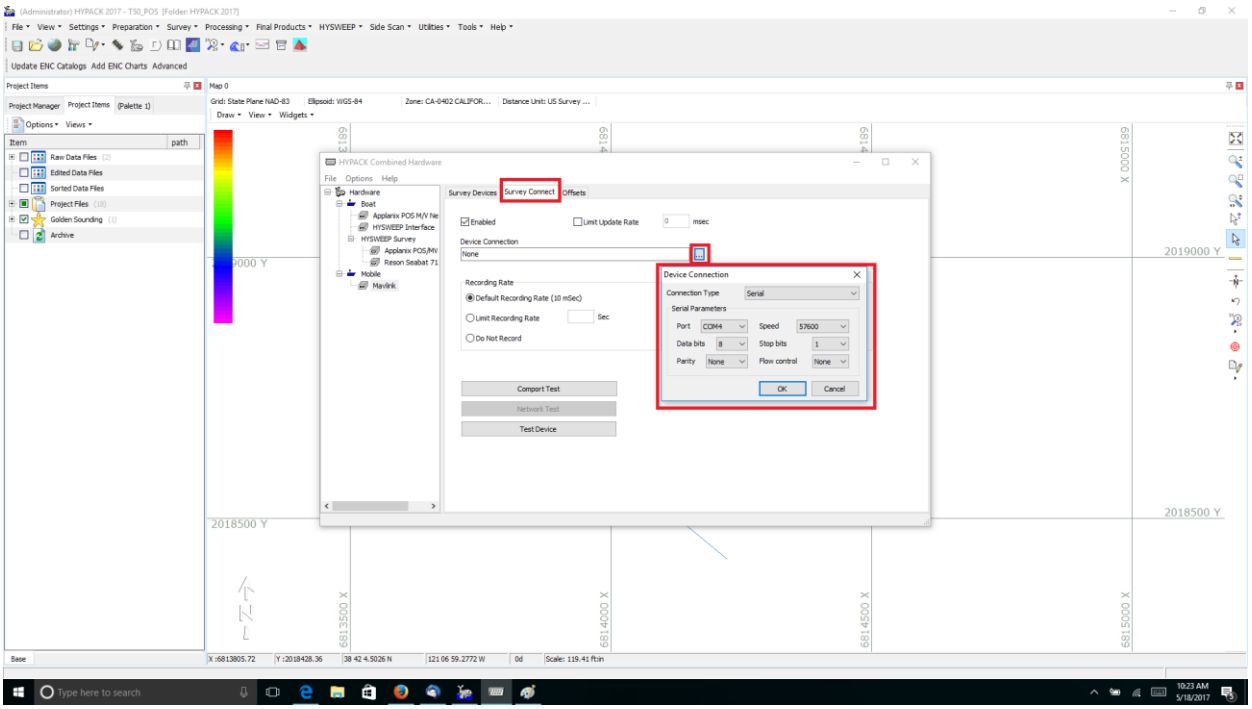
6. Write WP file to AutoNav. (You may save WP file for future surveys)
    a. This function will save the mission to the AutoNav topside control box.
        i. To initiate the mission, flip the top left switch on the Taranis.
        ii. Hydrone or EchoBoat will start on its mission shortly after switching from Manual to Auto mode on the Taranis remote. “Write WPs” alone will NOT start the mission.

AutoNav With Hypack

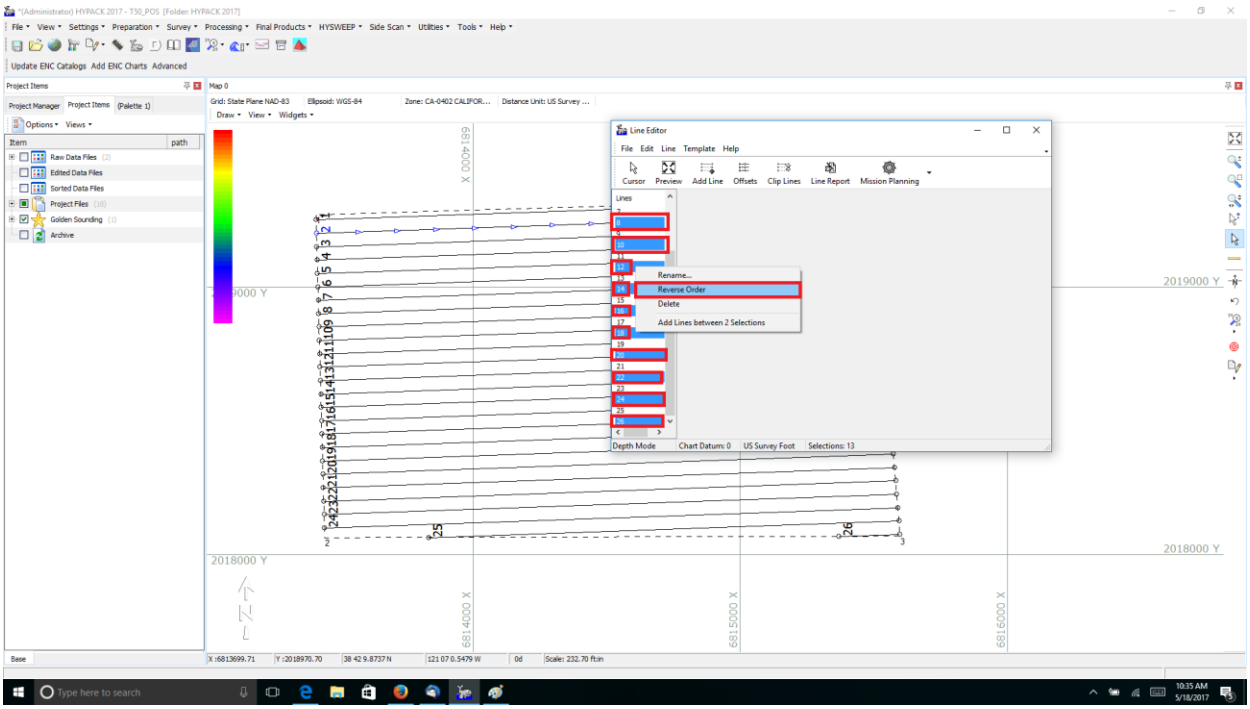
- Plug AutoNav USB Cable into PC on USV
- Open Computer Device Manager to find COM Port number of AutoNav USB
- Open Hypack Hardware Setup and add MavLink driver on your mobile device

