

PRF Research & Development Inc.

Conformal Antenna Design  
for  
Proximity Fuzes

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# OUTLINE

- Company Profile
- Product Portfolio
- Design of the Conformal Antenna
- Future Works
- Working through COVID-19

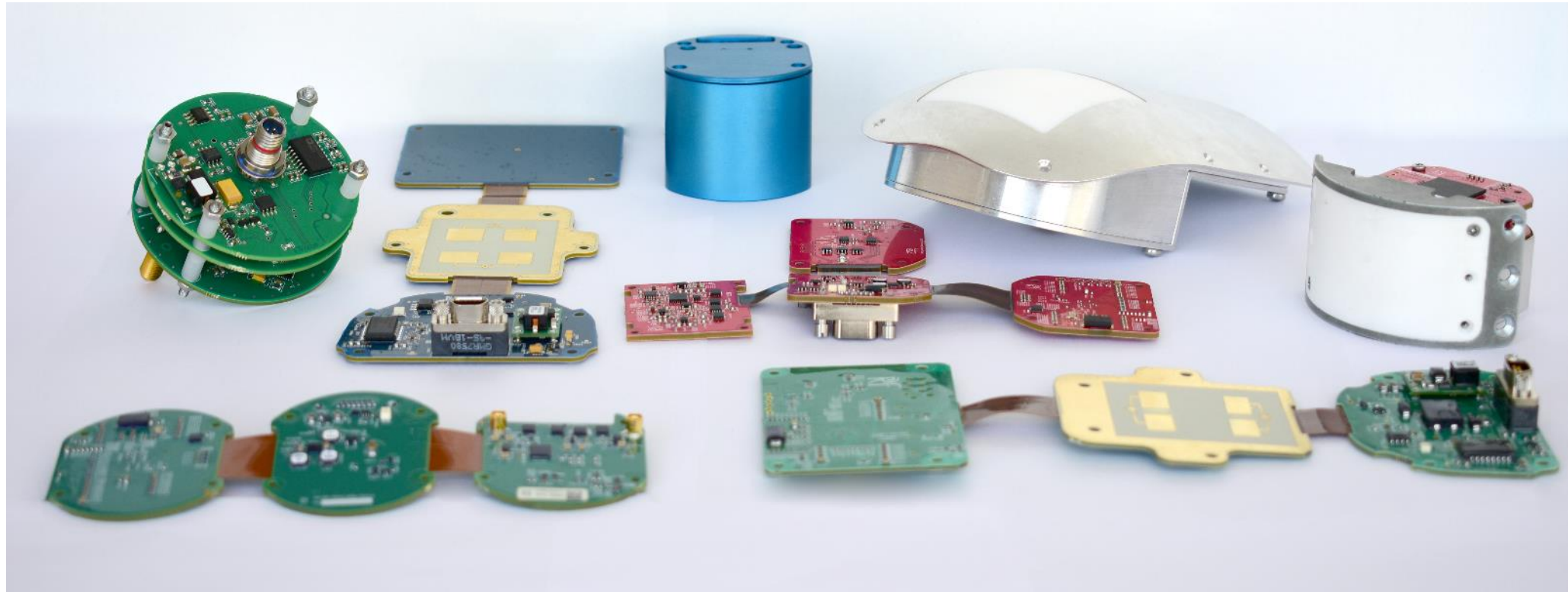


# COMPANY PROFILE

- Founded 2013, PRF R&D provides State-of-the-Art customised solutions for RF requirements and fuzing applications.
- Conveniently located in Middle East Technical University Techno-Park (Ankara/Turkey), innovative solutions are developed by utilizing benefits of research and development heritage with 24 engineers.
- Solutions provided are in a wide frequency range, from HF to millimetres waves.

