ANALOG DEVICES

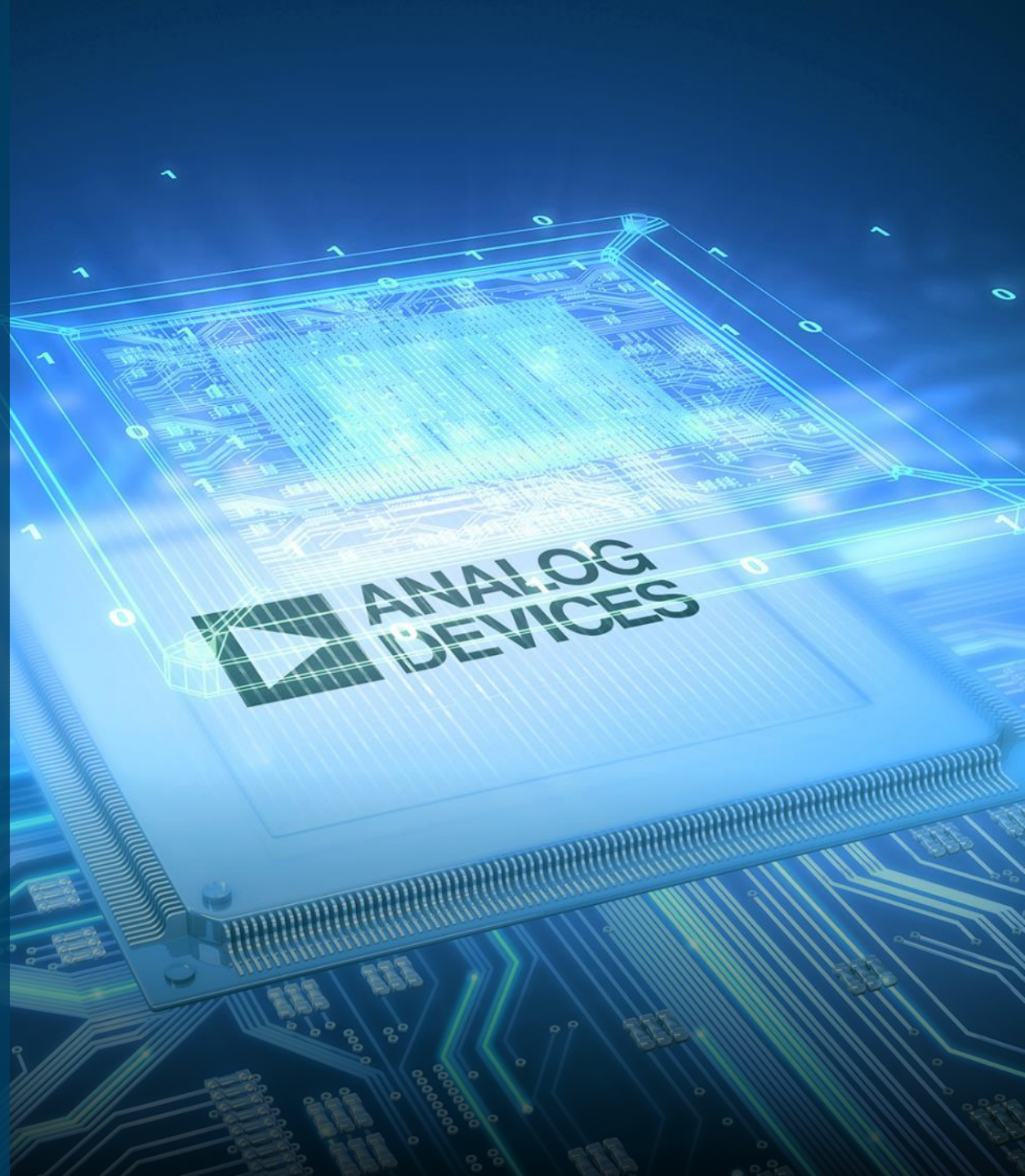
AHEAD OF WHAT'S POSSIBLE™

Phased Array Prototyping Examples

with X Microwave and the ADAR1000

JON KRAFT, FAE

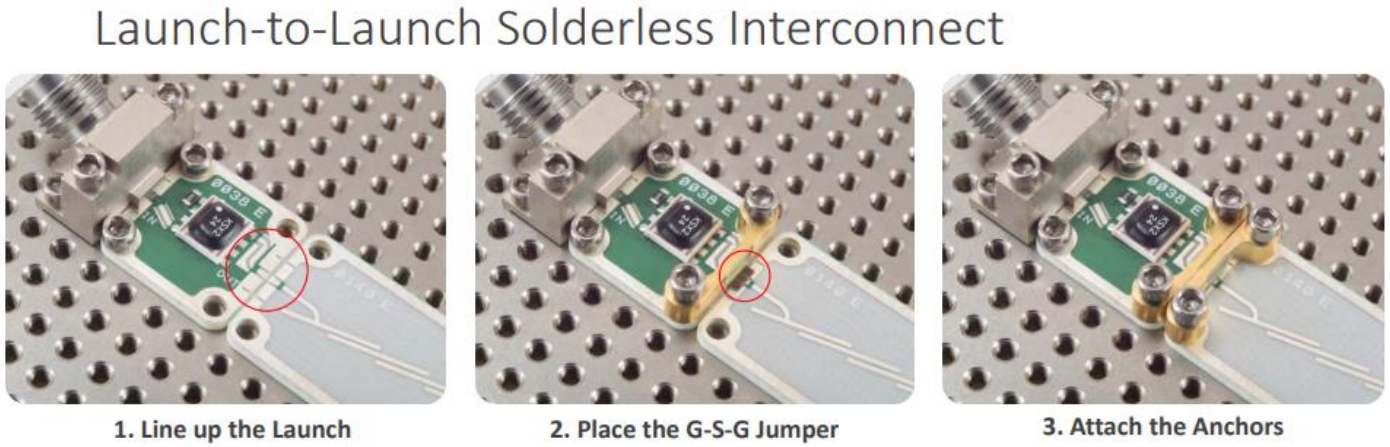
JUNE 2020



X Microwave

X Microwave

- X Microwave is doing great stuff.
  - https://www.xmicrowave.com/
  - It is RF breadboarding at up to 67GHz!

