

OPTICAL COORDINATE SENSOR FOR THE UNDERWATER SYSTEM OF THE AUTOMATIC LANDING AND DOCKING

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ABSTRACT

To ensure the process of automatic control of rapprochement and docking of underwater object to a target, the device that determines the coordinates of the object current position is needed. The article describes an optical coordinate sensor - the device adapted to locate the moving object current position relative to the fixed markers placed on the docking plane. The operation principles of the sensor as an element of the technical vision system, its structure and specifications are described. The optical layout of the instrument is designed by the results of optimization of the signal / noise ratio in the optical measurements in real aquatic environment as well as algorithms for recognizing objects in an image plane. This instrument comprises a lens and a photo detector array board, a processor, power supply and a secondary IO port for information flows and signals. Structurally all the nodes are placed in a single package. This instrument also includes a topographic target placed on the docking plane. One of the important features of the hardware is that the optical sensor is equipped with a signal processor, and processing takes place inside the image sensor. In the course of rapprochement the active illumination of the topographic target is used. Also the results of field tests are presented, both in test pool environment and in the coastal waters of the Barents Sea on board of DSRV "AS-34".

Key words: optical sensor, topographic target, automatic control, underwater docking.

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