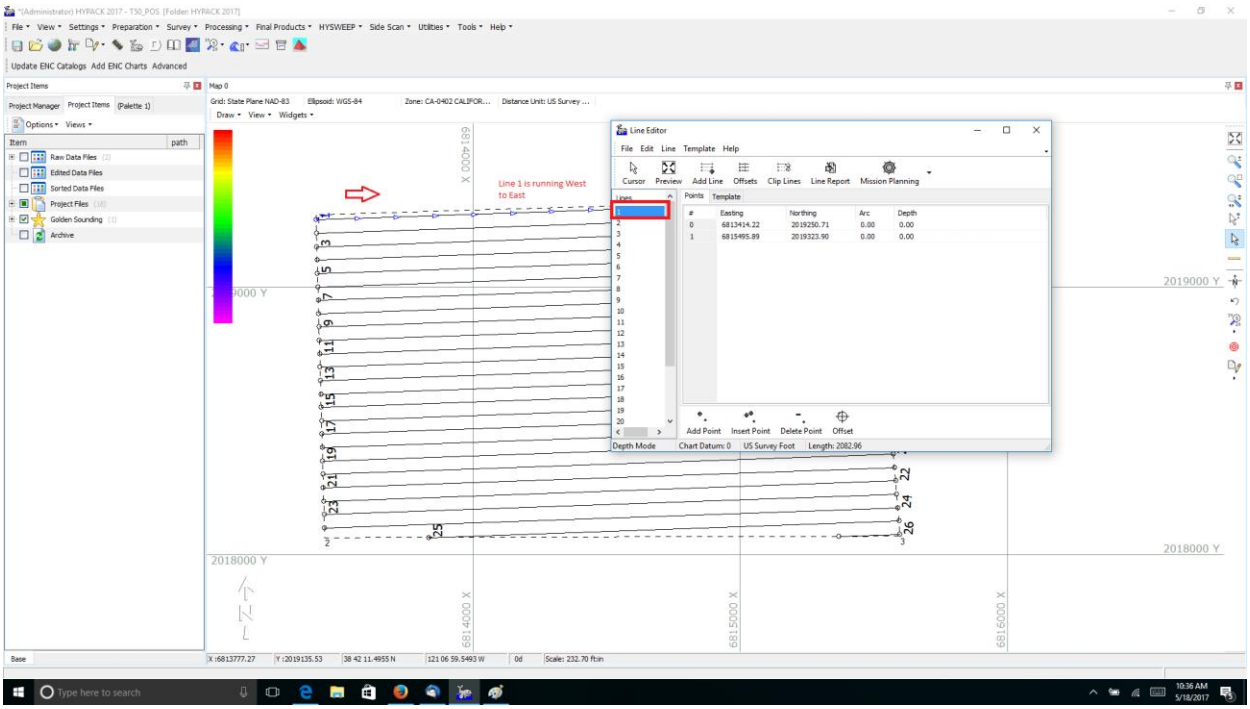


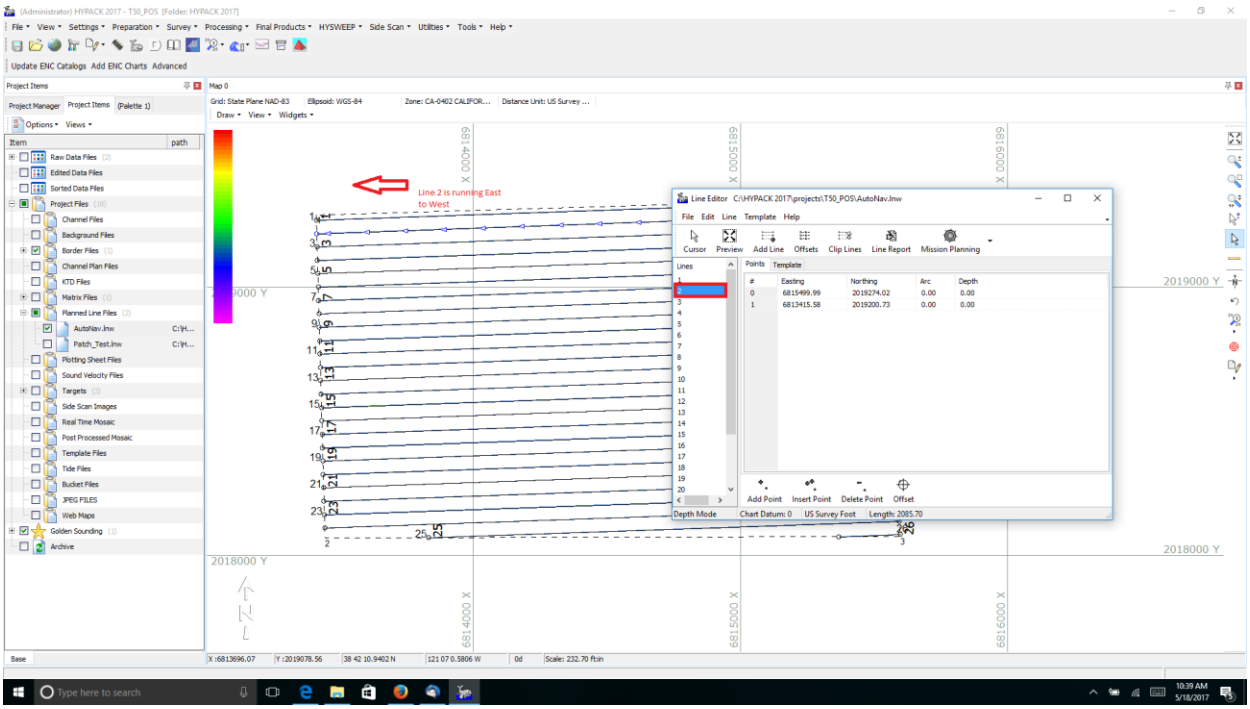
- Set MavLink connection to serial port number in Device Manager and 115200 Baud Rate



