OBJECTIVE

- Quadcopter drone detecting radar for event security

ABSTRACT

- Phased array designers are often faced with the tradeoff between granularity or beam width and system cost, size, weight and power (SWAP) when designing a radar
- By utilizing an orthogonal transmit-receive array (OLTRA), FOX reduces the cost, weight, and size of a traditional n by n element radar array, while achieving more effective detection and processing with coherent signal integration of the frequency modulated continuous waveform (FMCW).

PCB DESIGN

- Motor controller circuit board with two stepper drivers that receives commands and sends position data to the DREX

DIGITAL RECEIVER-EXCITER (DREX)

- The DREX consists of the RF front-end and multiprocessor SoC with an FPGA for signal processing, peripheral board control, and signal generation

HARDWARE

- Robust but lightweight radar mount allows for azimuth and elevation mechanical steering to search the entire sky

GRAPHICAL USER INTERFACE

- The graphical user interface allows easy click-and-drag sliders for manual control of both electronic and mechanical steering. The FMCW ramp parameters can be adjusted to increase the radar range. Target returns are displayed in an elevation cut, an azimuth cut, as well as a 3D plot.

SIGNAL PROCESSING

- Signal processing chain in HDL processes a sum and a delta path for a large search beam while being able to precisely locate the target.

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