Underwater Investigations and Robotics. 2012. № 2 (14). P. 4-15

THE MOBILE ACOUSTIC COMBINED RECEIVING SYSTEMS BASED ON THE AUTONOMUS UNINHABITED UNDERWATER VEHICLES

Shchurov V.A., Shcheglov S.G.
V.I. Il'ichev Pacific Oceanological Institute FEB RAS
43 Baltiyskaya Str., Vladivostok, 690041. E-mail: shchurov@poi.dvo.ru

Ivanov E.N.
Adm. G.I. Nevelskoy Marine State University
50a Verkhneportovaya Str., Vladivostok, 690059

ABSTRACT

The article is devoted to the analysis of the energy properties of vectorial acoustic fields in terms of the possible use of these properties in a practical hydroacoustic. Such possibility can be made for the following reasons. Vector-phase measurements enable you to get all the components of the energy tensor, i.e. full details of the acoustic field at the point of measurement, which can not be obtained by measuring only characteristics of the scalar pressure field. Combined receiver has a new universal property – it allows to determine the direction of the source. Moreover, it's size is considerably smaller than the wavelength of the measured field, that allows you to place the receiver on the small autonomous unmanned underwater vehicles. In essence, the system based on the vector-phase measurements is a new generation of sonar system and it allows to solve detection and targeting problems on a new principles and with major possibilities.

Keywords: anisotropic and diffuse acoustic fields, the vector and combined receivers, a vector of density of a flow of energy, an intensity vector, kinetic and potential energy.

REFERENCES

1. Shchurov V.A. *Vektornaya akustika okeana* [Vector acoustics of ocean]. Vladivostok, Dal'nauka Publ., 2003. 307 p.
2. D'Spain G.L, Hodgriss W.S. Edmonds G.L. Energetics of the deep ocean's infrasonic sound field. J. Acoust. Soc. Amer. 1991. Vol. 89, no.3. pp. 1134–1158.
3. Isakovich M.A. *Obshchaya akustika* [General acoustics]. Moscow, Nauka Publ., 1973. 495 p.
4. Shchurov V.A., Kuleshov V.P., Cherkasov A.V. *Akusticheskii zhurnal - Acoustical Physics*, 2011, vol. 57, no.6, pp. 837–843
5. Shchurov V.A., Cherkasov A.V., Kasatkin B.A., Zlobina N.V., Kasatkin S.B. *Podvodnye issledovaniya i robototekhnika - Underwater Investigations and Robotics*, 2011, no.2(12), pp. 4–17.
6. Krasovskiy P., Tsygankov S., Teverovskiy G. *Novyy oboronnyy zakaz. Strategii – New defensive order. Strategy*, № 3 (10), 2010, pp. 20–23.
7. Shchurov V.A., Ivanov E.N., Shcheglov S.G., Cherkasov A.V. *Podvodnyy planer dlya monitoringa vektornykh akusticheskikh poley* [Underwater glider for monitoring of vector acoustic fields]. Patent RF, no. 106880, 2011