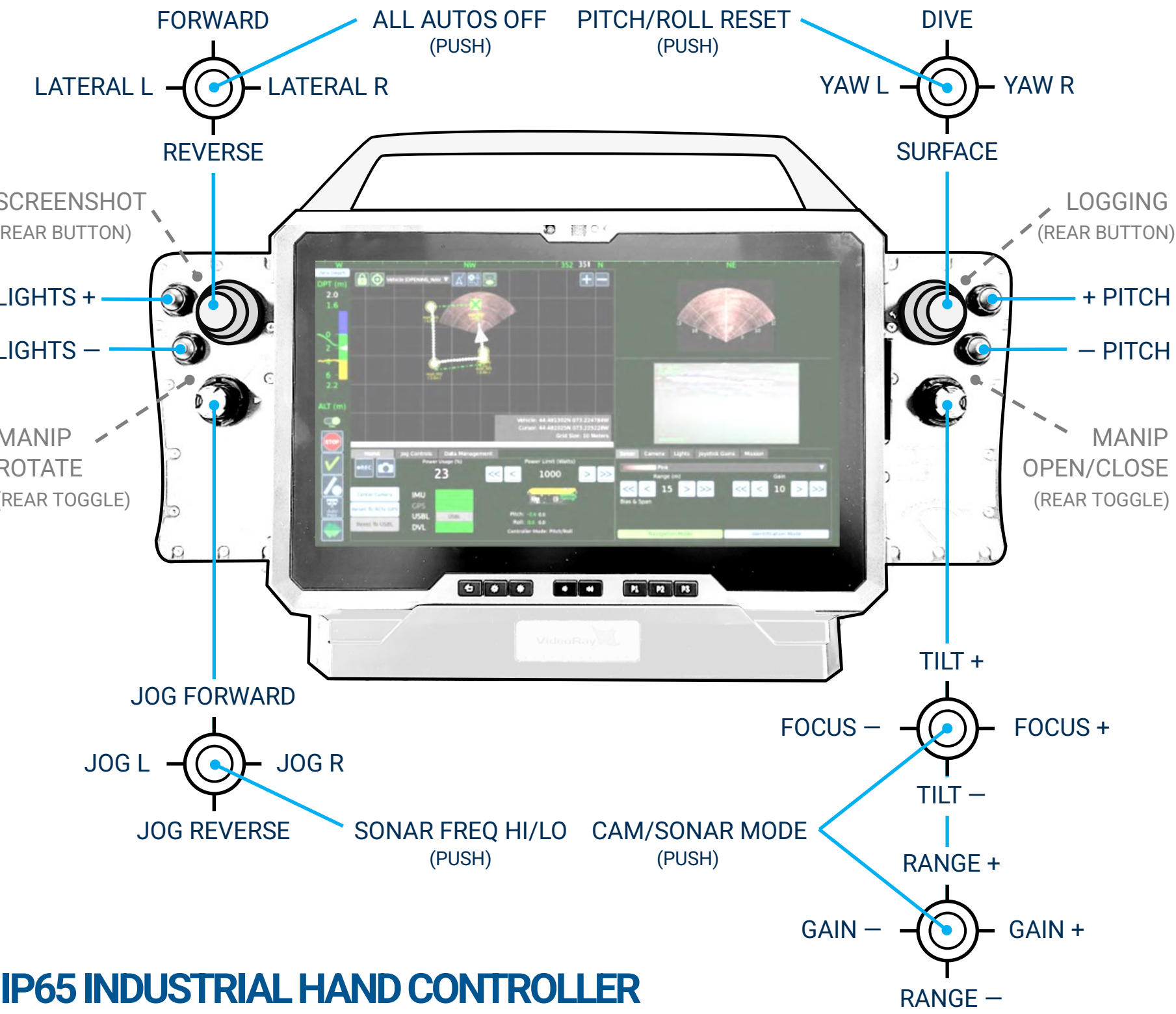


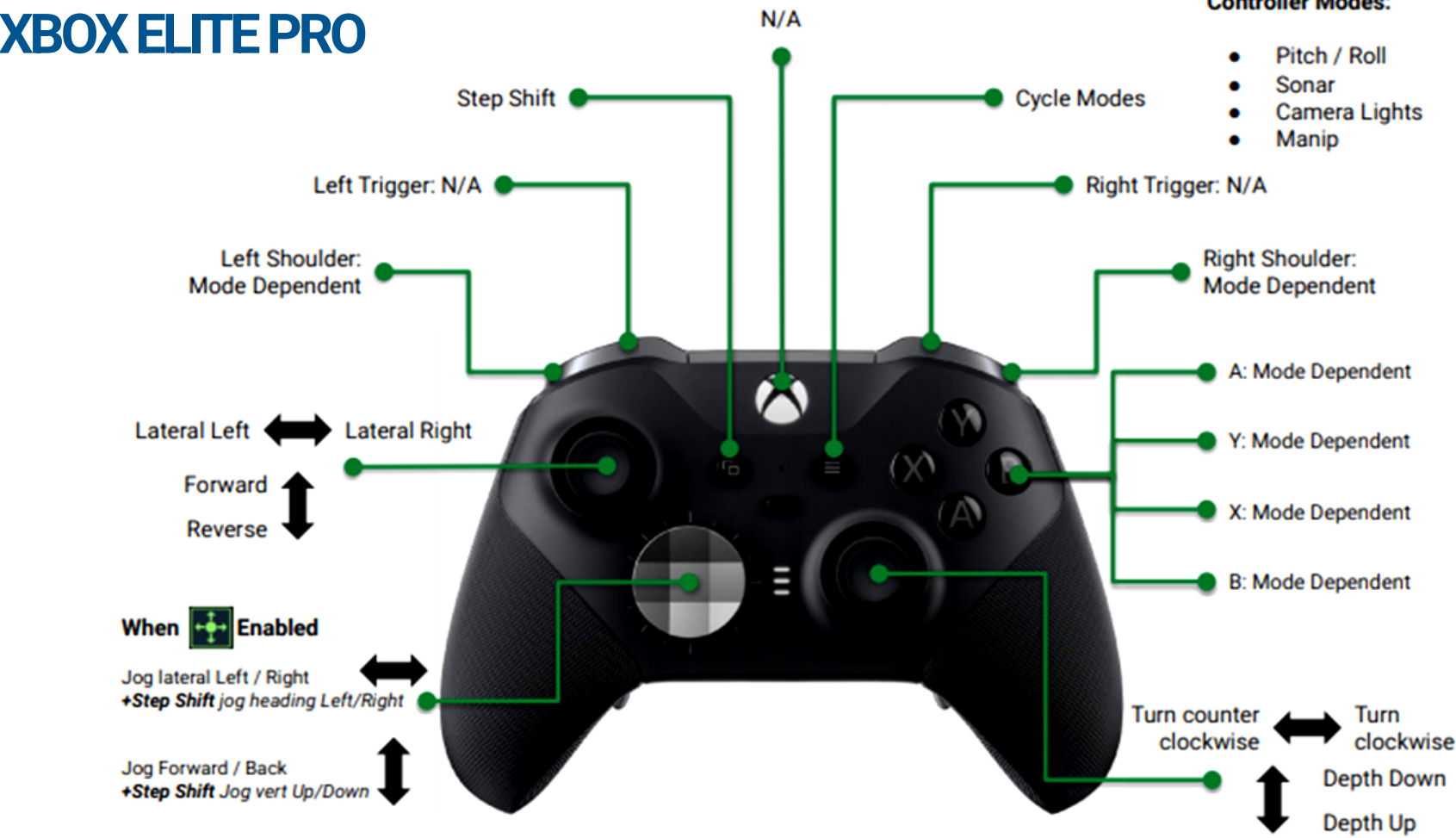
EXPEDITIONARY SPLASHPROOF CONTROLLER



IP65 INDUSTRIAL HAND CONTROLLER



XBOX ELITE PRO



Controller Modes

	CAMERA	PITCH/ROLL	SONAR	MANIP
A	Tilt Down	Pitch (-)5	Range (-)	Close
X	Focus In	Roll (-)5	Gain (-)	Rotate Left
Y	Tilt Up	Pitch (+)5	Range (+)	Open
B	Focus Out	Roll (+)5	Gain (+)	Rotate Right
RB	Lights On	Zero/Level	N/A	
LB	Lights Off	N/A	N/A	