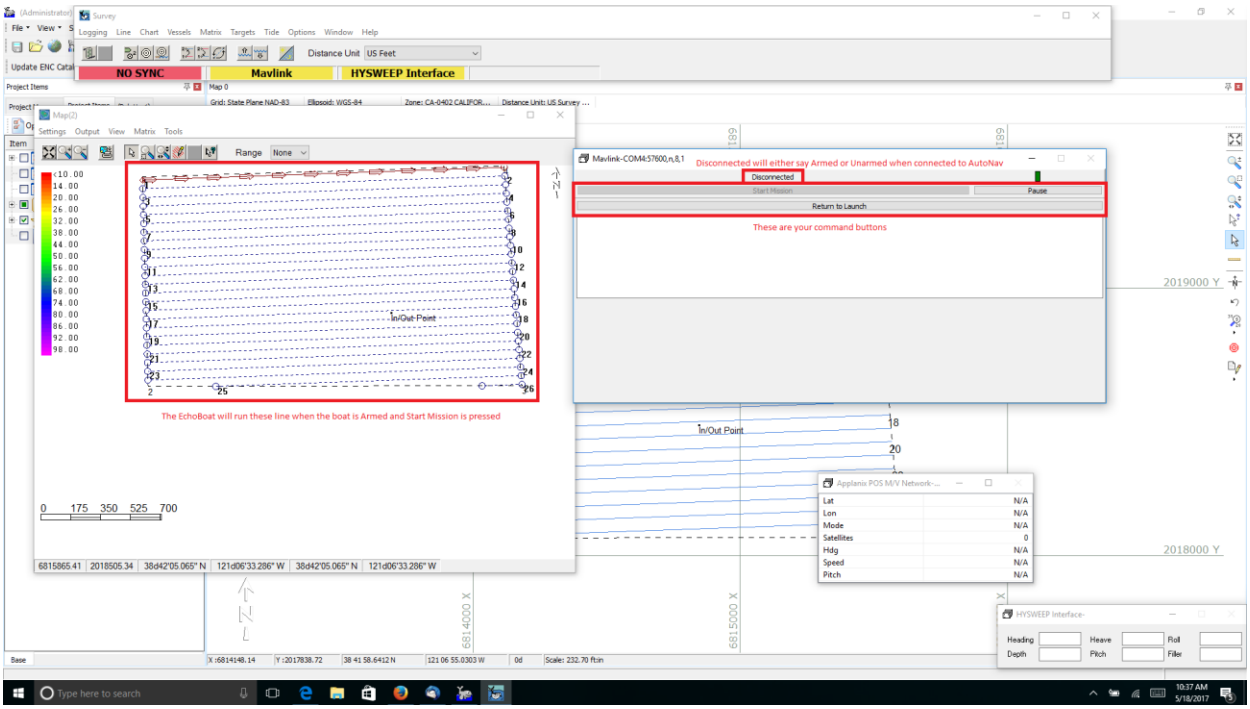
- Create your line plan using Hypack's standard Line Plane Editor
- Select every other line and reverse the direction







- Start Hypack/Hysweep Survey
- MavLink Driver will say Armed



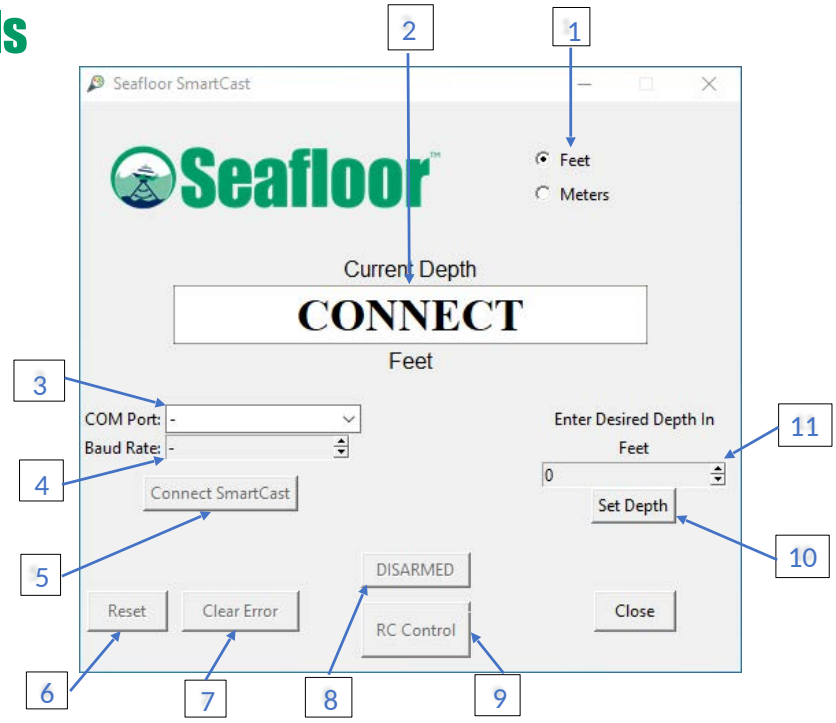
Start & End Mission

Mavlink driver button functionality:

- Start Mission
  - The boat will navigate the current line file
  - Once “Start Mission” is selected, it will turn to “Stop Mission”
  - Click “Stop Mission” once the boat is finished running all lines
- Pause
  - Once the Mission is started, use “Pause” to regain manual control of the boat
  - Use this to avoid obstacles
  - When “Pause” is selected, the button label will change to “Resume”
  - Use “Resume” to continue the mission after obstacle is avoided
- Return to Launch
  - The boat will take a straight line back to where the AutoNav was last armed
  - Make sure the boat has an unobstructed path if using this function
  - The bottom of the MavLink driver window should say “Flight mode set successfully” whenever one of the buttons are clicked

Smartcast Quickstart

Button Labels



1	Units: Selects the units the system will use; feet or meters.
2	Screen: Displays the current position of the sensor.
3	COM Port: Used to choose the COM associated with the SmartCast.
4	Baud Rate: Used to select the baud rate between the app and the SmartCast. Automatically fills to 57600.
5	Connect SmartCast: Connects the application to the SmartCast hardware.
6	Reset: Used when the system is armed to bring the sensor to the mast and reset the current position shown on the screen to zero.
7	Clear Error: Used to clear the continuous error caused by the sensor getting stuck on something underwater.
8	ARM: Used to arm/disarm the device for automated casting.
9	RC Control/Cast: Displays “RC control” when the system is not armed and is used to send a cast when the system is armed.
10	Set Depth: Used to confirm the value set in Desired Depth (11).
11	Desired Depth: Arrows are used to choose a depth for the sensor to go to.

