

**Advancements in Affordable Array Technology for Aerospace Applications**  
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Rockwell Collins is a leader in providing trusted solutions for commercial and defense systems in aerospace systems. Traditional military active arrays are too expensive and require too much power for most aerospace applications. In order to meet new challenges our customers face, Rockwell Collins has made several innovations to provide affordable arrays for aerospace applications leveraging analog and digital beamforming.

A significant challenge to widespread adoption of phased array technology is the affordability of such systems. Several technology advancements in printed circuit board technology, automated assembly of sub-system components, availability of integrated circuit (IC) components, and packaging have reduced the cost of phased array systems. These are key enablers in both beamforming and aperture developments at Rockwell Collins for ESA technology in aerospace markets.

Rockwell Collins has developed PCB-based ESAs with wideband and narrowband capabilities to enable military and commercial applications. One example in commercial markets is a SATCOM ESA aperture that seeks to replace existing mechanically steered arrays for data access on airplanes. Worldwide growing demand for high bandwidth, high throughput and low latency has pushed commercial markets to an affordable phased array solution.

An S-band monolithic antenna array capable of wide scanning and dual polarization has also been developed. This antenna array was paired with a digital beamformer developed under the DARPA Arrays at Commercial Timescales (ACT) program (T. Hoffmann, et al "Measured Performance of the IMPACT Common Module – a building block for next generation phased arrays," 2016 IEEE Phased Array Systems and Technology). Due to the inherent flexibility of the beamformer, a wide range of beamforming measurements were performed with minimal effort and lead time.