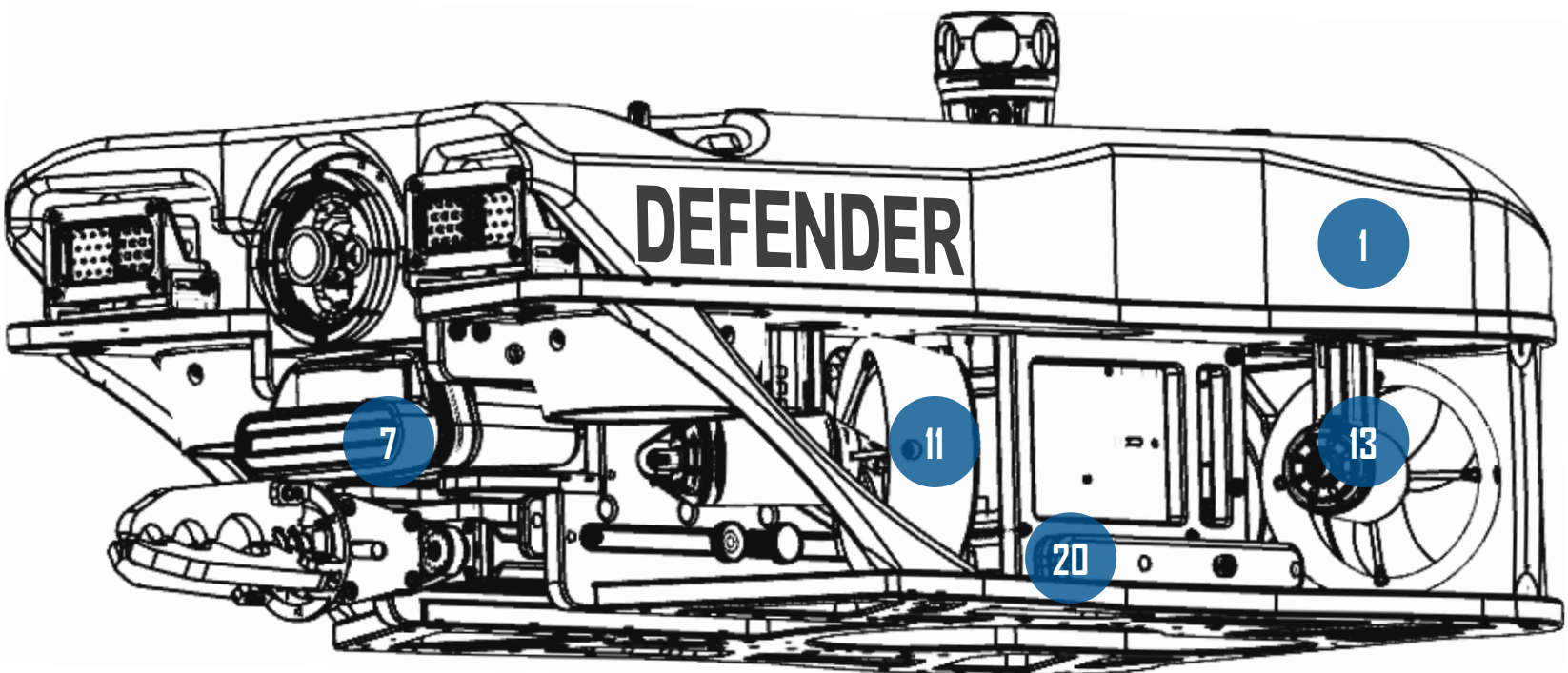


videoray.com/resources/  
support@videoray.com  
+1 610-458-3000, Opt. 1



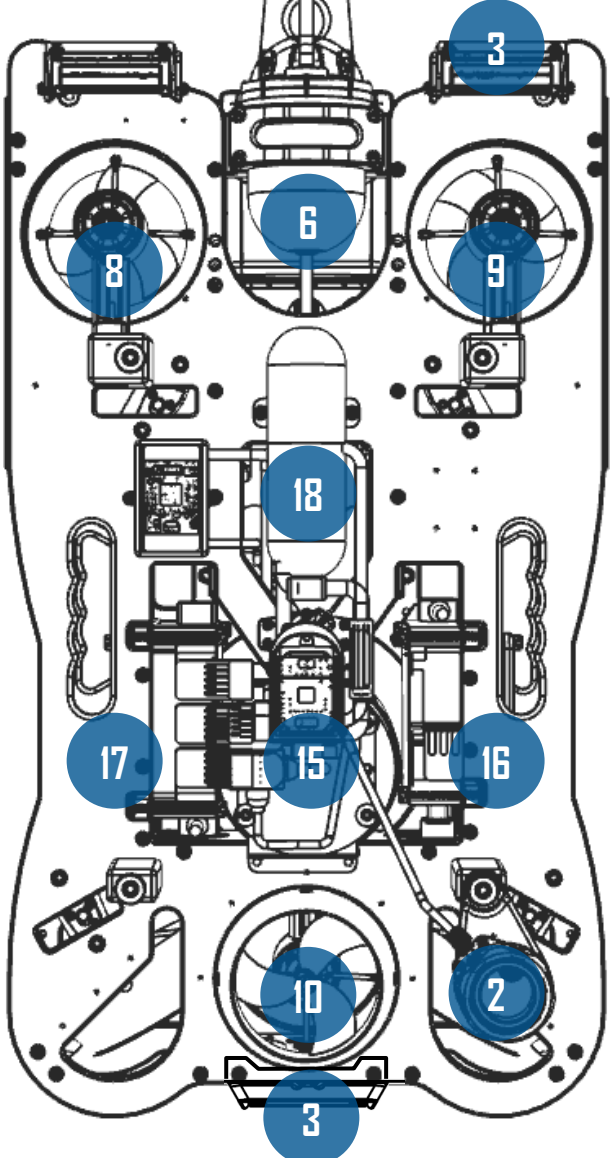
QUICK GUIDE

DEFENDER COMPONENT ID - NAVIGATION CONFIGURATION

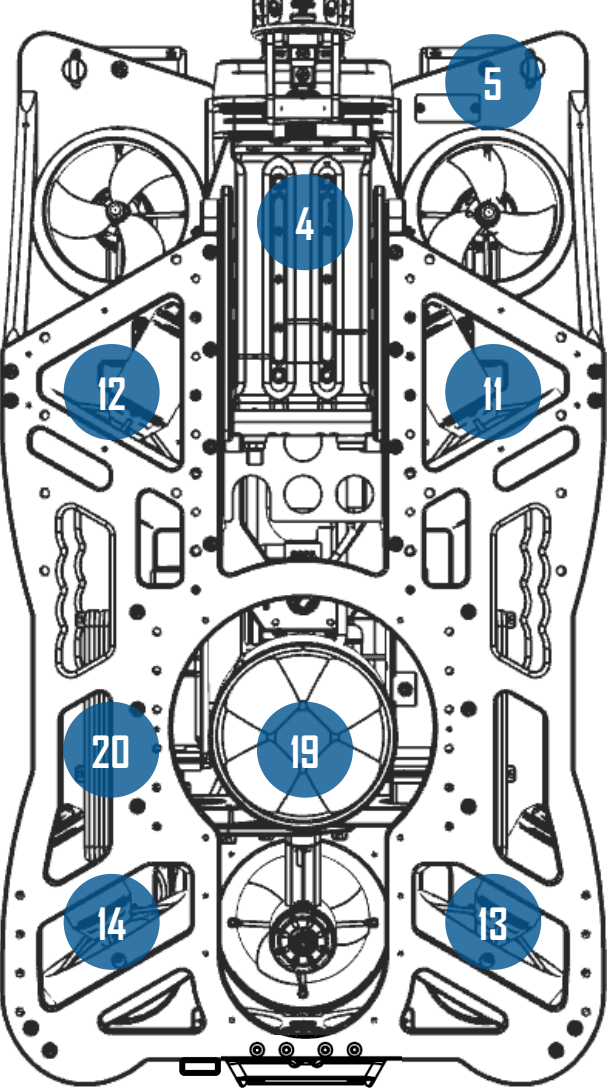


- 1 Float Block *part number 70779*
- 2 USBL X010 Beacon *part number 70696*
- 3 LED Lighting Modules *part number 70023*
- 4 Rotating Manipulator *part number 70824*
- 5 Serial Number Plate *part number 71094*
- 6 HD Camera Module *part number 70044*
- 7 M750d Sonar *part number 71047*
- 8 Port Vertical Thruster *part number 70503*
- 9 Starboard Vertical Thruster *part number 70503*
- 10 Rear Vertical Thruster *part number 70503*
- 11 Port Forward Thruster *part number 70503*
- 12 Starboard Forward Thruster *part number 70503*
- 13 Port Rear Thruster *part number 70503*
- 14 Starboard Rear Thruster *part number 70503*
- 15 Submersible GPS Module *part number 70809*
- 16 Power Module *part number 70160*
- 17 Communications Module *part number 70191*
- 18 AHRS Module *part number 70273*
- 19 Navigation DVL *part number 71044*
- 20 Ballast Weight *part number 70453*

TOP VIEW  
(FLOAT REMOVED)



BOTTOM VIEW



This Quick Guide provides a basic overview and instructions for the setup and operation of the Mission Specialist Defender with a Workhorse Control Console, and Greensea v.7 control software with a topside power source. Optional sonar, manipulator, Navigation package (DVL/GPS), and USBL instructions are also included.

Not all system configurations are covered; refer to the Defender User Manual for instructions, system information, and recommendations for use. Also see accessory Quick Guides for additional overview and instructions (subsea battery, USBL, fiber optic tether).



