Domestic Scan Proposal Form

AASHTO is now soliciting proposals for the **US Domestic Scan Program** (NCHRP Panel 20-68A).

Selected scan topics will be investigated by one of three ways: (type 1) site visits to three to six locations for approximately a two week period or less, by webinar; (type 2) peer exchange; or (type 3) conducted by a group of eight to 12 transportation professionals with expertise in the selected topic area. Proposed topics should meet the following criteria:

* Address an important and timely need for information by transportation agencies;
* Are of interest to a broad national spectrum of people and agencies;
* Are complex and also “hands-on,” meaning they lend themselves particularly well to exploration through on-site visits; and
* Are sufficiently focused that the tour participants are able to investigate and understand key issues in the limited time available on the tour.

Before submitting your proposal it is highly recommended that you read **What Makes a Good Scan Topic Proposal** [**http://www.domesticscan.org/what-makes-a-good-scan-topic-proposal**](http://www.domesticscan.org/what-makes-a-good-scan-topic-proposal)

This form is designed to collect the full length of your proposal. Sections requiring essays have unlimited space for you to use. Contact information has some limited text. ***Click on the highlighted boxes to advance to the area where you need to complete information.***

# Proposals should be returned no later than date list on NCHRP website.

**IMPORTANT NOTE on How to save your document**: ***LastNameFirst Initial, underscore\_Organization Acronym \_CY2021 Saved Document Name Example: NgetheP\_AASHTO\_CY2021***

***If you have more than one, add a number after first initial: NgetheP1\_AASHTO\_CY2021***

# Domestic Scan Proposal Contact Information

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**Date of submission**

Click or tap to enter a date.

Please **check** this box if your proposal has been endorsed or is being requested through an AASHTO Committee. List the AASHTO Committee(s) that endorsed this proposal: Right Of Way, Utilities & Outdoor Advertising, Utilities Subcommittee, Utility Accommodation and safety Technical Council

# Title of Proposed Scan:Maximizing Connected And Autonomous Vehicle (Cav) Success With Strategic Utility Facility Accommodation

**Problem Statement** (What topic is to be examined? What drives the need for the scan? Why now?)

Connected and Automated Vehicle (CAV) deployment is coming to transportation systems across the country. Several states have active testing of CAV technologies underway and some research exists on the topic. One report in particular is of interest; NCHRP Research Report 845, Strategies to Advance Automated and Connected Vehicles Briefing Document (2017). This research recommended investment in CAV infrastructure, specifically the 'deployment of important physical and digital infrastructure that enables an advanced connected transportation system'. CAV deployment does involve a number of communication methodologies, including Dedicated Short-Range Communications (DSRC), cellular, internet, and bluetooth technologies. The subject of infrastructure development was also a vital part of the 2017 I-95 Corridor Coalition's Connected and Autonomous Vehicles Workshop Summary Report. This coalition includes several states that would be excellent resources for CAV needed infrastructure and asset management data collection; including Virginia, Florida, Massachusetts, Maryland and several others.

In order to delve into this topic, one needs to be aware of the possible communication types and purposes. CAV communication can be divided into three general categories; (1) vehicle-to-vehicle (V2V) communication, (2) vehicle-to-infrastructure (V2I) communication, or (3) vehicle to everything (V2X) communication. V2V communication is centralized around safety including issuing collision warnings and assisting with vehicular movements. V2I expands the data goals to include both safety and efficient mobility. This includes signal control, warning of speed and signal violations, safety warnings such as slow traffic, accidents or work zones. V2X or vehicle-to-everything which includes vehicles, infrastructure, and other users of the road system.

State Transportation Agencies (STA) interested in furthering CAV technologies must consider what the necessary components of CAV systems are and how to effectively bring them into the road right of way infrastructure. Road-side units (RSU) are needed to broadcast and receive data for signal phase and timing (SPaT) and relaying basic safety Messages (BSM). In order to leverage SPaT, the signal controllers must have an interface with the RSU. Applications are needed to process the communications and relay warnings to connected vehicles. Ultimately, these components will need a data backhaul to feed the services. Agencies need to determine if they can gain access and use fiber networks, 5G and/or DSRC to provide CAV capable technology. The STA should be looking to strategically accommodate utility providers to leverage these components, but how is this best done?

In short, costly new infrastructure will be necessary to encourage CAV and cost may be a large factor in deciding to leverage, fiber, satellite, and cellular capabilities. Some degree of the total cost may be absorbed by strategic accommodation via partnering with private service providers.

