Spectrum Issues

TAC Informational Briefing

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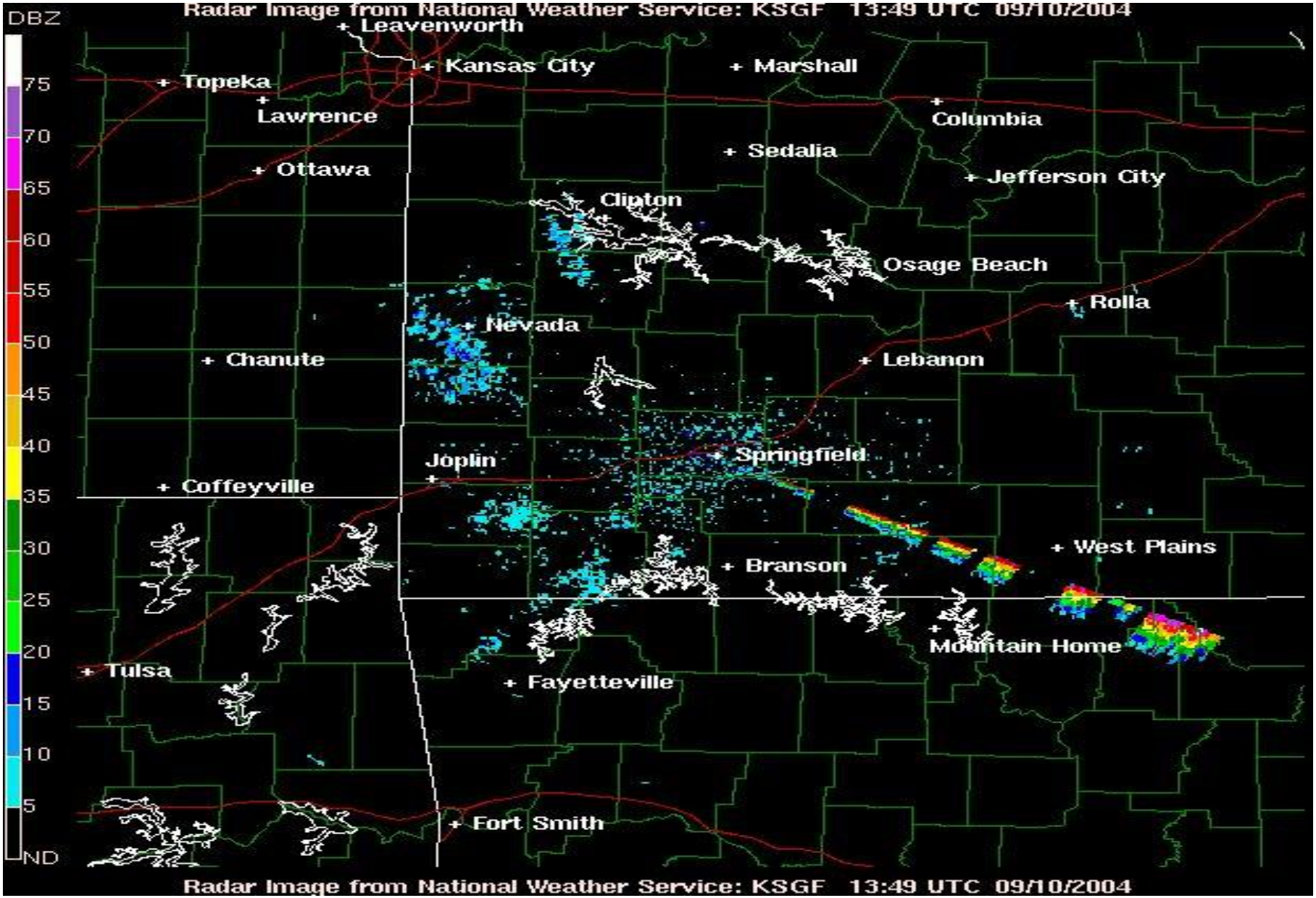
Spectrum Issues

- FAA ASR-11 Air Traffic Control Radars
- Worldwide Interoperability for Microwave Access (WiMax) Issues
- Day to Day Interference Issues
- Future Interference and Spectrum Management
- Frequent Requests for Justification of S-Band for Weather Radar

Spectrum Issues

- New S-Band ATC Radar deployed several years ago (ASR-11)
- ASR-11s placed within several miles of WSR-88Ds caused significant interference from out-of-bandwidth emissions
- Collaborated with JSC, NTIA, and FAA to resolve interference
- Improved WSR-88D front-end
- FAA Installing ASR-11 Transmit Filters on Applicable ASR-11s

