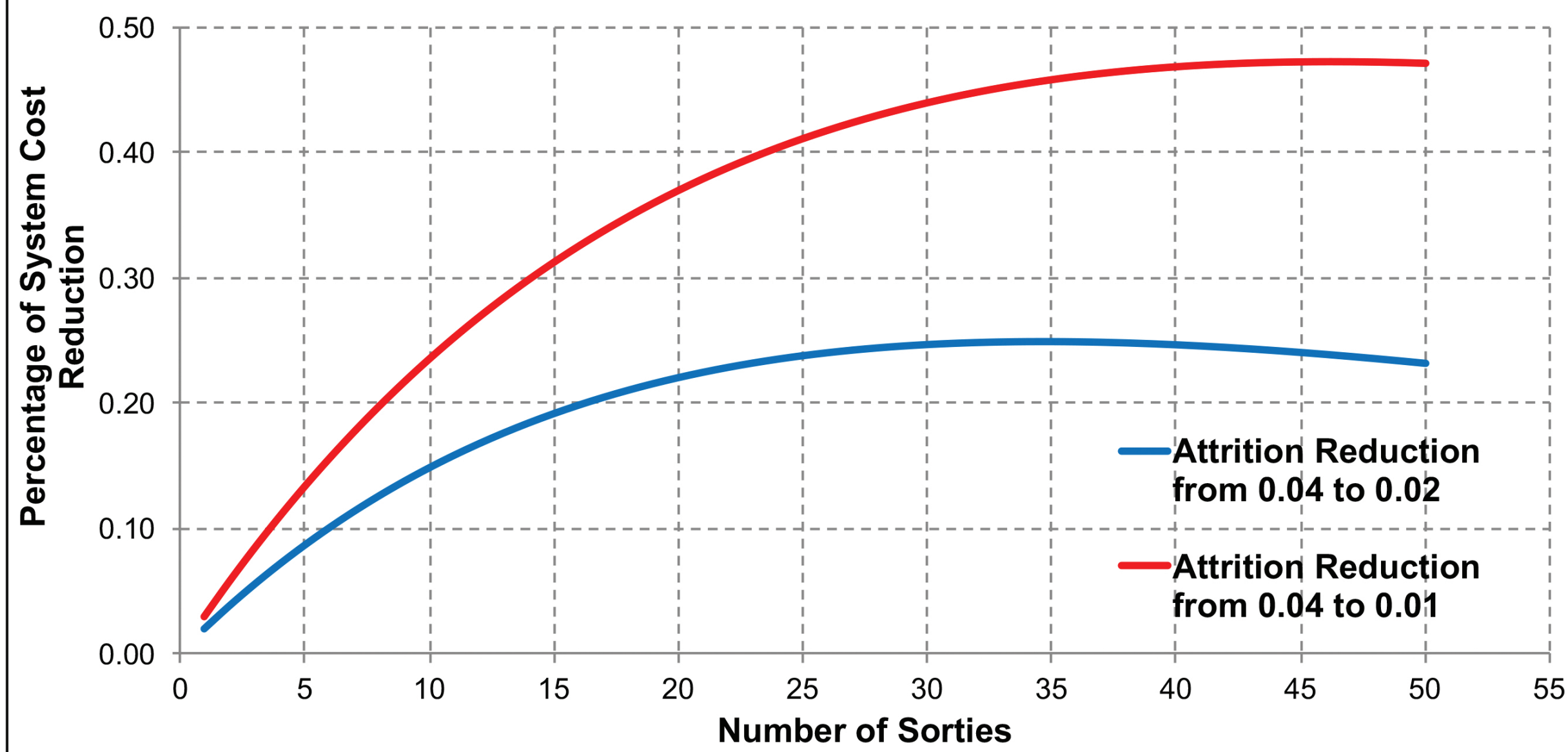




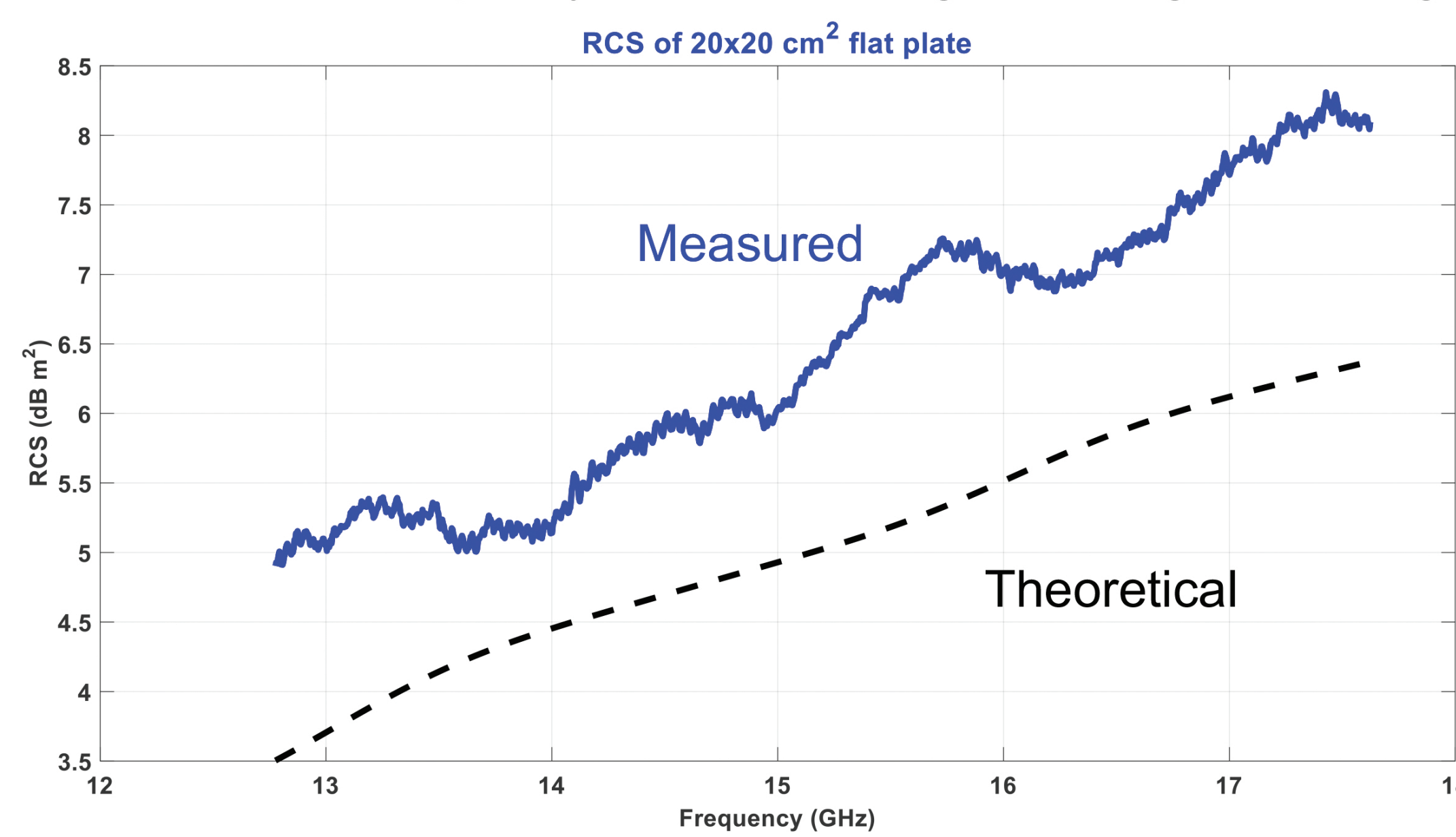
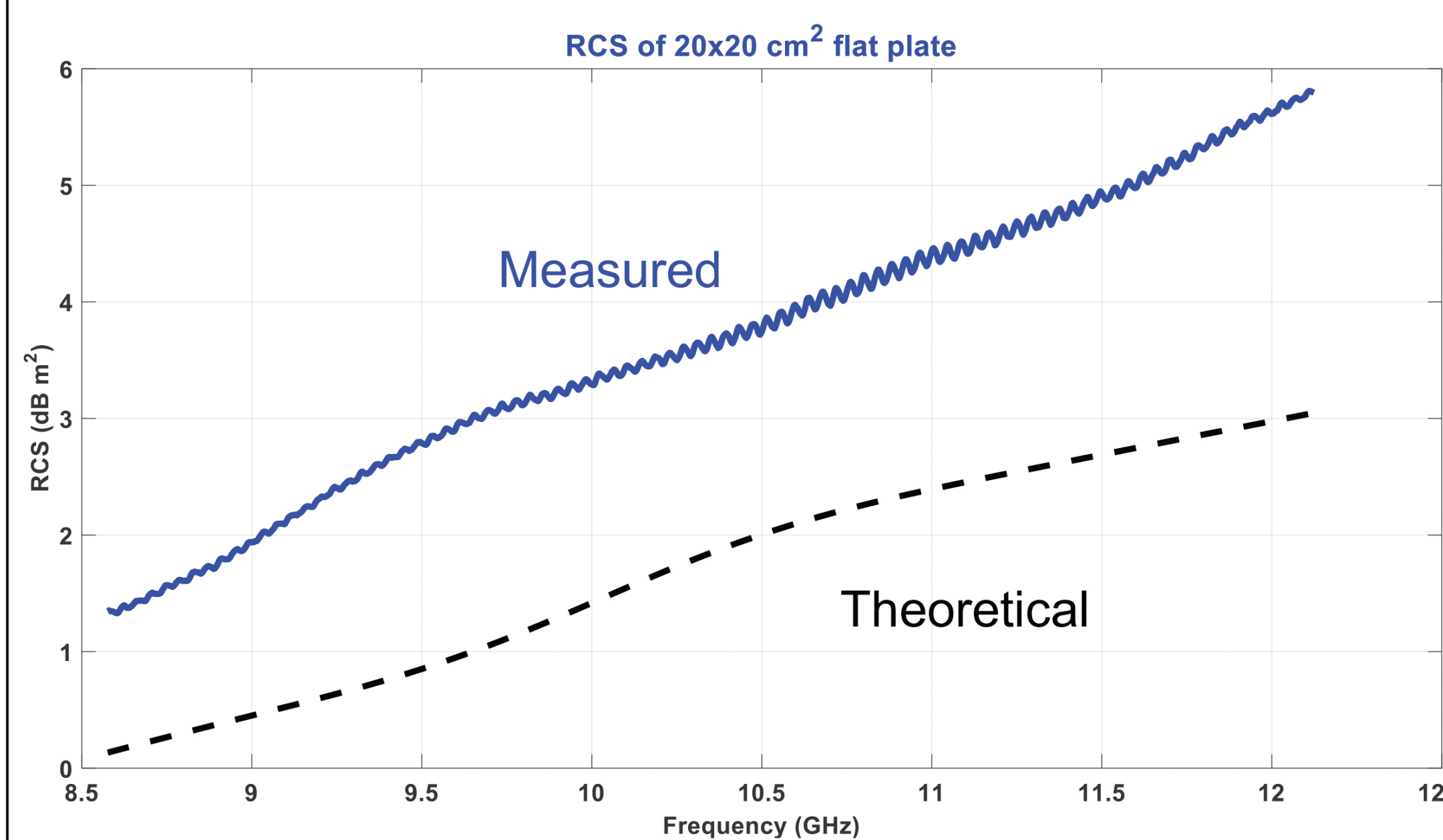
UAV Susceptibility and Self-Protection Measures

Scope: investigate whether RF expendable countermeasures are an effective mean to protect UAVs from known threats, through the