# PRODUCT PORTFOLIO

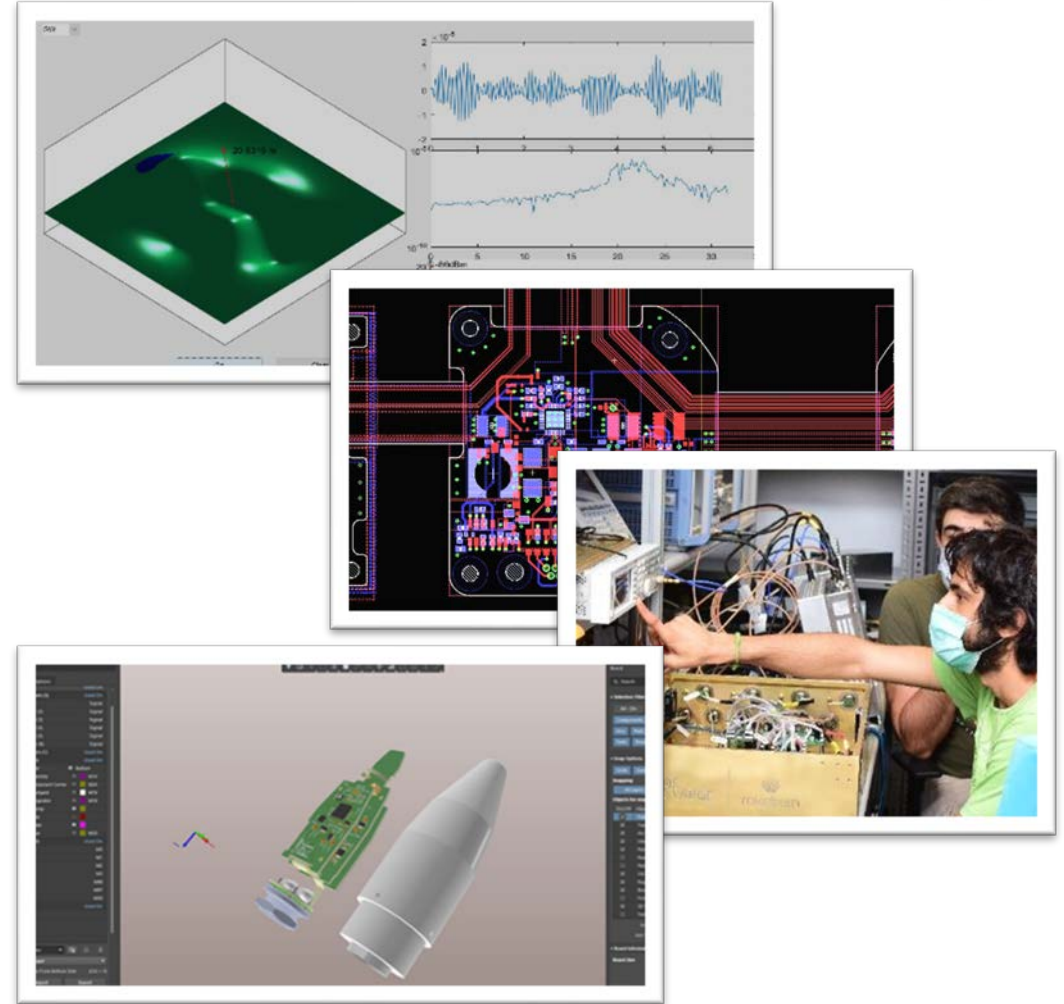
- Both CW and LFM CW Proximity Sensors for munitions which are operable up-to a few Mach velocities with a sensitivity of 1 metre are in service in TAF.



# PRODUCT PORTFOLIO

Specialised in proximity sensors,

- RF ground reflection simulations,
  - SIL/HIL test and simulation systems,
  - Frequency Diversity Arrays,
  - Solid State Power Combiners,
  - Customised Antennas,
  - RF Combiners and Waveguides,
- are the products in our portfolio.