Mission Specialist Defender - Navigation Configuration

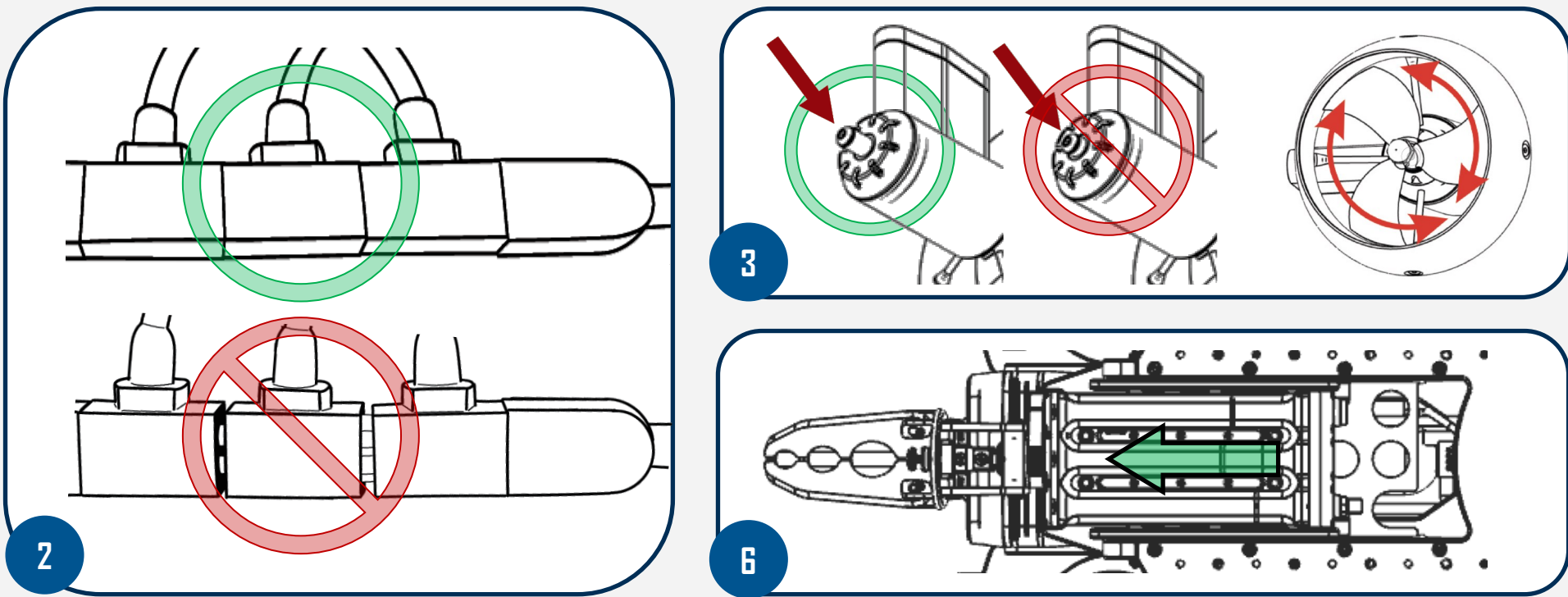
- |                             |                              |
|-----------------------------|------------------------------|
| Mission Specialist Defender | Navigation Package - DVL/GPS |
| Workhorse Control Console   | Lightweight USBL (optional)  |
| Dual Frequency FL Sonar     | Performance Tether           |
| Dual Axis Manipulator       | Spares & Tools               |



