AASHTO Innovation Initiative

[Proposed] Nomination of Innovation Ready for Implementation

# Sponsor

## Nominations must be submitted by an AASHTO member DOT willing to help promote the innovation. If selected, the sponsoring DOT will be asked to promote the innovation to other states by participating on a Lead States Team supported by the AASHTO Innovation Initiative.

1. Sponsoring DOT (State): Washington State Department of Transportation

2. Name and Title: Dongho Chang, Statewide Traffic Engineer

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# Innovation Description (10 points)

## The term “innovation” may include processes, products, techniques, procedures, and practices.

3. Name of the innovation:

Virtual Coordination Center (VCC)

4. Please describe the innovation.

The Virtual Coordination Center (VCC) is a cloud-based system that pulls in real-time data from public agencies responsible for transportation and incident management in the greater Seattle area. The data is shared in a common dashboard which allows responders across public agencies to see incidents as they happen, make more informed decisions, and collaborate in real-time to coordinate response and distribute a unified message to the public.

5. What is the existing baseline practice that the innovation intends to replace/improve?

The existing baseline practices that the VCC intends to replace are manual and fragmented communication methods. These practices often involve multiple channels such as phone calls, radio communications, emails, and physical documentation, leading to inefficiencies and delays in incident response. The VCC aims to replace these outdated practices by providing a centralized and automated communication platform. It eliminates the need for manual coordination and streamlines the incident response process by enabling real-time collaboration, information sharing, and automated workflows. By replacing these baseline practices, the VCC enhances communication efficiency, reduces response times, and improves overall incident management.

6. What problems associated with the baseline practice does the innovation propose to solve?

The VCC aims to solve several problems associated with the baseline practices. These problems include: 1.) Manual and fragmented communication: Traditional practices rely on manual communication methods like phone calls, emails, radio calls and physical documentation. This leads to inefficiencies, delays, and potential miscommunication in incident response. The VCC replaces these practices with a centralized platform that streamlines communication, ensuring real-time collaboration and incident information sharing. 2.) Lack of coordination: With fragmented communication channels, it becomes challenging to coordinate and align various stakeholders involved in incident response. The VCC addresses this issue by providing a cloud-based platform that is a centralized hub where all participating members can access information, collaborate, and follow standardized practices. It improves coordination and ensures everyone is on the same page during incident management. 3.) Slower incident response times: Manual communication methods often result in delays in incident response. The VCC addresses this problem by plotting real-time CAD feed and placing them on a travel map that can identify traffic impacts. This mapping tool provides current incidents, traffic impacts and the incident model provide the communication platform related to incident details, including crash information, lane closures and incident management participants. It ensures that incidents are identified and addressed promptly, reducing response times, and minimizing the impact of incidents. 4.) Limited visibility and accessibility: Baseline practices may lack visibility and accessibility to critical information, leading to confusion and potential errors. The VCC improves visibility by centralizing information and providing a single source of truth for all stakeholders. It ensures that everyone has access to the necessary data, updates, and documentation, enhancing overall incident management. Overall, the VCC innovation aims to address these problems by replacing manual and fragmented communication practices, improving coordination, reducing response times, and enhancing visibility and accessibility during incident response.

7. Briefly describe the history of its development.

Since February 2017, six agencies engaged in managing various components of the Seattle I-5 transportation corridor (King County Metro, Seattle Department of Transportation, Seattle Fire Department, Seattle Police Department, Washington State Patrol, and Washington State Department of Transportation) have been working together to perform all necessary activities, within the limits of their respective authorities to collectively design and implement a regional strategy for enhancing mobility and reducing impact when a major incident drastically reduces capacity along the Seattle I-5 corridor. By bringing together stakeholders to define and establish a joint framework for operations, information sharing, technical environment, and policies in support of coordinated congestion management. The goal of defining and establishing a regional operational framework evolved into an interagency effort to design, develop, and deploy a cloud-based environment in support of integrated management of mobility in the Seattle I-5 corridor–the VCC. The six original agencies formed the Seattle Area Congestion Management Joint Operations Working Group (SAJOG) and were joined by Sound Transit, the Port of Seattle, and the Northwest Seaport Alliance. State and City departments of transportation and Challenge Seattle funded the initial VCC effort and a model deployment phase, this pilot phase was managed by the University of Washington and launched in 2021 with a U.S. Department of Transportation Advanced Transportation and Congestion Management Technologies Deployment award. In July of 2023 the Washington State Department of Transportation (WSDOT) was awarded legislative funding to maintain and operate the Virtual Coordination Center. Effective October 1, 2023, the VCCs administration has been transferred to a WSDOT managed program. WSDOT will continue to work with our Seattle area partners and look to expanding the VCC statewide over the next couple of years.

8. What resources—such as technical specifications, training materials, and user guides—have you developed to assist with the deployment effort? If appropriate, please attach or provide weblinks to reports, videos, photographs, diagrams, or other images illustrating the appearance or functionality of the innovation (if electronic, please provide a separate file). Please list your attachments or weblinks here.

