WHOI at Sea
Remote Environmental Monitoring UnitS (REMUS)

REMUS
Length: 53 inches (1.3 m)
Diameter: 7.5 inches (19.1 cm)
Operating Depth: 492 feet (150 m)
Dive Duration: 14 hours at 4 knots

REMUS, or Remote Environmental Monitoring UnitS, is a low-cost autonomous underwater vehicle (AUV) developed by the Oceanographic Systems Laboratory for coastal monitoring and multiple vehicle survey operations.

The current vehicle is 53 inches long with a body diameter of 7.5 inches, although the length may be increased to support any reasonable payload. Weighing only 68 pounds in air, REMUS is neutrally buoyant in water and is powered by sealed lead acid batteries. The vehicle can be operated in fresh or salt water. Because REMUS is so small, it can be easily transported by compact car, is air shippable as baggage, and may be launched and recovered from a small vessel; special handling equipment is not required.

Although small in size, the REMUS vehicle is configured to support a

Specifications

variety of sensor packages. The vehicle has a CTD (conductivity/temperature/depth) sensor and an optical backscatter sensor on board. Telemetry data provides time of day, depth, heading, and a geographic fix for the data. A longer version of REMUS with an acoustic Doppler current profiler and GPS system is undergoing tests. Additional PC-104 slots and RS-232 ports are available for user-designed payloads.

REMUS has three motors forward of the propeller. The REMUS propulsion assembly is optimized to provide 1.5 pounds of thrust at a forward speed of four knots. At this speed a 40-nautical-mile track can be completed in 10 hours. REMUS runs from a 24-volt power supply and draws approximately 32 watts while maneuvering through the ocean, enabling the vehicle to operate at four knots for 14 hours.

The REMUS control computer is based on PC-104 technology, a small form factor version of the common IBM-PC hardware. The CPU sits in a custom motherboard, on which are eight 12-bit analog to digital channels, input/output ports, power supplies, and other interface circuitry. Internally, REMUS runs a DOS program written in C++ that executes out of an autoexec.bat file. The vehicle user interface is designed to run on a laptop computer.

REMUS possesses a sophisticated acoustical system with a digital signal processor. A receiving array of four hydrophones is located in the nose, and on the bottom is a hydrophone that can both transmit and receive. To determine its position, REMUS transmits a coded ping to a transponder and listens for a reply. The range and bearing of the reply allows REMUS to

determine its location. REMUS can be programmed to interrogate a trail of transponders, approaching each transponder by minimizing range. When the range to a transponder is below a predetermined threshold, the vehicle then listens on a different channel for the next transponder and approaches it using the same technique. By setting the transponders once using GPS, a known trackline may be followed on mission after mission. This system has been used to autonomously dock the vehicle.

Specifications

Length: 53 inches (1.3)
Beam: Approx. 5.5 feet
Diameter: 7.5 inches (19.1 cm)
Maximum Operating Depth: 492 feet (150 m)
Gross Weight: 68 lbs. in the air, neutrally buoyant in water
Dive Duration: 14 hours at 4 knots
Propulsion: Three motors; one direct drive thruster and sprocket driven rudder, two pitch motors, and one stem propeller
Power requirements: 24-volt supply, 32 watts while maneuvering at 4 knots
Power Source:
Rechargeable lead add batteries

back to top