

APPLICATION OF ACOUSTIC-SEISMIC METHODS FOR DETECTING MOVING OBJECTS

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Modern geophysical monitoring technologies effectively detect and track moving objects using acoustic and seismic methods. By analyzing sound waves and ground vibrations, these methods enable the remote monitoring of vehicles, pedestrian movement, and industrial activities [1-5]. The integration of these techniques enhances detection capabilities in complex environments, including urban and remote areas.

Key techniques include spectral-time analysis, which differentiates emitted signals, spectral-polarization processing, which refines directional information, and bearing determination, which locates objects based on wave propagation.

Field experiments demonstrate that these methods achieve 85-95% accuracy in object detection. Their application is particularly valuable for security, military surveillance, and automated industrial monitoring, ensuring real-time tracking and precise identification of moving targets. Moreover, the ability to operate passively without requiring active signal transmission makes them highly suitable for covert operations and environmental monitoring.

Acoustic-seismic methods provide an effective approach for the positive identification of moving objects. The combination of spectral-time analysis, spectral-polarization methods, and bearing determination allows for real-time refinement of an object's key parameters. This approach has promising applications in security, military monitoring, and automated control systems in industrial environments.

References

1. Nasibov Y. A. et al. Modelling of the rationally deployment of observing systems //Сучасні інформаційні системи. – 2019. – №. 3,№2. – С. 10-13.
2. Hashimov E. G. et al. Application of relief digital model for combat operation planning //Military Knowledge. – 2015. – Т. 4. – С. 63-69.
3. Hashimov E. G. Detection unobserved moving armored vehicles by seismic method // E.G.Hashimov, A.A.Bayramov / - Baku:National Security and Military Sciences. – 2015. – Т. 1. – №. 1. – С. 128-132.
4. Hashimov E. G., Bayramov A. A., Xalilov B. M. Terrain orthophotoplanes making for military objects revealing //National security and military sciences. – 2016. – Т. 2. – №. 4. – С. 14-20.
5. Hashimov E. G., Bayramov A. A., Khalilov B. M. Terrain orthophotomap making and combat control //Proceeding of Internatonal Conf.“Modern Call of Security and Defence”. I-st. – 2016. – Т. 19. – С. 68-71.