ASR-11 Interference at Springfield, MO



Spectrum Issues

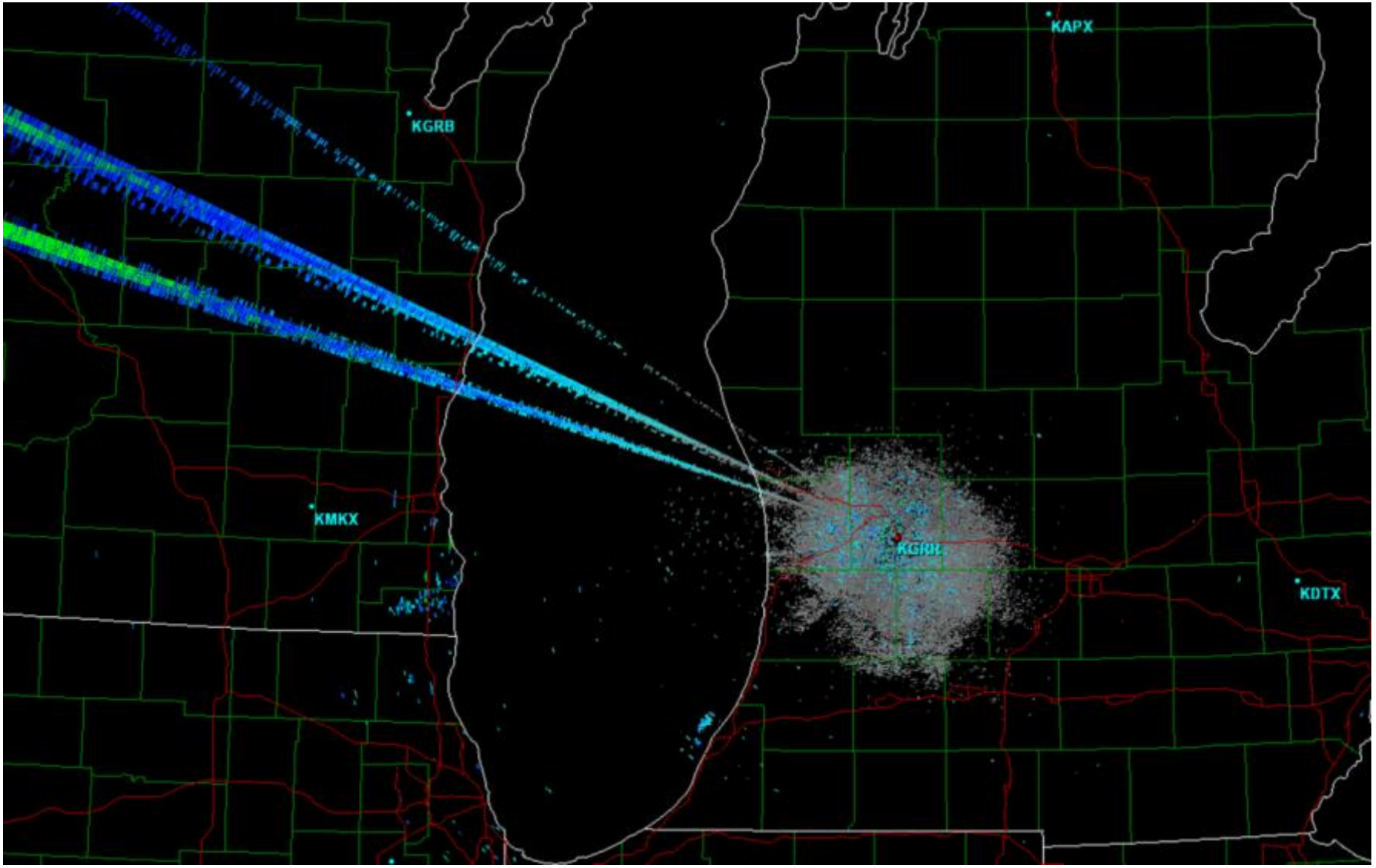
WiMax

- Licensed to Operate in 2500-2700 MHz band
- New Wireless 4G Technology causes similar out of bandwidth interference as ASR-11
- WSR-88Ds utilizing frequencies < 2775 MHz (40 radars) could be affected if WiMax transmitters are located within several miles
- Currently working with FCC, NTIA, ORFM, and WiMax Vendor to resolve. (WiMax transmit filter)

