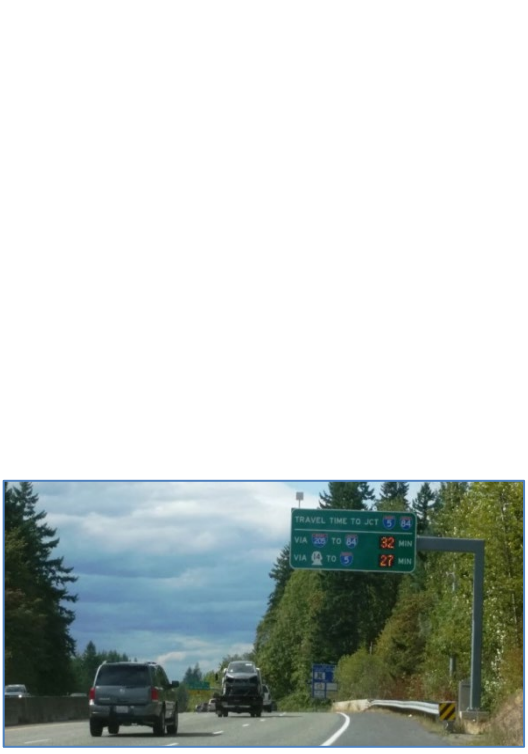
Vancouver Area Smart Trek (VAST)

Annual Program Report
YR 2021

A regional partnership of:



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INTRODUCTION

The VAST Program focuses on low-cost operational and Intelligent Transportation System (ITS) technology approaches that make better use of existing transportation facilities by improving system efficiency and performance and leverages technology to manage the system without adding new roadway capacity. The operational strategies were prepared through the region's 2011 Transportation System Management and Operations (TSMO) plan, which supports regional transportation goals by improving travel time reliability; reducing crashes; improving transit on-time performance; and reducing travel delay, fuel use, and air pollution. The 2016 TSMO Plan Update has tracked advances in technology and operations since 2011, identifies emerging issues such as connected and autonomous vehicles, and lays out future strategies for the continued implementation of operational strategies over the next five to ten years.

FEDERAL REQUIREMENTS

The ITS element of the VAST program meets federal requirements for planning, development, and implementation of ITS projects. Federal regulation 23 CFR 940 requires that regions develop and maintain a *regional ITS architecture* to ensure that ITS technology projects are interoperable and that it must include participation from transportation stakeholders so that projects are coordinated and integrated. The TSMO element of the Program directly supports the federal Congestion Management Process (CMP) by providing regional services to agency partners to improve transportation performance by collaborating on operational strategies. Federal regulation 23 CFR 450.320(c) for the CMP requires that agencies collaborate to utilize operational management, demand management, transit, and ITS technology to address travel demand before adding roadway capacity. In addition, a Memorandum of Understanding (MOU) executed between WSDOT, C-TRAN, and RTC ensures that that planning and deployment of ITS projects and operations are consistent and integrated with the ITS vision for the Clark County region.

MODEL for REGIONAL COLLABORATION

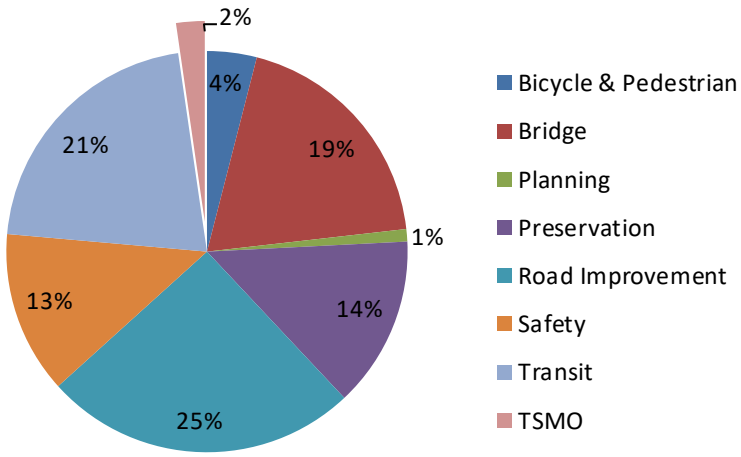
The VAST Program recognizes that the successful implementation of operational strategies requires cooperation between transportation agencies and interoperability between ITS technologies.

The VAST Steering Committee discusses transportation operations and technology and has been both a successful collaboration and an effective way for the agencies to coordinate on project delivery, joint project funding, monitoring project development, and project integration. RTC also manages the VAST Communications Infrastructure Committee (CIC). The CIC—which addresses sharing, maintenance, and standards for communications infrastructure and equipment—is made up of both transportation and communications technical staff from the VAST agencies. A chart of the program structure is shown on the following page.