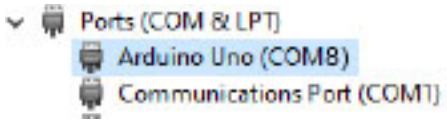
Setting up the SmartCast

Step 1

Double click on the SmartCast icon on the desktop

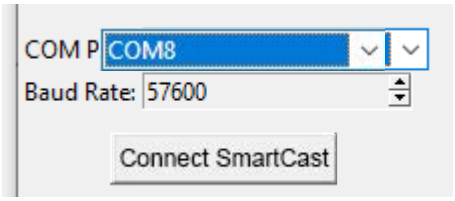
Step 2

If not known, find the COM port labeled “Arduino Uno”. This can be done by typing “Device Manager” in the search bar in the bottom left corner of the screen. Once there find “Ports (COM & LPT)” such as the example below and record the COM port number (in this case COM8)



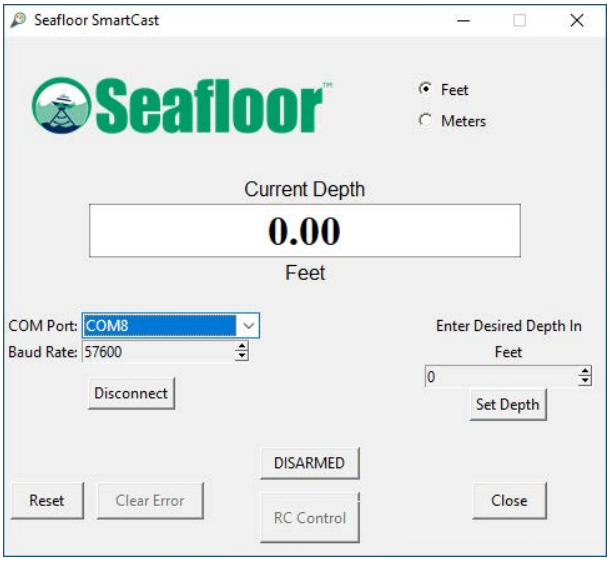
Step 3

Set the COM port from the drop-down menu and set the baud rate using the arrows, only the value 57600 is available.



Step 4

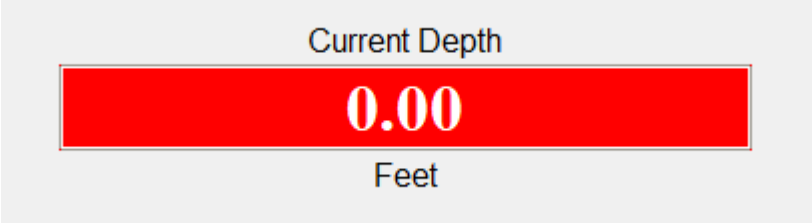
Click “Connect SmartCast”, the display should look like the one below if everything was done right.



Use the RC controller to drop the sensor to the desired depth, the current depth of the sensor can be read on the screen.

Be careful to not run the sensor into the ground as it can get stuck, the recommended maximum depth is 90% the distance to the bottom of the body of water.

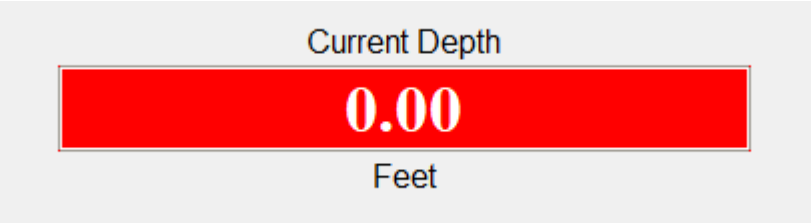
If the sensor is at the home position but the on-sceen display shows something different than 0. 00, the device can be armed to reset that value to 0.00 for more accurate and measurable c asts. The system can be disarmed by again clicking on the arming button.



Making an Automated Cast

Step 1

Arm the device by pressing the DISARMED button, the system will run the motor up to the home position and reset the position value at that point to 0.

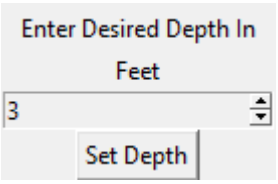


Step 2

Choose whether the cast will be set in feet or meters.

Step 3

Choose the depth the sensor will be cast to and confirm the value by clicking the “Set Depth” button.



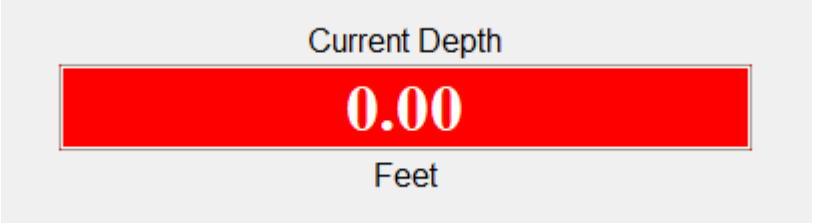
Step 4

Click the “CAST” button to begin the cast.

Once the cast has begun the system will again reset the “Current Depth” to zero. Next it will descend to the desired depth, pause for two seconds, and then come back up and reset “Current Depth” a third time. After this the system will disarm itself.

If the sensor hits the bottom of the body of water before the desired depth is reached the cast will stop prematurely and return to the home position.

If the system cannot pull the sensor up out of the water it will go into a continuous error, stopping casts from being made but still allowing RC control and motor control.



Use a combination of RC control and maneuvering the boat to try and free the sensor. Once the sensor is free the “Clear Error” button can be used to clear the continuous error and allow the system to be armed again.

Important Tips

1

-Do not run the SmartCast while the boat is moving quickly, or in a heavy current.

