FPGA Enhanced Digital Beamsteering Phased Array

Sponsor: L3Harris

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FAMU-FSU Engineering

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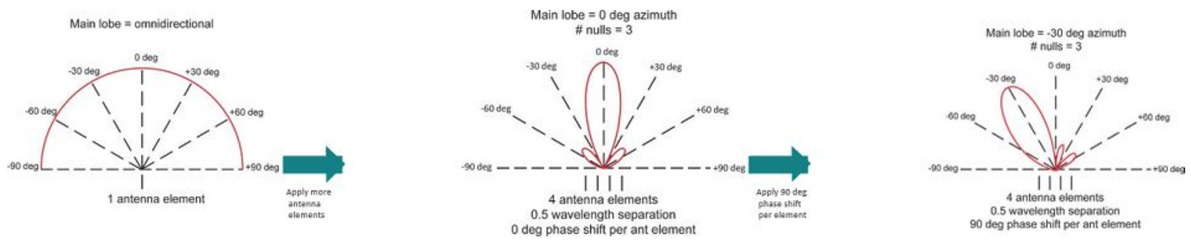
What is a Phased Array?



Why do we need Beamsteering?

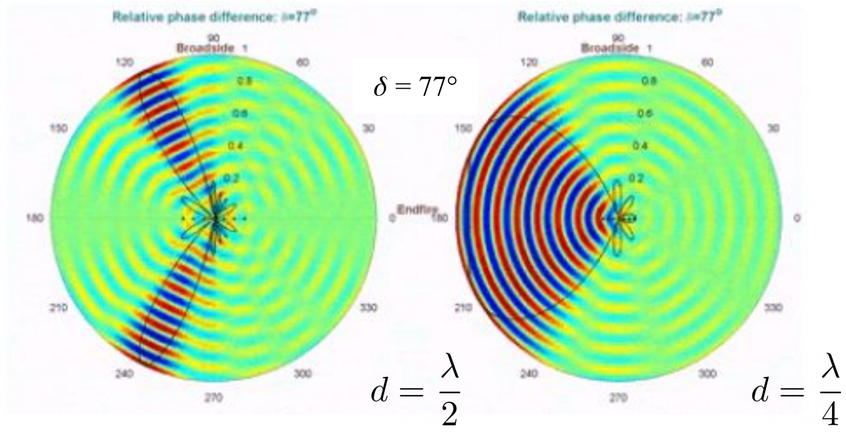
- The motivation for beamsteering is the need for higher data transmission rates.
- Beamsteering allows us to transmit a higher quality signal to receivers.
  - Leading to fewer errors in the transmission of data.
- We do not need to increase the transmitting power in order to achieve the higher quality signal.
  - By focusing the main lobe of the transmission radiation, we are also attenuating the side lobes of the radiation pattern.

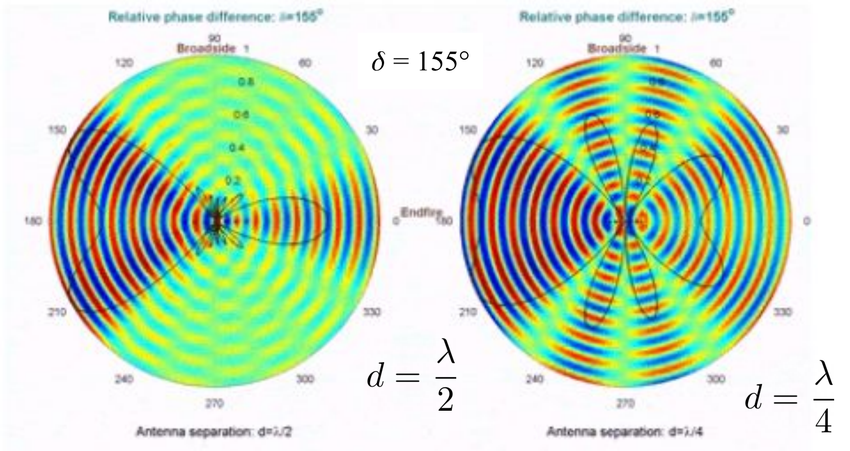
What is Beamsteering?

