

FEATURES NAVIGATION AND ALGORITHMIC SUPPORT REMOTE-CONTROLLED
UNMANNED UNDERWATER VEHICLES

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ABSTRACT

A vehicle-borne control and navigation system provides a remotely operated vehicle motion modes when detecting bottom targets as well as inspecting hydraulic structures and ship hulls. For underwater research and survey we apply the complex including both the autonomous underwater vehicle (AUV) and the remotely operated vehicle (ROV), their moving in the common field of a long baseline acoustic positioning system beacons being coordinated in the process.

When travelling to the predetermined target (its geographic position detected), the vehicle standard mission includes several stages. First, the remotely operated vehicle is transported to the target environment according to the data from satellite and acoustic navigation systems. Next, a sector-scan sonar conducts the bottom search and survey. Finally, visual targeting is followed by its close investigation by the sector-scan sonar, photo and video cameras. While inspecting engineering constructions or ship hulls the remotely operated vehicle is moving forward along the inspected object at set distance. Signals from the echolocation system, Doppler log and navigation sensors are used to control the vehicle angular orientation. Close investigation of an accurately located navigation object is done by the vehicle vision system and navigational complex, real-time data being transmitted to the off-vehicle control post.

The complex developed in the Institute for Marine Technology Problems, Far Eastern Branch of the Russian Academy of Sciences, was successfully tested at sea.

Key words: remotely operated vehicle, control system, navigation system, Doppler log, echolocation system, dynamic positioning system.

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