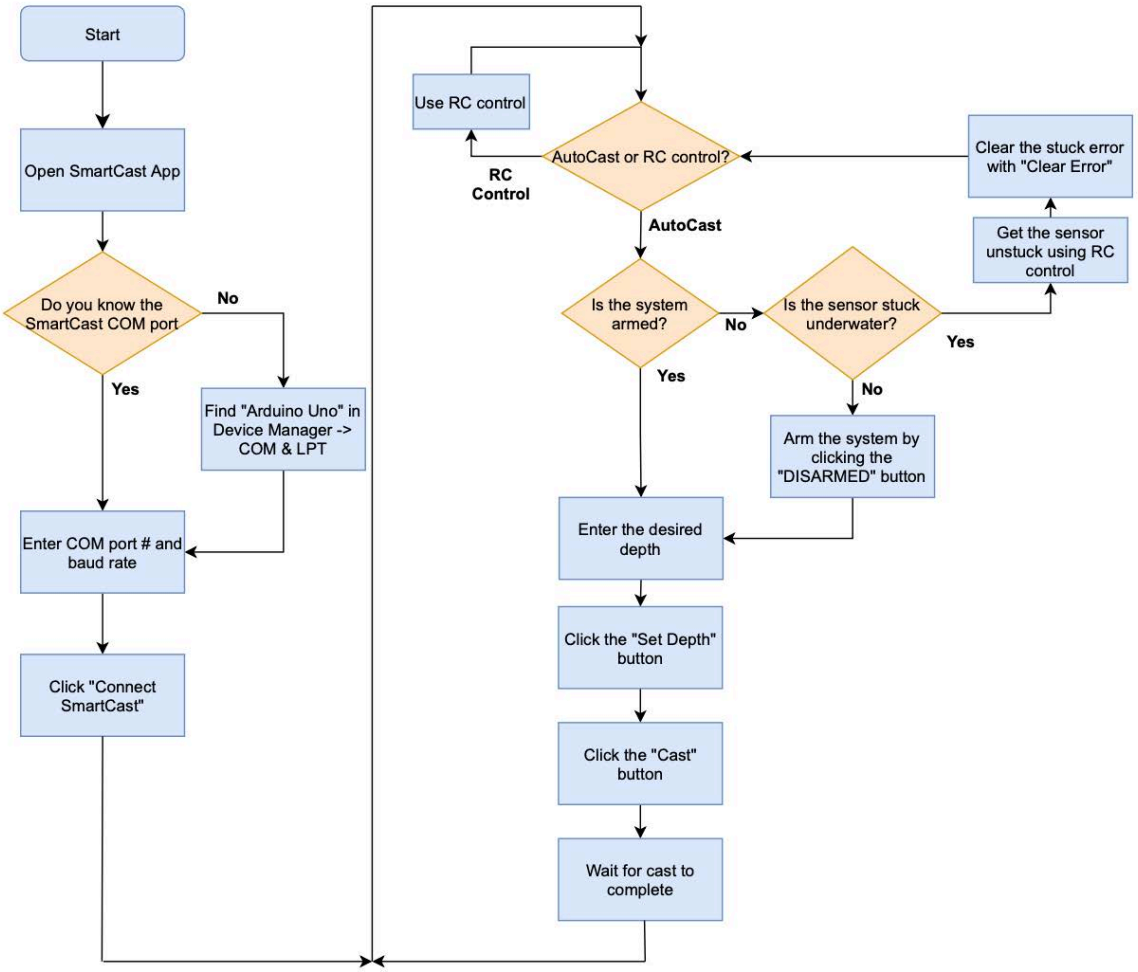
2

-If a depth is set but the “set depth” button is not set, when the cast button is clicked the last cast value will be used. A new depth does not need to be set if the same depth is desired.

3

-It would be good practice to unspool and respool the line before every mission to ensure the line does not become tangled. Tangled lines can result the direction of motion to be reverse or large amounts of line being released at once, both of which can stop the SmartCast from functioning properly.

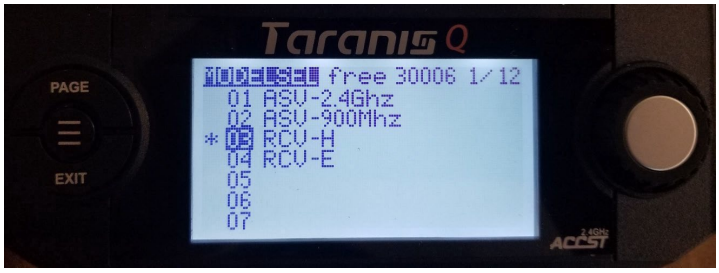
User Flow Chart



REMOTE PAIRING INSTRUCTIONS

Taranis Q X7 Remote

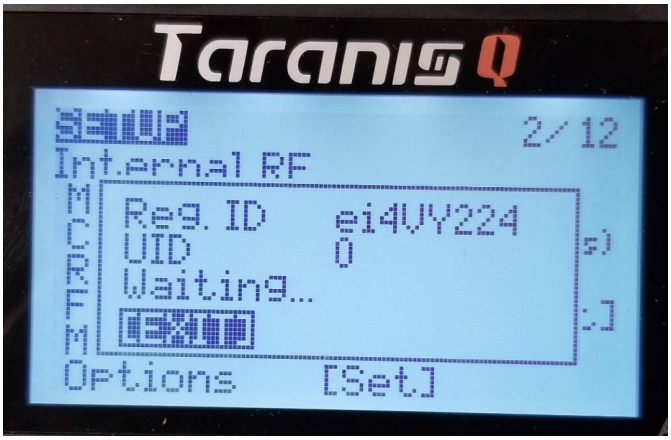
If your remote won't connect to the boat, follow these steps to pair the remote to the receivers:



With the remote on, tap the button with the 3 lines to get into the main menu. (NOTE: do not hold the button or you will be in another menu)

This page is the model select screen. Verify that you are on the correct model for your boat. In this case, just as you see on the screen.

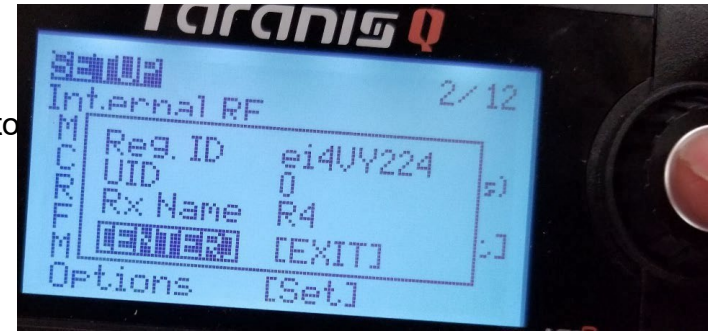
Look for "Internal RF Page. Set mode to Access. From here tap the page button once to get into the setup menu (2/12). Scroll down (using the knob on the right) until you see the “Reg” option.



