CLAIMS:

1. A launch and recovery system (LARS) for launching an autonomous underwater vehicle (AUV) into a body of water and recovering back the AUV from the water, the LARs comprising:

a suspension and retrieval (SAR) apparatus mountable on a surface vessel;

a docking apparatus suspended from the SAR apparatus; and

a capture device connected to the docking apparatus for engaging and securing the AUV, wherein the capture device is a cage-like structure made up of an upper jaw having a 3D taper form, defining a large front end transitioning to a semi-circular elongate prismatic rear end, and a lower jaw pivotedly joined to the upper jaw at the semi-circular elongate prismatic rear end by a pivot joint;

so that opening of the capture device provides a large exit area for non-contact with the AUV and operating the docking apparatus to move the capture device clear from the AUV during launch, or opening the capture device to provide a large entrance area for a front end of the AUV to enter therein, operating the docking apparatus to substantially locate the AUV inside the capture device and closing the lower jaw to secure the AUV inside the capture device during recovery.

2. The LARS according to claim 1, further comprising a hoist winch suspended on the SAR apparatus and a free end of an associated rope is terminated on a chassis of the docking apparatus.

3. The LARS according to claim 1 or 2, wherein the SAR apparatus is pivotable between a home position inboard the surface vessel and an extended position outboard of the surface vessel.

4. The LARS according to any one of claims 1-3, further comprising a plurality of rubber pads disposed in spaced orientation around an inside of the semi-circular elongate prismatic rear end of the capture device to fit the front end of the AUV.

5. The LARS according to any one of claims 1-4, further comprising cross bars disposed across the lower jaw at both the front end and rear end, with the cross bars having rubber sleeves to provide cushioned contact with the AUV.

6. The LARS according to any one of claims 1-5, wherein the taper form of the upper jaw is arranged to make tangential or gliding contact with the front end of the AUV.

7. The LARS according to any one of claims 1-6, further comprising a pair of electric winches disposed on the upper jaw whilst associated wire cables are terminated at the lower jaw, so that the pair of winches are operable to close the lower jaw against the upper jaw for securing the AUV inside the capture device.

8. The LARS according to any one of claims 1-6, further comprising a pair of linear actuators linking the lower jaw to the upper jaw, so that the linear actuators are operable to open and close the capture device during engagement or release of the AUV.

9. The LARS according to any one of the preceding claims, further comprising:

two or more floatation devices to provide substantially neutral or slight buoyancy when the capture device is submerged in water.

10. The LARS according to any one of claims 1-9, further comprising a camera disposed at the front end of the capture device and another camera disposed at the rear end, with the cameras being equipped with lights for illumination.

11. The LARS according to any one of claims 1-10, further comprising a pair of hydrophones disposed at the front end of the upper jaw to provide stereoscopic locating of the AUV.

12. The LARS according to claim 11, further comprising a pair of hydrophones disposed at the front end of the lower jaw.

13. The LARS according to any one of the preceding claims, further comprising a depth sensor so that launch and recovery of the AUV is operable at a predetermined depth.

14. Method for launching/recovering an autonomous underwater vehicle (AUV) from the water employing a launch and recovery system (LARS) having a cage-like

capture device that is dimensioned to substantially accommodate the AUV, with the cage-like capture device having an upper jaw with a 3D taper form defining a large front end transitioning to a semi-circular elongate prismatic rear end, and a lower jaw pivotedly joined to the upper jaw at the semi-circular elongate prismatic rear end, the method comprising:

operating a suspension and retrieval (SAR) apparatus between an inboard position and an outboard position on a surface vessel; ~~and~~

suspending and launching/recovering the LARS when the SAR apparatus is at the outboard position; and

~~wherein a motion of operating the SAR apparatus is independent of a motion of suspending and launching/recovering the LARS~~

during launching of the AUV, increasing the mouth area at the front end by pivoting the lower jaw away from the upper jaw; translating the capture device a clear distance away from the AUV; closing the capture device; and retrieving the capture device from the water; or

during recovering of the AUV, increasing the mouth area at the front end by pivoting the lower jaw away from the upper jaw; translating the capture device so that the AUV is substantially inside the capture device; and closing the lower jaw against the upper jaw to locate and secure the AUV inside the capture device.

15. The method according to claim 14, wherein ~~the independent motions of operating the SAR apparatus and launching or recovering of~~ suspending and launching/recovering the LARS is implemented by ~~locating~~operating a hoist winch located on a pivoted frame of the SAR.