5.9 GHz DSRC in Connected Vehicle Pilots

“Supporting Smart Cities and a Smart Continent”

TRB Annual Meeting Session 764 - Connected-Vehicle Pilot Projects
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Unified Implementation of the CVRIA

Connected Vehicle Reference Implementation Architecture.

Makes use of all available communication media.

Uniform data unit definitions.

- Architecture site

- SET-IT tool site
  - Version 2.1
  - Sample project
DSRC – a Key Part of Communications

- Large-scale pilots are underway that will exercise the **complete system architecture** with the **full capability** of DSRC
- We have arrived at a **consensus of interpretation** of standards for the next generation of installations
- **Production programs** are underway

DSRC is ready to be part of the next Generation
DSRC in the Reference Architecture

DSRC has 4 parts

- **Channel 172** WSMP for time critical, very efficient data sharing for crash avoidance and efficiency improvement
- **Channel 184** WSMP for Public Service use
- Control Channel/Service Channel (Channels 174 – 182) for other WSMP
- Control Channel/Service Channel (Channels 174 – 182) for IP transport
Maturity levels

4 levels of maturity in the use of DSRC:

1. DSRC on Channel 172 for crash avoidance
   - Safety Pilot/Model Deployment

2. DSRC on Channel 172 for intersection safety and efficiency improvement

3. DSRC on All Channels for a variety of message-based uses
   - Connected Vehicle Pilots

4. DSRC on all channels for message-based and IP transport-based uses.
   - Smarts City Challenge project, Grants projects

No one entity has to build all of the parts. Different parties can contribute parts of the whole.
Looking Forward to the Next Generation

- Better coordination of Radio Access Technologies
- Opportunity of preserve the capabilities of DSRC in a portfolio of wireless services
- DSRC could drop into 5G to cover significant vehicle-oriented use case needs

DOT Smart City Challenge

- Designed to help cities begin to address the challenges of rapid population increases and rapidly growing demands on their transportation infrastructure
- Up to $40M
- [https://www.transportation.gov/smartcity/](https://www.transportation.gov/smartcity/)
- [https://youtu.be/14adE8pVakI](https://www.youtube.com/watch?v=14adE8pVakI)
How CV Pilots can use Certification Services

1. A **Site Operator** requests the **Certification Operating Council (COC)** to develop certification testing based on the **Device Requirements**
2. **COC** develops **Test Specifications** based on **Device Requirements**
   - COC and the Site Operator agree on certification criteria
3. The **Site Operator** references **Test Specification** in the procurement guidelines to **Vendors**
4. **Vendors** submit products to **COC** for the **Certification Testing**
5. **COC** conducts device testing per **Test Specification**
6. **COC** uses 3rd part test results + results from their own certification testing
7. **COC** issues certification verdict
8. **COC** issues **Certification Mark** on passing
9. **Site Operator** buys marked devices
Main points

- Scalable to a continent-wide deployment.
  - Not just a smart city but a smart continent with uniform implementations and ubiquitous access for fundamental elements.

- Demonstrates full utility of assets.
  - All of the capabilities of spectrum allocations are demonstrated and effective ways of sharing capacity are shown.
“Make no little plans. They have no magic to stir [people]’s blood and probably themselves will not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with ever-growing insistency.”
- Daniel Burnham

“I have always believed in planning big, and I have always discovered after the fact that, if anything, we didn’t plan big enough.
- Alfred Sloan
Back up slides
Adjacent Channels

One way to get the most capacity from the medium:

- Channels 172, 178, and 184 are everywhere.
- The Service Channels 174, 176, 180, and 182 can be deployed with some separation to avoid competition in adjacent zones.
A region would start to look like this.

10 to 20 gateways per square Kilometer would be needed.