

# Performance Analysis of Perturbed Optimum Aperture Placement for a Space-Based Radar Interferometry

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The performance of the space-based radar interferometric satellite system was developed and analyzed. The space-based radar interferometric system can be applied to several multi-spacecraft missions for surveillance, active/passive radiometry, terrain mapping, navigation, communications, and ground moving target indication. In this study, the optimal aperture placement for surveillance was determined using the  $UV$  distribution and the point spread functions of radar to collect sufficient data from the signal returns. The system model for the performance of radar interferometric system is also presented. For US Air Force TechSat-21 Earth orbiting clusters in close formations with perturbations, the point spread functions of radar are analyzed so that the satellite formation can be held to provide the high resolution of image. A comprehensive analysis of radar performance for the image is proposed to provide an appropriate orbit control point for reconfiguration of the satellite formation.