

8. The sampling apparatus of claim 1, wherein the apparatus is positioned in or near the body of water and is on at least one of a sea-going vessel, a buoy, a drifter, a trawler, a research vessel, a private yacht, a commercial boat, a tanker, a fishing boat, a pier, a floating platform, a naval vessel, or an oil-drilling platform.

9. The sampling apparatus of claim 1, wherein the body of water includes at least one of a lake, a sea, an ocean, a stream, a river, or a reservoir.

10. A vessel, comprising:

- a hull for supporting the vessel in a body of water;
- a water inlet disposed through the hull;
- a pump, in fluid communication with the water inlet, for drawing a water sample from the body of water through the water inlet;
- a plurality of plug-in testing units, in fluid communication with the pump and the water inlet, for determining characteristics of a the water sample, the plurality of plug-in testing units being contained within a dry instrument module within the hull;
- a plurality of electrical components, in communication at least with some of the plurality of plug-in testing units, for generating data signals concerning the characteristics of the water sample, the plurality of electrical components being contained within a computer module within the hull;
- a computer, in communication at least with some of the plurality of electrical components, for collecting the data signals generated by the plurality of electrical components and for providing the data signals to a database; and
- a water outlet, in fluid communication with the plurality of plug-in testing units, for returning the water sample to the body of water.

11. The vessel of claim 10, wherein the computer is located within the computer module.

12. The vessel of claim 10, wherein the database is located in at least one of a memory in the computer or a memory in a computer located remotely from the sampling apparatus.

13. The vessel of claim 10, wherein the plurality of plug-in testing units determine characteristics for at least one of salinity, water temperature, dissolved oxygen content, pH, Eh, Chlorophyll content, CDOM, turbidity, meteorological conditions, global position, bioluminescence, toxic metal content, phosphate content, silicate, pCO₂, biochemical content, ozone content, and solar radiation.

14. The vessel of claim 10, wherein the plurality of plug-in testing units operate autonomously according to a predetermined program within the computer.

15. The vessel of claim 10, wherein the computer automatically and periodically calibrates the plurality of plug-in testing units to compensate for measurement error.

16. The vessel of claim 10, wherein the computer automatically and periodically performs an anti-fouling operation to minimize accumulation of biofouling agents.

17. The vessel of claim 10, wherein the body of water includes at least one of a lake, a sea, an ocean, a stream, a river, or a reservoir.

18. The vessel of claim 10, further comprising:

- a scoop, disposed exterior to the hull, with an opening therethrough defining the water inlet; and
- at least one break away bolt connecting the scoop to the hull, the at least one break away bolt shearing upon application of more than a predetermined force on the scoop;

wherein the opening is displaced a predetermined distance from the hull to minimize at least one of ingestion of debris, ingestion of bubbles, or cavitation,

wherein the scoop has a curved surface to minimize drag in the body of water, and

wherein the scoop has venting holes to eliminate excess water from the system and reduce bubbles in the water stream.

19. The vessel of claim 18, further comprising:

- a sieve, positioned over the opening and at a predetermined angle, for minimizing at least one of ingestion of debris, ingestion of bubbles, or cavitation.

20. The vessel of claim 19, wherein the predetermined angle is 45 degrees.

21. The vessel of claim 10, further comprising:

- a sensor, disposed within the instrument module, for generating a warning signal if water is present in the instrument module;
- a solenoid valve, disposed downstream of the water inlet, for closing the water inlet upon receipt of the warning signal; and
- a containment vessel, disposed just inside of the hull and surrounding the solenoid valve, for preventing water from entering the hull if a leak develops between the hull and the solenoid valve.

22. A system for sampling water at locations around the world, comprising:

- a plurality of vessels, each having
 - a hull for supporting the vessel in a body of water,
 - a water inlet disposed through the hull,
 - a pump, in fluid communication with the water inlet, for drawing a water sample from the body of water through the water inlet,
 - a plurality of plug-in testing units, in fluid communication with the pump and the water inlet, for determining characteristics of a the water sample, the plurality of plug-in testing units being contained within a dry instrument module within the hull,
 - a plurality of electrical components, in communication at least with some of the plurality of plug-in testing units, for generating data signals concerning the characteristics of the water sample, the plurality of electrical components being contained within a computer module within the hull,
 - a computer, in communication at least with some of the plurality of electrical components, for collecting the data signals generated by the plurality of electrical components and for providing the data signals to a database, and
 - a water outlet, in fluid communication with the plurality of plug-in testing units, for returning the water sample to the body of water;
- a plurality of transmitters aboard the plurality of vessels for transmitting the data signals;
- at least one orbital satellite for collecting data signals from the plurality of transmitters and for re-transmitting the data signals; and
- a remote computer for receiving the data signals from the at least one satellite and for compiling the data signals into the database.