



AUV / ROV Autopilot

The AUV autopilot is based on the SPECTRE autopilot board and has been installed on submersible vehicles.

The system is suitable for taking over any level of control in:

- A manned submersible, for example an SDV (swimmer delivery vessel), and mini-submarine.
- Semi-submersible autonomous vehicle with / without physical data link to operator workstation.
- An ROV with a physical data link to the operator workstation.
- An autonomous AUV / UUV in contact with a support ship.
- A completely autonomous AUV / UUV operating 'fire and forget' missions. AUV/ROV/UUV autopilot offers heading, speed, track, attitude and depth/height control.

The operator, located on land or on a support ship, can track the progress of the vehicle visually on screen and control the vehicle, by communicating with the controller on board the vehicle. Data from the navigational instruments on board the vehicle may be sent back to the remote control workstation and used to display the progress of the vehicle on screen (see RCW software).

The proprietary, low bandwidth communication protocol, allows efficient two-way communication between the remote control computer and the vehicle. This is particularly important with submersible systems operating with no umbilical cable.

Commands may include actuator demands, from sliders, external console or joystick panel, or as high-level mission commands. High-level commands are combined with the navigation information from onboard instruments, such as the velocity sensor and inertial navigation system, and converted into control signals for the actuators and control surfaces. The controller parameters can be configured 'on the fly' by downloading parameters over the link from the remote control workstation.

The AUV / ROV autopilot functions include heading control, depth hold, speed hold, attitude (roll and pitch) hold, track control and hovering.

Shown here is the Wayamba vehicle developed by DSTO in Melbourne, Australia. The vehicle is equipped with multiple thrusters and hydroplanes and was able to hold station in mid-water to within a few millimetres, as well as following waypoints and headings with impressive levels of accuracy.

The use of unmanned semi-submersible vehicles as AUV support vehicles combines the advantages of being able to receive radio transmission, including GPS, with better stability due to being largely submerged. The vehicle positions itself above the AUV and communicates using an acoustic link with the AUV, while the AUV locates itself acoustically relative to the vehicle. It is essential that the autopilot can maintain the semi-submersible's attitude (roll, pitch and heading) and depth below the surface.