



Multiagent system for waves climate monitoring in a coastal zone

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The use of systems that can significantly improve the efficiency of wave climate research of coastal zones is actual by its potential application in the field of geological prospecting in the shelf zone where there are significant reserves of minerals. Modern approaches for complex measurements of waves include remote and contact sensing. Both have advantages and disadvantages, but combination of these methods with automation of measurement process based on mobile robots makes possible to achieve significant performance in complex monitoring. We consider measurements of wave climate by means of telemetrically connected group of ground, overwater and underwater robots. The ground robot based on a custom made mobile platform with three various types of changeable movers and remote sensing equipment base on radio frequency beam measurements (ship's radar «Micran») [Kurkin, A., Pelinovsky, E., Tyugin, D., Kurkina, O., Belyakov, V., Makarov, V., Zezulin, D., 2017, Unmanned ground vehicles for coastal monitoring. International Journal of Imaging and Robotics 17, 64-75.] Specially designed underwater robot collects data using a video inspection system and a hydrostatic wave recorder with a string sensor. It has the ability to adjust the position of the center of gravity to increase stability when driving on steep slopes of the seabed. The overwater robot was designed for conducting detailed bathymetry measurements of investigated water areas by means of a multi-beam echo sounder. All robots have on-board computers with the software for measurements recording, remote controlling and data communication. Underwater and overwater-based robots were tested in July 2017 on Sakhalin Island. Both robotic systems were merged into the united local network. The results of their operation were obtained to verify the data from measuring systems of the ground robot. Experiments with all three robots connected are planned on 2018 year. Acknowledgment: This study was initiated in the framework of the state task programme in the sphere of scientific activity of the Ministry of Education and Science of the Russian Federation (projects No. 5.4568.2017/6.7 and No. 2.1433.2017/4.6).