L-band Interference Monitoring: DOT Developments

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PNT Advisory Board (virtual)

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U.S. Department of Transportation
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Focused L-band Interference Monitoring Scope

Immediate Scope for Domestic L-band Interference Monitoring

- **Baseline:** Survey RF environment at or near adjacent band sources a priori
- **IDM**: Interference detection and mitigation – localize, report, and enforce
- **ABC**: Signal Conformance – models of PNT (defense) and comm (offense)

Precision Spectrum Sensor + Network + Software Defined Radio

- DOT mission as spectrum monitor, event-based & responsive
- Interoperable devices & data, e.g. NGA HRTR, MITRE GNSSTA, FAA GIII, etc.
- Rapid Deployment – existing networks, DOT and USG facilities
- Joint Ops Center – DHS/DOT/DOD watch-standers,notification, and archives

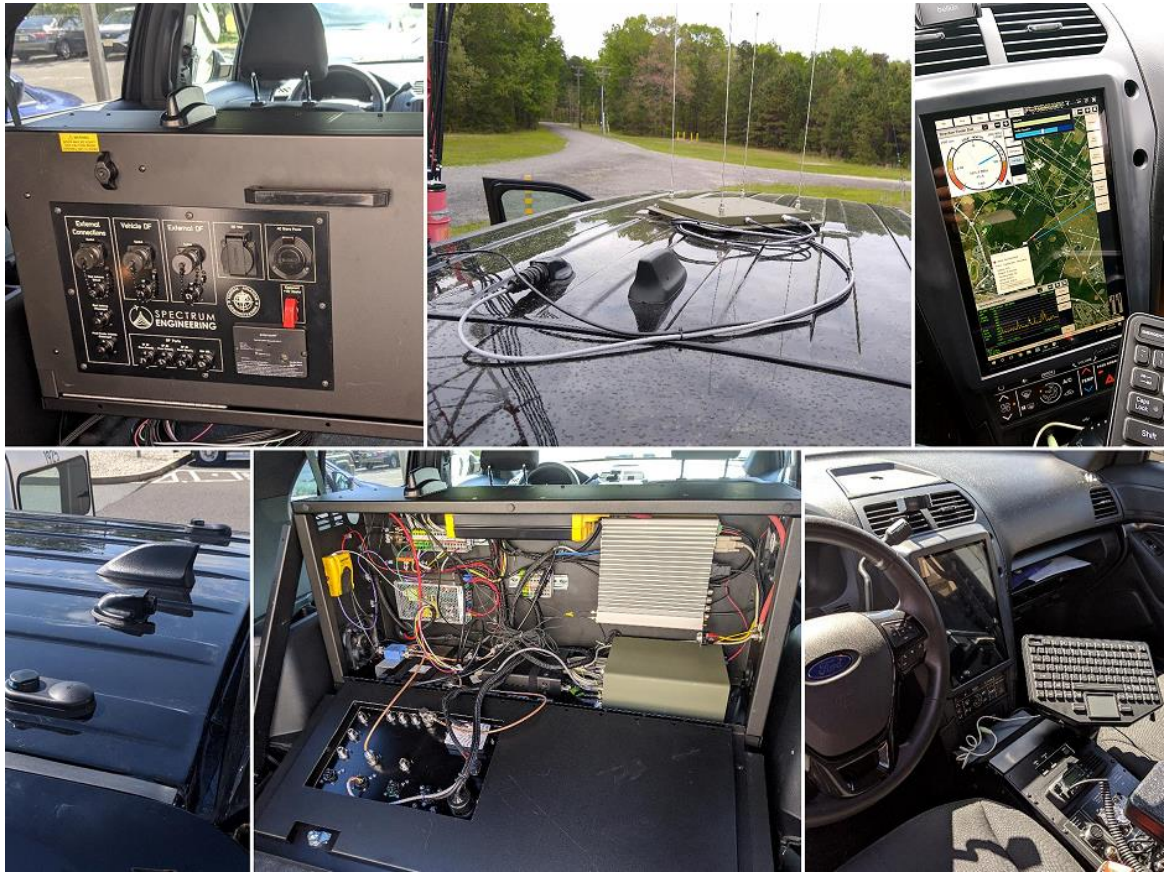
A Contributing Proposal for USG/DOT IDM Plan