VCC Training Videos, VCC User Guide, VCC Quick Start Guide, attached within email.

Attach photographs, diagrams, or other images here. If images are of larger resolution size, please provide as separate files.

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# State of Development (40 points)

## Innovations must be successfully deployed in at least one State DOT. The AII selection process will favor innovations that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.

9. How ready is this innovation for implementation in an operational environment? Please select from the following options. Please describe.

Prototype is fully functional and yet to be piloted

Prototype has been piloted successfully in an operational environment

Technology has been deployed multiple times in an operational environment

Technology is ready for full-scale implementation

The VCC has been deployed and functional for over a year now. We are entering into our second year of full deployment and in an operational environment.

10. What additional development is necessary to enable implementation of the innovation for routine use?

As part of the ongoing development of the Virtual Coordination Center (VCC), WSDOT intends to expand the VCC in the greater Seattle area initially and then ultimately statewide. This expansion aims to further enhance our coordination and collaboration capabilities, allowing us to better serve the needs of our members in this region. This expansion reflects our commitment to continuous improvement and our dedication to providing the best possible support to our members.

11. Are other organizations using, currently developing, or have they shown interest in this innovation or of similar technology??  Yes  No

If so, please list organization names and contacts. Please identify the source of this information.

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| **Organization** | **Name** | **Phone** | **Email** |
| City of Seattle Traffic Management Center | Carter Daane | 206-733-9789 | Carter.danne@seattle.gov |
| City of Seattle Police Department | Lt. Clenna | Click or tap here to enter text. | Bryan.clenna@seattle.gov |
| WSDOT NWR Traffic Management Center | David Baker | 206-410-0004 | bakerda@wsdot.wa.gov |

# Potential Payoff (30 points)

## Payoff is defined as the combination of broad applicability and significant benefit or advantage over baseline practice .

12. How does the innovation meet customer or stakeholder needs in your State DOT or other organizations that have used it?

The VCC innovation meets the customer needs of the Washington State Department of Transportation (WSDOT), Washington State Patrol, King County Metro, Sound Transit, and the city of Seattle by providing efficient and effective coordination and communication solutions. With the expansion of the VCC in the greater Seattle area and statewide, VCC members will benefit from improved real-time monitoring and management of transportation systems, allowing for quicker response times to incidents and emergencies. The VCC's advanced technology and data-driven approach enable better coordination of resources, such as traffic control, incident response, road maintenance, and construction projects, leading to smoother traffic flow and reduced congestion. Additionally, the VCC's ability to integrate various transportation modes, such as road, rail, and ferry, helps VCC members provide seamless multimodal experiences for commuters and travelers. Overall, the VCC innovation addresses the specific customer needs by enhancing transportation efficiency, safety, and reliability.

13. Identify the top three benefit types your DOT has realized from using this innovation. Describe the type and scale of benefits of using this innovation over baseline practice. Provide additional information, if available, using quantitative metrics, to describe the benefits.

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| **Benefit Types** | **Please describe:** |
| Other (please describe) | Real-time traffic information for the VCC (Virtual Control Center) brings numerous benefits to transportation systems over baseline practices of traffic management. Firstly, it enhances overall efficiency by providing up-to-the-minute data on traffic conditions, allowing for better decision-making and quicker response to incidents or congestion. This helps to minimize delays and optimize routes, ultimately saving time for commuters and reducing fuel consumption. Additionally, real-time traffic information enables more accurate predictions of travel times, allowing users to plan their journeys more effectively and avoid potential bottlenecks. By providing this valuable information, the VCC promotes smoother traffic flow, improves safety, and enhances the overall quality of transportation services. |
| Organizational Efficiency | The integration of the VCC significantly improves organizational efficiency compared to baseline practices when it comes to incident management. The VCC provides a centralized platform where all relevant stakeholders can access real-time incident information, enabling quicker and more coordinated responses. With instant access to incident details, such as location, severity, and available resources, decision-makers can promptly allocate the appropriate response teams and resources, minimizing response times and ensuring a more efficient incident resolution. The VCC also facilitates seamless communication and collaboration among different departments and agencies involved in incident management, fostering a more integrated and streamlined approach. Overall, the VCC enhances organizational efficiency by optimizing resource allocation, reducing response times, and promoting effective coordination during incidents. |
| Improved Safety | The VCC enhances safety by providing real-time traffic information and incident alerts. This enables proactive measures to be taken, such as rerouting traffic or providing timely warnings to drivers, reducing the likelihood of accidents, and improving overall safety on the road. |

Provide any additional description, if necessary:

Click or tap here to enter text.

14 How broadly might this innovation be deployed for other applications. in the transportation industry (including other disciplines of a DOT, other transportation modes, and private industry)?