VAST Program Structure

The VAST program is funded primarily through federal grants with local matching funds. It has resulted in projects that benefit individual transportation agencies and the Clark County region, resulting in a valuable pathway for developing and securing funding for ITS/operations projects totaling more than $40 million in federal funding over the last 19 years. A wide range of projects to improve transportation operations and to build the supporting communications and technology have been funded since the initiation of the program. They include central signal system upgrades, new signal controllers, signal optimization projects, freeway and arterial detection, cameras, variable message signs, and transit signal priority, as well as the fiber and network communications needed for connecting ITS devices and infrastructure. These investments are a small but effective part of the overall transportation funding program. For example, the 2022-2025 TIP has $424 million in programmed projects. The TSMO category made up about 2% of the total program.

Percentage of Dollars Programmed by Project Type ($424M total)



ONGOING PROGRAM ACTIVITIES

The VAST Program will continue the coordination and management of ITS- and operations-related activities, which include providing support to partner agencies on:

- Transportation operations and planning
- ITS projects, communications, and integration
- Manage the TSMO/ITS committees
- Funding applications for operations and ITS projects
- Performance measurement of operational projects
- Ensure that projects are interoperable

In addition, RTC will continue to manage the VAST Steering Committee and Communications Infrastructure Committee and in the next year will include:

- Continue expansion of communications infrastructure
- Maintain and update shared asset management database
- Identify additional funding opportunities
- Develop agreements, on fiber, infrastructure, and equipment

The VAST program will continue to utilize technical assistance and support the PSU data archive in carrying out the activities described above.

The first TSMO Plan, in 2011, set the policy and performance guidelines for the consideration of regional operational strategies in Clark County. The 2016 update laid out strategies for the continued implementation of operational strategies over the next five to ten years. The Regional Communications Plan describes the communications and network needs that are critical components of the regional transportation system and are fundamental to connecting management centers with field equipment that facilitate regional mobility. The ITS Regional Architecture provides a framework for integrating existing and planned ITS systems for transportation agencies in the region.

Program Activity	**Status**	**Next Update**
TSMO Plan	Current	2023
Regional Communications Plan	Current	2023
ITS Regional Architecture	Completion in 2022	Periodic
Fiber Sharing Permits	Current	ongoing

VAST PROGRAM AGREEMENTS

The VAST agencies adopted a memorandum of understanding in 2001 that outlines how agencies collaborate on ITS project coordination, integration, review, guidance, and endorsement and to ensure that the communications network for VAST is integrated. A Communications MOU executed in 2004 addresses the use, sharing, maintenance, and standards for communications infrastructure and equipment. VAST agreements are summarized below.

Agreement	Entities	Status
Memorandum of Understanding (MOU) Defines how the agencies work together on ITS policy, plans, programs, and projects. *Formed the VAST Steering Committee*	Clark County WSDOT C-TRAN Vancouver RTC	Ongoing
MOU for Communications Similar to first MOU but focused on communications infrastructure. Defined how partners work together on ITS infrastructure and devices. *Formed the Communication Infrastructure Committee*.	same	Ongoing
Communications Interoperability Agreement Gives authority at staff level for entering into fiber and communication sharing agreements, or permits, to the CIC for use by VAST agencies.	same	Periodic amendments to update contract managers, permit format, etc.
MOU with C-TRAN, WSDOT, and RTC Ensures that planning and deployment of ITS projects and operations are consistent and integrated with the ITS vision for the Clark County region.	same	Periodic review
OSPInSight License Use Agreement A cloud web-based database mapping tool. Used and shared among all VAST agencies. Tool displays communications fiber and equipment, as well as their detailed attributes. Supports fiber sharing among agencies and allows agencies to manage their own assets more effectively.	same	Annual licensing review

RECENT VAST ACCOMPLISHMENTS

Transit and Traffic Operations

2021 witnessed completion of two projects to support improved transit reliability and corridor traffic operations. Both projects demanded collaboration between TSMO partners, working together to improve regional travel reliability and mobility.

