Multistatic Velocity Backprojection for Simulated and Experimental Multistatic Radar Data

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This presentation follows the talk entitled "Passive Bistatic and Multistatic Radar Using WiMAX Signals of Opportunity." While the first talk focuses on passive bistatic and multistatic experiments conducted at the Naval Research Laboratory, this talk introduces multistatic velocity backprojection and applies the technique to visualize simulated data and data collected during the experimental campaign.

Multistatic radars are capable of providing a direct measurement of the three-dimensional position and velocity vectors associated with a moving target. Rigorous multistatic radar theory is needed to address the complexity associated with this six-dimensional measurement. Specifically, one area of investigation is how data from a multistatic radar system should be best processed, combined, and visually represented.

This presentation describes a multistatic velocity backprojection operation for pulsed multistatic radar systems with stationary transmitters and receivers and multiple moving targets. This work addresses the fusion of pulsed data from distributed receivers and visualization and interpretation of multistatic radar data. Processed radar data is visualized by taking a cut that corresponds to a single velocity vector and reduces the position dimension by one, yielding a single two-dimensional image in position for each target.

The transmitter and receiver configuration of the passive multistatic experiments conducted at the Naval Research Laboratory is simulated with targets moving at velocities with different magnitudes and directions. The multistatic velocity backprojection technique is subsequently used to interpret both the simulated and experimental multistatic radar data. The data from multiple receivers is successfully combined using this technique and this representation is compared with range-Doppler processing of data from bistatic pairs.