



University of New Hampshire
Connectivity Research Center



New Hampshire's Response to AASHTO's SPaT Challenge

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Our Project Partners

- NHDOT
- FHWA
- AASHTO
- City of Dover, New Hampshire
- McCain, Vista CA
- DENSO International America, Vista CA
- UNH Connectivity Research Center
- Electric Light Company (Electrical Contractor)



Research Objectives

- Satisfy the Goals of the SPaT Challenge
- Compare two communication paths for V2I connectivity
- Test the FHWA V2I Hub Software
- Contribute field-tested research addressing:
 - Is DSRC the optimum solution for V2I?
 - Should “mobility” and “safety” information use different paths?



DSRC Path

Controller



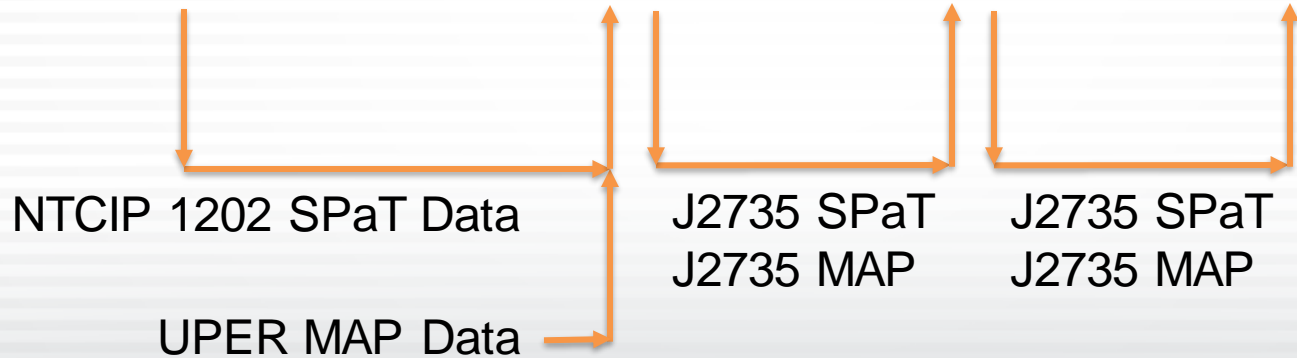
V2I Hub



DSRC RSU



DSRC OBU
With Display





Cellular Network Communications Path

Controller



V2I Hub



Traffic Server



Internet



LTE Radio With Display



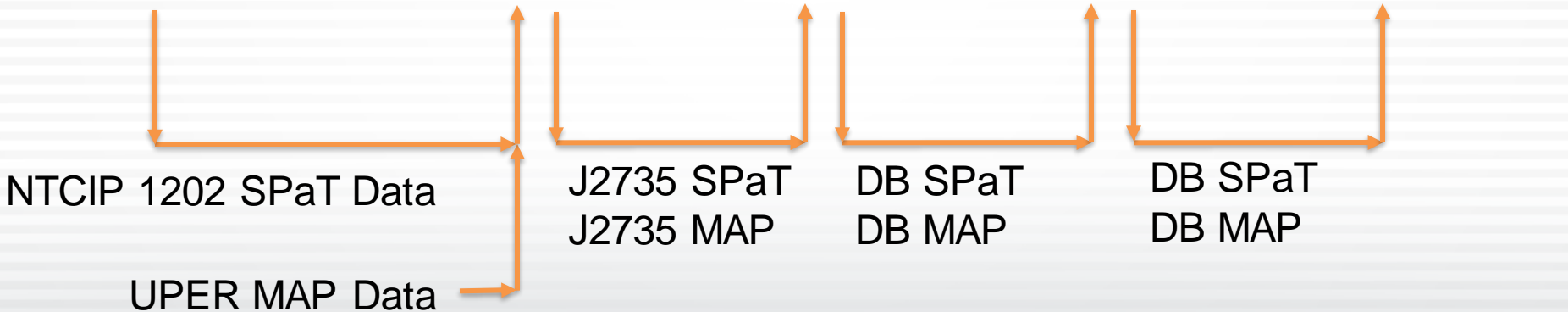
NTCIP 1202 SPaT Data

UPER MAP Data

J2735 SPaT
J2735 MAP

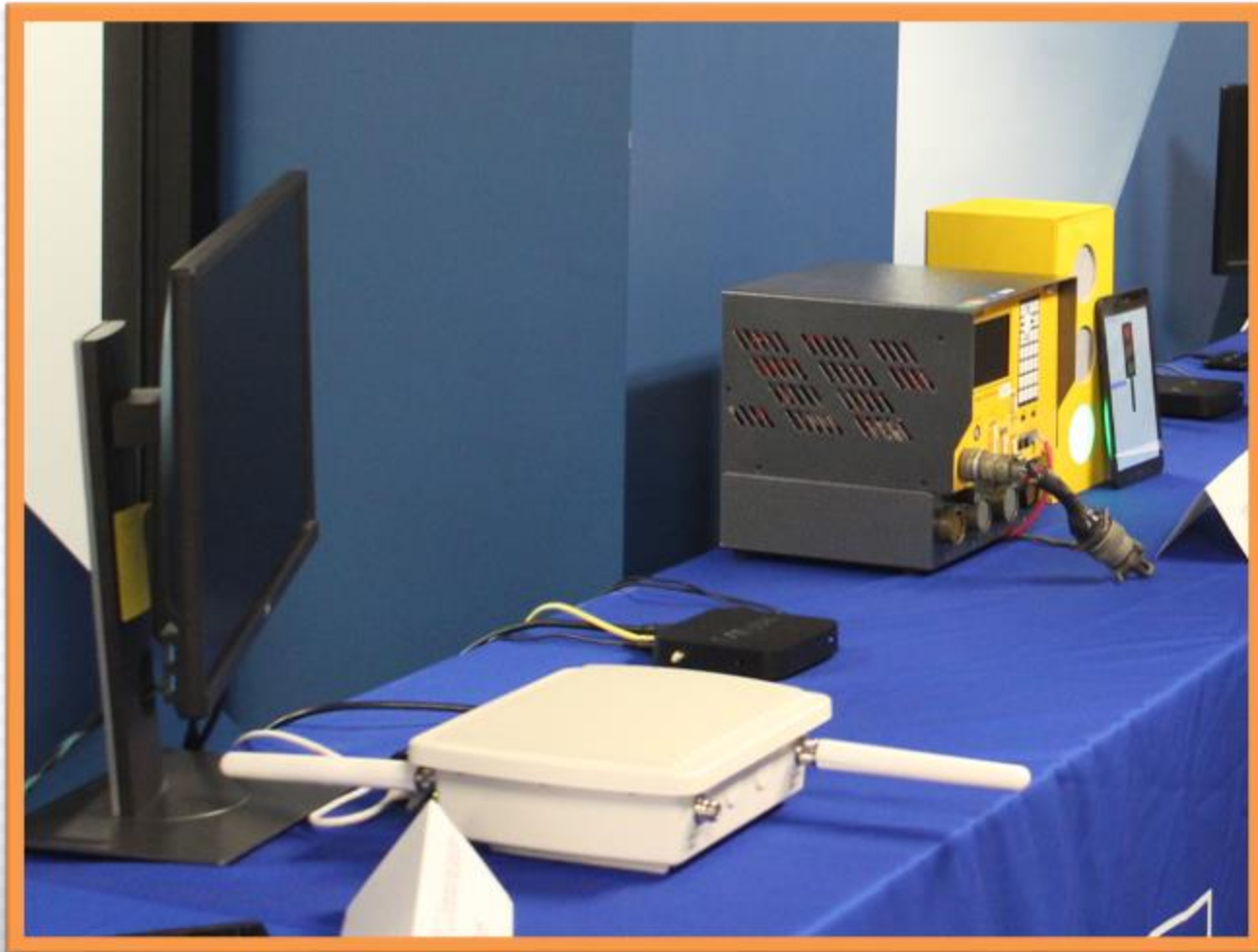
DB SPaT
DB MAP

DB SPaT
DB MAP





UNH CRC Lab Testing





Lab Testing Results

- Average File Size
 - SPaT: 450 Bytes
 - MAP: 700 Bytes
- Average Latency in the Lab
 - DSRC: 70ms or 0.07 seconds
 - 4G LTE: 150ms or 0.15 seconds



Field Testing

- Goals
 - Validate RSU deployment
 - Determine field range of RSU
 - Determine LTE network speed with field conditions
 - Calibration of MAP file







DSRC Field Testing Results

- Average Range of Latency in the Field
 - 5ms or 0.005 seconds to 20ms or 0.020 seconds
(Lab results averaged 70ms or 0.070 seconds)
- Maximum Range Measured in the Field
 - Measured roughly 800 feet



4G LTE Field Testing Results

- Average Range of Latency in the Field
 - 128ms or 0.128 seconds to 142ms or 0.142 seconds
(Lab results averaged 150ms or 0.150 seconds)



Conclusions and Observations

- Interoperability challenges
- Equipment Limitations
- 5.9 Ghz FCC Licensing
- MAP File Creation and Operations
- Final Report Submitted - January 2019
- The DSRC radios remain in the field for future use



Questions and Comments?

