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A TRACKING TECHNIQUE FOR MULTIPLE AERIAL TARGETS BASED ON MULTI-PLANAR ARRAYS

Abstract

In order to realize multi-target tracking, telemetry and command (TTC) with single ground TTC station, digital beamforming technique is an ideal choice to meet the growing demands of antenna system. For the purpose of simultaneous multi-target tracking, a flexible hemispherical coverage array antenna based on multi-planar arrays is proposed. Compared with dome phased arrays, multi-planar arrays are easier to form desired beams and implement in engineering. Mainlobe jamming poses a particularly difficult challenge for multi-target tracking, as the monopulse ratio curve is too distorted to be suitable for the angle estimation when adaptive beamforming is employed to cancel interferences, especially to cancel mainlobe jamming. An innovative approach combing adaptive principle and convex programming is presented. Based on the desired monopulse ratio response, sum pattern is obtained by adaptive method, and then difference pattern is synthesized with the constraints to minimize the distortion of resulting monopulse ratio. The results of the proposed technique indicate that the adaptive monopulse technique is capable of canceling composite mainlobe or/and sidelobe jamming while preserving the monopulse processor ability to estimate the target angle accurately.