

## C-Ray - An autonomous amphibious vehicle with ice, land, surface and underwater operating capability

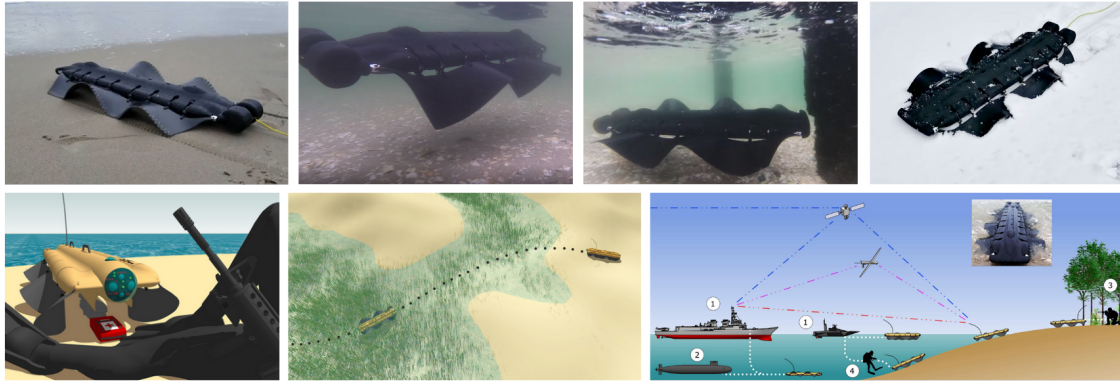


Image credit: <https://www.pliantenergy.com/robotics>

C-Ray platform is a unique autonomous amphibious vehicle, developed by Pliant Energy Systems in Brooklyn NY, with funding from the Office of Naval Research (Dr. Tom McKenna at ONR). It can use several modes of locomotion found in the animal kingdom using just one pair of fins. These fins are best described as four-dimensional objects with a hyperbolic geometry that allows the robot to swim like a ray, crawl like a millipede, jet like a squid, and slide like a snake. C-Ray has unprecedented freedom to travel through a range of environments in a single mission. As an underwater vehicle, the robot's ability to instantly reverse direction and do quick turns make it ideal for tasks such as coral reef inspection or dragon fish hunting where a craft must rapidly maneuver to look around and between objects.

MIT Marine Autonomy Lab is working with Pliant Energy Systems, on integrating autonomy to this platform. The goal of this effort is developing a vehicle that is capable of conducting autonomous amphibious missions. An example mission may look like: the vehicle being deployed from a surface boat where it is required to transit in-water to a designated sandy beach, and conduct an autonomous survey to detect buried metal objects, after which it will re-enter the water and return to the surface boat.

<b>Size:</b>	1.0 m length
<b>Sensors:</b>	GPS, IMU, external pressure/depth sensor, wifi, GSM, and TBD
<b>Software:</b>	Autonomy System: MOOS-IvP Navigation System: HydroMAN
<b>Projects:</b>	Autonomy integration (ONR funded)
<b>Manufacturer:</b>	<a href="https://www.pliantenergy.com/">https://www.pliantenergy.com/</a>