- Uses an array of antennas that differ by a phase to constructively and destructively interfere such that the majority of the constructive interference occurs in the direction that we want the main lobe to point.

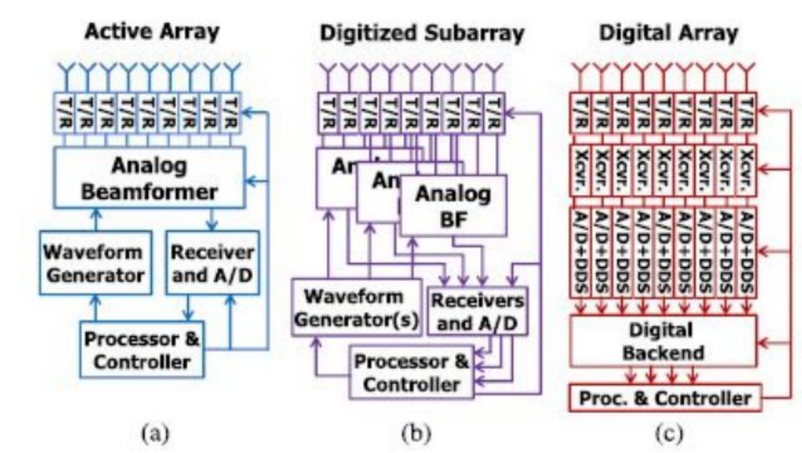
How are we going to implement Beamsteering?