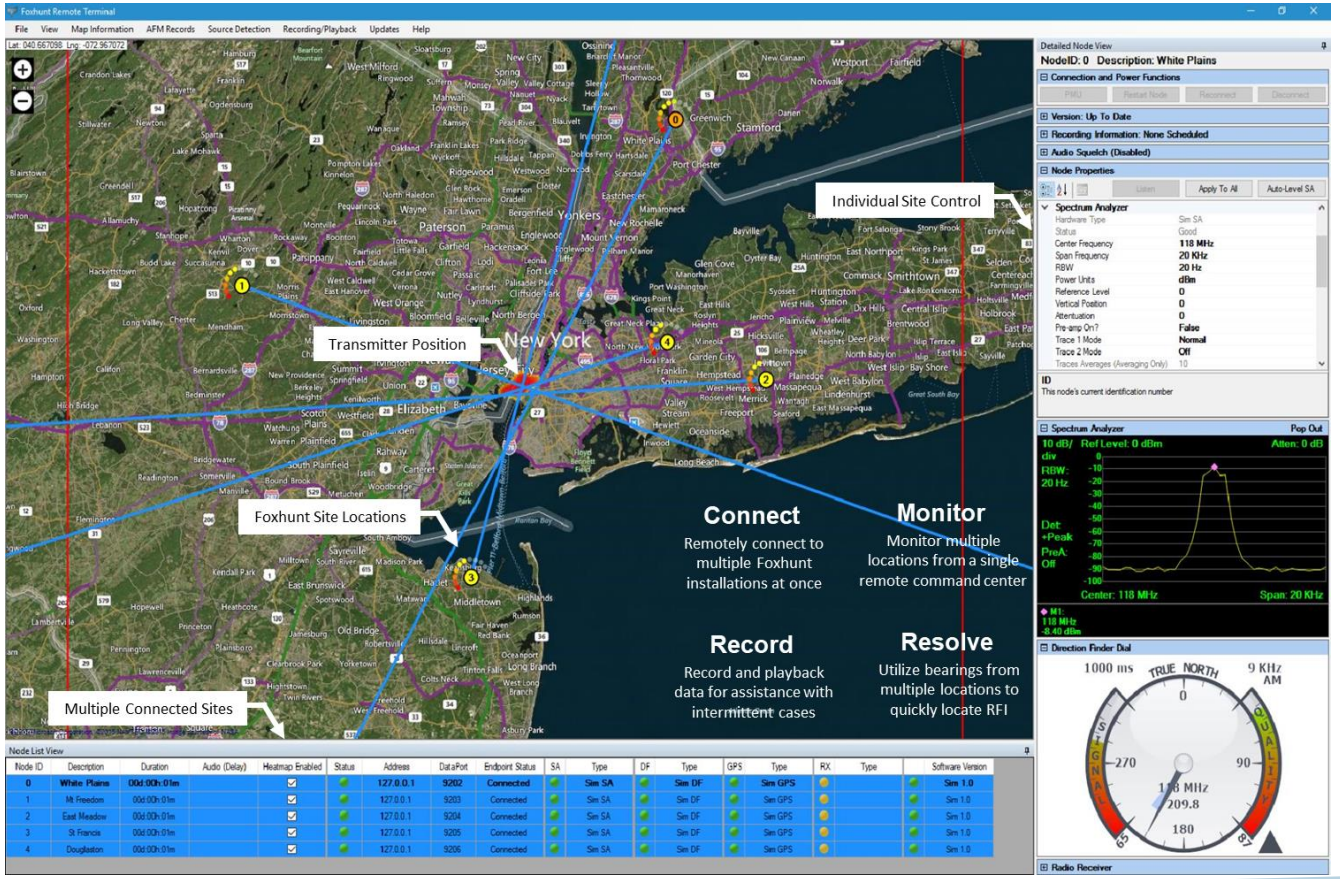
Four Increasing Levels of Capability – Preparing for Adjacent Band RFI

1. Rapid laboratory integration of spectrum monitoring equipage
   - 2 rack units, 4-6 mo
   - HRTR, patch/dish/directional antennas, digital RF/IF/base band feed, customized SDR functions
   - command/control, clock, array storage, and event detection computer – WAAS/GBAS RFI analog
2. Mobile host platforms as responsive asset
   - 3 DOT + FAA mobile units, 2-4 mo
   - fully functional, portable laboratory
   - modular, coordinated, and expandable
3. Rapid deployment, fixed network on existing backbone(s) (12-15 units, 6-12 mo)
4. Scaled deployment, coordinated high density network (40-50 addtl. units, 15-18 mo)
   - compatible and/or interoperable with DHS/DOD/DOI/DOC/NASA assets
   - lead-time to develop joint operations center, economy of scale units, custom monitoring

