5.9 GHz DSRC Vehicle-based Road and Weather Condition Application

7/17/2013

2013 RWM Stakeholder Meeting

Cooperative Transportation Systems Pooled Fund Study (CTS PFS)

- CTS PFS is a group of ten state and local transportation agencies and FHWA
- Focused on research and application development to prepare agencies for the deployment of connected vehicle (CV) technology
- CTS PFS has contracted with Synesis Partners and its team members Parsons Brinckerhoff and NCAR to demonstrate a 5.9 GHz DSRC vehicle-based road and weather condition application

Project Objectives

- Develop and test acquisition of weather and road condition data from 5.9 GHz DSRC-equipped agency vehicles
  - From the vehicle's data bus
  - From supplemental devices like plows and spreaders
- Transmit the data to DSRC roadside equipment
- Send the data to an aggregation server
- Enable storing/processing the data in WxDE/VDT

Major Project Elements

- Task 1: Messaging Requirements Development
  - Based on road weather and 5.9 GHz DSRC standards
- Task 2: Concept of Operations
  - Consistent with Connected Vehicle Road Weather application concepts
- Task 3: Applications Development
  - Primarily software for the DSRC on-board unit (OBU)
- Task 4: Application Installation
  - Operating along NYSDOT's Long Island Expressway

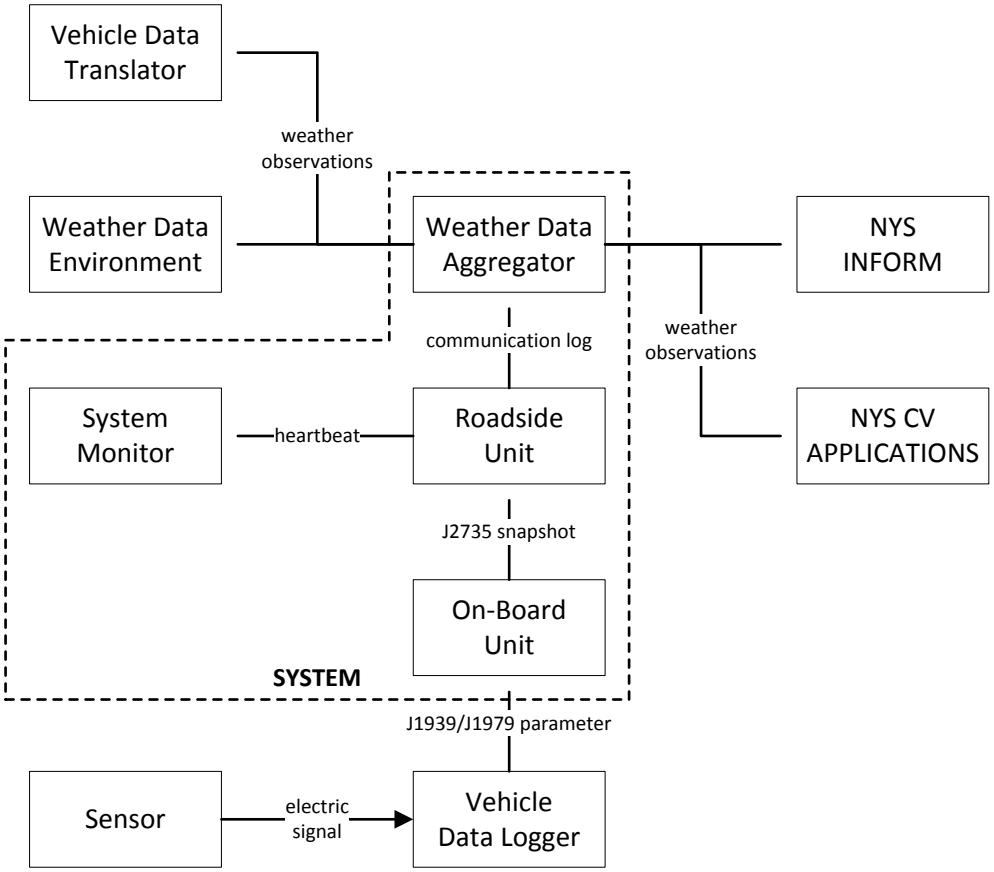
Messaging Requirements

- Gathering road and weather data from vehicles is driven by what data vehicles can provide
- Relevant standards include
  - DSRC radios
  - Communications over DSRC
  - Data bus standards for light and heavy vehicles
  - Messages sent over DSRC
    - Basic Safety Message
    - Probe Vehicle Data Message

