

Chapter 12



SeaMATE

Chapter 12: *SeaMATE*

Stories From Real Life: Jules Verne—Fact, Fiction, and Inspiration

Chapter Outline

1. **Introduction**
 - 1.1. What Is *SeaMATE*?
 - 1.2. What Can It Do?
 - 1.3. What Can't It Do?
2. **Building the *SeaMATE* ROV**
 - 2.1. Budget
 - 2.2. Skills
 - 2.3. Workspace
 - 2.4. Basic Tools, Devices, and Supplies
3. **Sourcing Materials**
 - 3.1. Shopping for Parts and Materials
 - 3.2. *SeaMATE* Parts List
4. **Constructing the Frame**
 - 4.1. Parts
 - 4.2. Procedure
5. **Constructing the Ballast Subsystem**
 - 5.1. Parts
 - 5.2. Procedure
6. **Constructing the Tether and Junction Box (Electrical Termination Can)**
 - 6.1. Parts
 - 6.2. Procedure for Constructing the Tether
 - 6.3. Procedure for Constructing the Junction Box
7. **Constructing the Thrusters**
 - 7.1. Parts
 - 7.2. Procedure
8. **Adding an Underwater Video Camera, Lighting, and Sensors**
 - 8.1. CCD Video Cameras
 - 8.2. Pressure-Proofing a Camera
 - 8.3. Mounting the Camera and Prepping the Junction Box
 - 8.4. Underwater Lighting Options
 - 8.5. Adding Other Navigation Sensors
9. **Fabricating the Control Box, Wiring the Junction Box, and Testing**
 - 9.1. Parts
 - 9.2. Procedure
 - 9.3. Wiring the Junction Box
 - 9.4. Testing for Wiring, Thruster, Camera, and Light(s)
10. **Constructing Payload Tools**
 - 10.1. Pick-Up Probe
 - 10.2. Other Payload Options
11. **Preparing for Sea Trials and Ops**
 - 11.1. Potting the Junction Box
 - 11.2. Finishing the Fabrication
 - 11.3. Getting Ready for Sea Trials
 - 11.4. Piloting Practice
12. **What's Next? Going Beyond *SeaMATE***
 - 12.1. Modifying *SeaMATE*
 - 12.2. Going Deeper
 - 12.3. Using Multiple Vehicles
 - 12.4. Going Tetherless
 - 12.5. Designing a Hybrid
 - 12.6. Exploring Other Worlds
 - 12.7. Knowledge, Experience, and Dreams
13. **Chapter Summary**

Figure 12.1.cover: Roll Up Your Sleeves and Dive In!

In classrooms around the globe, students are learning the science and excitement of designing and building robotic vehicles like the SeaMATE ROV detailed in this chapter. Once they master these basics and gain hands-on experience, they can explore more advanced craft like the ROV pictured here or AUVs.

Image courtesy of Steve Van Meter, VideoRay LLC

Chapter Learning Outcomes

- Build a simple shallow diving ROV using hardware-store technology.
- Conduct an underwater mission.
- Identify key issues involved in designing a deeper-diving vehicle.
- Research and evaluate system options and components for an ROV capable of going to 100 meters (approx. 325 ft).