

## Hybrid Antenna Array with the Bowtie Elements for Super-Resolution and 3D Scanning Radars

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**Abstract :** The antenna arrays for the entire 3D spherical coverage have been developed for their potential use in variety of applications such as radars and body-worn devices of the body area networks. In this study, we have rigorously revamped the hybrid antenna array using the optimum geometry of bowtie elements for achieving a significant improvement in the angular discrimination capability as well as in separating two adjacent targets. In this scenario, we have analogously investigated the effectiveness of increasing the virtual array length in fostering and enhancing the directivity and angular resolution in the 10 GHz frequency. The simulation results have extensively verified that the proposed antenna array represents a drastic enhancement in terms of size, directivity, side lobe level (SLL) and, especially resolution compared with the other available geometries. We have also verified that the maximum directivities of the proposed hybrid antenna array represent the robustness to the all &nbsp;variations, which is accompanied by the uniform 3D scanning characteristic.

**Keywords :** bowtie antenna, hybrid antenna array, array signal processing, body area networks

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