The VCC has the potential to be deployed broadly across the transportation industry, revolutionizing various applications, and enhancing overall traffic incident management efficiency. By integrating real-time data from sensors, cameras, and other sources, the VCC can provide comprehensive insights into traffic patterns, congestion, and incidents. This information can then be used to optimize traffic flow, improve signal timing, and efficiently allocate resources for a smoother and safer transportation network. Additionally, the VCC can play a crucial role in logistics and supply chain management. By effectively coordinating the movement of goods and services, the VCC can aid to minimize delays, optimize routes, and streamline operations during an unplanned incident . This will not only improve efficiency but also reduce costs and environmental impacts associated with transportation. Furthermore, the VCC can be utilized in public transportation systems to ensure seamless integration and connectivity. By integrating data from different modes of transportation, such as buses, trains, and bicycles, the VCC can provide real-time information on schedules, routes, and availability. This enables passengers to make informed decisions and facilitates the seamless transfer between different modes of transportation. Moreover, the VCC can contribute to the development of smart cities by integrating transportation data with other urban systems. In conclusion, the VCC holds immense potential for deployment across the transportation industry. Its ability to streamline coordination efforts, enhance communication, and facilitate data sharing can revolutionize traffic management, logistics, public transportation, and the development of smart cities. By embracing this technology, the transportation industry can unlock new levels of efficiency, safety, and sustainability.

# Market Readiness (20 points)

## The AII selection process will favor innovations that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential.

15. What specific actions would another organization need to take along each of the following dimensions to adopt this innovation?

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| **Check boxes that apply** | **Dimensions** | **Please describe:** |
|  | Gaining executive leadership support | Organizations would need to conduct a comprehensive analysis of their organization's current incident management operational challenges and limitations, presenting a business case demonstrating the potential for long-term benefits of implementing the VCC. In addition, they would need to develop a detailed implementation plan with clear milestones and timelines. |
|  | Communicating benefits | Present highlights of the VCC in terms of benefits, collaboration with partner agencies, improved travel efficiencies, real-time incident management response, and increased reliability. It may also be beneficial to point out the WSDOT has successfully deployed the VCC in the greater Seattle area. Utilize WSDOTs VCC resources to provide active examples of the VCC and its use. |
|  | Overcoming funding constraints | To overcome funding constraints, it is important to explore partnerships opportunities or seek grants to secure funding. Engaging with the University of Washington could be beneficial, as they may assist in identifying potential avenues of support or provide valuable guidance on transitioning the VCC in another state. Conduct a cost analysis related to the VCC, focusing on data-related expenses, member on-boarding, and program implementation can help identify areas where cost optimization can be achieved, potentially freeing up resources for the program. Exploring alternative funding models, such as user fees (WSDOT does not currently charge users to use the VCC) or cost-sharing arrangements may be considered to sustain the VCC in the long term. |
|  | Acquiring in-house capabilities | The team would need to invest in talent, infrastructure, and technology. VCC users would need to be skilled in traffic management. Additionally, your team should include skilled IT staff in various areas such as software development, data analysis, and system integration. The team would be responsible for deploying and maintaining the VCC infrastructure. |
|  | Addressing legal issues (if applicable) (e.g., liability and intellectual property) | The VCC addresses legal issues regarding data sharing and interlocal agency agreements through careful documentation and agreements. When establishing data sharing agreements with relevant stakeholders, outline the terms and conditions for accessing and utilizing data. These agreements ensure that the VCC complies with privacy regulations and safeguards sensitive information. Additionally, an interlocal agreement will need to be established and it will define the roles, responsibilities, and legal obligations of participating agencies in the VCC's operations. These agreements help to mitigate legal risks and ensure that all parties involved adhere to applicable laws and regulations. By implementing comprehensive data sharing and interlocal agreements, the VCC maintains legal compliance and fosters trust and cooperation among stakeholders. |
|  | Resolving conflicts with existing national/state regulations and standards | Click or tap here to enter text. |
|  | Other challenges | Execution of the data sharing and interlocal agreements has been challenging. However, we are looking into alternative processes to mitigate those challenges. |

16. Please provide details of cost, effort, and length of time expended to deploy the innovation in your organization.

**Cost**: $8,391,361

**Level of Effort**: The level of effort to create the VCC was extensive. Now that VCC has been deployed and functioning successfully, our efforts are directed to member participation and the expansion of the VCC statewide.

**Time**: January of 2020 to July 1, 2023

17. To what extent might implementation of this innovation require the involvement of third parties, including vendors, contractors, and consultants? If so, please describe. List the type of expertise required for implementation.

Future implementation of the VCC in other states may include the involvement of vendors, contractors, and consultants, depending on the specific requirements and scope of the project. If there is interest from other states to utilize the VCC we recommend they contact the University of Washington directly. WSDOT used other resources when developing the VCC for system development, maintenance, and support. Consultants with expertise in traffic incident management, data management, cybersecurity, and legal regulations could provide guidance and assistance throughout the implementation process. Additionally, experts in project management may be required to ensure effective planning, agreement execution, and adoption of the VCC. The specific expertise needed would vary based on the goals and complexities of the implementation of the VCC, but it would typically encompass areas such as technology, data privacy, legal compliance, and project management.