Commercial Applications of Drone-based Spectrum Measurements

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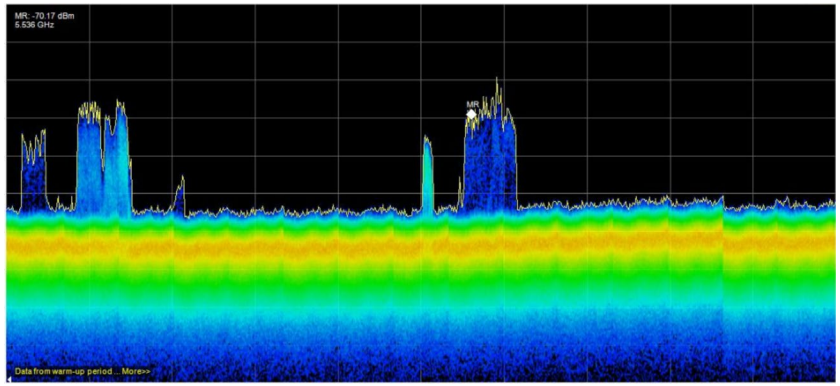

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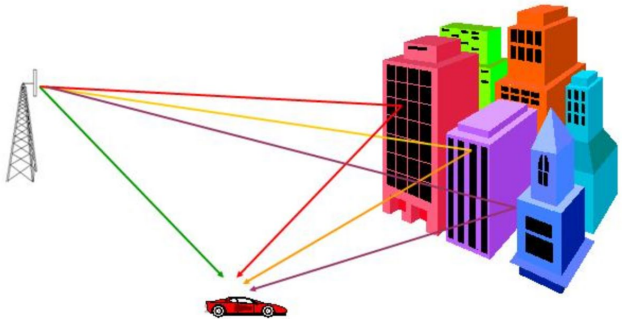
Agenda

- Why Elevate Spectrum Measurements
- Broadcast Coverage Mapping
- Antenna Pattern Verification
- Cellular RF Signal Surveys
- LMR Interference Hunting
- WiFi 6E Interference Hunting
- Wildlife Tracking
- Isotropic EMF Measurements

Why Elevate Spectrum Measurements

- "See what your receive antenna Sees"
  - Rx at 150 ft. No interference on the ground
- Line-of-Site to source
- Eliminate Multipath errors
- RF Environment on ground compromised
  - Inverter Noise
  - AC Noise
  - Cell Phone Signals



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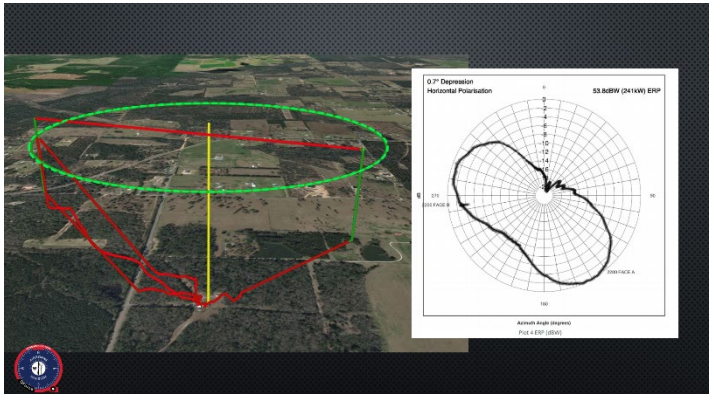
Broadcast Antenna Pattern Verification



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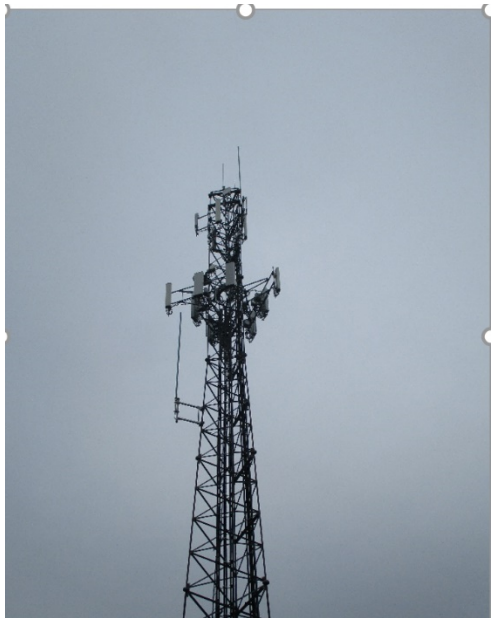
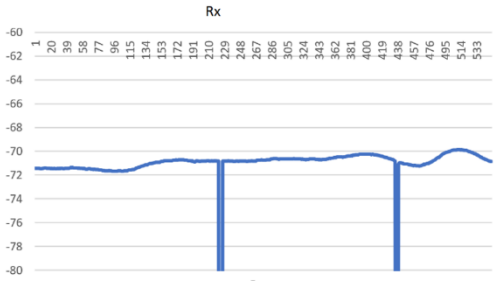
LMR Antenna Pattern Verification

