ALSTR-1 Radar Prototype (Backup for FCC Exp. License)

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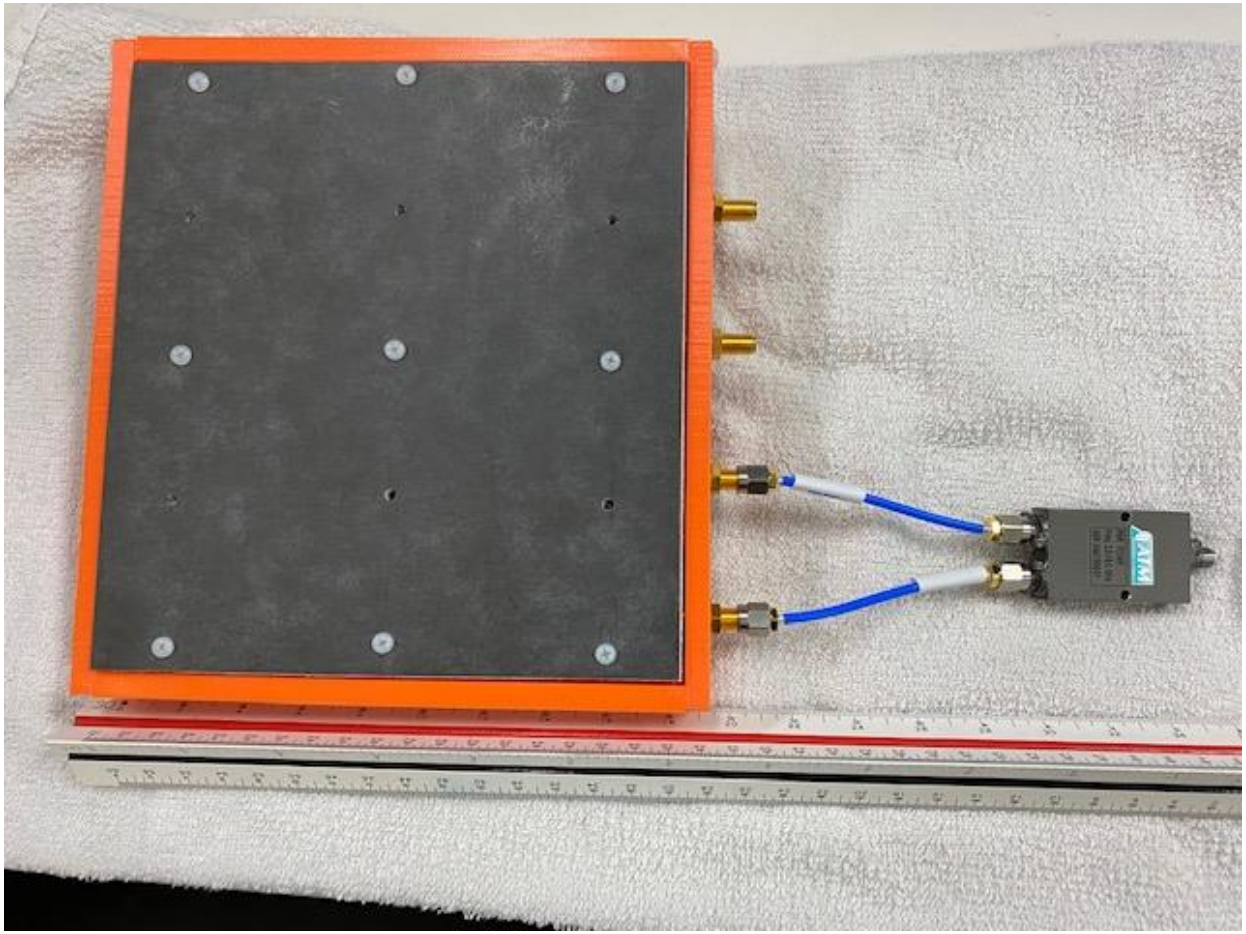
Antenna