Pre-Dive Operations - *\*steps for configurations with optional accessories*

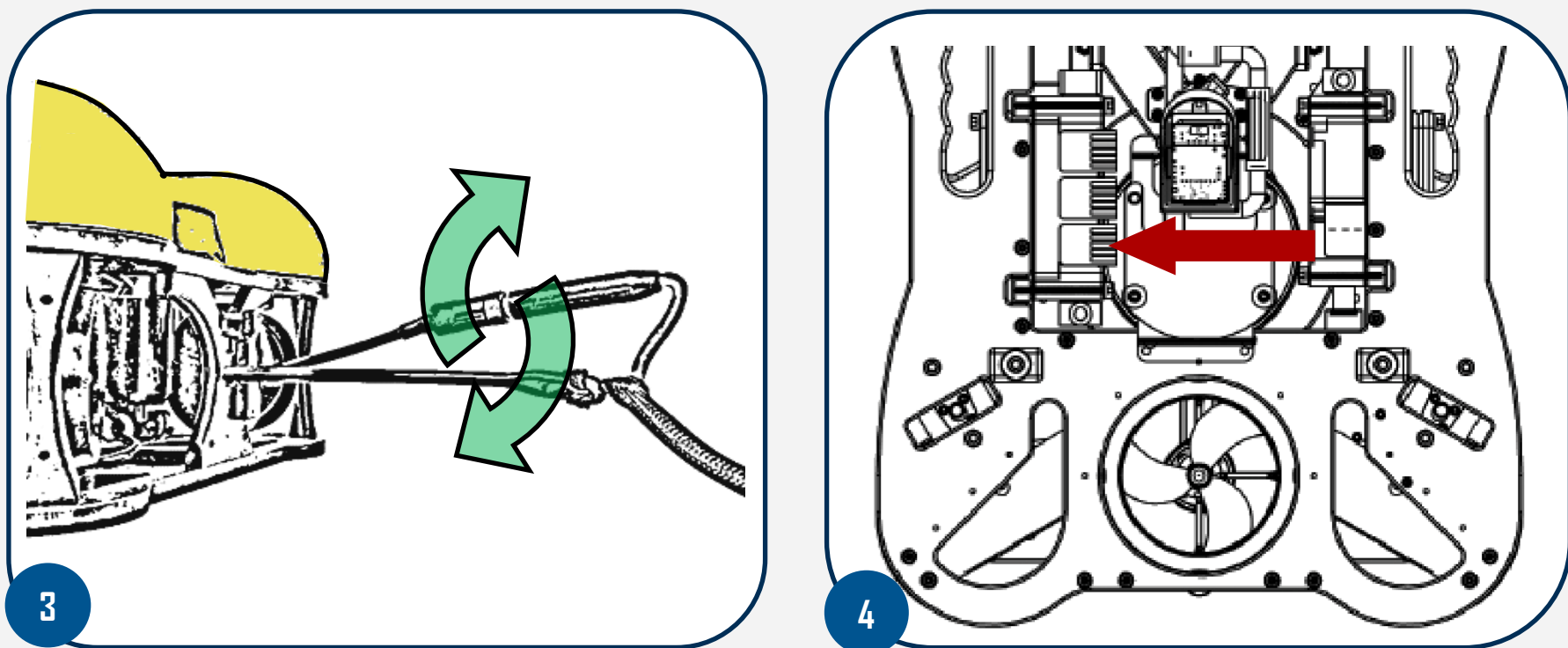
VISUAL INSPECTION

1. Confirm all mission equipment is on scene
2. Remove float block and inspect connections
3. Check that thruster tell tales are visible and propellers spin freely
4. Check propellers for damage and cracks along the hub
5. Inspect camera dome for damage or internal moisture
6. *\*Ensure manipulator is securely mounted and extended*
7. *\*Ensure Defender's USBL beacon is securely mounted*



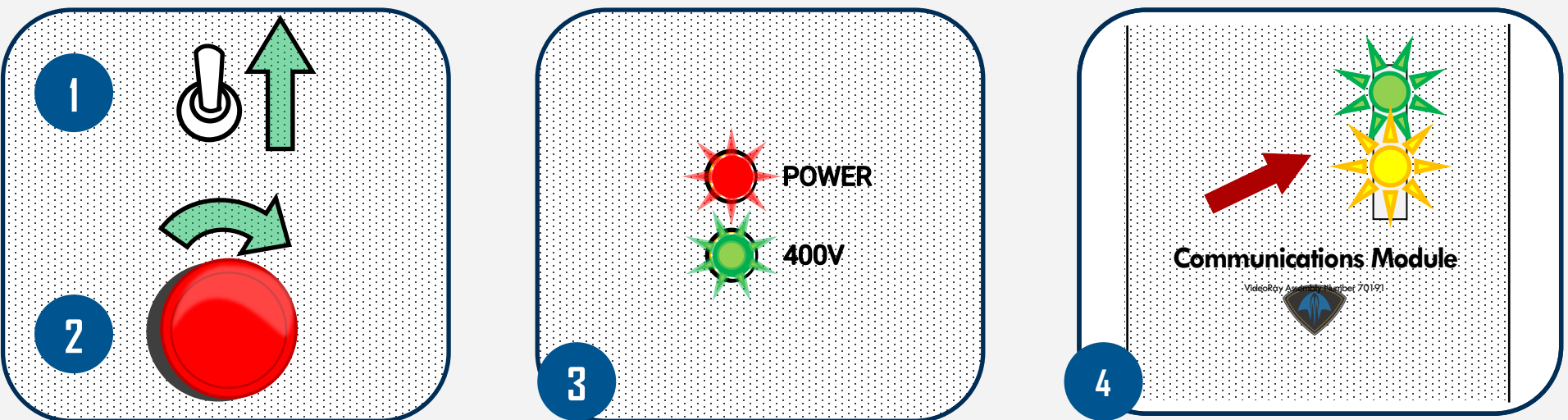
MAKE CONNECTIONS

1. Always start making connections at the Defender and work toward the controller
2. Using silicone, lubricate and securely mate the tether to the Defender's 8-pin whip
3. Connect the strain relief and test all angles to prove no tension is on the tether
4. *\*Lubricate and connect the Defender's USBL beacon to Port 6 of the Communications Module*
5. Replace float block, *\*extend the Defender's GPS mast*
6. Connect the topside end of the tether to the console's 8-pin whip
7. Make connections within the console (keyboard, controller, *\*topside USBL beacon*)
8. *\*Submerge the topside USBL beacon ~ 1m (3') underwater*
9. Connect the system to a clean and reliable power source