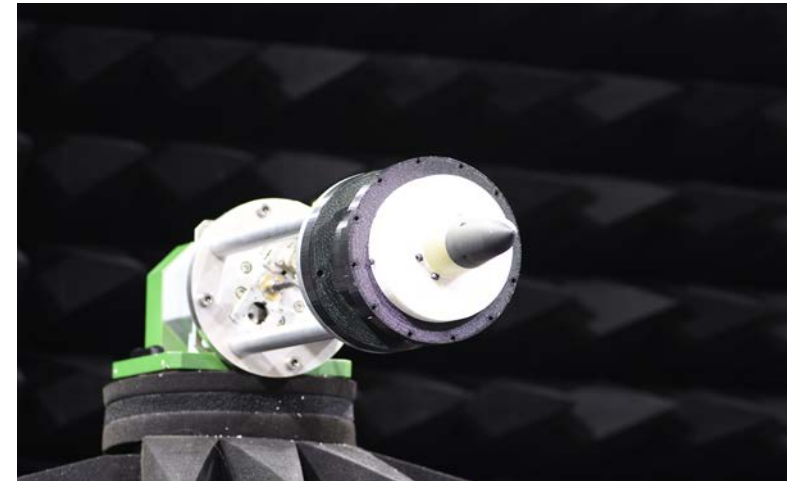
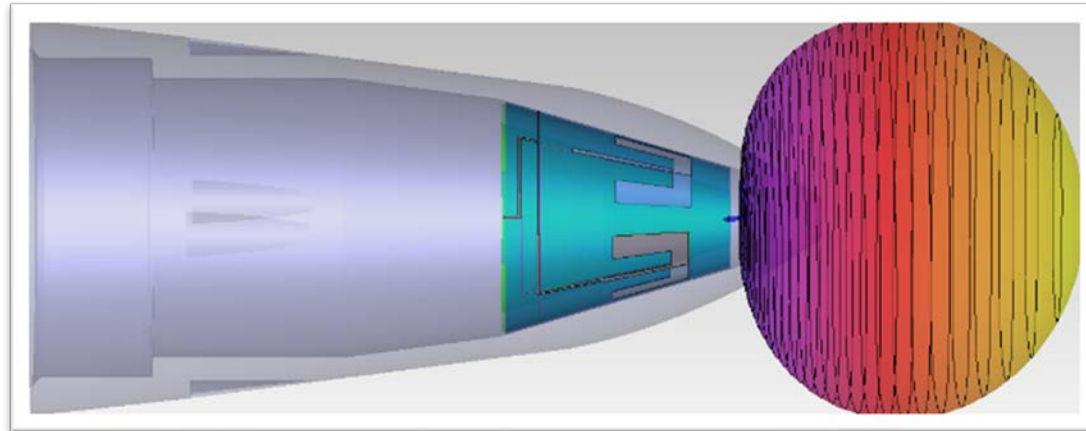


# APPLICATION

122mm fuze head

Small space for antenna and the electronics

A conformal antenna pair in C-band



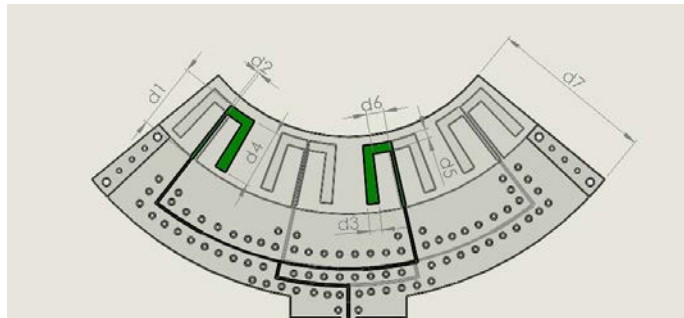


## DESIGN GOALS AT A GLIMPSE

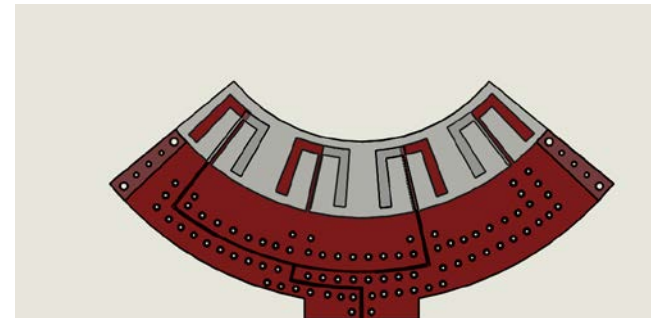
- Electrically small, yet directive antenna
- Integration with electronics
- Scalable design for similar geometries
  
- Flexible PCB

# CONFORMAL ANTENNA

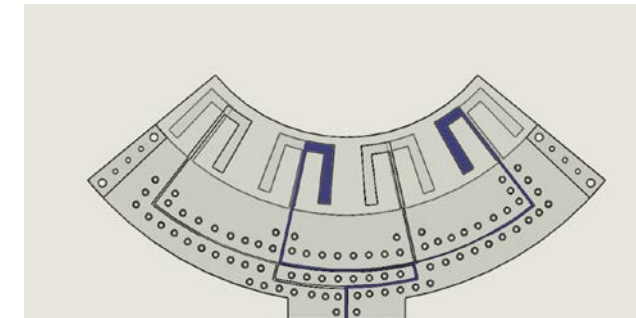
- Printed folded dipole pairs and truncated reflector plane.
- Wide band characteristics with a directed radiation



