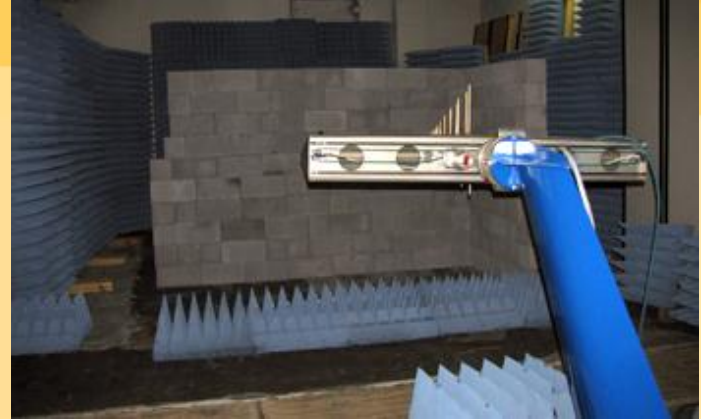


RF MEASUREMENT CAPABILITIES

MTRI is a recognized leader in the research, development and practical application of sensor and information technology to solve critical problems in national security, bio informatics, earth sciences and environmental processes.

The Institute maintains a reconfigurable measurement facility, 8 x 14 m, and RF equipment to make fully polarimetric scattering measurements over wide frequency bands. The facility allows MTRI to replicate a variety of real-world clutter scenarios, and MTRI's portable collection hardware allows for off-site collections with the same equipment used in the laboratory.

MTRI provides the expertise necessary to plan, collect, and analyze measurements from designing and executing experiments in our own laboratory to extended measurement campaigns at remote sites.



Collections are complemented by the Institute's expertise in signal processing, analysis and information technology. Collected data for a variety of collections can be processed as imagery, with detailed analysis of phenomena and results integrated into web-based decision support applications.

COLLECTION MODES

- SAR, ISAR, HRR, MTI
 - Rotation platform
 - Horizontal and Vertical antenna translation
- Systems Spanning 1 MHz to 98 GHz
 - HF, VHF, UHF, L, S, C, X, Ku, Ka, W bands
- Up to 16 GHz of Bandwidth
 - 1 cm resolution
- Bistatic Imaging
- Passive Interferometric Imaging

ANTENNA COMPLIMENT

- Broadband HF Antenna, 3 to 30 MHz
- Horn Antennas, 0.7 to 18 GHz
- Log Periodic Antennas, 0.3 to 4 GHz
- Lens Antennas, 26.5-40 and 90-98 GHz



APPLICATIONS

- Ground penetrating imaging
- In-building imaging
- Target Signature Collection
- Material Characterization
- RF Source imaging



MTRI COLLECTION EXPERIENCE

MTRI has demonstrated success in laboratory and field collections.

CUSTOMERS

- DARPA
- US ARMY – TARDEC
- US AFRL
- Michigan Department of Transportation
- National Highway Traffic Safety Administration
- Toyota – CSRC

RESEARCH AND DEVELOPMENT

- Tests of different GPR designs for ice penetration and sub-surface imaging
- Determining the electrical characteristics of concrete cores for studying weathering effects and moisture retention
- Measuring custom GPR antenna characteristics
- Measuring W-band RCS of automobiles and identify prominent scatterers

EXAMPLE COLLECTION CAMPAIGNS

- Supporting the development of through-wall imaging algorithms, MTRI designed experiments and collected data in its measurement facility to measure attenuation, delay, and dispersive effects of building materials
- Supporting algorithm development to detect urban weapons, MTRI planned experiments for laboratory and realistic field collections. Laboratory measurements, with static clutter, were used to mitigate risk and provide initial datasets. MTRI then deployed equipment and staff to a remote MOUT training facility, and successfully collected more than 26,000 range profiles, satisfying all principal objectives of the program
- Supporting algorithm development for locating assets, MTRI has planned, collected, and analyzed passive interferometric RF signals to image cooperative sources.

Measurement Configuration	Implementation / Capabilities	Radar	Frequency Coverage	Polarization
Portable Instrumentation Radar	Range-gated, wideband data collections over multiple frequency bands provide a versatile measurement capability. RCS measurements, outdoor collections	SPC Cheetah	2-18 GHz 26.5-40 GHz 90-98 GHz	Dual polarization (HH, HV together) (VV, VH together)
Lightweight, Portable Radar	Range-gated, multi-static, man-portable RADAR system for use in either in the lab or in the field	Akela Wideband Network Analyzer	300 – 3000 MHz 750 – 6000 MHz	HH,HV,VV,VH (single pol per sweep)
Ground Penetrating Radar	State-of-the-art capabilities in surface (ice/soil) RADAR measurements in man-portable, multi-static system	Akela Wideband Network Analyzer	300 - 3000 MHz 750 – 6000 MHz	HH,HV,VV,VH (single pol per sweep)
Indoor Range Bistatic Radar	Two sets of relocatable wideband antennas provide a versatile bistatic measurement capability	HP 8510-based System	0.3 - 4.0 GHz 0.7 -18.0 GHz	HH,HV,VV,VH (single pol per sweep)
Dual-Channel Receiver	High-speed, dual-channel, synchronous digitization of received signals provides interferometric capability	Aeroflex 3030a PXI digitizers	0.33 - 3 GHz	HH,HV,VV,VH (single pol per sweep)
Software Defined Radio	High-speed multi-channel, multi-node synchronous digitization of RF signals with transmit capability	USRP	1 MHz– 6 GHz	HH,HV,VV,VH (single pol per collect)

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