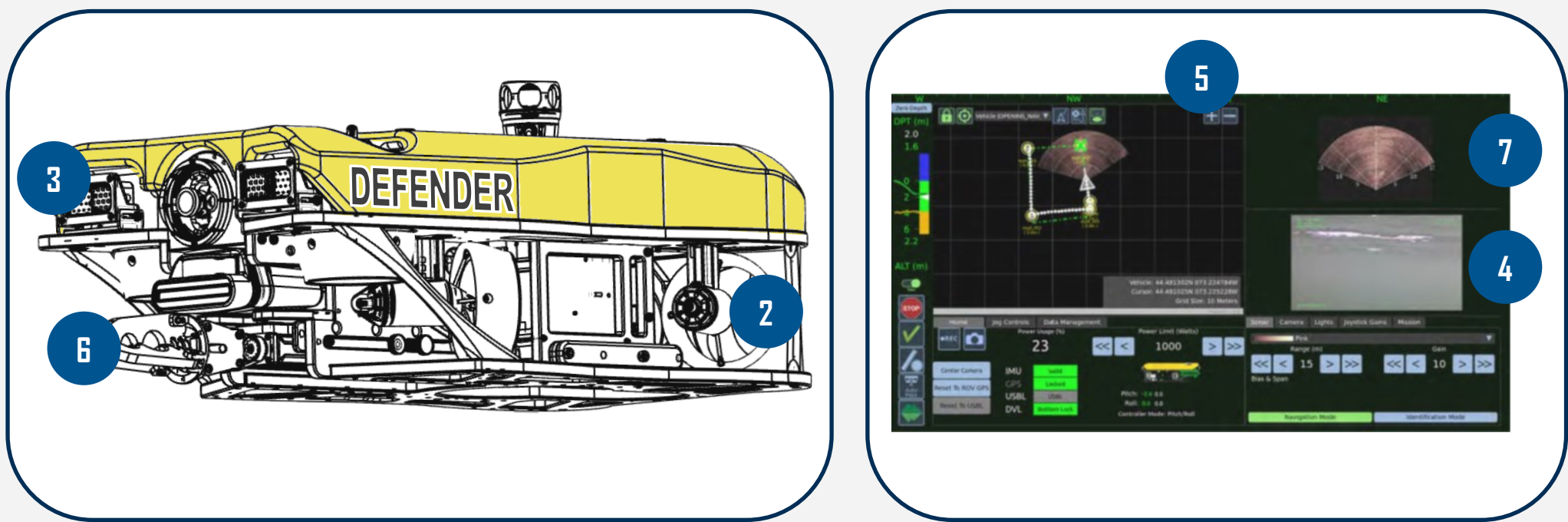
POWER SYSTEM ON

1. Power on the console using the toggle switch
2. Rotate the red Power Mains clockwise to send power to the Defender
3. Confirm console power and 400v indicators are illuminated
4. After several seconds, verify that the Defender is powered up by checking the status LEDs on the Power and Communications modules



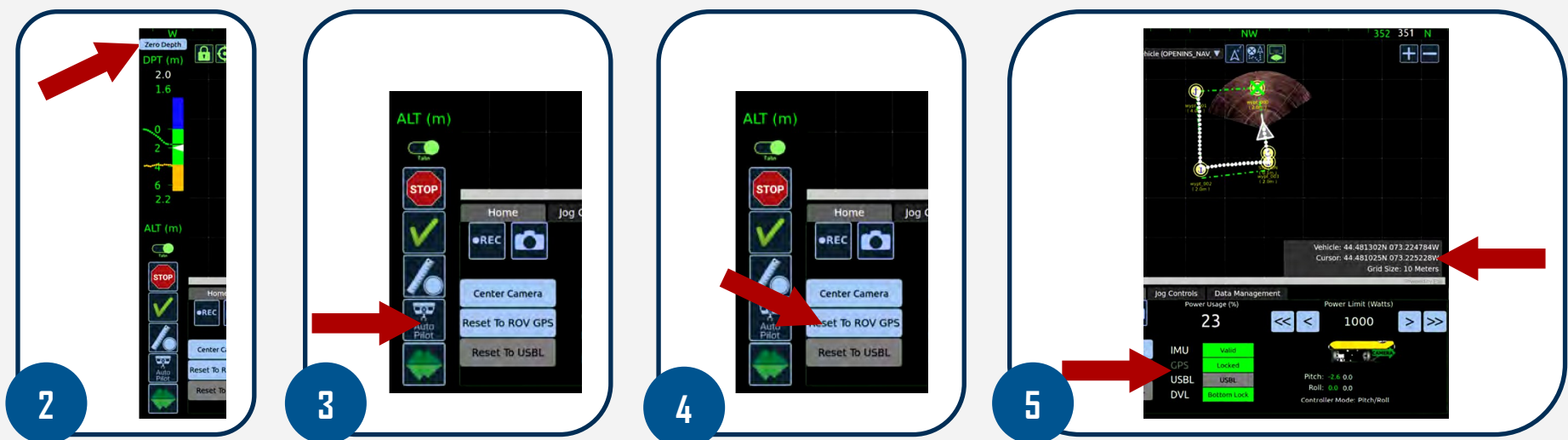
FUNCTION TEST

1. Double-click the Greensea Workspace Icon on the desktop to open the control software
2. Momentarily test thrusters (horizontal/vertical in all directions)
3. Momentarily test LED light functions (on/bright/dim/off)
4. Verify video feed imagery, (camera tilt/focus)
5. Check that compass heading ribbon is responsive and accurate
6. *\*Check manipulator operation (open/close, rotation)*
7. *\*Verify sonar feed is displayed*



