



INSTRUMENTATION RADAR MEASUREMENT SERVICES

ECS owns and operates three precision instrumentation radar systems available for indoor or outdoor measurements and a fixed frequency radar system. The systems have been used for SAR imaging, as well as RCS signature tests against both static and dynamic targets. They have been deployed on moving and stationary trucks, in helicopters, and in an airship. ECS also maintains an echoic indoor range at its Chantilly, VA facility.

Measurement Assets

Radar Systems

- Two MkVe instrumentation radars
- Cheetah instrumentation radar
- Low Frequency airborne radar

Indoor Range

- 20 feet wide x 18 feet high x 60 feet long
- Located in Chantilly, Virginia
- Echoic chamber suitable for >2GHz
- Various rotators and rails available
- Can be secured for classified programs (option)

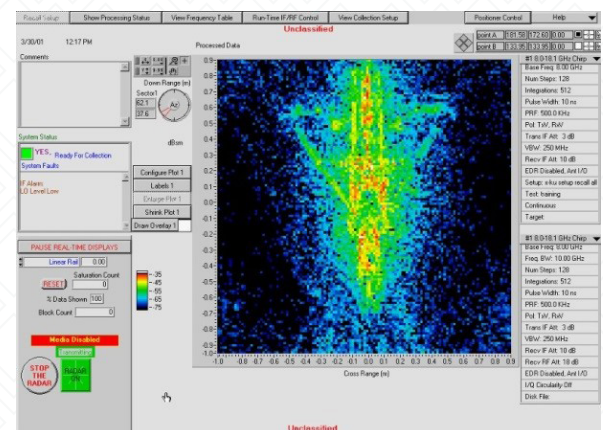
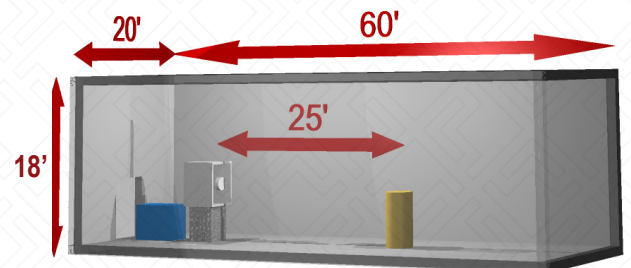
Types of Measurements

Indoor

- SAR/ISAR (airborne, fixed and mobile ground-based)
- Interferometric/3-D measurements
- RCS signature characterization
- Antenna pattern measurement

Outdoor

- Ground/foilage penetration
- Ground clutter
- Sea clutter
- Kill assessment
- RCS signature characterization
- Interferometric/3-D measurements
- Space system reentry ionization measurements



MKVE INSTRUMENTATION RADAR SPECIFICATIONS

PERFORMANCE FEATURE	SPECIFICATION
Architecture	VXI-Bus Compatible, DSP Re-programmable Processing
Control Computer	COTS Intel CPU based; rackmount or desktop
User Interface	LabVIEW GUI on Windows
Frequency Coverage	2-18 GHz in 8 Hz steps
Frequency Expansion	100 MHz -100 GHz
Frequency Switching Time	20 μ s (0.3 μ s optional)
Frequency Table	2 ²⁰ entries
Frequency Step-Chirp	Pulse to pulse, sequential or user-defined sequence
Phase Code	Mono-, bi-, polyphase (sequential, pseudorandom, or user-defined)
Waveform Flexibility	Variable PRF, phase, frequency, pulsewidth, etc.
Antenna Polarization Ports	Linear and circular
Polarization Switching	Full matrix pulse to pulse
Transmit Pulsewidth	3.0 ns-1.3 ms in 0.156-ns steps
Instantaneous RF Bandwidth	500 MHz
Selectable Video Bandwidth	0.1 to 250 MHz in 8 steps
PRF/Sample Rates	Variable to 5 MHz (in 20 ns steps)
Range Delay	0-42 ms in 0.156-ns steps
Range Sampling Jitter	< 3.5 ps
ADC Quantization	14 or 16 bits
Signal Integration	1 to 2 ²⁰ , integer variable
Dynamic Range	> 67 dB instantaneous @ full bandwidth + integration
I/Q Circularity	<0.015 dB rms (real-time corrected)
System Stability	\pm 0.1 dB, \pm 1° after warmup
System Drift	Monitored & Corrected (offline or real-time)
System Linearity	\pm 0.2 dB (-12 to -82 dBsat); 1.0 dB overall
Online Diagnostics	Stability, statistics, loop tests, etc.
Built In Test	RF and digital to board level
Calibration	Automatic external reference and internal loop
Bias Subtraction	Bi-phase, poly-phase processing
Background Subtraction	-40 dB typical
Data Collection Rate	100 Mbps
Realtime Auxiliary Data Inputs	24 bits each
Pulses in the Air	Single or multiple
RF Channels	1 standard; expandable to 2
Range Gates	1, 2, 3, or 4 per channel
Real-time Processing	SAR, ISAR, RCS, 1D transforms
Gain Control	Transmitter leveling; 1 dB resolution; programmable by frequency step
Optional Range Tracking	Manual, automatic split-gate, or automatic external
Optional Angle Tracking	Manual, automatic video, or automatic external