FAA Spectrum Engineering Mobile System

Designed and Implemented for VHF/UHF – Direct Upgrade to L-Band





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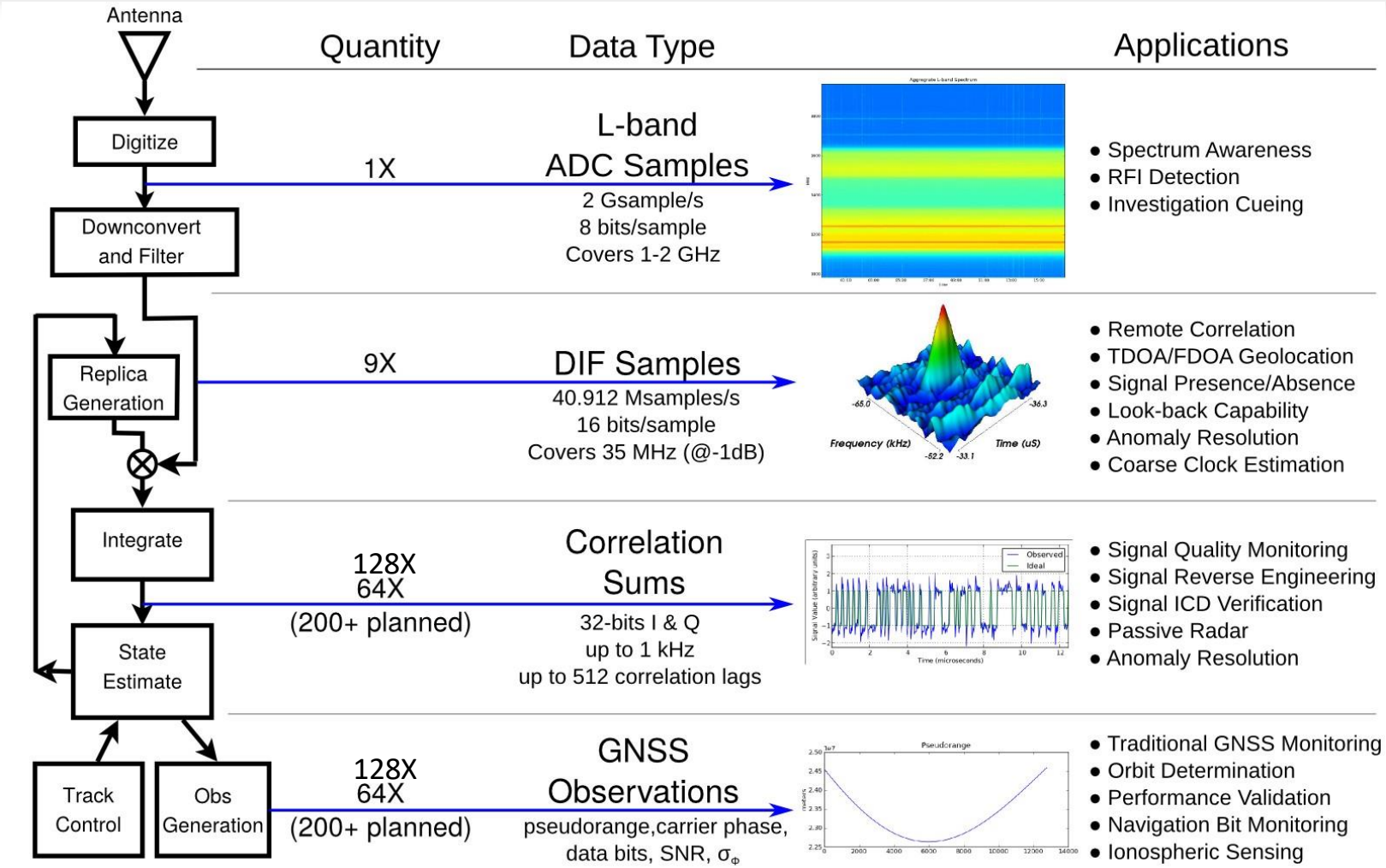
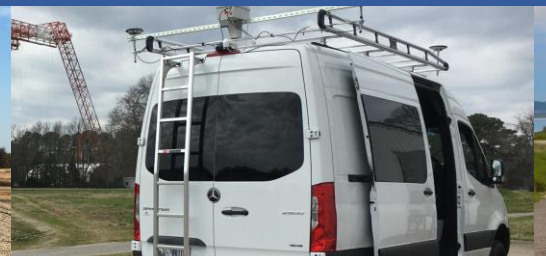
(U) HRTR Data Types / Applications