TX Dipoles arms



Ground and Dipole arms on Layer-2

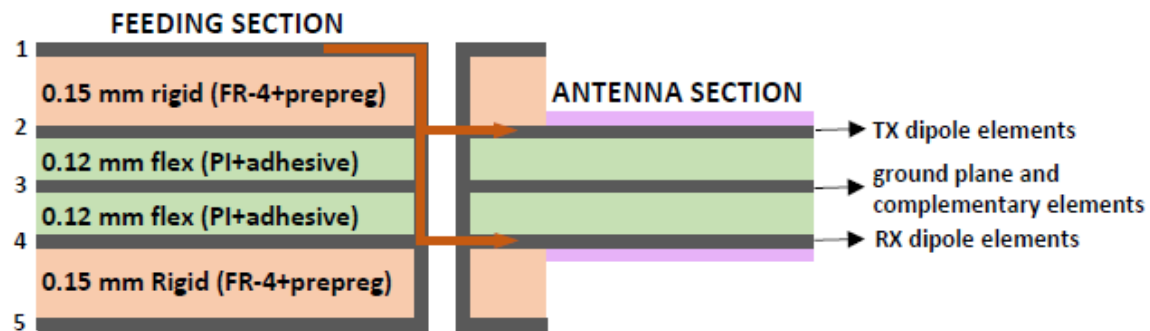


RX Dipole arms on Layer-3

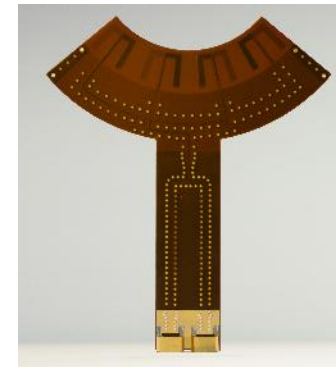


# CONFORMAL ANTENNA

- A hybrid board laminated together
  - 5-layer rigid section
  - 3-layer flexible section



