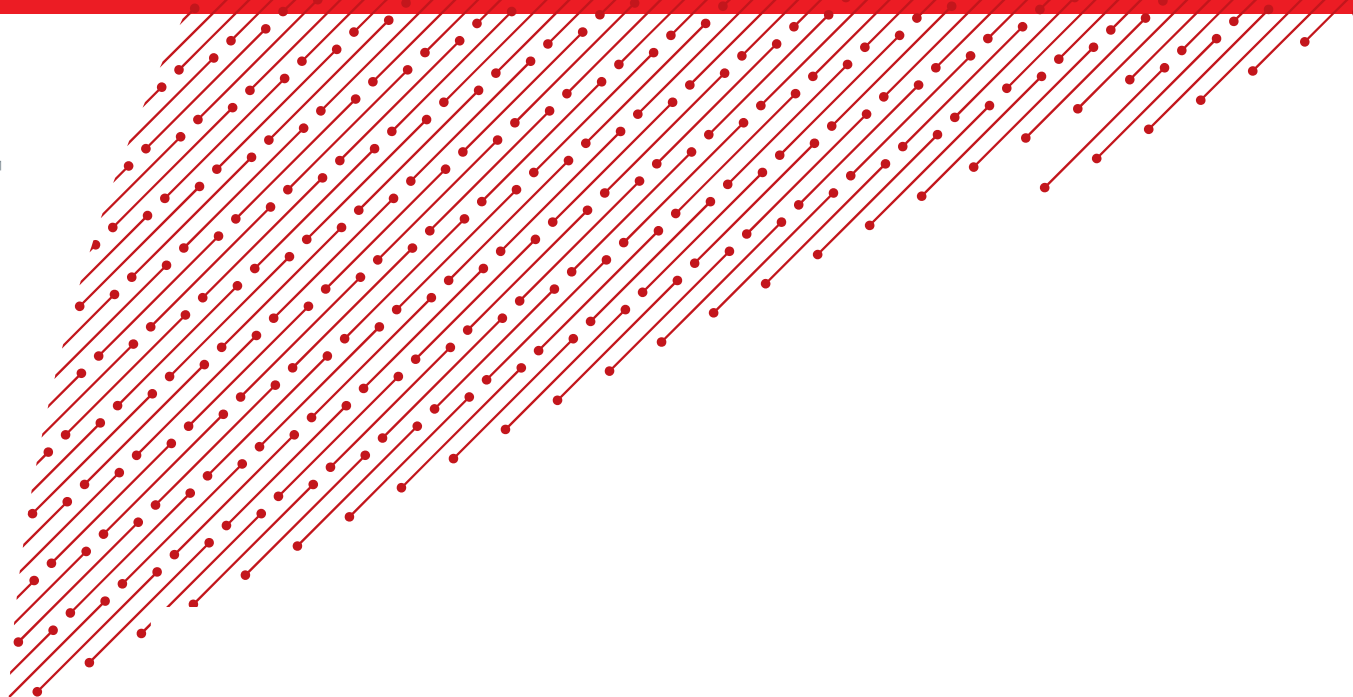




experience
performance
results



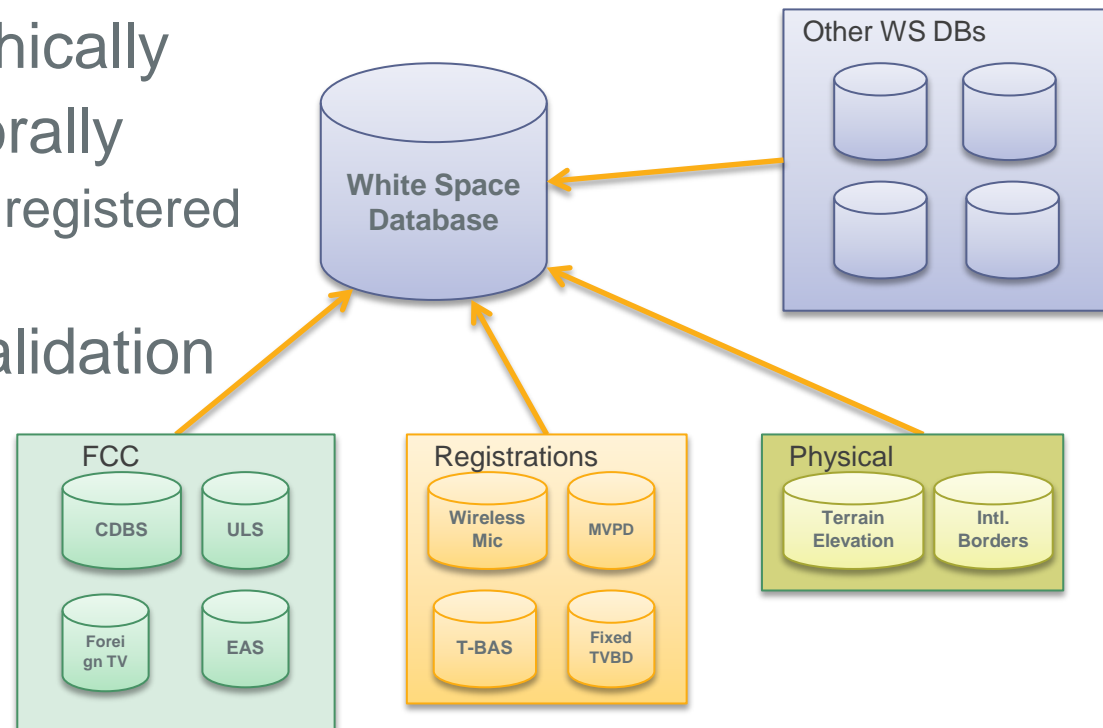
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TVWS geo-location database system

