ROV Frame Design Considerations

- Keep it simple.
- Concentrate weight low and buoyancy high to provide a large righting moment to stabilize the body.
- Maintain symmetry in thruster placement to minimize undesired torques on the body.
- There is generally a trade off between stability and maneuverability; highly stable vehicles are usually more desirable.
- The orientation of the thrusters has a huge effect on stability. Draw an imaginary line between the center of the thruster and the center of mass. If the thruster is parallel to that imaginary line, then that thruster will not cause the vehicle to rotate (stable), if the thruster is perpendicular to that line then the thruster will cause a large rotation. (The moment is equal to the vector cross product of force and thruster position.)
- Use cross braces to strengthen the frame. The more triangles (trusses) that exist in the structure, the more rigid it will be.
- Be sure to have enough buoyancy that it will be possible to add sensors and other payload. When you add heavy payload you can remove ballast weights. Have enough floatation to require ballast weights.
- Consider mounting a sensor tray in the front that will be in view of the camera.
- Don't let the size become so large that the vehicle is very difficult to transport and store. Keep the size small enough that one, or at most, two people can pick out of the water.

ROV Frame Design Considerations

- There are six possible motions for a body, three linear and three rotational. With optimal thruster placement, the number of thrusters will equal the number motions possible for the vehicle. For example a vehicle with four thrusters could potentially go forwards – backwards, up – down, left – right, and turn left – turn right. A vehicle with only three thrusters would be able, for example, to go forwards – backwards, up – down, and turn left – turn right. Adding more thrusters does not guarantee additional motions will become possible. Additional motions are only possible with certain thruster configurations.