

Space Time Adaptive Algorithm in Bi-Static Passive Radar Systems for Clutter Mitigation

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Abstract : Space – time adaptive processing (STAP) is an effective tool for detecting a moving target in spaceborne or airborne radar systems. Since airborne passive radar systems utilize broadcast, navigation and excellent communication signals to perform various surveillance tasks and also has attracted significant interest from the distinct past, therefore the need of the hour is to have cost effective systems as compared to conventional active radar systems. Moreover, requirements of small number of secondary samples for effective clutter suppression in bi-static passive radar offer abundant illuminator resources for passive surveillance radar systems. This paper presents a framework for incorporating knowledge sources directly in the space-time beam former of airborne adaptive radars. STAP algorithm for clutter mitigation for passive bi-static radar has better quantitation of the reduction in sample size thereby amalgamating the earlier data bank with existing radar data sets. Also, we proposed a novel method to estimate the clutter matrix and perform STAP for efficient clutter suppression based on small sample size. Furthermore, the effectiveness of the proposed algorithm is verified using MATLAB simulations in order to validate STAP algorithm for passive bi-static radar. In conclusion, this study highlights the importance for various applications which augments traditional active radars using cost-effective measures.

Keywords : bistatic radar, clutter, covariance matrix passive radar, STAP

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