

Next Generation Interference Resolution and Enforcement

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Full Summary and Background

The increasingly complex radio spectrum environment is changing the sources and nature of interference threats to wireless services and devices, an essential part of economic and social well-being as well as life-safety and national defense. At the same time, new and evolving technologies and institutions hold great promise for mitigating these threats.

On the one hand, changes in radio systems – from analog to digital, narrowband to wideband, high-tower-high-power to small cell deployment, information in the clear to encrypted, static assignments to dynamic sharing, wide to narrow guard bands, etc. – create challenges in preventing and resolving both intentional and unintentional interference. The characteristics of modern wireless systems present significant challenges to the relatively unsophisticated, manually operated spectrum monitoring and direction-finding system used in traditional enforcement activities. At the same time, funding and personnel constraints are forcing the FCC to change how it approaches enforcement.

On the other hand, many of the same, underlying technological developments that have created these challenges have also led to dramatically improved capabilities for detecting, classifying/identifying, locating and reporting sources of interference. Emerging general purpose computing technologies such as data mining, crowdsourcing and automated dispute resolution may offer new ways to manage interference and resolve disputes.

Spectrum enforcement has a variety of connotations, including interference detection, claim adjudication, rule enforcement, and compliance (both before and after the fact). This conference will address all of them, but it will focus on the question of how existing rules should be enforced. However, the questions of how rules should be constructed in the first place, and their adjustment if unexpected interference emerges over time, cannot be ignored.

This conference is the latest in a series of conversations that Silicon Flatirons has hosted on this topic, including in a [conference in 2010](#) and a [roundtable in 2013](#). Enforcement has been the focus of a number of private/public studies in recent years, notably reports by the CSMAC in [2014](#) and [2015](#), and a report by the FCC TAC in [2014](#). Work on next generation interference resolution is proceeding on many fronts: studies are being conducted by the FCC TAC and NTIA, and enforcement will be an important theme in WSRD and ISART meetings.

As a result of such initiatives there is an emerging consensus—or perhaps a shared hope—that largely voluntary, inter-party collaboration and coordination will prevent and resolve most interference incidents. However, a variety of difficult open questions remain, including:

- Determining whether interference is “harmful” or otherwise unacceptable is a threshold issue, and one where considerable ambiguity remains. Can engineering definitions like harm claim thresholds improve clarity?
- Transparency and information sharing will be important to facilitate monitoring, but questions remain about what (and how) information will be collected, shared, and used.
- What should the expanded role of private actors in enforcement be? For example, can or should third parties (such as spectrum access database operators) be deputized to monitor and enforce interference behavior?
- How can limited government current capabilities best be deployed, and how should spectrum managers deal with future challenges?

The goal of this conference is to take stock of progress so far this decade, and prioritize opportunities and challenges that remain. Topics to be discussed include:

1. The changing radio system environment and associated challenges
2. Particular challenges of federal/non-federal band sharing
3. Current and emerging interference resolution and enforcement requirements
4. Improved capabilities for detecting, classifying/identifying, locating and reporting interference
5. The use of computer systems to improve interference detection, dispute adjudication, and rule compliance

The conference will feature a keynote speech and three panel discussions, followed by a wrap-up and reception

Panel 1: Taking stock—progress and challenges

- Challenges posed by the changing radio system and regulatory environment
- Recent and upcoming initiatives to study and improve enforcement
- Progress in improving enforcement and interference resolution, and outlook

Panel 2: The use of technology to improve enforcement

- Monitoring: sensor networks, crowdsourcing, drones etc.
- Data integration – the role of databases, engineering proxies for harmful interference
- Automated dispute resolution

Panel 3: The role of market and regulatory institutions

- The ability of the FCC and NTIA to detect and resolve interference disputes
- Role of private parties
- Challenges of fed/non-fed sharing