STAs will also need to be considering infrastructure changes that have historically been less technical in nature. Signage, pavement markings, striping, and ITS equipment retrofitting or establishing standardization may be required to support CAV.

Some of these issues have been researched broadly previously and this proposal intends to take the next step to document and communicate tactics taken, successes and failures. The integration of CAV into state DOT operations requires understanding of these good practices for infrastructure placement and maintenance.

**Scan Scope** (What specific subject areas are to be examined? Which cities and states might be visited? Which agencies/organizations (including specific departments or types of staff if applicable)?

Strategic infrastructure deployment for Connected and Automated Vehicles (CAV) has been part of prior investigations as a technique to encourage CAV. It has not been investigated in great detail however and this proposal would do that further study by reviewing the work named below and conduct in person investigations of identified agencies that have taken steps on the subject.

The NCHRP Research Report 845, Strategies to Advance Automated and Connected Vehicles Briefing Document (2017). This research specifically recommended investment in CAV infrastructure, including the 'deployment of important physical and digital infrastructure that enables an advanced connected transportation system'. This research would investigate those findings and collect data from pertinent agencies.

The I-95 Corridor Coalition's Connected and Autonomous Vehicles Workshop Summary Report (2017) provided insights into several states' efforts to encourage CAV via infrastructure deployment. This coalition is an excellent resource for CAV needed infrastructure and asset management data collection. This research would identify states to collect data from and collect that data; including but not limited to, including Virginia, Florida, Massachusetts, and Maryland.

The AASHTO SPaT Challenge involves public sector infrastructure owners and operators working to achieve CAV deployment. They are promoting the installation of DSRC infrastructure with Signal Phase and Timing (SPaT) broadcasts in at least one corridor. The goal is a SPaT Corridor in each of the 50 states by January 2020. This research would identify state and local agencies to collect data from and collect that data.

The research will be looking for accommodation standards and means to secure the necessary infrastructure in an economic and mutually beneficial manner. The infrastructure to be investigated includes but may not be limited to: Road-side units (RSU), signal controller and RSU interface, and data backhaul. The research will seek recommendations on the installation and use of fiber networks, satellite, cellular, 5G and/or DSRC to provide CAV capable technology. The research will look for strategic and economic means to accommodate utility providers to leverage these components and how some of the total cost may be absorbed by partnering with private service providers.

Finally the research will consider infrastructure changes that have historically been less technical in nature including but not limited to signage, pavement markings, striping, and ITS equipment retrofitting.

This proposal intends to document and communicate tactics taken, successes and failures. The integration of CAV into state DOT operations requires understanding of these good practices for infrastructure placement and maintenance.

**Anticipated Scan Results** (What key information is to be gained? What information is to be shared after the scan? Who would the audience be for this information?)

This scan is expected to yield two primary products.

First, the scan will identify ways that STAs have effectively accommodated infrastructure in ways to promotes CAV technologies. These accommodations are likely to involve successful cooperative efforts between private sector providers and STA to co-habitat infrastructure such as back haul fiber, 5G cellular technologies, DSRC infrastructure, and more. These outcomes, which are mutually beneficial to the provider and agency, will be formally shared with STAs via webinar and ongoing training for replicating the practices and outcomes.

The scan will also develop a mechanism to promote a formal, ongoing exchange of information between scan-team members and subject matter experts. This network of professionals is needed to monitor the technologies in CAV. They will need a means for extended interactions, long after the scan report is completed, speeding dissemination of good ideas and leading practices within and among agencies. While this scan will produce guidance to help other agencies understand effective mechanisms and tactics to build the infrastructure necessary for CAV technologies.

**Benefits Expected** (Including potential impacts on current technology or procedures) The discovery and dissemination of mechanisms to accommodate the infrastucture needed for CAV technologies will help the nation arrive at standards of practice and help expedite sound technological implementations. CAV implementation is expected to be the next significant step STAs can make to increase traveler safety due to the potential of crash reduction with V2V communication. V2V communication will allow for vehicular collision warnings and assist with some vehicular movements. CAV is also expected to allow for more efficent traveling since V2I communication will allow for intelligent signal controlling, increasing effiicency. This includes signal control, warning of speed and signal violations, safety warnings such as slow traffic, accidents or work zones. V2X communication will take the next step of considering other users of the road system, including other modes of travel and maintenance personnel.