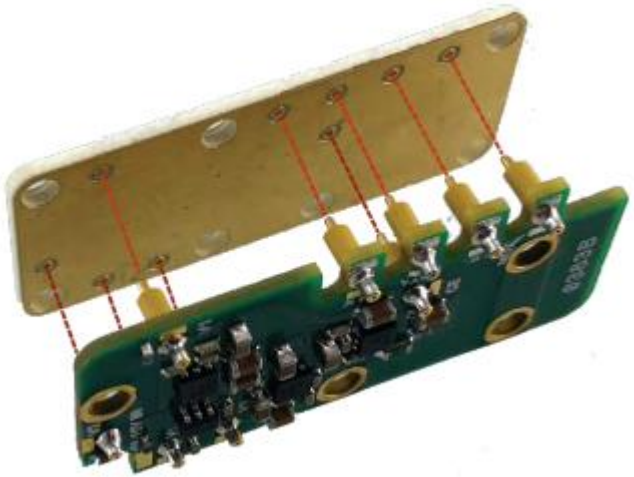


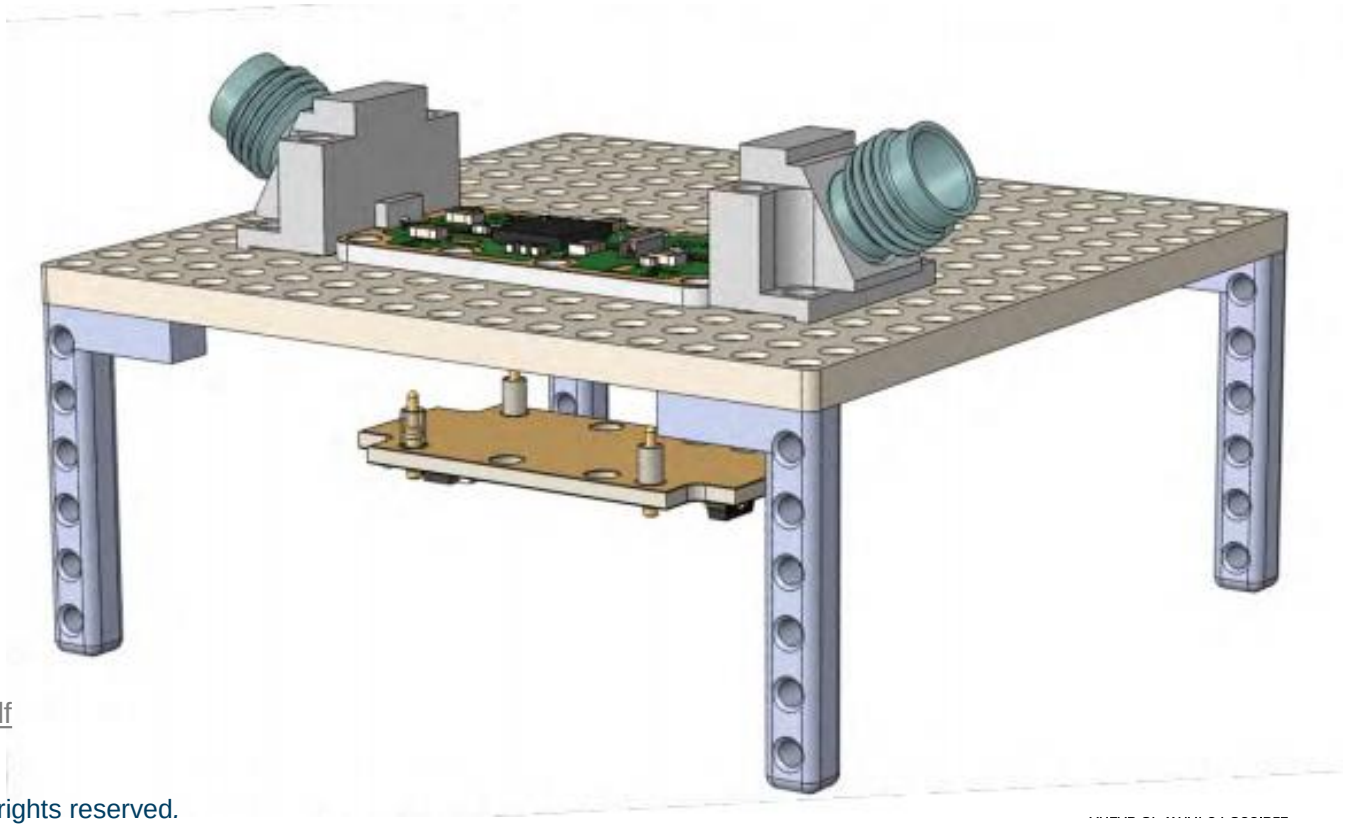
https://www.xmicrowave.com/wp-content/uploads/Texas-Symposium_Luther2019.pdf

- Over 400 Unique ADI Parts in their library: ADI/HMC/LTC RF parts
- More are added monthly

X Microwave: Power and Data Routing

- Power and SPI comes from an accessory board on the bottom.
- It connects via pogo pins to spots on the main RF board.
- So the RF path is kept pristine





