

# TECHNOLOGIES OF UNMANNED UNDERWATER VEHICLES AND HYDROACOUSTIC SYSTEMS FOR UNMANNED MINE PROTECTION SYSTEMS

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Sea mines are very effective and inexpensive weapons. The leading maritime powers are developing mine action forces as part of programs to modernize sonar and navigation equipment and create complexes of surface and underwater unmanned systems that, unlike trawling techniques, can neutralize minefields from a safe distance. The article examines one of the options for a ship-based mine protection system with a specific set of technical means that allows for effective and safe search, identification and destruction of mines.

**Keywords:** unmanned underwater vehicle, side scan sonar, hydroacoustic navigation system, shipboard mine protection system

## References

1. Ageev M.D., Kiselev L.V., Matvienko Yu.V. Avtonomnye podvodnye roboty: sistemy i tekhnologii. M.: Nauka, 2005. 398 s. [In Russ.]
2. Voitov D.V. Avtonomnye neobitaemye podvodnye apparaty. M.: Morniga, 2015. 331 s. [In Russ.]
3. Voitov D.V. Teleupravlyayemye neobitaemye podvodnye apparaty. M.: Morniga, 2012. 677 s. [In Russ.]
4. Voitov D.V., Tkachenko A.O., Tsarichenko S.S. Avtonomnye neobitaemye podvodnye apparaty. Podvodnye tekhnologii i sredstva osvoeniya Mirovogo okeana. M.: Oruzhie i tekhnologii, 2011. S. 218–227. [In Russ.]
5. Dudkin A.A., Stepanov D.A., Sokol A.S. Iстория возникновения и применение морских робототехнических комплексов военного назначения для ведения противоминных действий. Morskoy sb. 2018. No. 6 (2055). S. 73–77. [In Russ.]
6. Bystrov B.V., Kuleshov K.V., Pirozhenko V.A., Svetlov M.A. Aspekty sovershenstvovaniya protivominnyyh sil i sredstv Voenno-morskogo flota Rossii. Morskoy sb. 2017. No. 10(2047). S. 46–51. [In Russ.]
7. Illarionov G.Yu., Sidorenko V.V., Smirnov S.V. Avtonomnye neobitaemye podvodnye apparaty dlya poiska i unichtozheniya min // Podvodnye issledovaniya i robototekhnika. 2006. No. 1. S. 31–39. [In Russ.]
8. Lekomcev V.M., Titarenko D.V. Gidroakusticheskie sredstva vizualizacii dlya neobitaemykh podvodnykh apparatov. Morskie informacionno-upravlyayushchie sistemy. 2014. No. 3(6). S. 14–19. [In Russ.]
9. Lurton H. Vvedenie v podvodnuyu akustiku – principy i prilozheniya. 2-e izd. Ksav'er Gejdell'berg: Lurton Springer, 2010. [In Russ.]
10. Hansen R.V. Vvedenie v gidrolokator s sintezirovannoj aperturoj, gidroakusticheskie sistemy. Intekh; 2011. DOI: 10.5772/23122. URL: <http://www.intechopen.com/books/sonar-systems/introduction-to-synthetic-aperture-sonar>

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