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#20 *Progress Report*: Sharing Connected Vehicle Infrastructure for Safety Applications, Smart City and Internet Access

Progress Updated	April 19, 2017, 9:37 a.m.	Grant Type	Research
Principal Investigator	peha@cmu.edu	Research Type	Advanced
Status	Active	Grant Cycle	SAFETY 2016 UTC FAST ACT RFP
Start Date	Jan. 1, 2017		
End Date	Aug. 31, 2018		

Abstract

Use of connected vehicles to enhance traffic safety could vastly reduce traffic fatalities, but this requires the deployment of roadside communications infrastructure which comes at a considerable cost. At the same time, there is reason to deploy roadside communications infrastructure for other purposes, such as smart city applications, and Internet access. In general, this research explores how public-private infrastructure sharing arrangements might greatly reduce the cost to tax-payers of improving vehicular safety and of supporting smart cities, while also expanding the availability of a new way to provide low-cost Internet access. This includes the potential benefits and trade-offs of infrastructure-sharing arrangements and pricing strategies. The research focus this year will be on spectrum decisions that might affect infrastructure-sharing arrangements, including how much spectrum will be available to intelligent transportation systems, how much of that spectrum will be shared with other kinds of devices, and the technical rules by which sharing would occur.

Description

Timeline

Deployment Plan

Expected Accomplishments and Metrics

Individuals Involved

Email	Name	Affiliation	Role	Position
aligo@cmu.edu	Ligo , Alexandre	EPP	Other	Student - PhD
peha@cmu.edu	Peha, Jon	ECE/EPP	PI	Faculty - Researcher/Post-Doc

Budget

Request

\$121404.00

Funding

\$127500.00

Documents

Type	Name	Uploaded
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Type	Name	Uploaded
Proposal Form	Jon_Peha_FY2016.UTC_Proposal_one_year_version_.doc (/media/project_files/Jon_Peha_FY2016.UTC_Proposal_one_year_version_.doc)	Jan. 26, 2017, 7:33 a.m.
Proposal Budget	Peha.CY2017UTC.2.xlsx (/media/project_files/Peha.CY2017UTC.2.xlsx)	Jan. 26, 2017, 7:33 a.m.
Publication	Is It Cost-Effective to Share Roadside Infrastructure for Non-Safety Use? (/docs/detail/58)	April 19, 2017, 9:37 a.m.
Publication	Throughput and Cost-Effectiveness of Vehicular Mesh Networks for Internet Access, (/docs/detail/59)	April 19, 2017, 9:37 a.m.
Publication	VIDEO: Connected Vehicles and Intelligent Transportation Systems (/docs/detail/60)	April 19, 2017, 9:37 a.m.
Presentation	Is It Cost-Effective to Share Roadside Infrastructure for Non-Safety Use? (/docs/detail/61)	April 19, 2017, 9:37 a.m.
Presentation	Throughput and Cost-Effectiveness of Vehicular Mesh Networks for Internet Access, (/docs/detail/62)	April 19, 2017, 9:37 a.m.
Presentation	Cost-Effectiveness of Using Connected Vehicle Infrastructure for Internet Access (/docs/detail/63)	April 19, 2017, 9:37 a.m.

Match Sources

Name	Amount	Role	Type
Jon Peha	0.00		Extension

Progress - Reporting Period 10/1/2016 - 3/31/2017

% Project Completed to Date	20
% Grant Award Expended	20
% Match Expended & Document	20

USDOT Requirements

Anticipated Research Outcomes

This work is still underway, but in baseline scenarios, we find that this form of sharing can be used to pay for 20% of the total nationwide cost of roadside infrastructure required for safety applications, although some regions benefit more from these arrangements than others. We hope that many state and location transportation agencies in regions where infrastructure sharing is effective will explore the creation of public-private partnerships based on our work, as this would both save tax-payer dollars and facilitate the roll-out of less expensive Internet service for mobile users. Our results should also inform and guide pricing strategies that government agencies should use in these public-private partnerships.

Did research results confirm or change practice?

Research results have not yet changed practices, but it is early, in part because the research is still underway and in part because the U.S. Department of Transportation has not yet decided whether to require DSRC technology in new vehicles. Until that decision is made, the strategies for deploying DSRC-equipped roadside infrastructure are theoretical. However, some of our results have been presented to decision-makers at the highest level, including the Chairman of the U.S. Federal Communications Commission, and Pennsylvania Transportation officials.

Web Links

<https://users.ece.cmu.edu/~peha/vehicular.html> <https://users.ece.cmu.edu/~peha/papers.html#Vehicular>
<https://www.youtube.com/watch?v=mYgeEiXHs4M>

Issues

No problems have arisen. We are making very good progress, although there is a lot more useful work to do.

Accomplishments

We have published in one IEEE vehicular technology conference, and a paper has been accepted for the next conference. We have repeatedly briefed government leaders involved in making decisions about vehicular networks, including the Chairman of the U.S. Federal Communications Commission.