LAUNCH

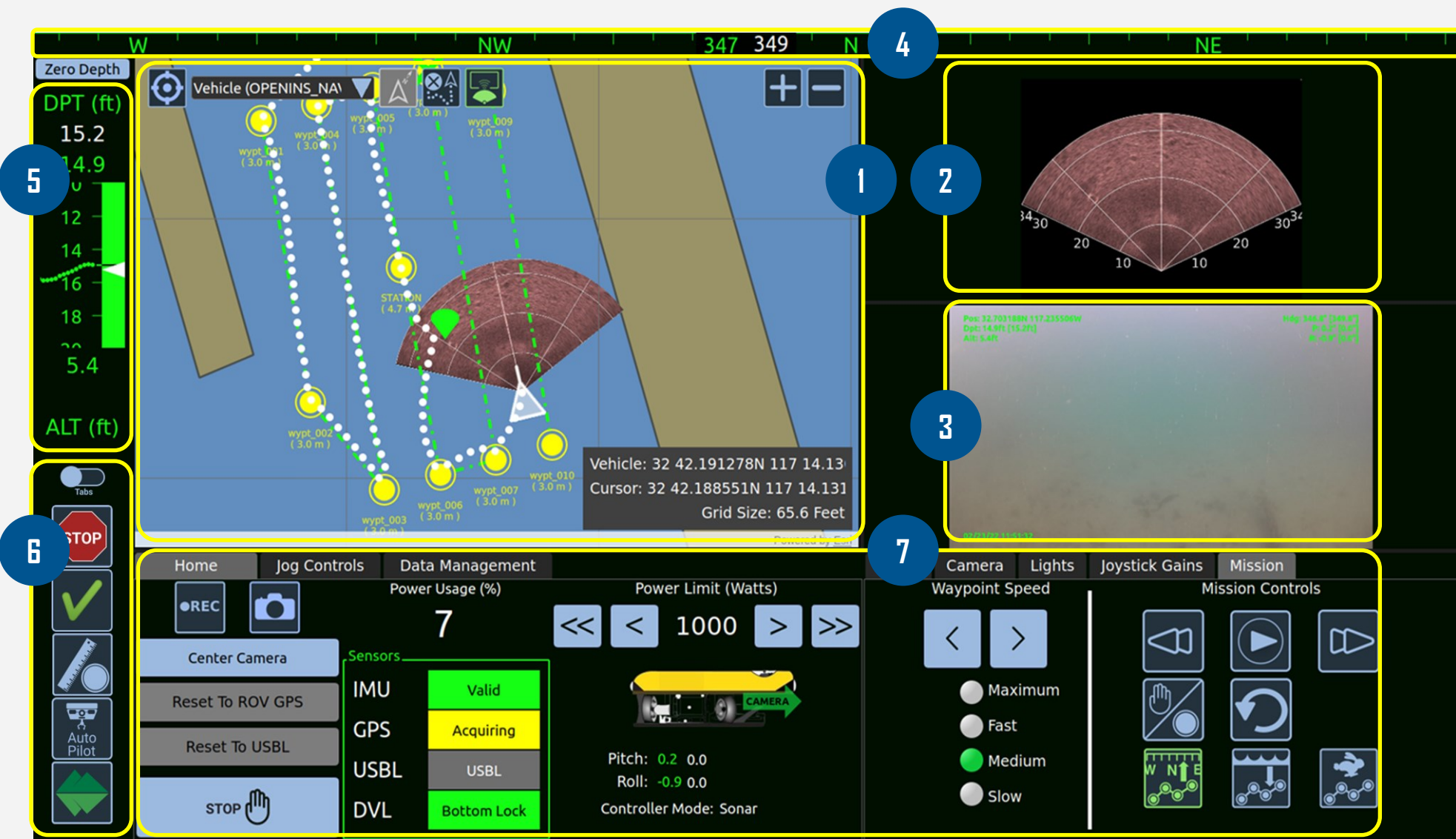
1. Deploy the Defender and check ballast / trim— optimum buoyancy is just at the surface and level
2. Zero the depth while on the surface
3. Enable Auto controls (heading, depth/*\*altitude*, pitch, roll, *\*dynamic positioning*)
4. *\*Reset to GPS when position for the Defender is acquired and displayed in the Map View*
5. Dive 1-2 m, *\*verify positioning in the Map View and navigation sensor status in the Home tab*



Operational Overview

Piloting the Defender will have minor variations with different configurations and control software versions. The recommended considerations are as follows:

- Select a deployment site that aids in piloting and tether management, e.g., a clear path without obstructions
- Make sure tether connections and strain reliefs are secure
- Begin slowly and use moderate controller inputs as you improve your piloting skills and techniques
- Always track or estimate your position and be mindful of your heading and route.
- Use caution when piloting; keep clear of people and hazards on the surface and underwater.



1. Map Display

2. Sonar Display

3. Video Display

4. Heading Bar
5. Depth & Altitude Bar

6. Control Bar

7. Flight View Tabs

Post-Dive Operations - *\*steps with optional accessories*

1. Maintain communication between pilot/tether handler
2. Disable all Auto Pilot controls, *\*Dynamic Positioning*
3. Recover via the tether or Defender frame
4. *\*Open quick-release manip jaw halfway for removal*
5. Shut off Defender Power Mains and console
6. Stop video logging and exit Greensea software
7. Undo all deployment connections, inspect, and replace protective caps/covers
8. Remove float block - rinse the Defender and subsea components
9. Conduct a thorough post-dive inspection of the entire system
10. If operating in salt or brackish water, soak the Defender for a minimum of 30 minutes
11. Allow to dry completely before storing