Real-time FPGA Implementation of Adaptive Beamforming Using QR Decomposition

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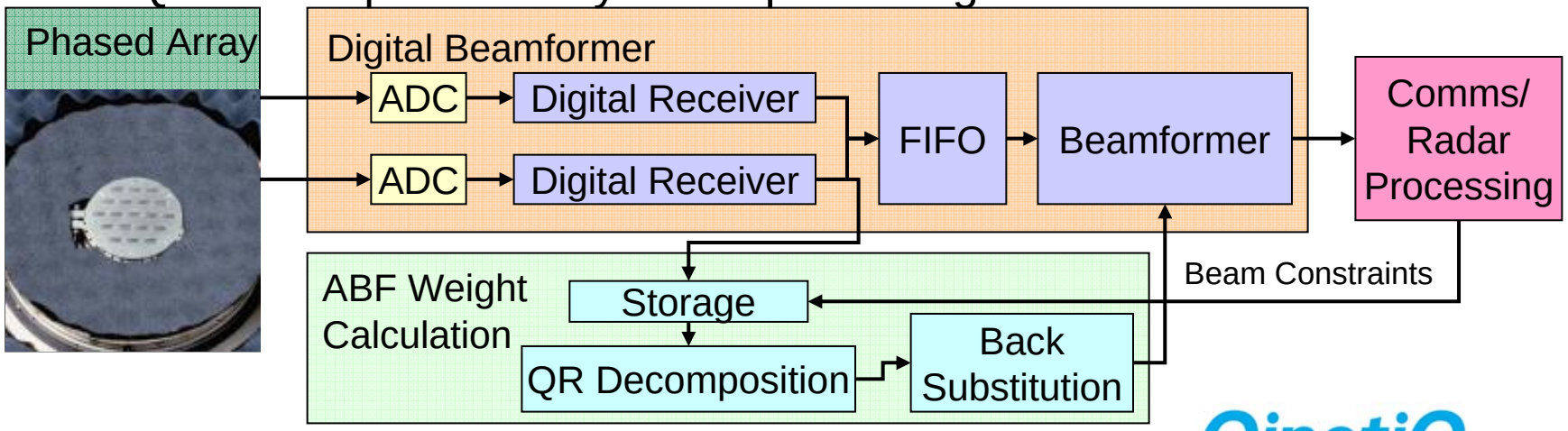
Real-time Adaptive Beamforming using QR Decomposition

- Phased array antennas
  - Potential to adaptively modify beam patterns
  - Minimise effects of jamming and interference
- Real-time processing required
  - Compensates for platform / jammer motion
- Computationally intensive processing
  - Multiple sensor inputs
  - Digital receiver / beamforming processing
  - Adaptive weight calculation via QR decomposition and back substitution
  - QR decomposition key to adaptive weight calculation



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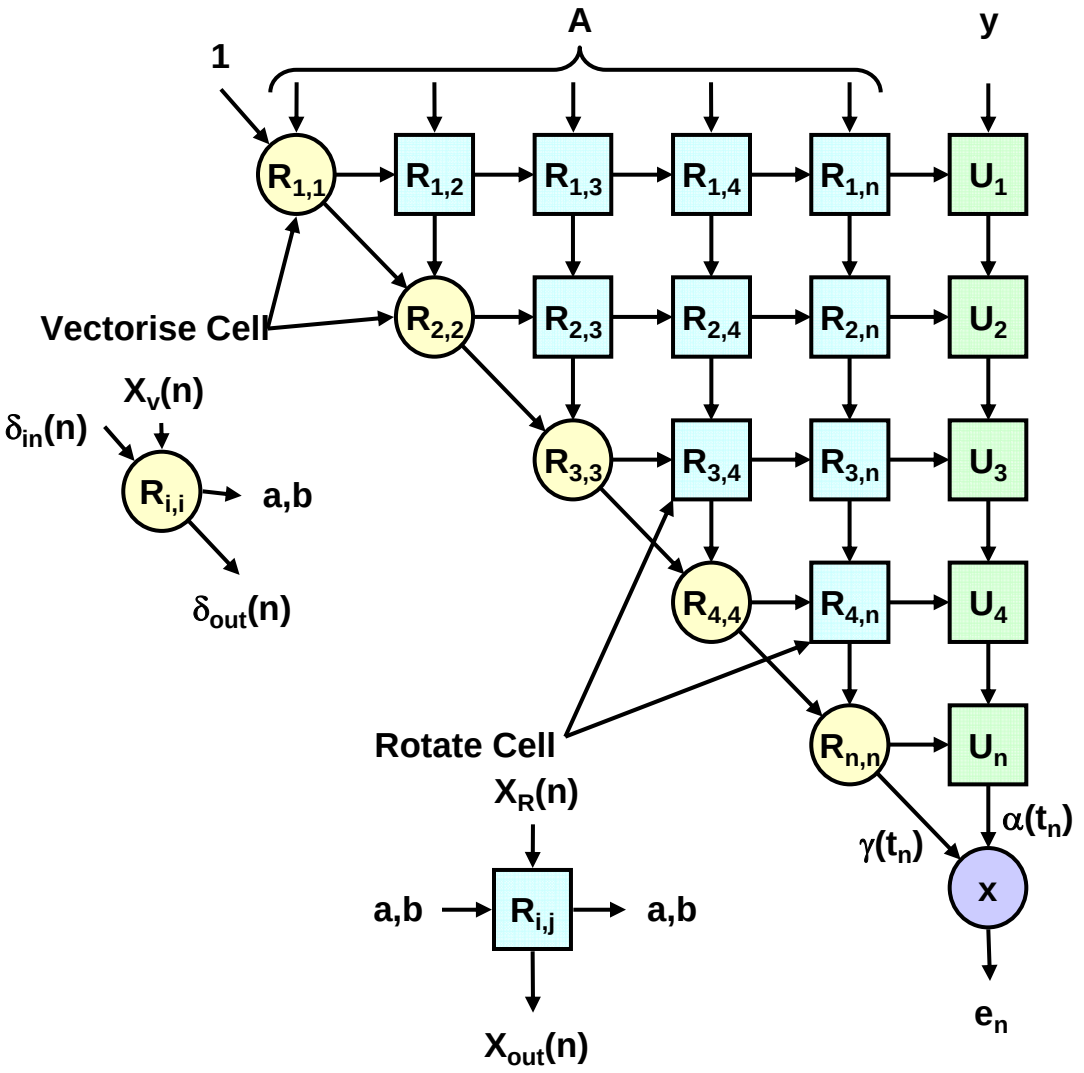
FPGA Implementation of QR decomposition

- QR is a method for solving simultaneous equations
  - Determines least mean square error
  - Converts input data into an upper triangular array
  - Back-substitution applied to extract weights
- Suitable for FPGA implementation
  - Rotate and Vectorise processor cells
- Developed as a configurable FPGA core
  - Trade FPGA resources against processing speed



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