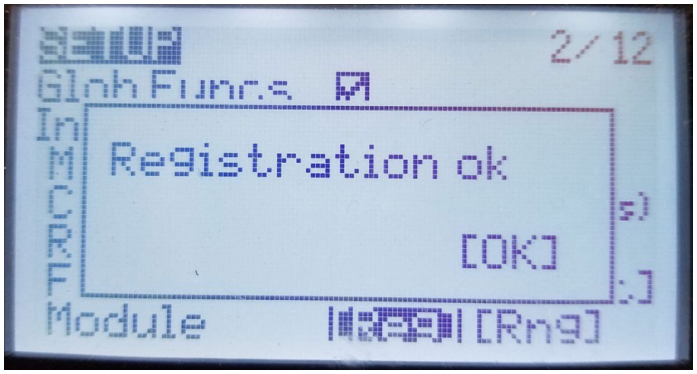
Once there, press on the center of the knob one time and a new menu will pop up.

Find the Archer R4 receivers in the boat by following the white, red, and black wire set from the ESC. The left side will be plugged into channel 1 the right side will be channel 2. To bind the process must be started on the right pontoon.

On the Archer R4 there is a small switch next to the LEDs. Use a small object to press this switch down and turn the pontoon on. After a few seconds you will see this screen on the remote.

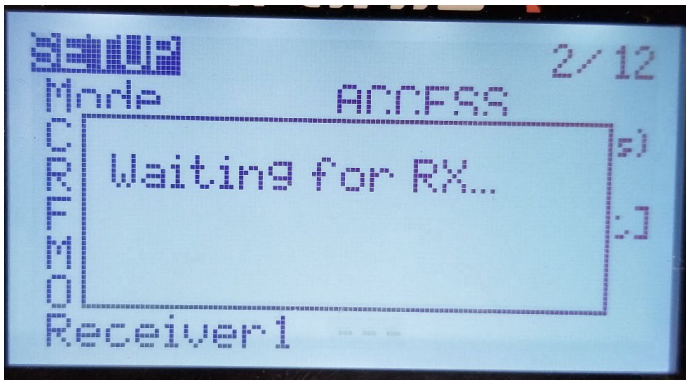


After selecting enter a success screen will pop up and the receiver will also show a light sequence once registered

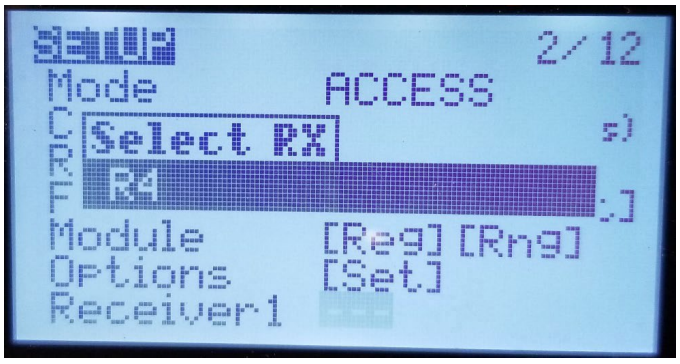


Select the enter option and turn off the pontoon Next go down to the “BND” option for “Reciever1” on the remote and select it using the knob.

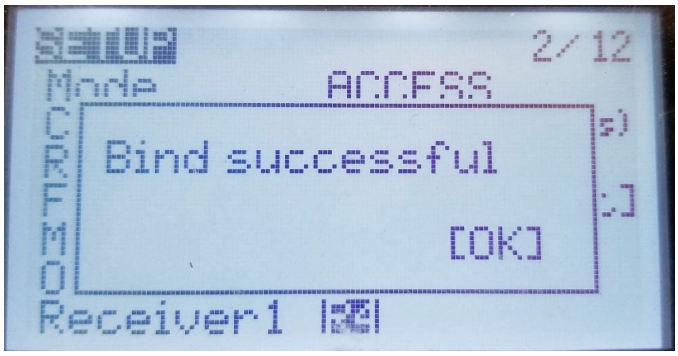
(Note: The right pontoon uses “Reciever1” while the left will use “Reciever2”) A page will pop up indicating the remote is waiting to see the receiver.



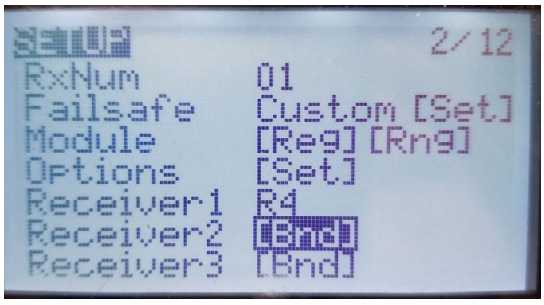
Turn the pontoon on and the page will change, when prompted select the R4 option.



With that done the pairing is now complete and there will be a solid green light on the receiver.



The process can now be repeated for the left pontoon. There is one important note, when binding the second receiver, the “Receiver2” option is used.



EchoBoat-240 RCV / ASV Remote Calibration

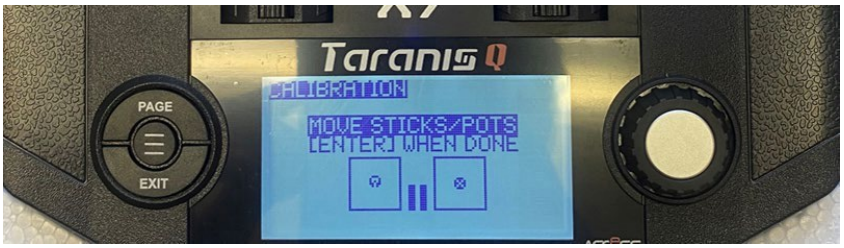
Perform these steps if your vessel appears to not respond promptly to commands send via remote:

1. Hold down button on left side with three horizontal lines

2. Navigate to the 6th page where you should see this screen

3. Using the silver button on the right select [CALIBRATION]
4. Press the silver button once more to begin the calibration
5. Move sticks to midpoint and press the silver button to confirm

6. Move the sticks along each extreme top, bottom, left, and right. During this step the knobs should be turned to their extremes as well. Finally press the silver button to confirm

