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SOFTWARE SIMULATION FRAMEWORK ON THE BASE OF MULTIPROCESSING ARCHITECTURE FOR AUTONOMOUS UNDERWATER VEHICLES

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ABSTRACT

Real-time simulation of resource-intensive tasks connected with testing of autonomous underwater vehicles' (AUV) "intelligent" control algorithms implies the need of framework design with distributed computing. Algorithms research in the described framework environment is carried out by simulation of wide range of onboard sensors, AUV dynamics and underwater physics. Simulator distinctive feature is the possibility to test algorithms directly in selected AUV control system environment.

Simulation framework architecture utilizes client-server technology and centralized database with possibility to connect both personal computers and supercomputers as computational nodes. Utilized modular approach provides for possibility to expand algorithm and functional base at the expense of connection of additional modules via plug-in technology. Framework functional capabilities, modules interaction diagram under the circumstances of distributed computing, data communications and storage protocols taking into account specific features of simulated processes are described.

Framework testing results with different computation configurations illustrate possibility of AUV control processes real-time simulations with heavy computational loads.

Keywords: autonomous underwater vehicle, simulation framework, distributed program architecture, hybrid parallelism, real-time.

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