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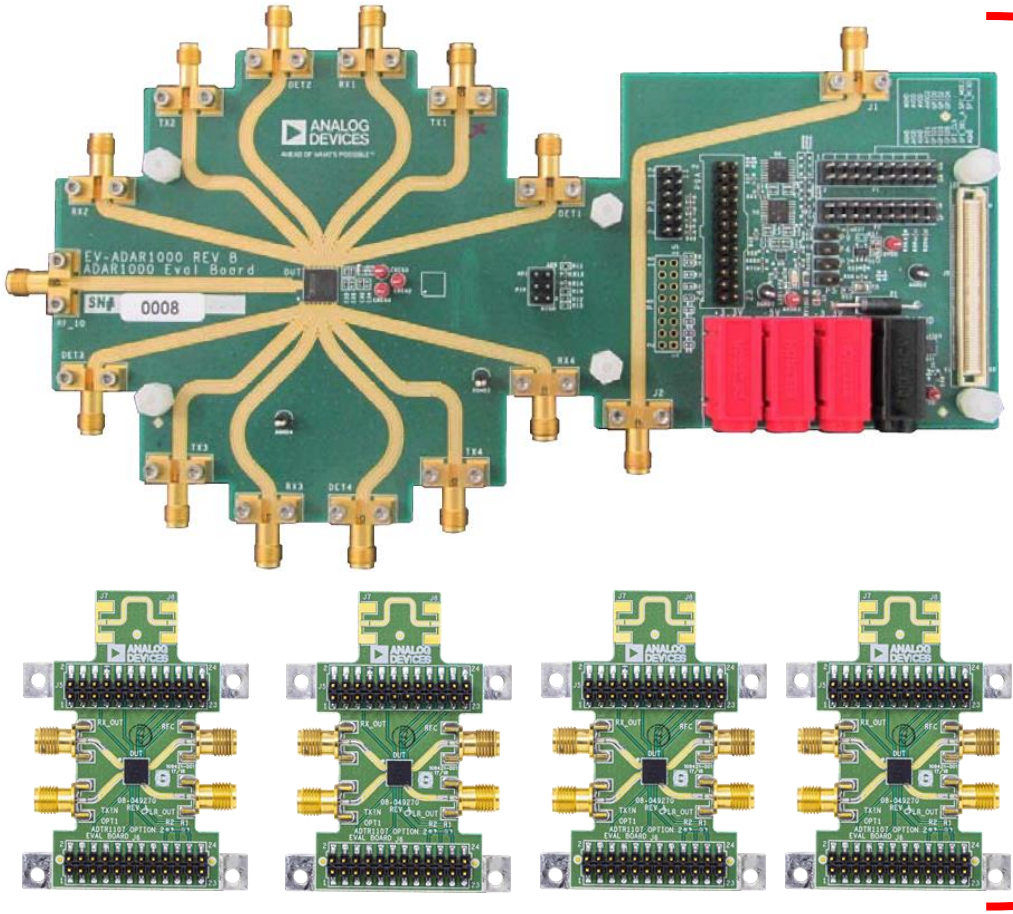
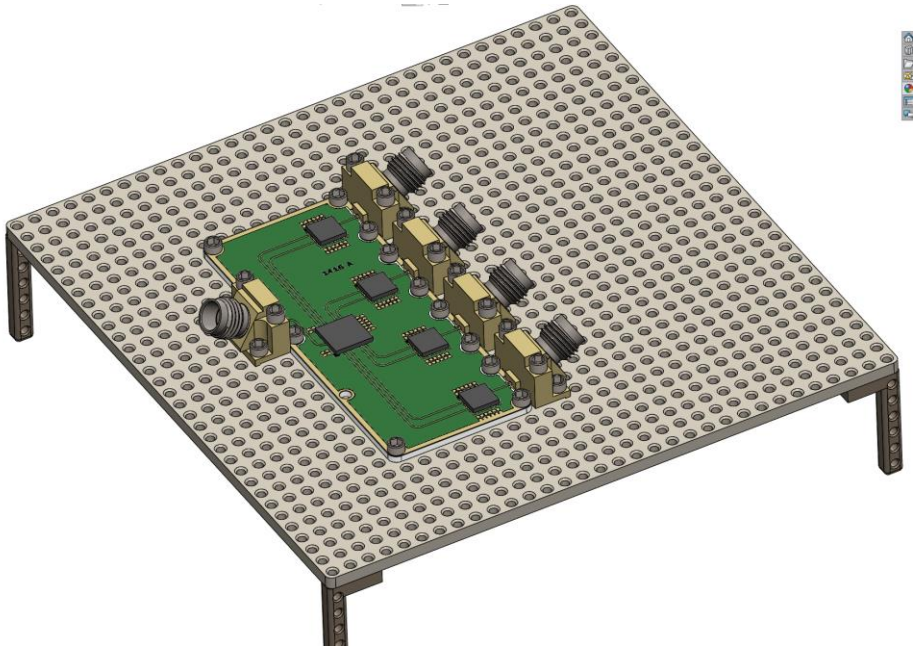
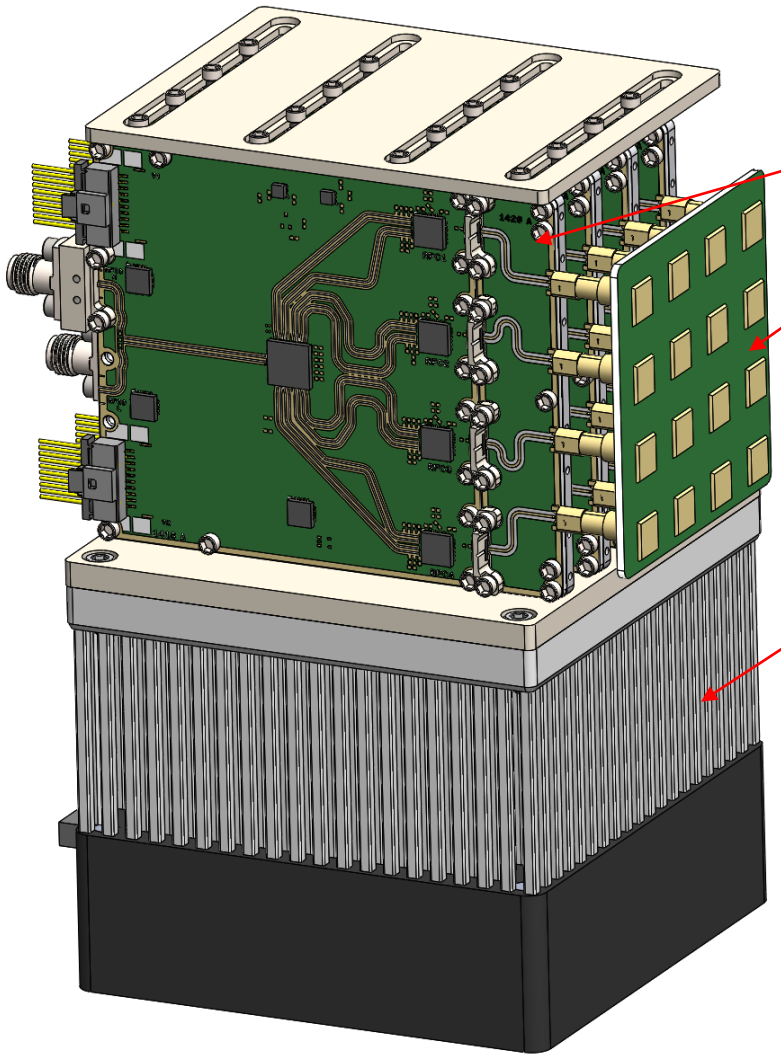
X Microwave ADAR1000 Module





ADAR1000 + 4 ADTR1107 (TR Modules—i.e. PA/LNA/Switch)

Stack ADAR1000 Modules Together for the Phased Array Cube:

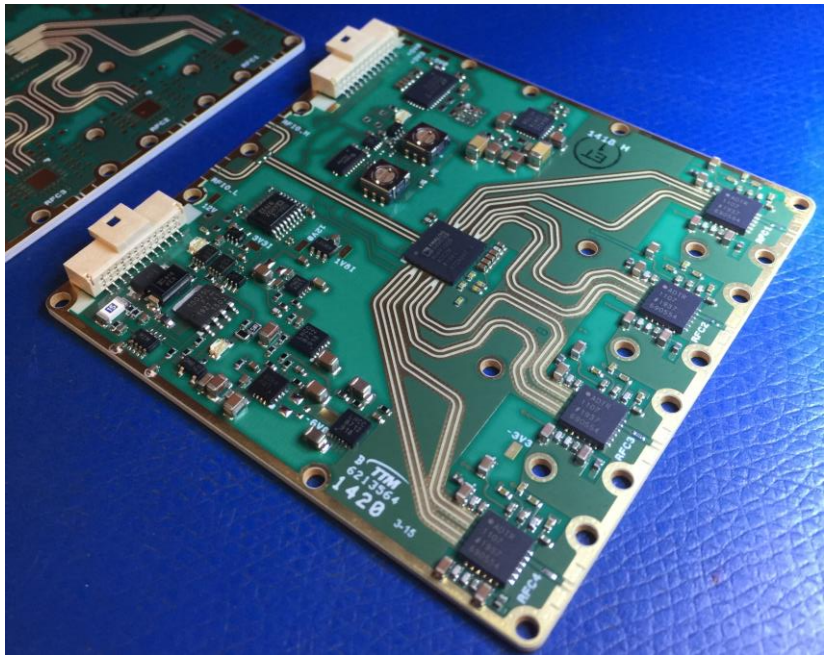


Stack 4 together to create a 4x4 array

Interposer board to fit whatever lattice spacing

Antenna snaps on

Heatsink



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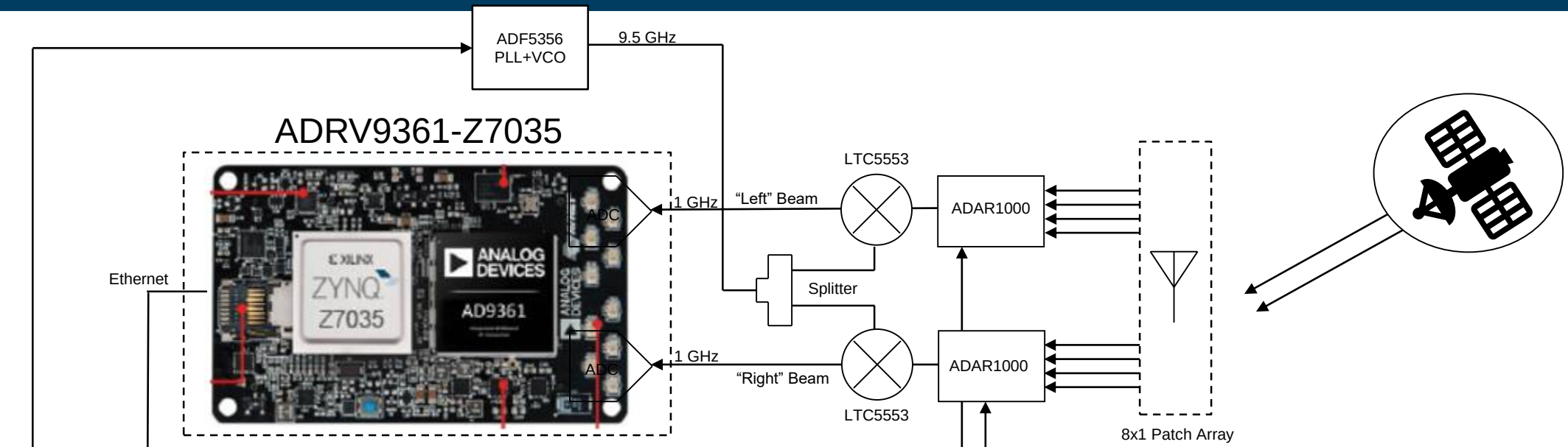
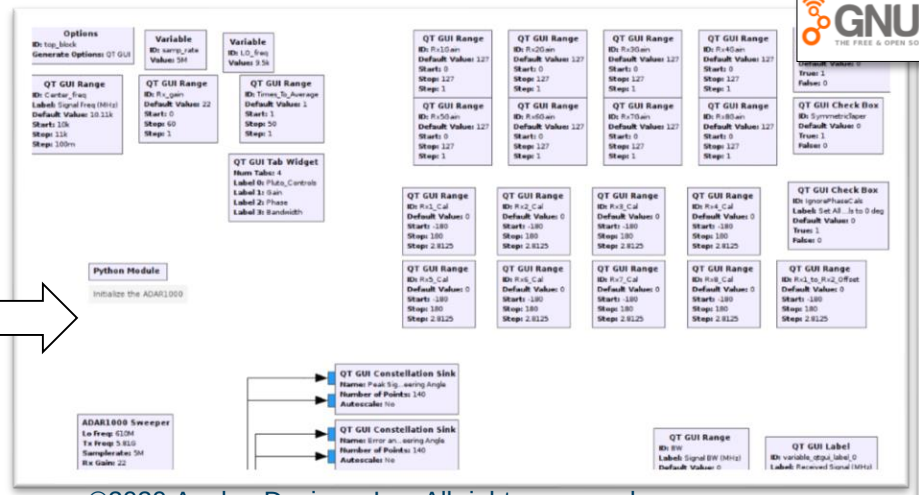
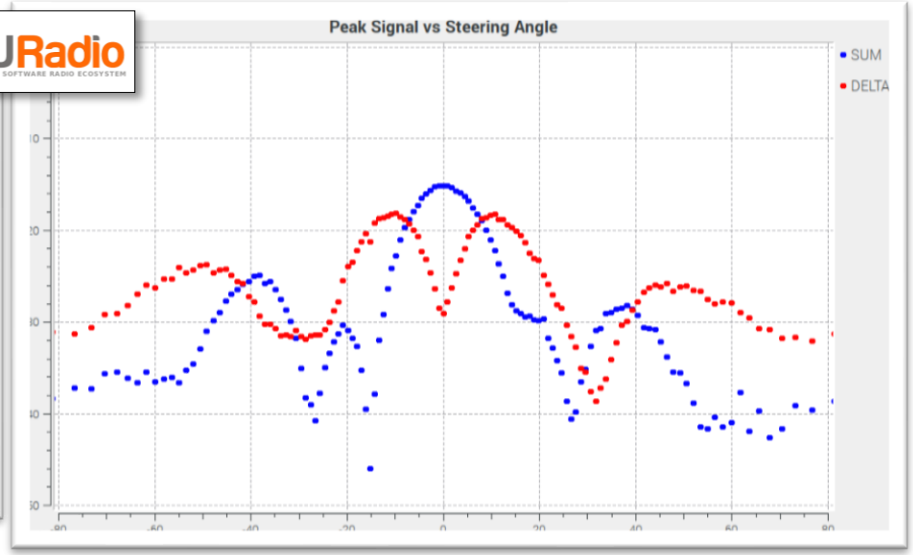
X Microwave Setup

Monopulse Tracker Setup:

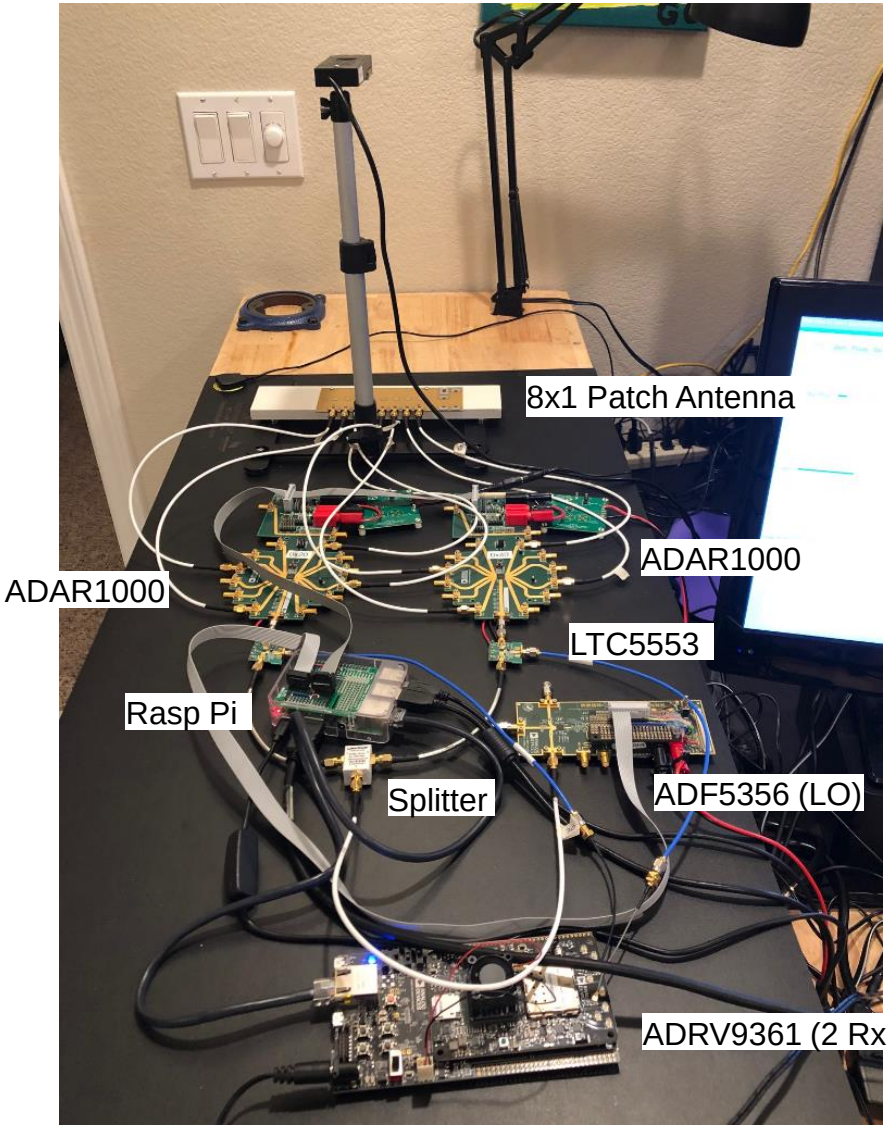




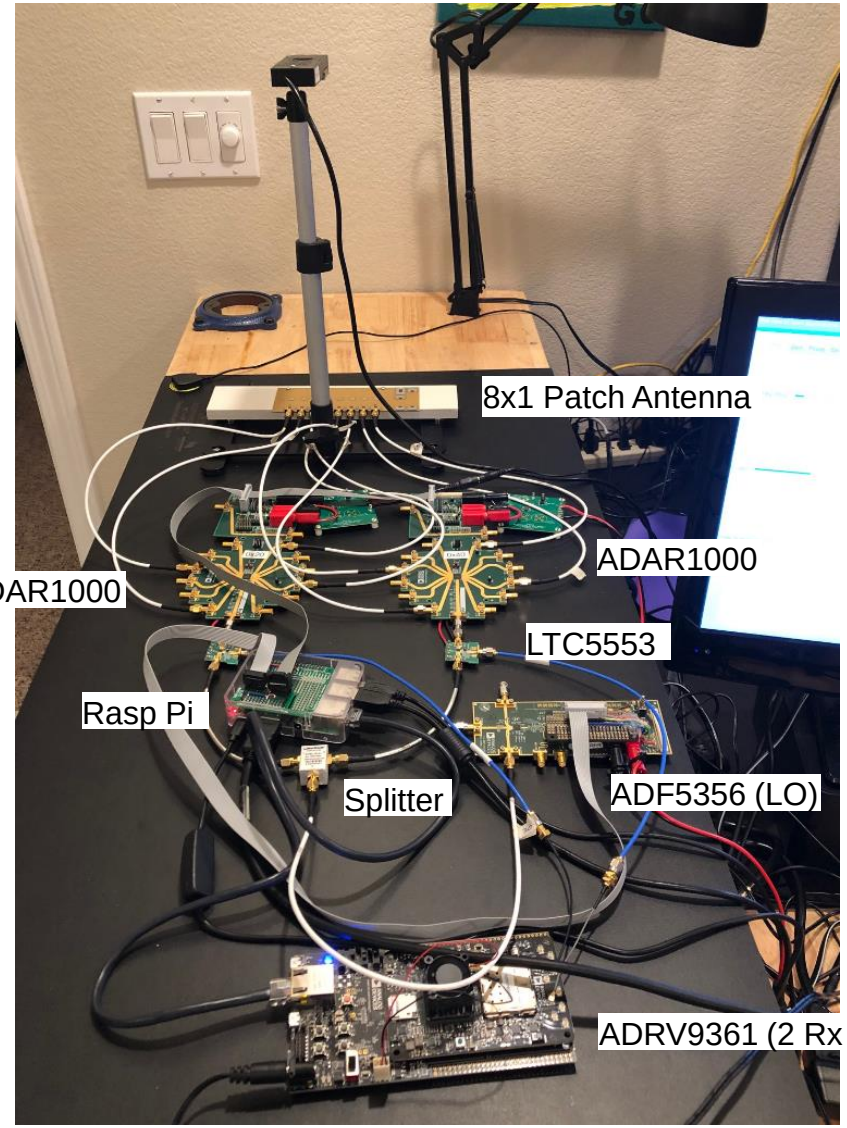


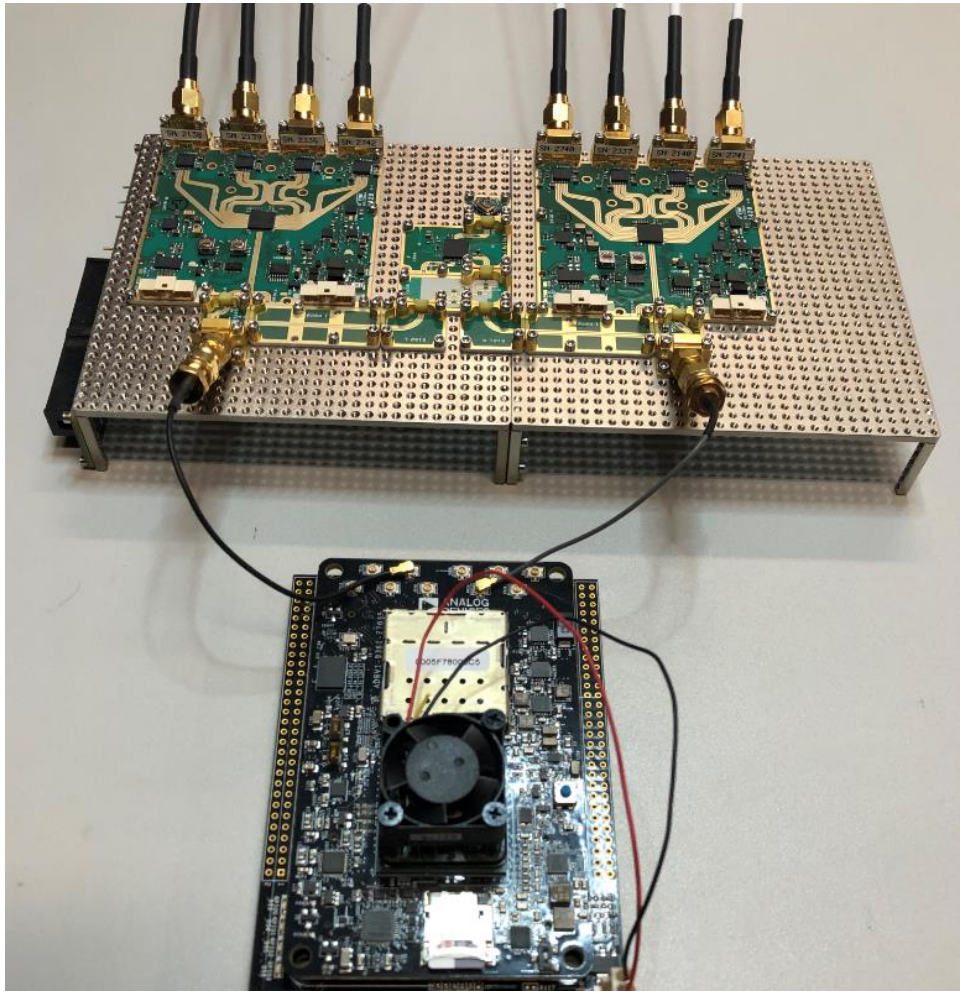
2 Beam Setup For True Monopulse Tracking

- For 2 beams, our eval board setup becomes a bit more complicated….