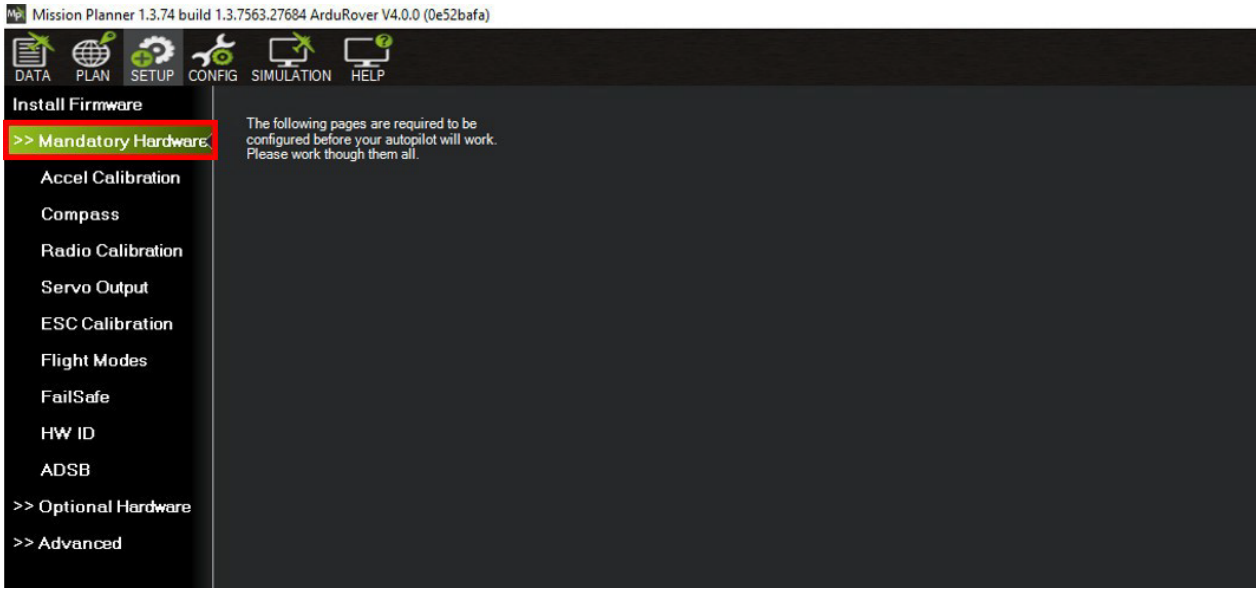


7. Your transmitter should now be properly calibrated

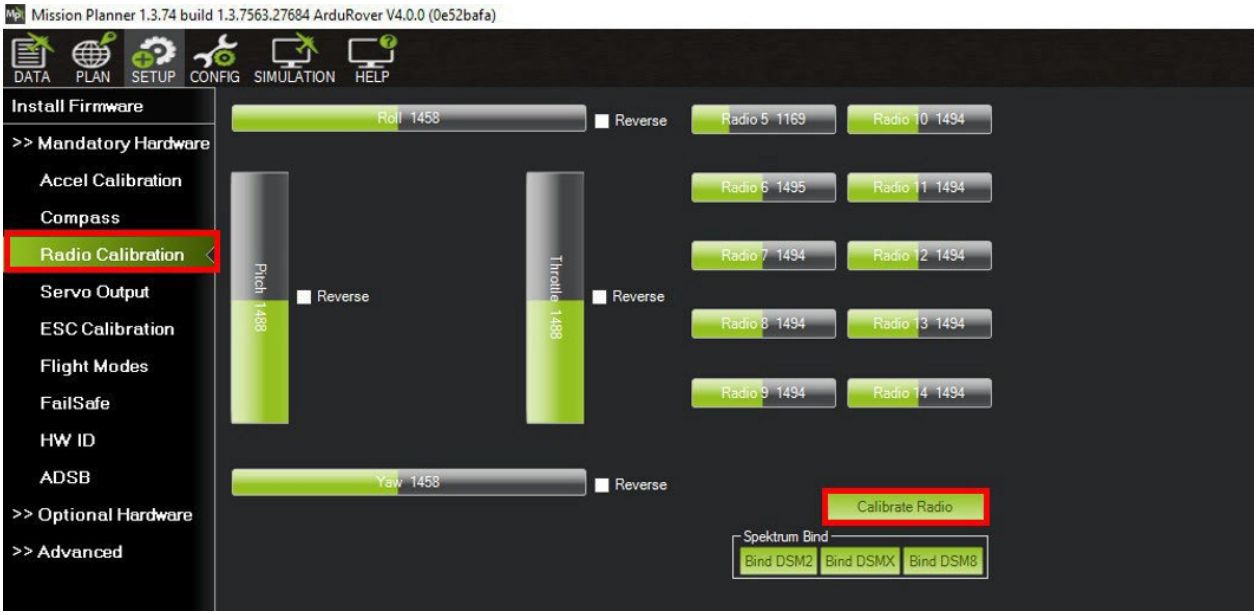
AutoNav Radio Calibration Instructions

1. Turn on your transmitter and connect to Mission Planner.
2. First, press the button in the top left of the program labeled “SETUP”

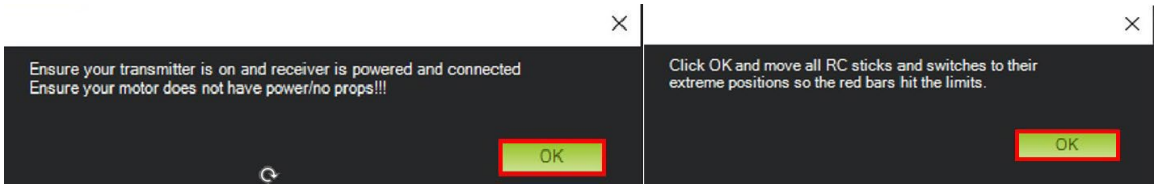
3. Next press “Mandatory Hardware”