use of prediction and simulation tools to estimate the UAV RF signature; simulate engagement scenarios with RF trackers and seekers against UAVs and try to break lock using expendable countermeasures; review the payload of dispensing system and evaluate the countermeasure required to break lock; and assess the launching geometry and dictate the installation countermeasure dispensers on a UAV.

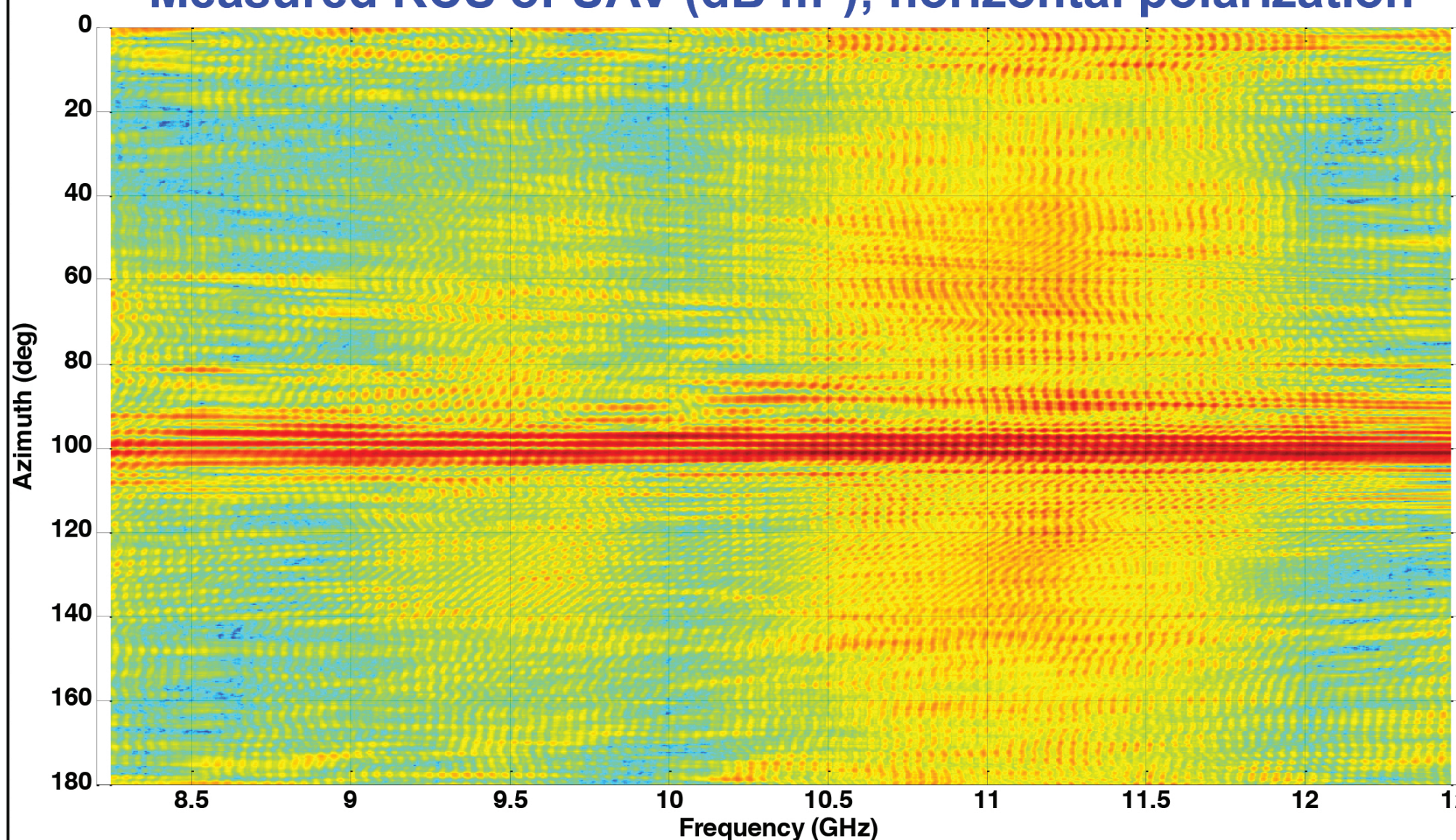


RADAR Cross Section measurements considerations

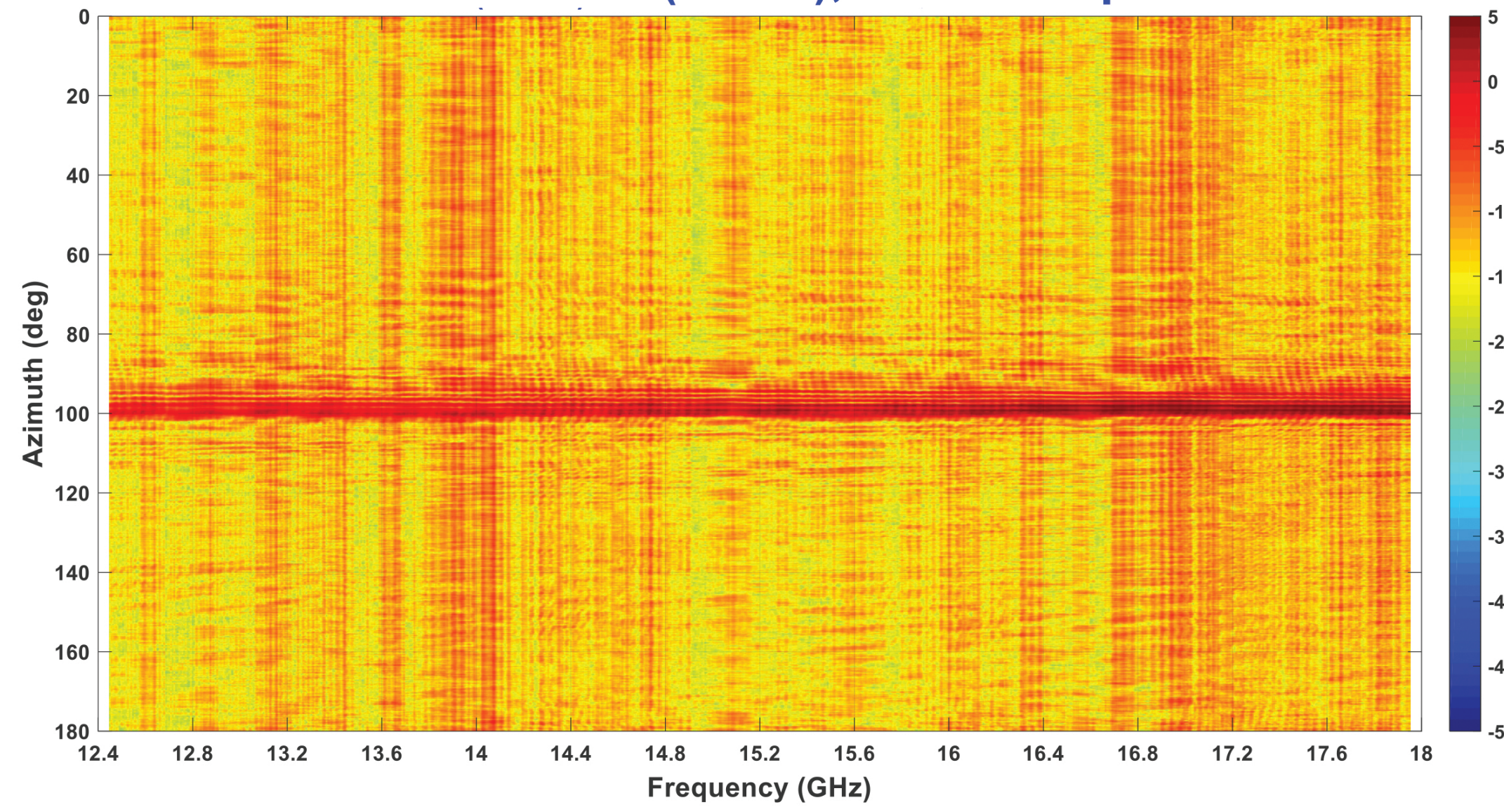
- Calibration scatterer is a flat plate instead of a sphere to combat clutter