- Employs a 4x4 patch array (S-band)
- Custom built by Applied Radar
- 4 columns will be combined externally
- Dimensions ~ 6”x6”x1”
- Mounted INTERNAL to aircraft (i.e. radiates out window to one side of acft)
- Monostatic antenna (employs T/R switch)

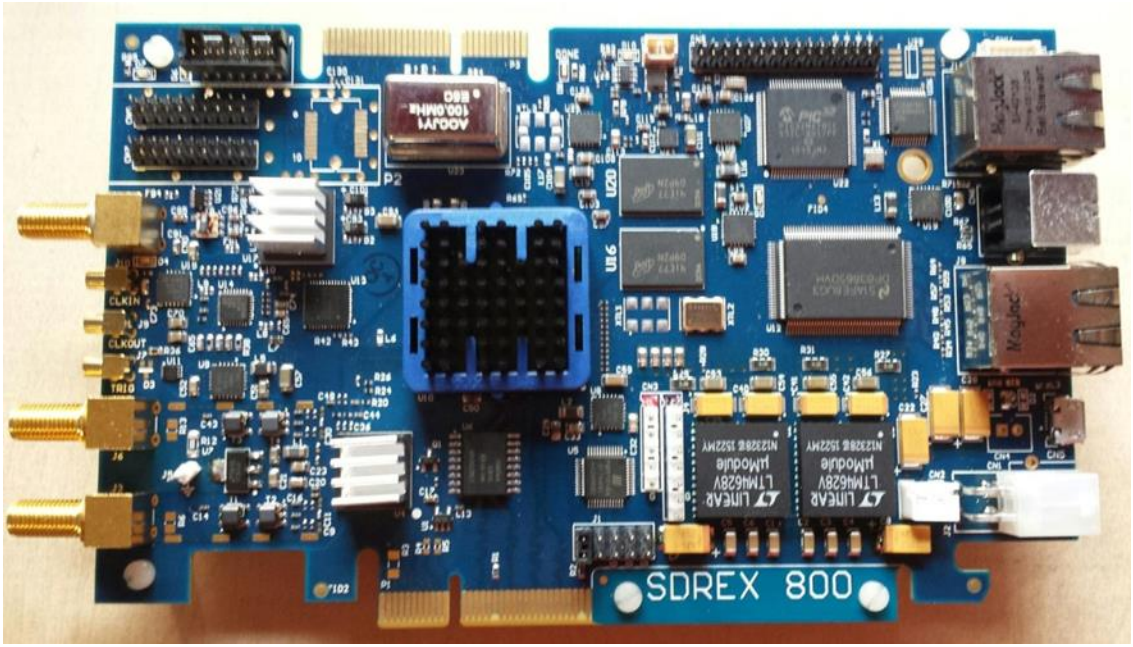


ALSTR-1 Radar Transceiver

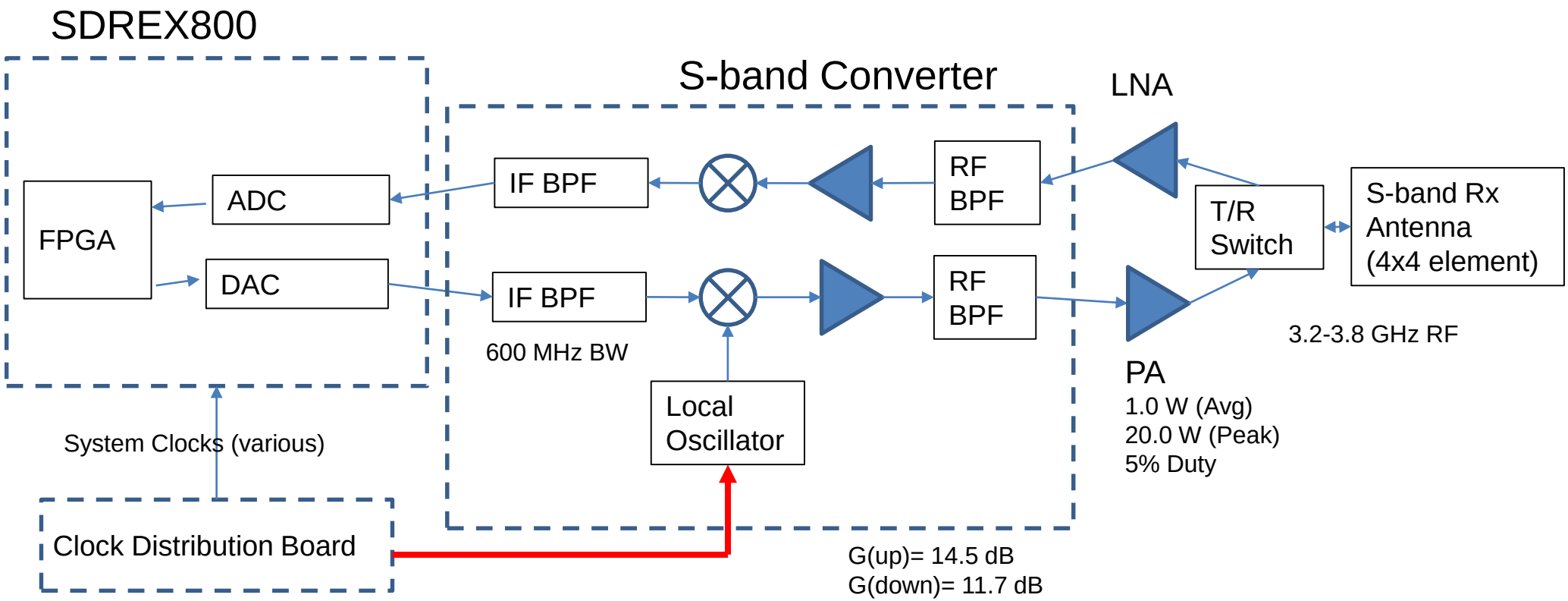
- Pulse-FM waveform controlled by SDREX800 radar unit and GUI processor

ALSTR-1 DREX Channel (SDREX800)

- 600 MHz IBW Tx/Rx
- Firmware demonstrated for waveform generation and data collection
- Form-factor: 4”x7” (PCI card), 0.75 lbs (12 oz)



Simplified Xcvr Block Diagram



Radar Waveform

- The following pulse-parameters are used (stepped FM waveform):

Stepped FM Waveform (DREX Parameters)	
Fstart	550 MHz (IF Freq)
Fstop	1050 MHz (IF Freq)
Fstep	1.0 MHz
Pulse Width (PW)	6.65 us
PRI	0.1 ms
Number of Coherent Pulses	1024*100

Airborne SAR Demo

- Testing will involve generating an airborne synthetic aperture radar (SAR) image of targets of interest such as buildings and vehicles from the radar mounted in a light twin-engine aircraft (shown on right)
- Radar data will be collected from an altitude of between 1000-3000 feet
- Testing will be conducted over a 25 km radius
- Test sites:
  - Quonset State Airport, RI
  - Aberdeen Proving Ground, MD
  - Eglin AFB, FL
- Frequency range: 3.2 – 3.8 GHz
- Waveform: Linear FM
- Note: we have the ability to blank certain frequencies on request

Aircraft Beech Baron BE-55

Picture of Experiment

Airborne Radar
S-band

Distributed target
(landscape)

RF Pulse

Altitude
1000-3000 ft

Radius
< 25 km

Point target
(vehicle)

Requested Site Locations

- Quonset State Airport (NL 41-35-31, WL 71-24-43)
- Aberdeen Proving Ground, MD (NL 39-27-59, WL 76-10-06)
- Eglin AFB, FL (NL 30-28-55, WL 86-31-30)

How Experiment Contributes to Scientific Knowledge

- Purpose of experiment is to demonstrate SAR processing with low-cost radar hardware
- Uses off-the-shelf components
- Small form-factor