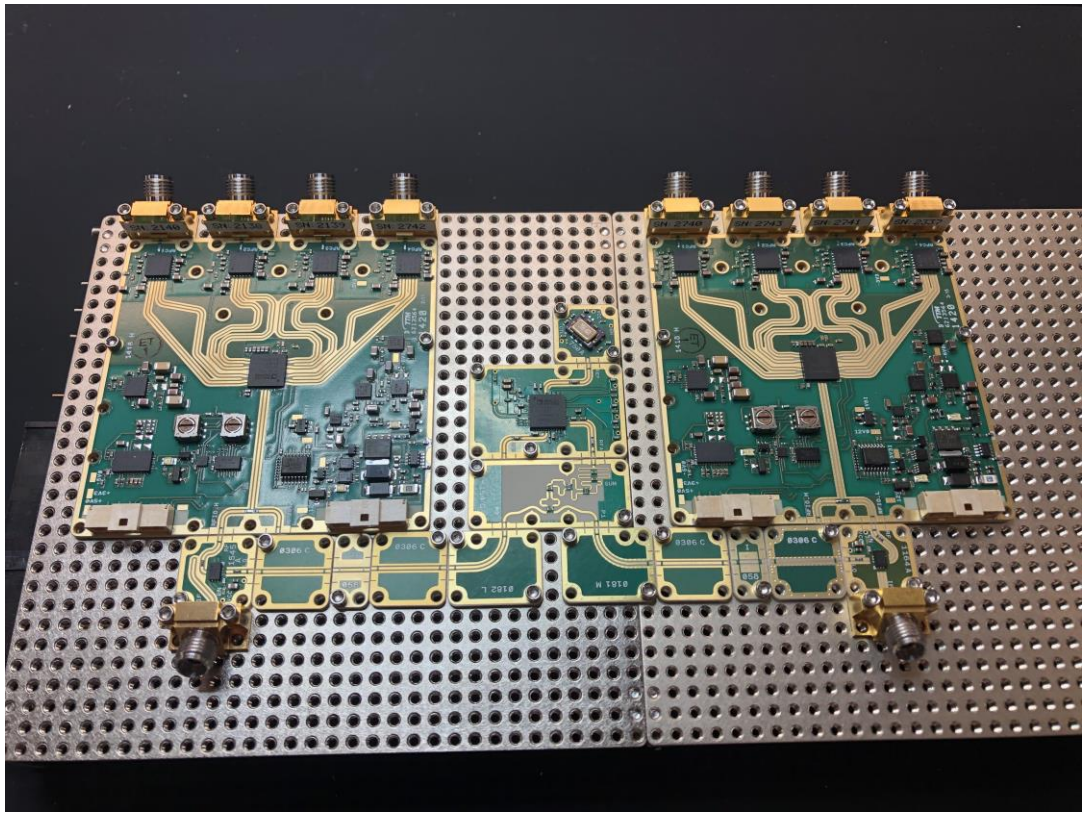


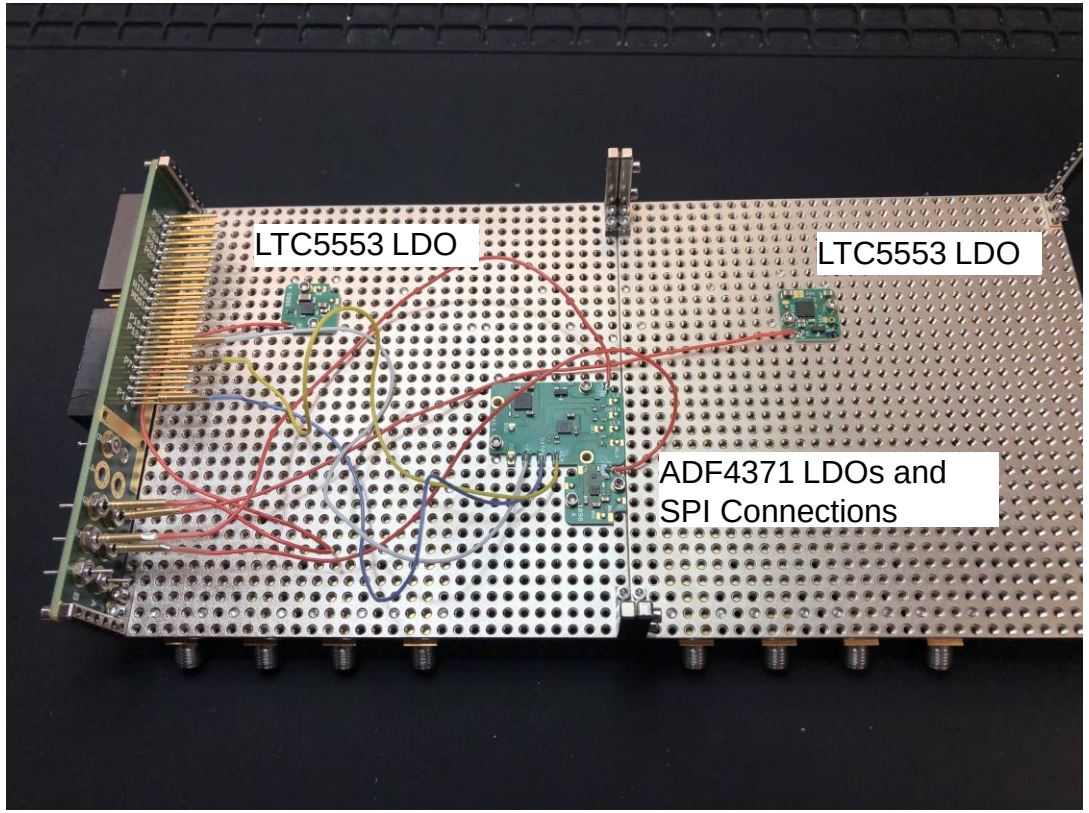
2 Beam Setup For True Monopulse Tracking