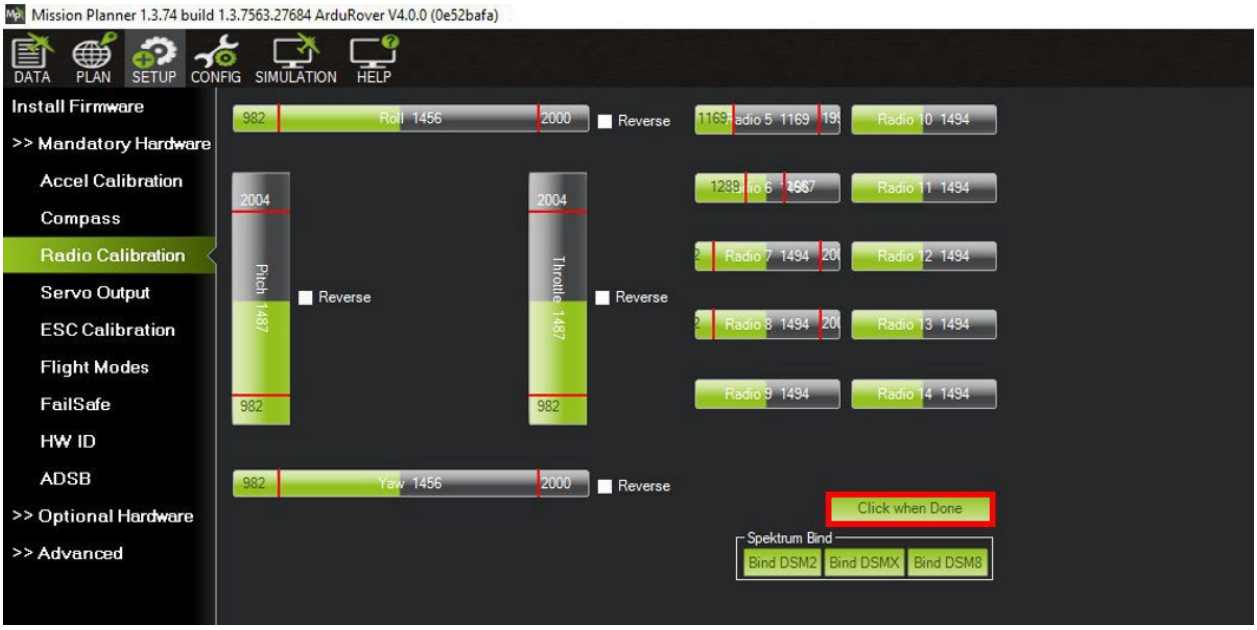
4. Next click “Radio Calibration”, once on the page click the button labeled “Calibrate Radio”



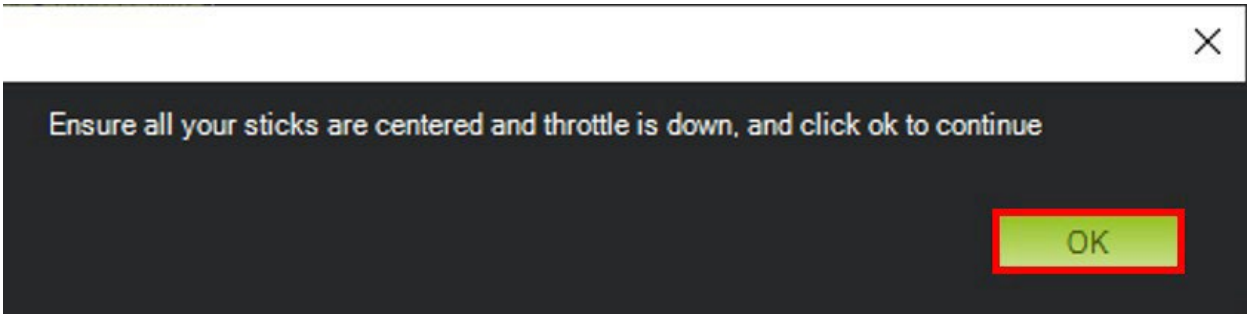
5. Two dialogue boxes will appear. The first is a warning that the boat should be unpowered, if this is not possible then make sure the ESCs that control the motors are switched off or disconnected. The second box gives directions on what to do during the calibration (see next step). Get through the boxes by clicking “OK”.



6. Move every stick, dial, and switch on the RC transmitter to its’ extremes. Generally, each channel will range from around 1000 at the low end to around 2000 at the high end, but this is not always the case. The extreme positions will be marked with red lines on each of the indicator bars. When confident that all sticks have been moved, finish by clicking “Click when Done”



7. A final dialogue box will appear, center all the sticks and switches, and then click “OK”.



8. You are now done with radio calibration.

Calibrating Speed Controls for Motors

1. Power on EchoBoat-240
2. Arm AutoNav
3. Remove thumbscrews on the stern electrical wall
4. Turn off ESC switches (Located on the Port/Starboard of AutoNav Box)
5. Hold full throttle on transmitter
6. Turn on Port switch
7. Release throttle after the ESC emits two beeps
8. ESC will finalize calibration with tones
9. Turn off Port switch
10. Repeat with Starboard switch
11. Turn on both switches

Seafloor

GUARANTEE

All products sold by Seafloor Systems Inc are inspected and adjusted individually before leaving the manufacturer and are guaranteed to be free of material defects and manufacturing faults when new.

General Warranty Policies

Seafloor Systems Inc warrants all products to be free of material and workmanship defects for a period of 365 days from date of purchase for all electronic components and 365 days for all non-electronic components. If a component is defective or was not correctly made, Seafloor Systems Inc will, at its sole discretion, repair or replace the item free of charge. This is a non-transferable warranty and does not cover normal wear and tear, crash or water damage, modifications, failure to perform routine maintenance, or any damages arising as a result of improper use.

EchoBoat-240 Warranty

Seafloor Systems, Inc. makes every effort to ensure its products meet the highest quality, reliability and durability standards and warrants to the original purchaser or purchasing agency that each EchoBoat-240 be free from defects in materials or workmanship for a period of one year from date of shipment.

Warranty does not apply to defects due directly or indirectly to misuse, negligence or accidents, repairs or alterations outside of our facilities, use of the EchoBoat-240 for purposes other than water measurements.

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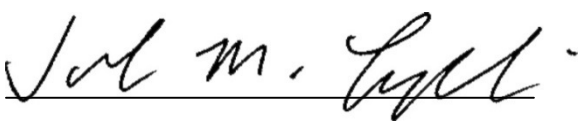
All warranty services are FOB Seafloor's facility in Shingle Springs, California, U.S.A.

John Tamplin (Seafloor Systems President)



Change of Record

9-14-2022 Creation Date (v1.0)

9-21-2022 Updated Images (v1.1)