CV Weather Data Elements

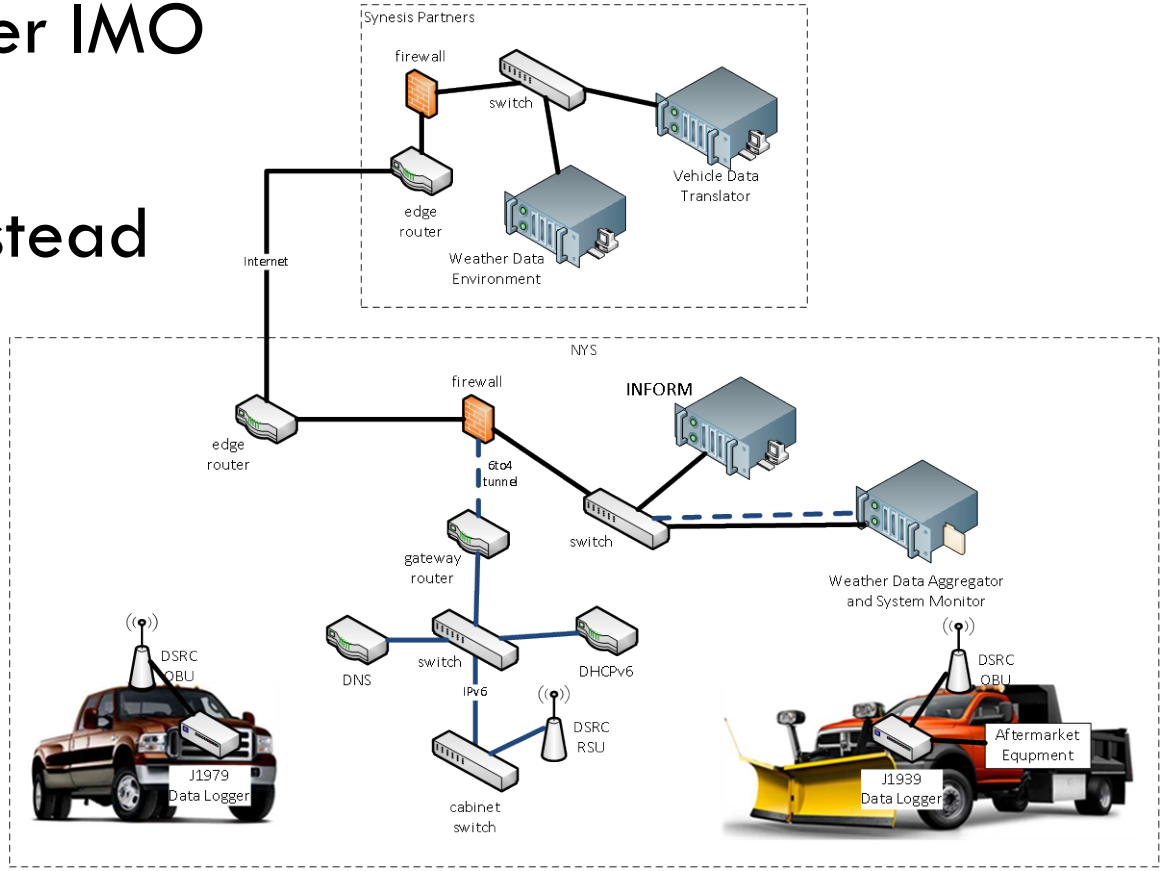
- Exterior lights
- Wiper status front
- Wiper rate (front)
- Wiper status rear
- Wiper rate (rear)
- Sun data
- Rain data
- Air temperature
- Air pressure
- Is raining
- Rain rate
- Precipitation situation
- Solar radiation
- Mobile Friction

System Data Flows



Logical Deployment

- Similar to other IMO deployments
- Uses DSRC instead of cellular from vehicles to roadside



Physical Deployment

Challenges

- Standardizing the DSRC implementation
  - Messaging for probe data
  - Network configurations
  - On-board unit configurations
- Deployment and operations
  - Siting to reduce data latency

Opportunities

- Developing a prototype DSRC-based application supporting DOT road weather operations
- Replacing two NYSDOT first-generation DSRC RSEs with new generation RSE 3.0 devices
- Demonstrating operations that gather probe data from DOT vehicles over DSRC
- Implementing DSRC-based IMO in other agencies
- Providing a new data feed for the WxDE

Status and Schedule

- Completed Messaging Requirements and Concept of Operations
- Currently procuring DSRC equipment and starting application development
- Deployment in 2013Q4
- Operations through 2014Q1
- Report March 2014

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