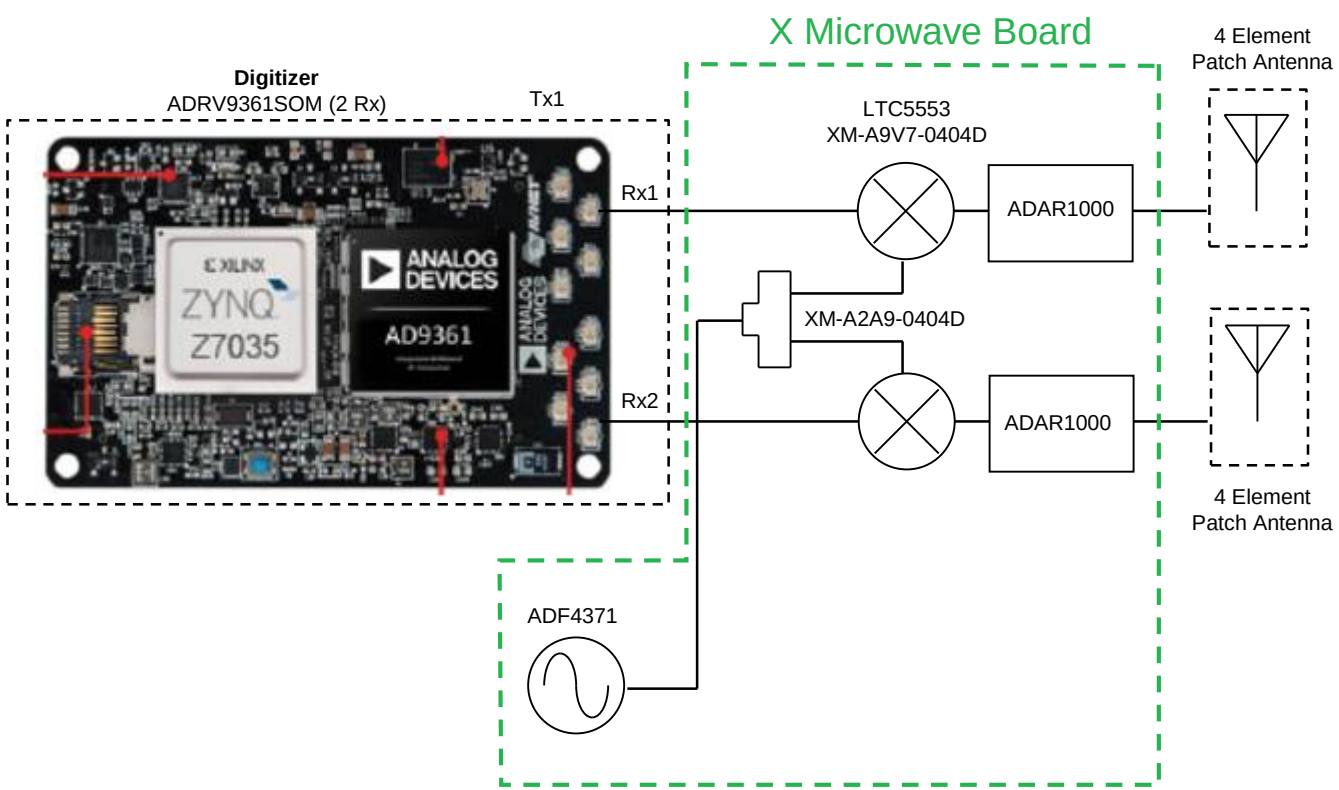
ADAR1000 Setup: Top and Bottom Views

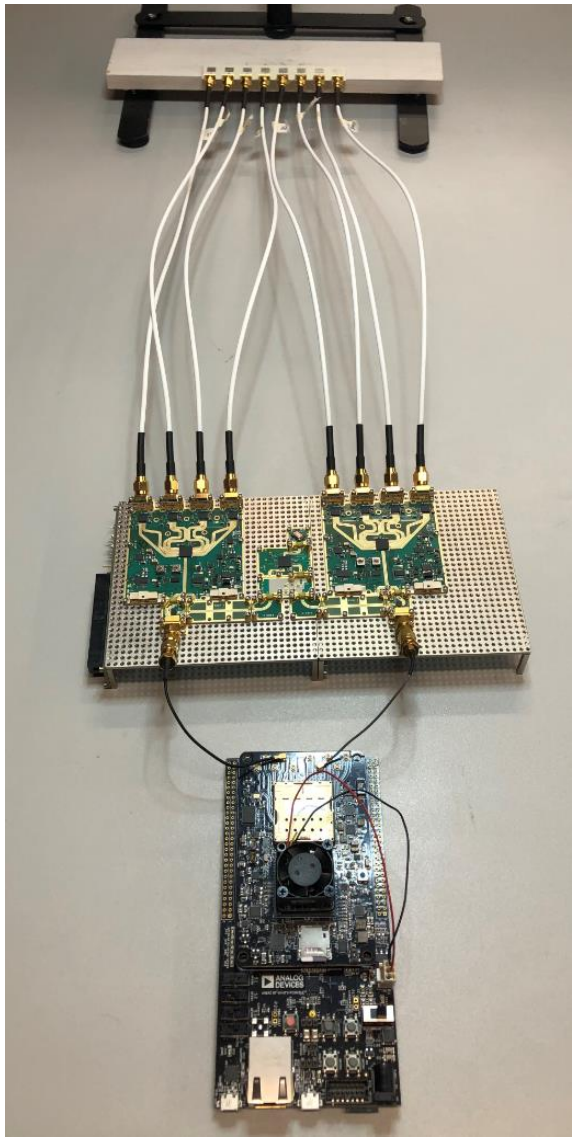




Time lapse construction video at https://youtu.be/W-0AWST1dpU

Hybrid Beamformer with X Microwave

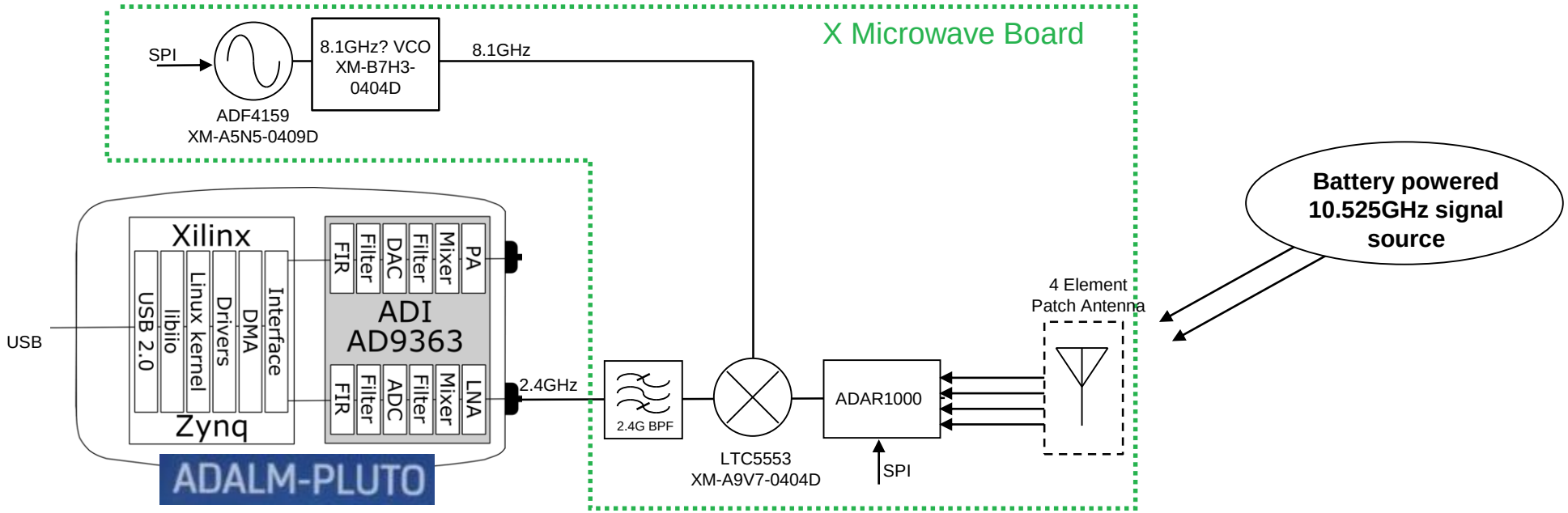


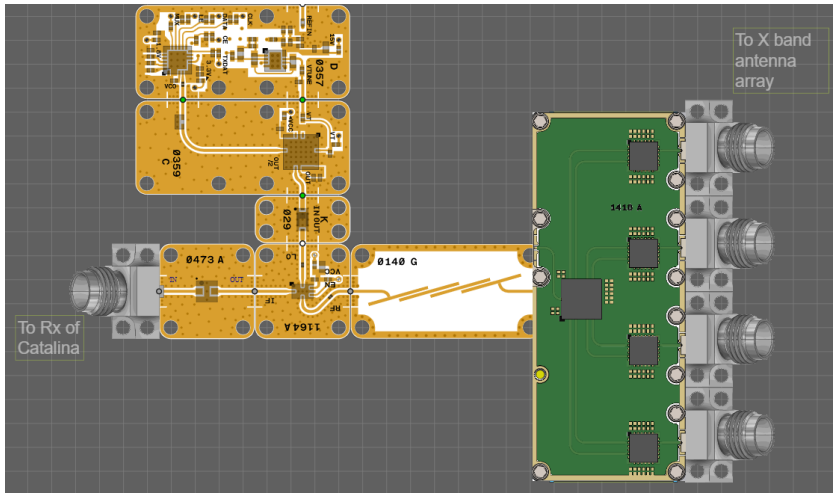


