



# MINIATURIZED CRPA ANTENNAS



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## DESCRIPTION

Miniaturized Controlled Reception Pattern Antennas (CRPAs) were developed for application on small military platforms. The size of existing GPS adaptive arrays, such as the GPS Antenna System-1 (GAS-1) CRPA with a 14" diameter, precludes their installation on small military aircraft with severe space limitations, such as the F-18, AV-8 and many helicopters. These aircraft currently use the much smaller Fixed Reception Pattern Antenna (FRPA) solely for GPS navigation. However, a FRPA does not provide the capability to counter interference or jamming. To address this problem, two reduced size CRPAs have been designed, built, and tested. One of these arrays has the same footprint as the FRPA-3 and has four antenna elements. The other is a seven element array in a 7" square footprint—half the size of a GAS-1 CRPA. A five element version of CRPA in the same form factor is also available and offers improved gain performance by reduction of the mutual coupling effects.

## FEATURES

- ▶ Two Miniaturized CRPAs have been built and tested:
  - 1) FRPA-3 size (4.625" square) CRPA with four elements, and
  - 2) Seven or five element CRPA in a 7" square footprint.
- ▶ Right Hand Circular Polarization (RHCP) stacked patch antenna elements on high dielectric constant substrate for operation at both L<sub>1</sub> and L<sub>2</sub>
- ▶ Design allows polarimetric type of nulling with RHCP in the reference element and dual linear polarization in the auxiliary elements to provide extra degrees of freedom to null out jammers
- ▶ Bandwidth: 24 MHz for 2:1 VSWR
- ▶ M-code compatibility of both arrays demonstrated by measuring signal fidelity of M-Code correlation for the BOC (10, 5) code

- ▶ Boresight gain of FRPA-sized array elements:
  - 3 dB at L<sub>1</sub> and -0.8 dB at L<sub>2</sub>
- ▶ Nulling performance against jammers has been evaluated through measurements using the GAS-1 Antenna Electronics

## APPLICATIONS

Reduced sized CRPA for smaller military airborne platforms

## FOR FURTHER INFORMATION CONTACT:

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