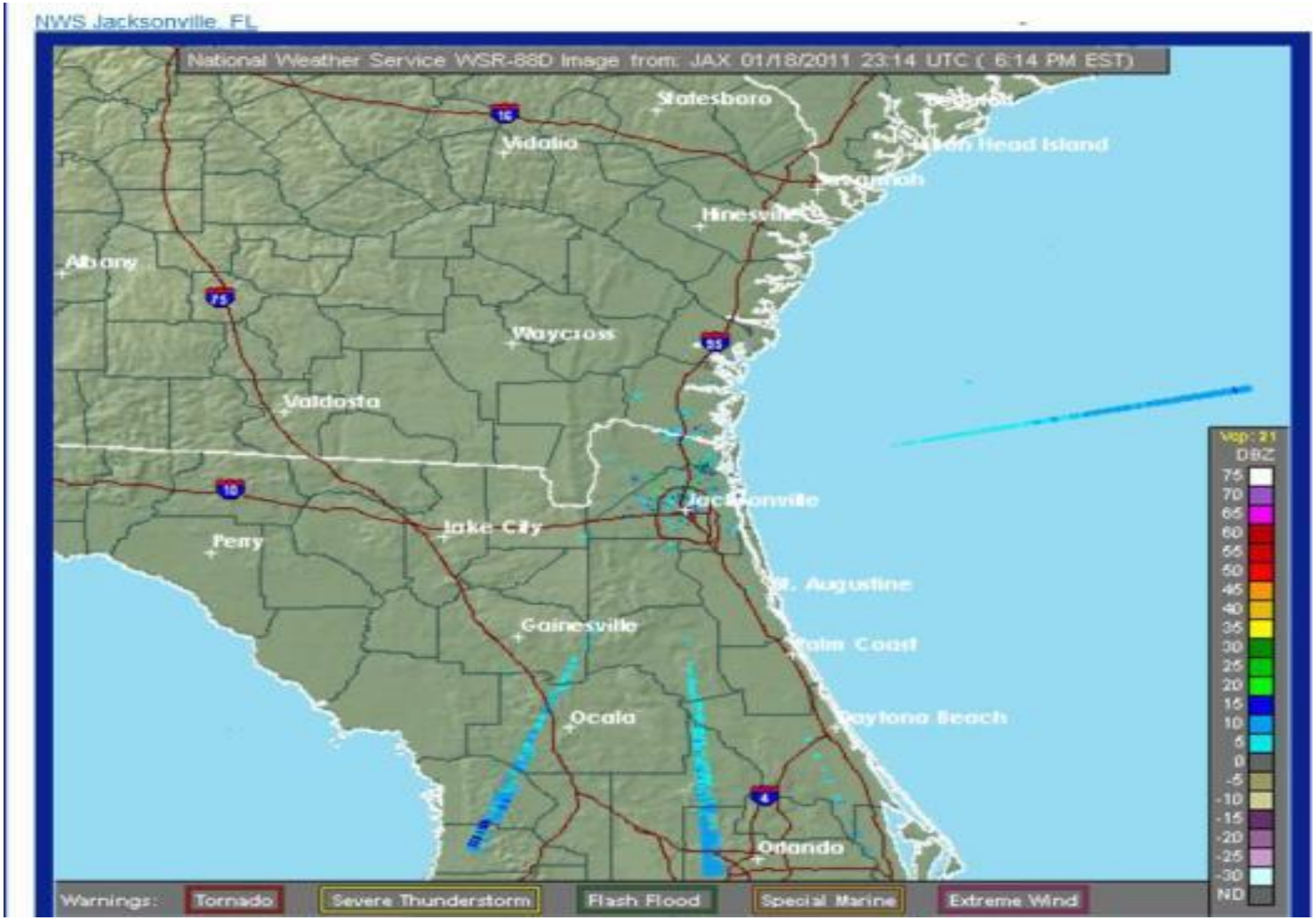
Spectrum Issues

- Known WiMax Interference Sites
  - Grand Rapids, MI
  - Jacksonville, FL
  - St. Louis, MO
- Probable WiMax Interference Sites
  - KOUN Dual Pol Testbed
  - Midland/Odessa, TX
  - Houston, TX

Interference spikes from 4 WiMax 4G transmitters in this Grand Rapids WSR-88D reflectivity product



WiMax Interference Spikes on the Jacksonville, FL WSR-88D. Twelve WiMax interference sources exist, but only four are visible on radar products



Spectrum Issues

- Day-to-Day Interference over Entire Network

- Continual intermittent interference from
  - FAA and DoD Radars
  - NEXRAD (Bistatic Coupling)
  - Wireless Networks
  - Unknown Sources

Spectrum Issues

Future of Interference and Spectrum Management

- DoD Spectrum Symposium Fall 2010
  - “It is not a matter of if, but when, private industry will be allowed into government only frequency bands.”
- National Telecommunications Information Administration (NTIA) and FAA Spectrum Management
  - Each time a new RF system is turned-on we may have to go through this same exercise.

Spectrum Issues

Recurrent Requests to Justify S-Band for Weather Radar

- Higher frequency results in reduced range
  - Significantly more radars required to maintain existing coverage
  - Investment in algorithms put at risk
  - Performance of some algorithms will be degraded
- Investment in Dual Polarization put at risk
  - Bulk of Govt sponsored research was S-band
- Cost?

Spectrum Issues

- Backup Slides

Spectrum Issues

Principle Players

- FCC – All commercial and Private Users
- NTIA – All government Users
- IRAC – (Interdepartment Radio Advisory Committee)

Spectrum Issues

- Active Interference Sites
  - Dodge City, VORTAC
  - Cleveland, ASR-9
  - Bismarck, unknown