PCB Stack-Up



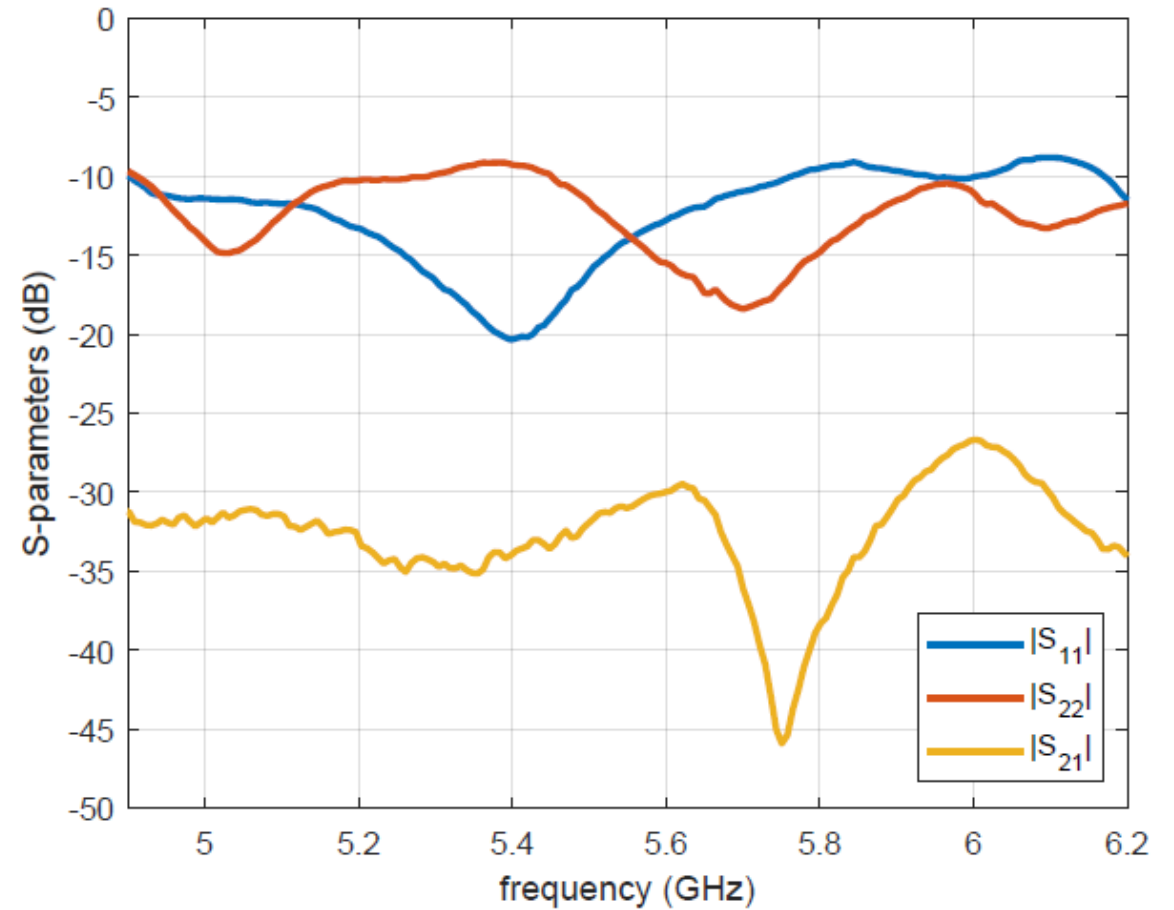
Coplanar Antenna

# MEASUREMENT RESULTS



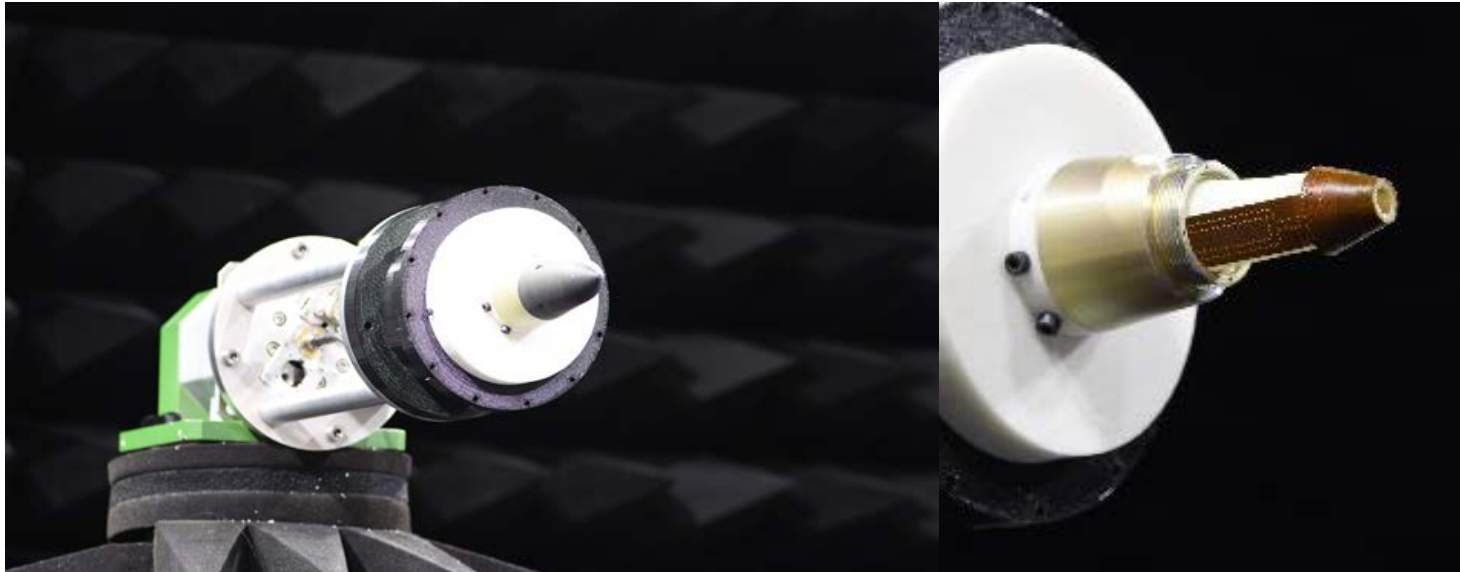
Wideband match

Better than 30dB isolation



# PATTERN MEASUREMENT

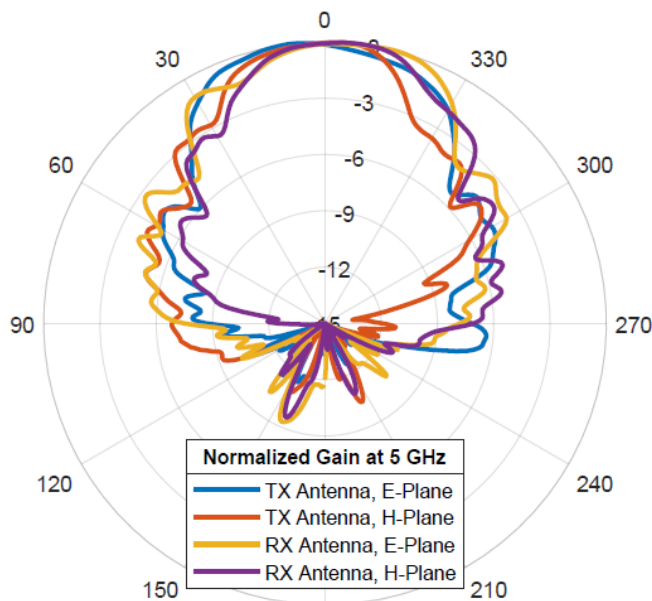
## Far Field and Spherical Near Field Measurements



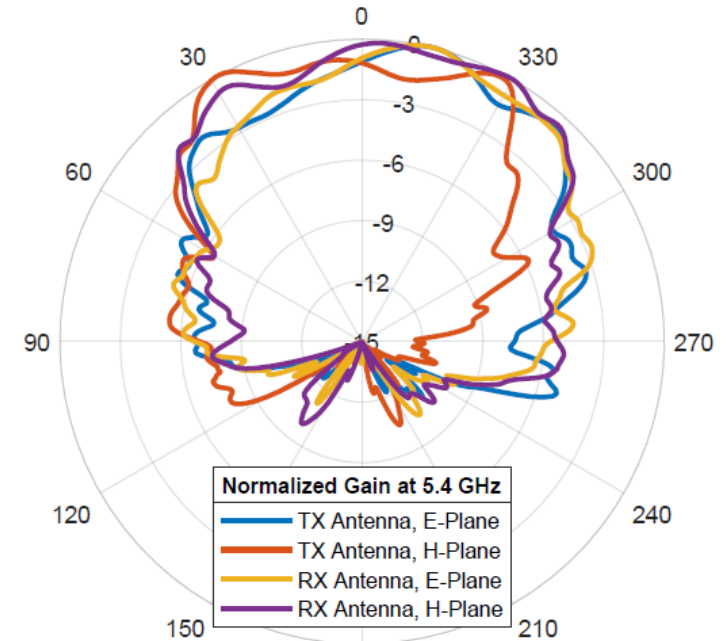
Anechoic Chamber Tests

# MEASUREMENT RESULTS

- It yields wide band characteristics with a directed radiation towards the tip of the cone.
- The mutual coupling has been achieved less than 30dB.



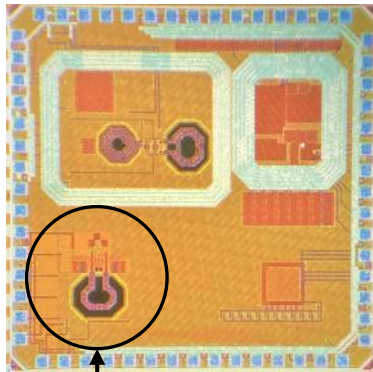
Radiation Pattern @ 5GHz



Radiation Pattern @ 5.4GHz

# FUTURE WORKS

- To develop and produce customised RFIC including most possible components to get more space in the fuze,
- MEMS S&A device combined with EFI.



VCO Section

(Developed by PRF R&D)



# WORKING WITH COVID-19

- Transportation
  - Car pooling and avoiding public transport
  - Fuel Compensation
- Clean air ventilation at any weather condition
- Remote Working
  - Remote Desktop access
  - Deploying personal computers and some test equipment to home
  - Meeting with Zoom

THANK YOU !



“ Professional, Powerful, Precise RF ”