

We present an in-depth look at the challenges involved in using analog retrodirective arrays for satellite communications (SATCOM). The main technical issues surrounding the development of a retrodirective (self-steering) SATCOM system are given and techniques for mitigating these issues are provided. Detailed results are given for a prototype high-performance circularly polarized retrodirective array architecture suitable for mounting on an unstabilized mobile platform. This paper concludes with practical retrodirective L-band array results with the array used to acquire actual broadband satellite data signals from a commercial L-band satellite system. Received satellite signals as low as -130 dBm at the antenna elements are tracked. Accurate self-tracking occurs over the azimuth range of up to $\pm 40^\circ$.