Radiation Pattern Comparison for Antenna Spacing





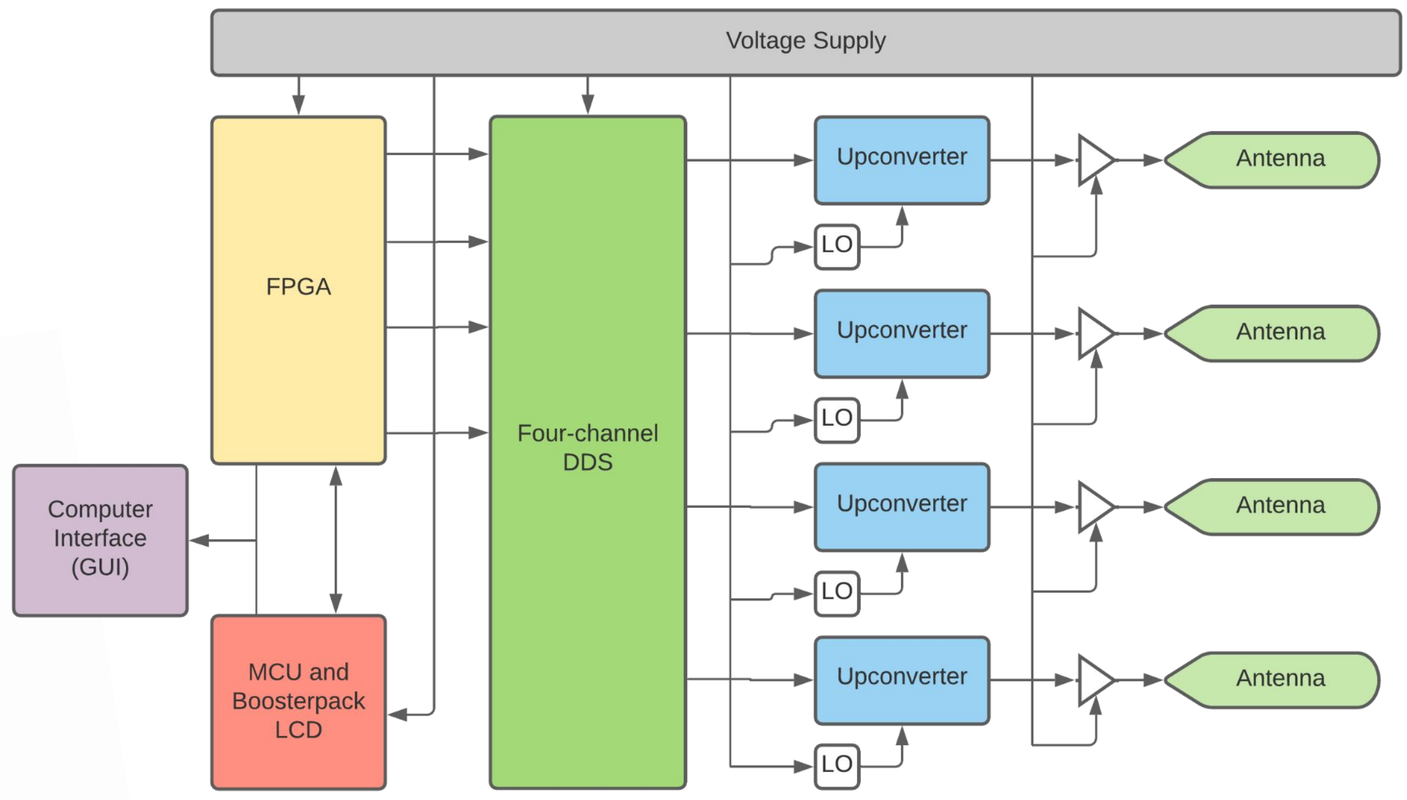
Build Options

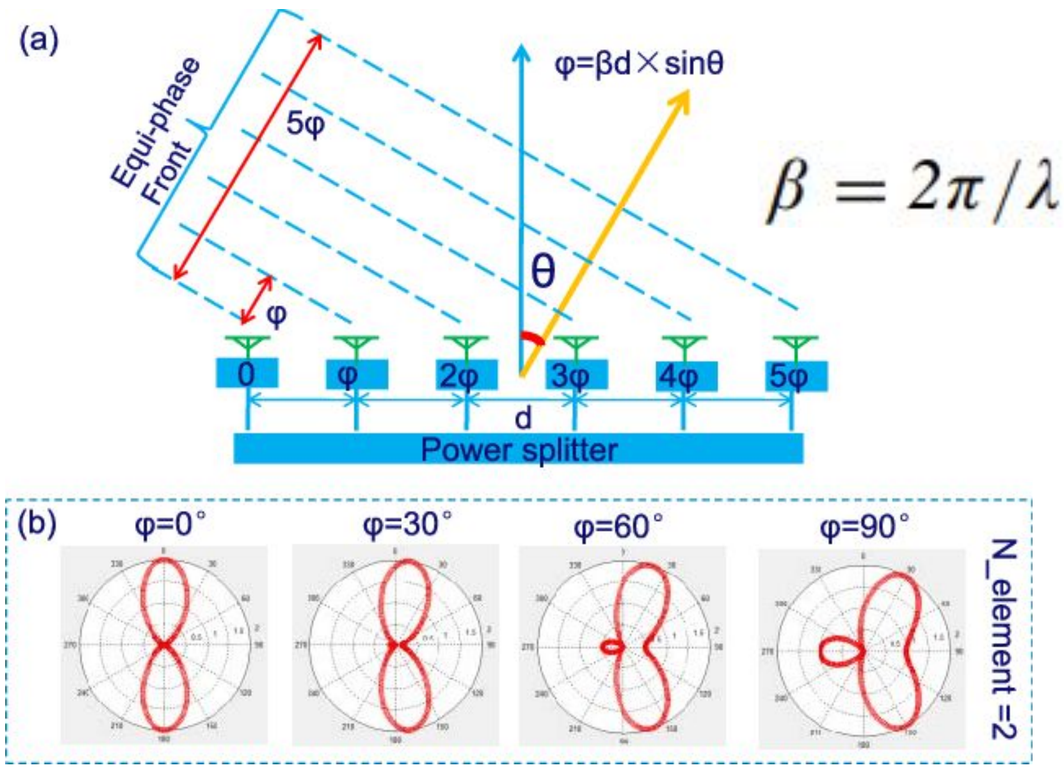


Final Preliminary Design

- PVC Junction box
  - Mounting Brackets
  - Made for electrical components
- Booster Pack for control

System Block Diagram





Phased Angle Beam Relation