- Wideband transmission to resolve target in down-range
- Rotation sampling to resolve target in cross-range and remove cross-range ambiguities
- Antenna positioning to capture target in cross-range, taking into account the antennae beamwidth dependency on frequency and size
- Calibration including isolation to minimize antenna cross-talk and background clutter
- Coherent background subtraction and range gating to suppress stationary clutter
- RF low observable pylon (Styrofoam) and RAM panels to minimize antenna back-lobing and clutter
- Laser range-finder and inclinometer to align antennas and calibration scatterer
- Automation of VNA and turntable for unmanned operation (no movement inside the laboratory)
- High resolution range profiles (HRRP) and focused full-360° inverse SAR (ISAR) to evaluate the collected data
- Polarization, frequency and look and angle alter target scattering brightness



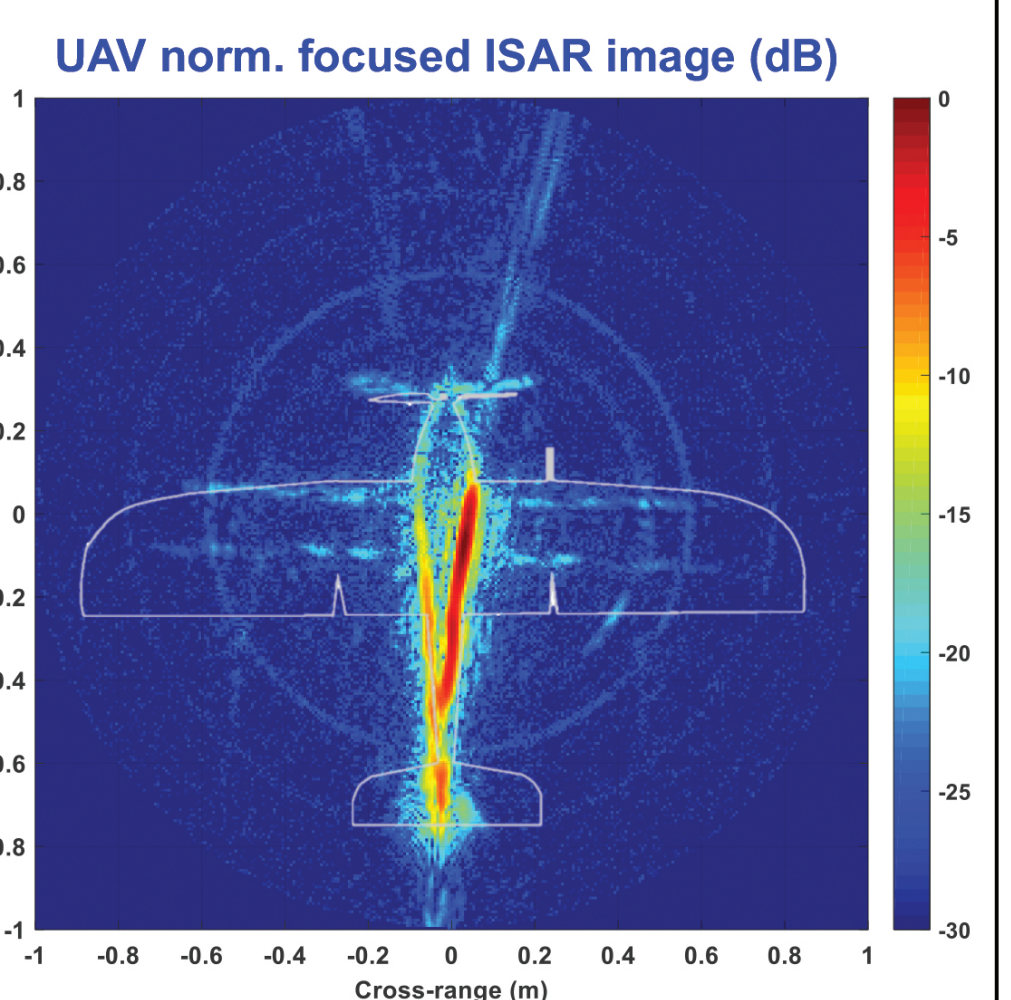
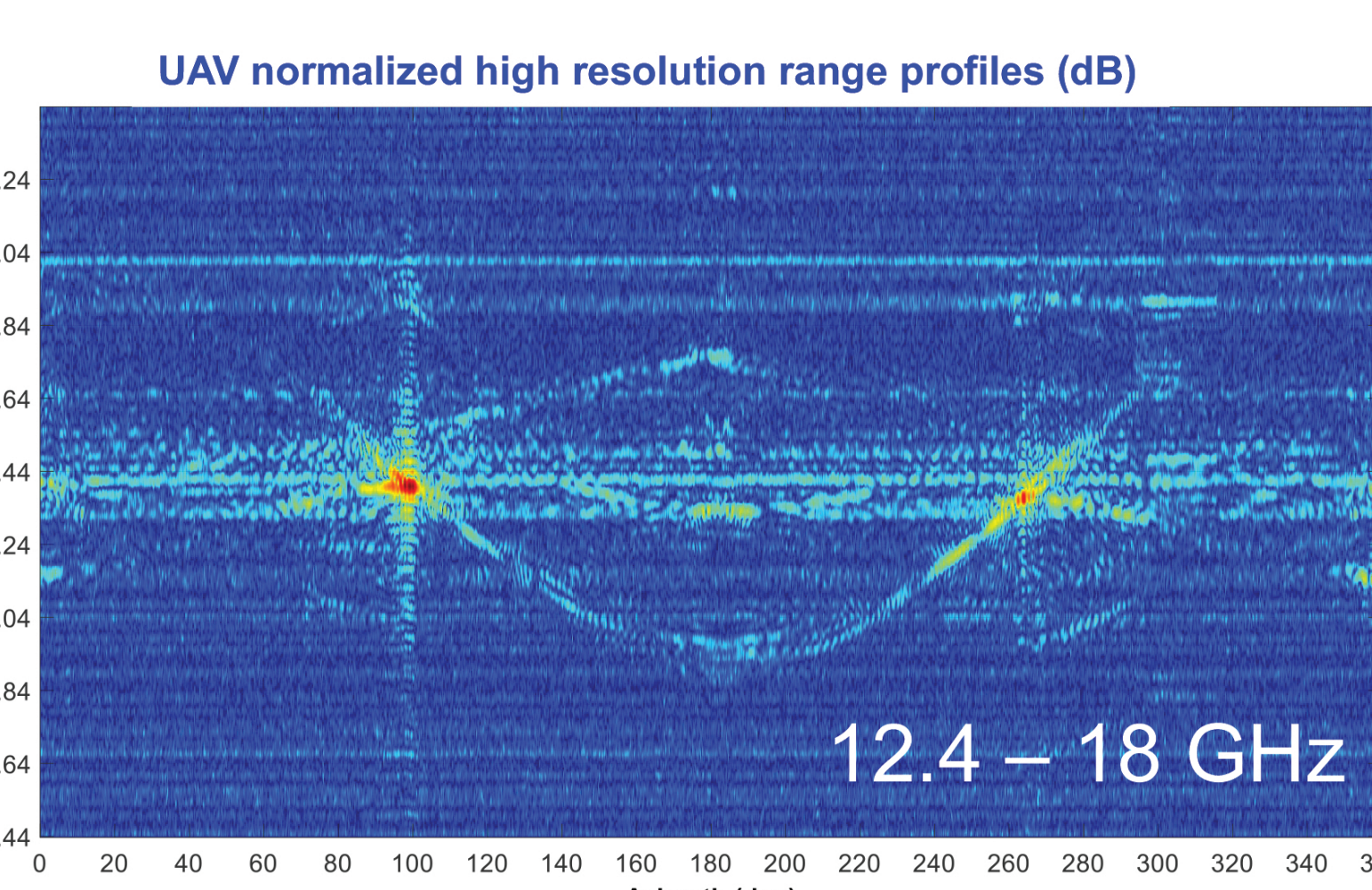
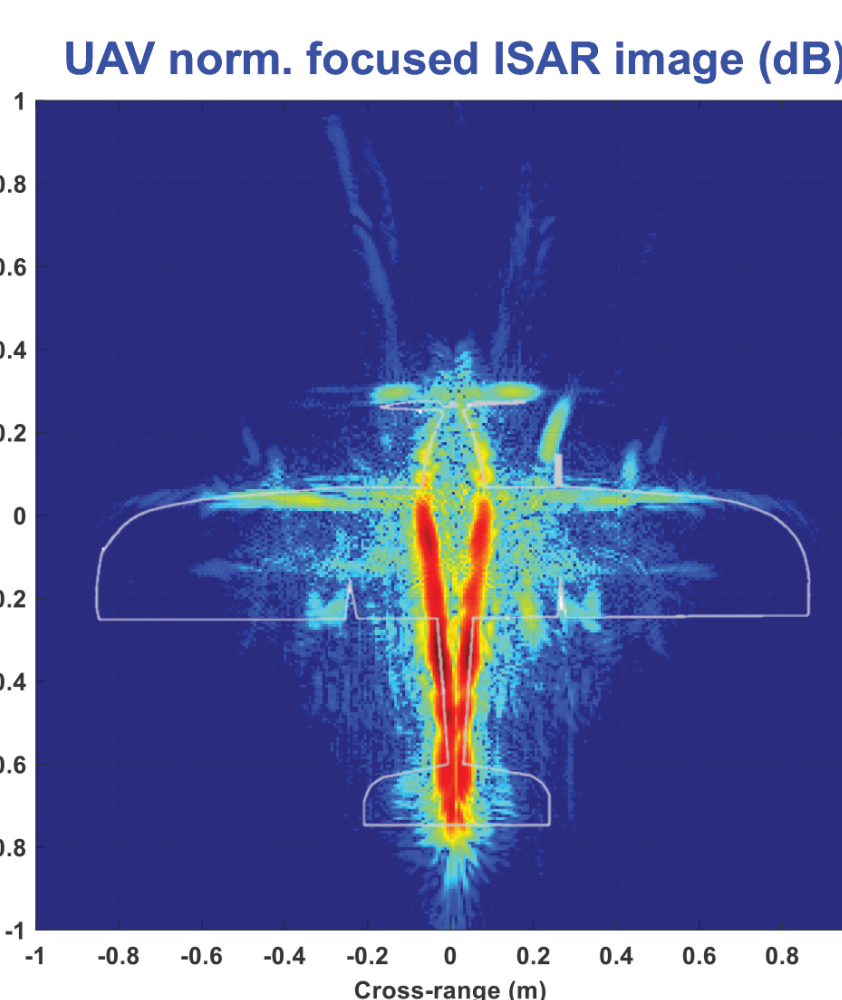
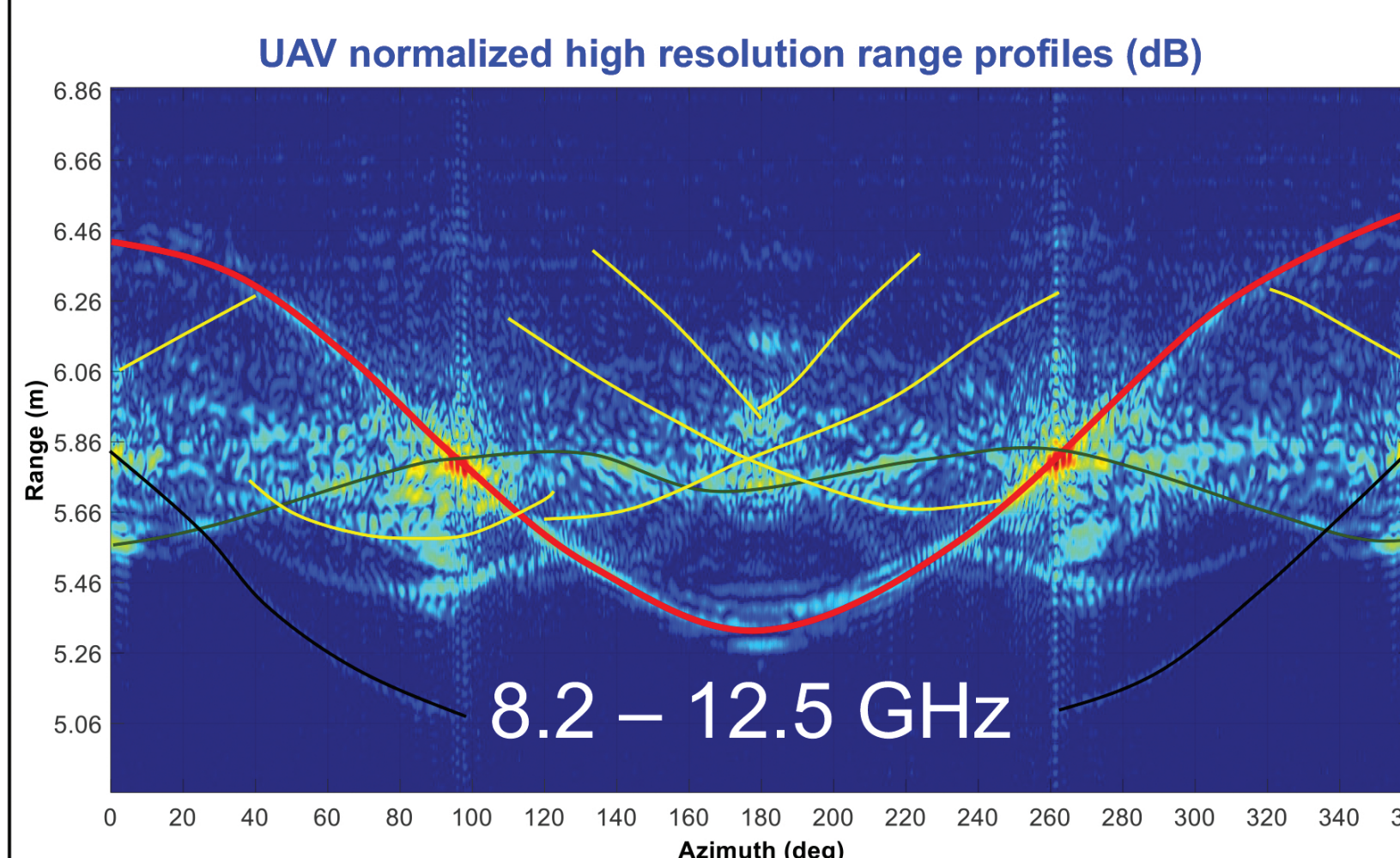
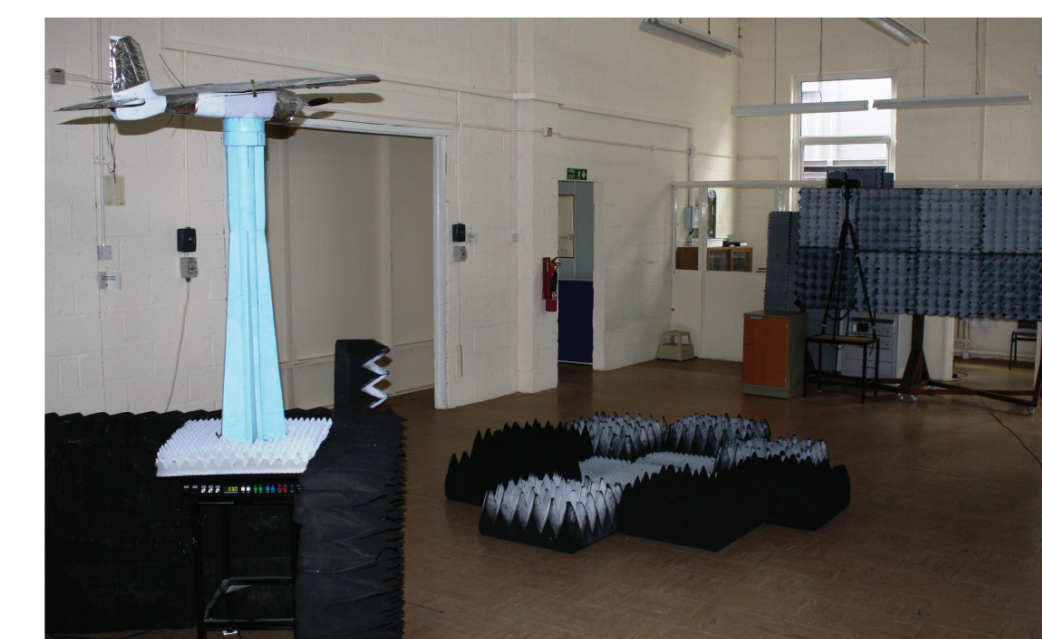
Measured RCS of UAV (dB m²); horizontal polarization



Measured RCS of UAV (dB m²); horizontal polarization



Azimuth coverage	0-360 deg	Bandwidth	4.3 GHz, 5.6 GHz
Azimuth step	0.1 deg	Frequency points	1601
Polarization	Horizontal	Centre of rotation	5.865 m, 6.437 m
Wingspan	1.5 m	Offset	0.25 m
Image size	2x2 m²	Number of pixels	301x301



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