The Flying Wing Autonomous Underwater Glider Technology

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BACKGROUND

The underwater glider can be categorized as an autonomous underwater vehicle (AUV) that does not rely on an electrically driven propeller, but relies on small changes in its buoyancy and wings to move up and down. The pitch and roll is controlled by using an adjustable ballast. The AUV has been quite useful for collecting oceanographic data due to its unique propulsion system that uses very little energy and its ability to be on a sampling mission for weeks to months.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a new class of fully autonomous underwater gliders optimized for long distance and long duration (persistent) flights in the ocean. The design uses the high lift-to-drag ratio properties of flying wings in order to maximize horizontal transport efficiency and significantly increase the speed and payload/cargo-carrying capacity of underwater gliders. The flying wing gliders have 20-ft wing spans and total internal volume in the 1,000 liter range. They are equipped with passive acoustic and oceanographic sensors, and very-low-power embedded computers for real-time processing of the sensor signals and for flight control. Navigation systems include GPS while on the surface, and a depth sensor, an attitude-heading reference sensor, and very-high-frequency velocity sensor while submerged. Satellite communications as well as high-data-rate line-of-sight communications are available while at the surface, whereas two types of underwater acoustic modems can be used while submerged.

APPLICATIONS

This vehicle is useful for basic science applications such as monitoring fisheries, marine mammal populations, or waste field discharged by offshore outfalls, as well as both civilian and military applications.

ADVANTAGES

The invention offers the ability to do long range roaming in combination with adequate speed capability to penetrate strong ocean currents.

STATE OF DEVELOPMENT

A working prototype has been developed and has made numerous successful dives.

INTELLECTUAL PROPERTY INFO

The technology is available for licensing.

PATENT STATUS

Patent Pending

CONTACT

University of California, San Diego
Office of Innovation and Commercialization
innovation@ucsd.edu
tel: 858.534.5815.

OTHER INFORMATION

KEYWORDS

autonomous underwater vehicle, underwater glider, oceanographic sensing

CATEGORIZED AS

- **Environment**
  - Sensing
- **Sensors & Instrumentation**
  - Environmental Sensors
- **Engineering**
  - Robotics and Automation

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2007-302-0

University of California, San Diego
Office of Innovation and Commercialization
9500 Gilman Drive, MC 0910, ,
La Jolla,CA 92093-0910

Tel: 858.534.5815
innovation@ucsd.edu
https://innovation.ucsd.edu
Fax: 858.534.7345