Abstracts

Microwave Acoustic Simulation of Airborne Radar Ground Echoes

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A method is described for generating simulated microwave frequency radar terrain echoes. This method makes it possible for the first time to realistically duplicate in the laboratory the principal characteristics of echoes due to radar motion and terrain roughness. These characteristics include variation of echo delay, Doppler shift, random fine structure, and their time variation. The simulation is based on modeling of the radar beam propagation and diffuse reflection processes by use of microwave acoustic energy in a solid medium. Scaling relations between radar and acoustic model parameters are derived. An experimental program was carried out whose purpose was to develop a practical solution to the problem of varying the distance between a microwave acoustic transducer and a reflecting surface, and to determine the overall feasibility of the simulation method. Results indicating its practicability are presented and directions for further work are suggested.

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