Tracking operation demo at https://youtu.be/oz7FxLkVPxg

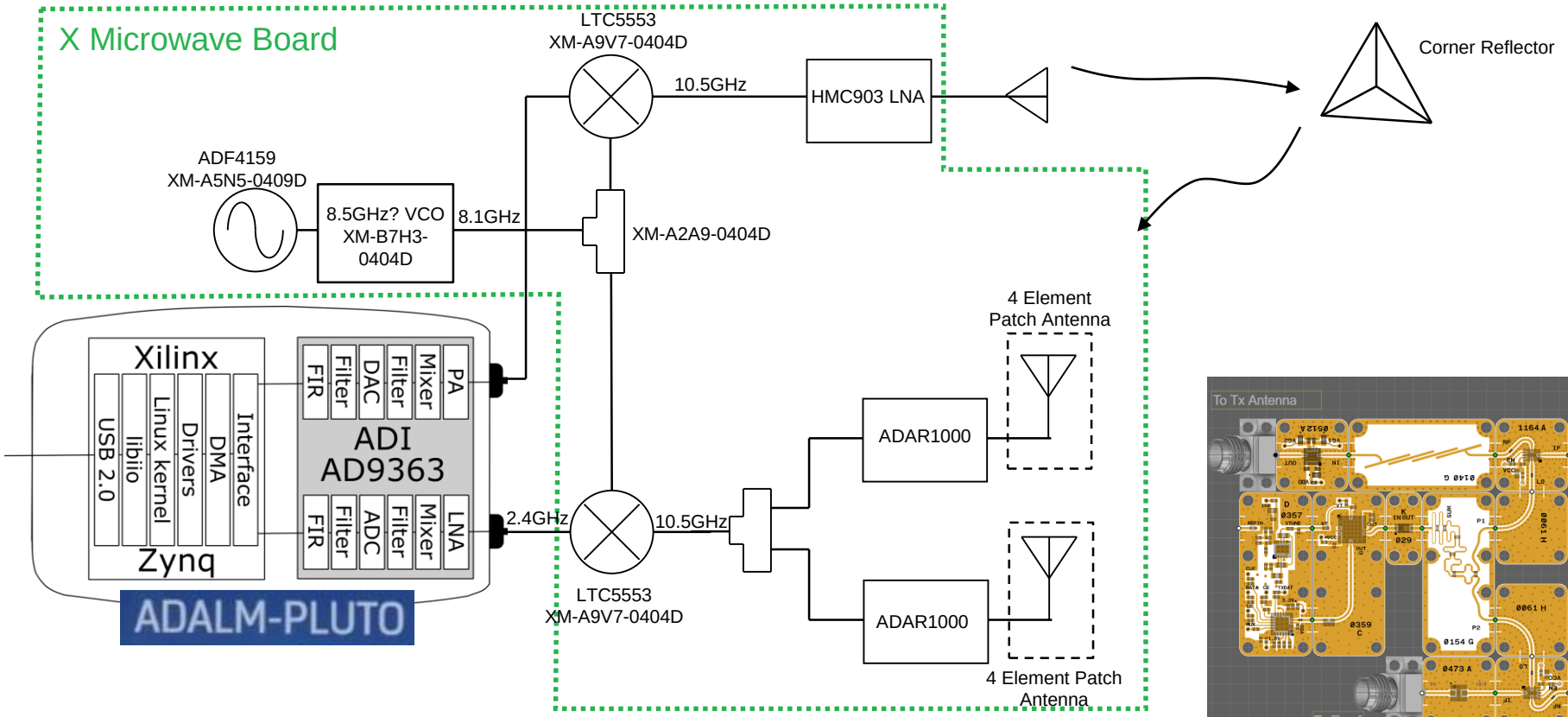
What can we make with these X Microwave Modules???

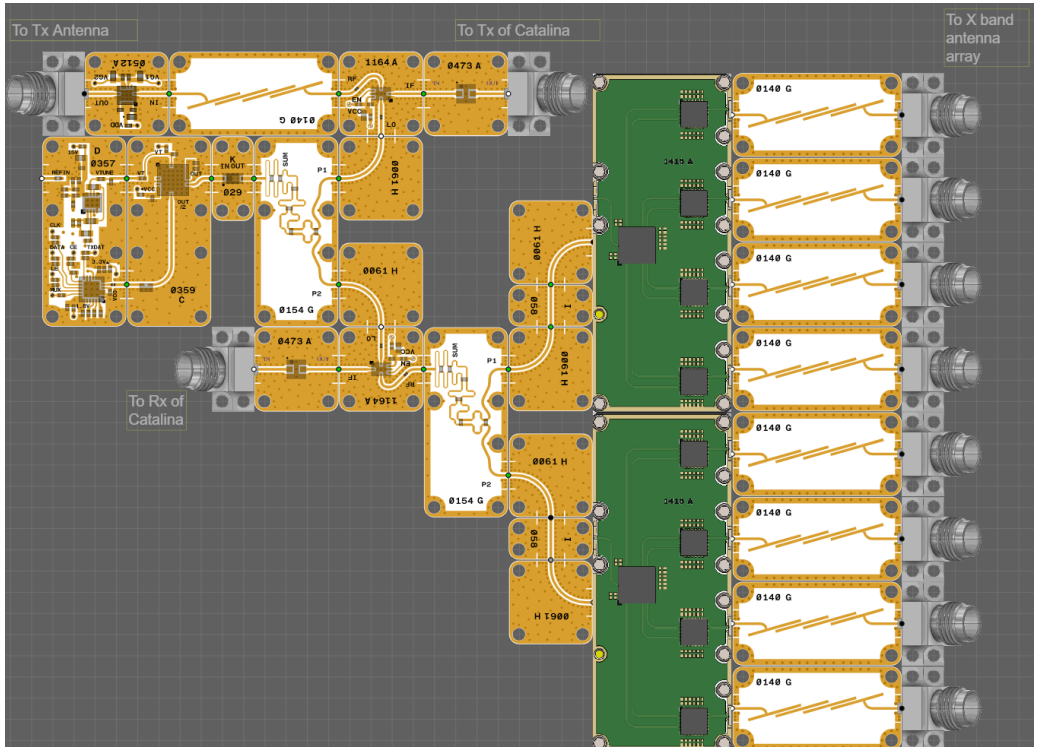
Direction of Arrival Demo (1 Rx Channel)





FMCW Phased Array Radar (1 Rx Channels)





FMCW Phased Array Radar (2 Rx Channels)