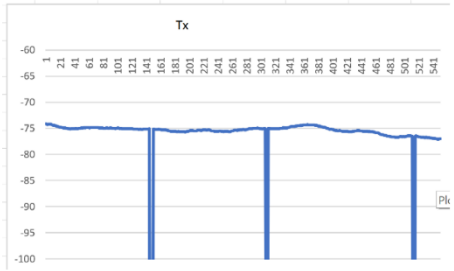
N California PD Antenna Study

- Poor Coverage at Station from 50 W Transmitter 5 miles away
- Separate Rx and Tx Antennas on Cell Tower
- Drone RSSI Measurements showed Antenna Patterns were good but RX Side Mounting Reduced Rx by 5 dB
- Reversed Tx and Rx antennas. Other Rx Receivers Voted Systen





Signal strength vs. height for the Rx antenna



Signal strength vs. height for the Tx antenna

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Cellular RF Signal Survey

Scanning Receiver | 10 MHz – 6 GHz

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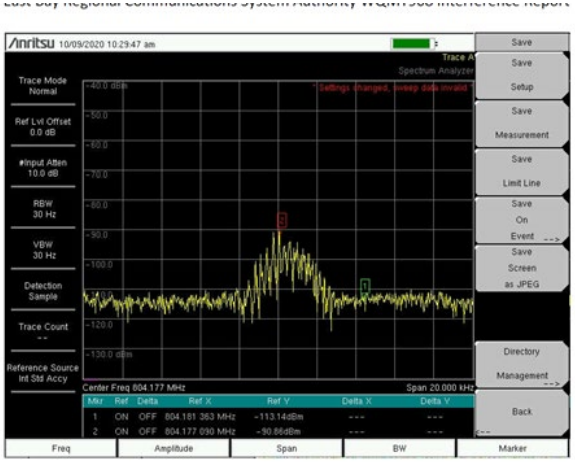
LMR Interference Hunting

Northern California Interference to 700 MHz Public Safety

- CSI Telecommunications Consulting Engineers
- FCC

- Into RX Antenna at 150 ft
  - No Signal on Ground
  - Needed bearing from 150 ft



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WiFi 6E Interference Hunting

- 5.925 to 7.125 GHz
  - TDD
- 10,000 fixed wireless links
- Aaronia Spectran V6 with (New) 8 GHz extension option
- Lightweight High Gain Horn Antenna

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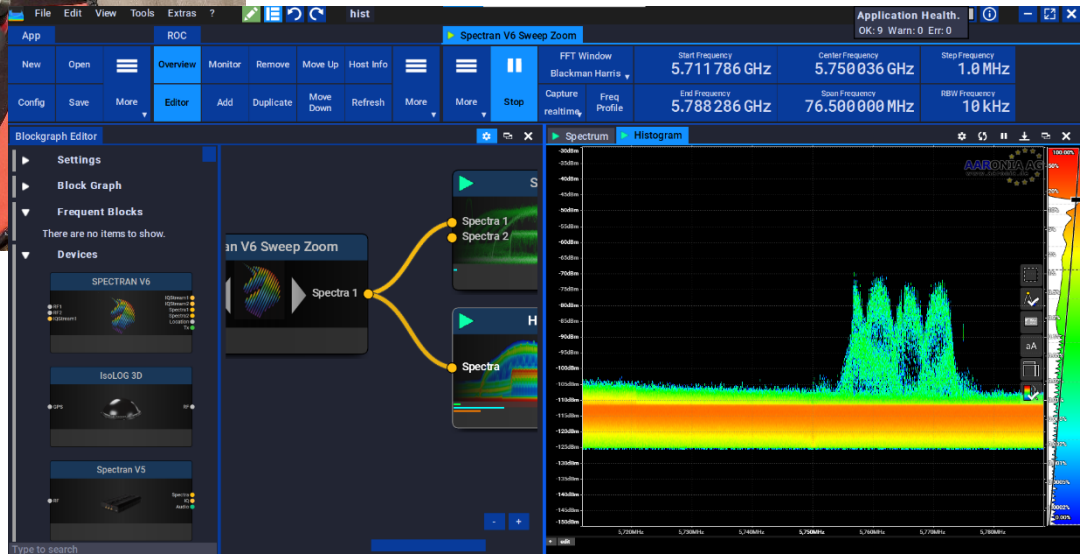
WiFi 6E Interference Hunting

- Aaronia / Spectran Real-Time Spectrum Analyzer



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Wildlife Tracking

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Wildlife Drones

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Isotropic EMF Measurements

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Summary

- Rapidly Expanding Applications for Drone-based Spectrum Measurements
- “Flyable” Spectrum Analyzers are slowly advancing
- Drone Services Teams are stepping up to support needs

- Questions?

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