- The TVWS geo-location database is the first evolutionary step toward the Spectrum Access System described in the PCAST report.
- The TVWS geo-location database is a fully functioning commercial system in operation nationwide, not a proof-of-concept
 - The TVWS database provides protection for incumbent license holders in the VHF and UHF TV spectrum
 - It provides protection for other users of the spectrum, such as wireless microphone users, radio astronomy sites, offshore radio telephone service, etc.
 - It provides protection for entities that are fixed and unchanging over time and entities that are event-based and change frequently
 - It provides available channels for a certified device based on location, antenna height, and radio power

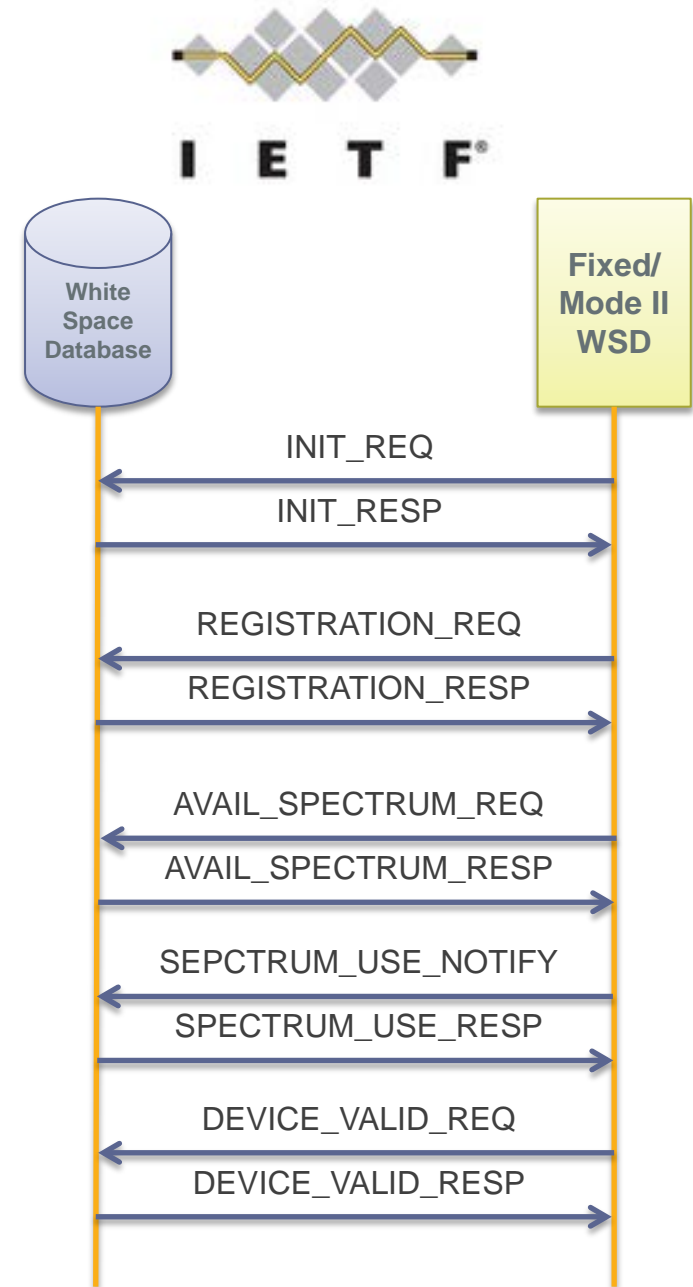
Parallels between TVWS and 3.5 GHz NPRM

- Tiered access
 - Incumbent access is equivalent to broadcast television
 - Priority access similar to wireless microphone registration
 - General authorized access is same as TV band white space devices
- Federal database of incumbent users
 - TVWS databases currently incorporate information about incumbent users from FCC databases
- Protection varies geographically
- Protection changes temporally
 - Event based protection for registered entities
- Security authentication, validation



PAWS device-to-database interface

- International standardization of the interface between the database and white space devices
 - Result of multi-vendor cooperation
 - Not restricted to TV white space operation
 - Provides messaging applicable to white space operation in any band
 - Messaging to inform device of available channels
 - Database can indicate channel priority based on interference modeling from protected entities into “available” channels
 - Messaging from device to database to inform it of chosen channel provides step toward closed-loop feedback



Summary

- The TVWS model provides an example of an operational SAS that is
 - Regulatory policy: implemented in the database and not directly exposed to the devices
 - Flexible: rules changed while databases were in operation and changes were quickly accommodated
 - Scalable: database and cloud computing technology has advanced to the point that it can scale to tremendous data volumes
 - Multi-vendor: There are 2 certified and 8 conditionally approved databases
 - Cooperative: The database providers worked together to create standard methods of operation and information exchange mechanisms
- The future of spectrum access... is here today