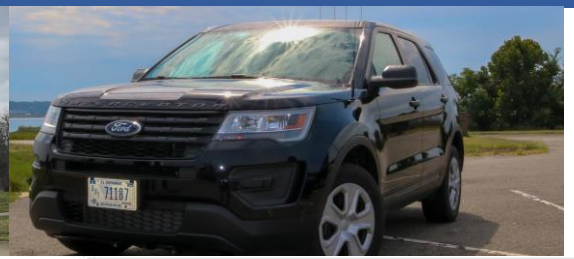


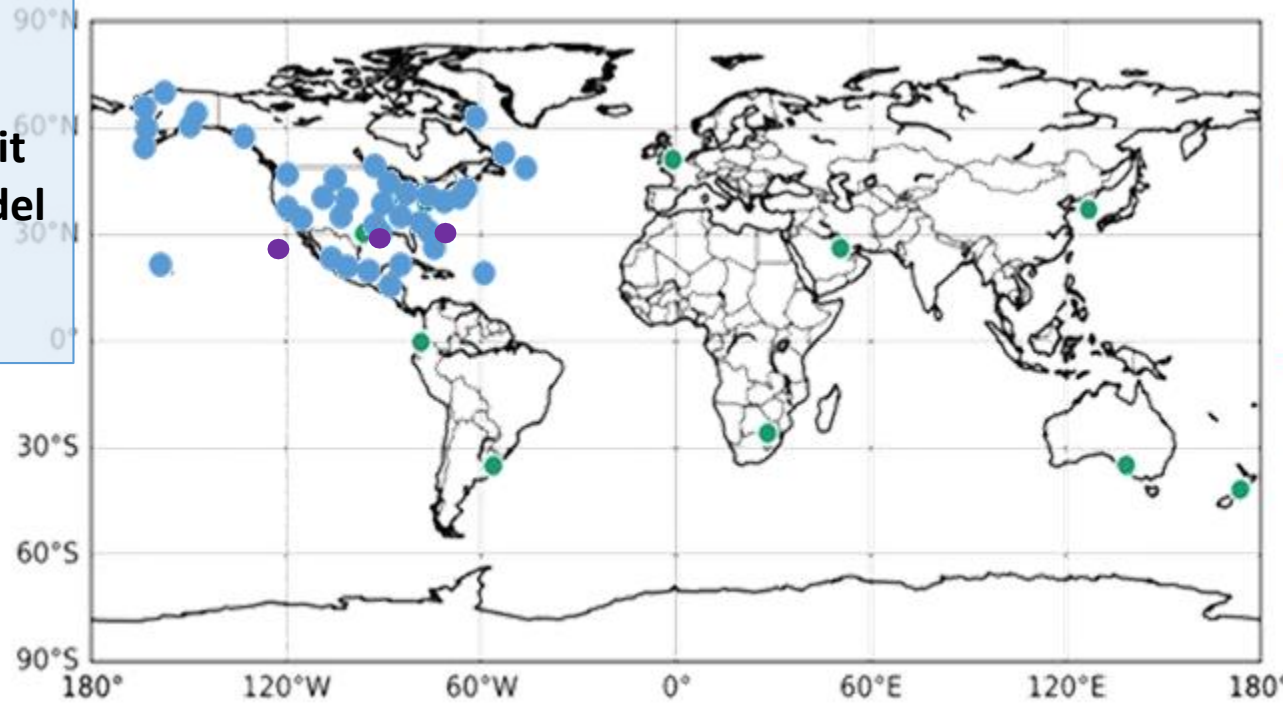
Pathfinder DOT IDM Mobile & Fixed Networks

Active Functions
- **In-band Interference**
- **Phase Jump/Jitter**
- **Cross Ambiguity Function Inconsistency**

Future RFI Functions
- **Adjacent Band Over-limit**
- **Adjacent Band PNT Model**
- **Adjacent Band Errant Modulation**







Possible Early Path-finders
- NGA Monitor Stations
- Volpe Wake Vortex Installations
- FAA WAAS/NSTB Network
- ADS-B Ground Base Transceiver (GBT) Network
- PIRT OLSON Network
- Airport Facilities, e.g. Glide Slope/Localizers
- Mobile/Dispatch Platform
- CISA National Critical Function Sites

Questions?

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