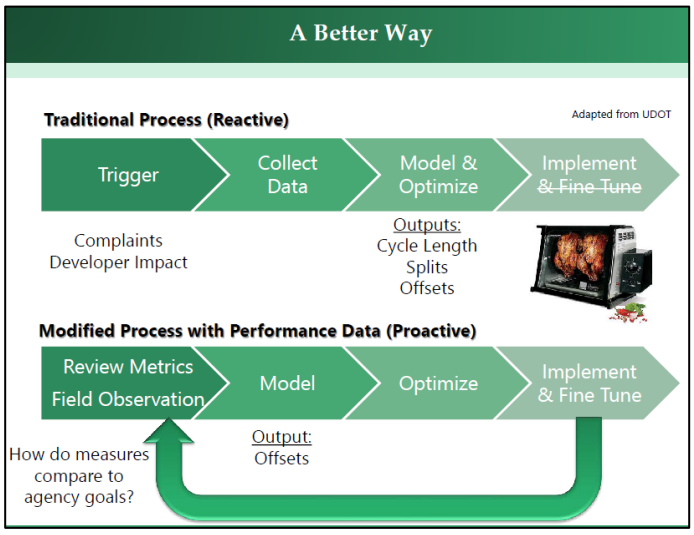
Highway 99 Corridor Transit Signal Priority (TSP) Upgrade

C-TRAN, in coordination with Clark County, upgraded traffic signals at 11 intersections along Highway 99 to implement Transit Signal Priority (TSP) between Ross Street and the C-TRAN 99th Street Transit Center. Two bus routes travel along the corridor within the project limit. Bus Route 71 (Highway 99) traverses the whole corridor, serving Hwy 99 between Downtown Vancouver and the 99th Street Transit Center. Bus Route 78 (78th Street) serves Hwy 99 between 78th Street and 99th Street, providing service from Vancouver Mall Transit Center to the 99th Street Transit Center.

The project supports C-TRAN objectives to improve transit system performance by increasing on-time performance to improve bus operations. In addition, reduced transit travel times along the corridor result in the reduction of required vehicle resources, giving C-TRAN the opportunity to expand transit services elsewhere in the system

It helps transit service efficiency and results in increased transit capacity through speed improvements. TSP also benefits existing riders by improving travel time and reliability and making transit more attractive to new riders.

Mill Plain Arrival on Green



The City of Vancouver purchased, installed, and programmed signal controller equipment with new high-end CPUs to upgrade 15 existing intersections on Mill Plain Boulevard to allow for high resolution data collection. The equipment upgrades allow the City to collect and process data for using Arrival on Green and Transit Signal Priority to improve future intersection signal coordination along the corridor. These high-grade controllers, combined with new central system software, allow staff to conduct more detailed evaluation of traffic operations and signal response to improve travel time for advancing traffic management and operations technologies and facilitating higher frequency transit service.

Recently Programmed Agency Projects

The TSMO Plan connects the planning process with project implementation. RTC's role in operations planning is intended to identify the best operational projects in coordination with the partner agencies, while the agencies are responsible for project delivery. RTC works closely with the VAST agency partners to identify projects and develop federal funding applications that leverage local funds for the partner agencies.

Selected operational projects programmed for 2021 contained in the 2021-2024 TIP are listed in the following table. These projects consist of $720 thousand in federal funds, leveraging more than $248,000 in local funds.

Project	Agency	Summary	Federal	Local
Small Cities ATMS	Batt le Ground, Camas, Washougal	Construction for integration of small cities signals with Clark County's central signal system to benefit signalized intersections that interface with both Clark County and WSDOT facilities.	$276K	$95K
I-5 NB Fourth Plain Ramp Meter	WSDOT	Design for installation of ramp meter, ramp detection, and cameras on NB Fourth Plain on-ramp. It is the first NB ramp meter on I-5 and was a recommendation from the Urban Freeway Corridor Operations Study	$75K	$25K
I-205 SB Ramp Meters	WSDOT	Design for installation of ramp meters along the I-205 corridor Padden Parkway to Mill Plain Boulevard. The southbound ramp meters are part of the Vancouver East Highway Operations Study recommendations for I-205.	$372.5K	$128K

Upcoming 2022-2025 TIP Projects (RTC Board Resolution 10-21-29)

SW Washington Joint Operations Center (JOC): *($369K Federal)* This project builds on WSDOT's center by expanding staff for 24/7 operation to actively manage the regional transportation network in a real-time environment. An incident on I-5 or I-205 that blocks one or more lanes in one or both directions may result in traffic being detoured or diverted to the arterial network. The JOC will be able to enable alternate signal plans in real time to reroute traffic because of the incident.

I-205 SB Ramp Meters: (*$2.8M Federal)* This is the construction phase of the I-205 SB ramp meter project to operate ramp meters from 134th Street to Mill Plain Boulevard to complete the project.

WSDOT Ramp Meter

SUCCESSFUL PARTNERSHIPS

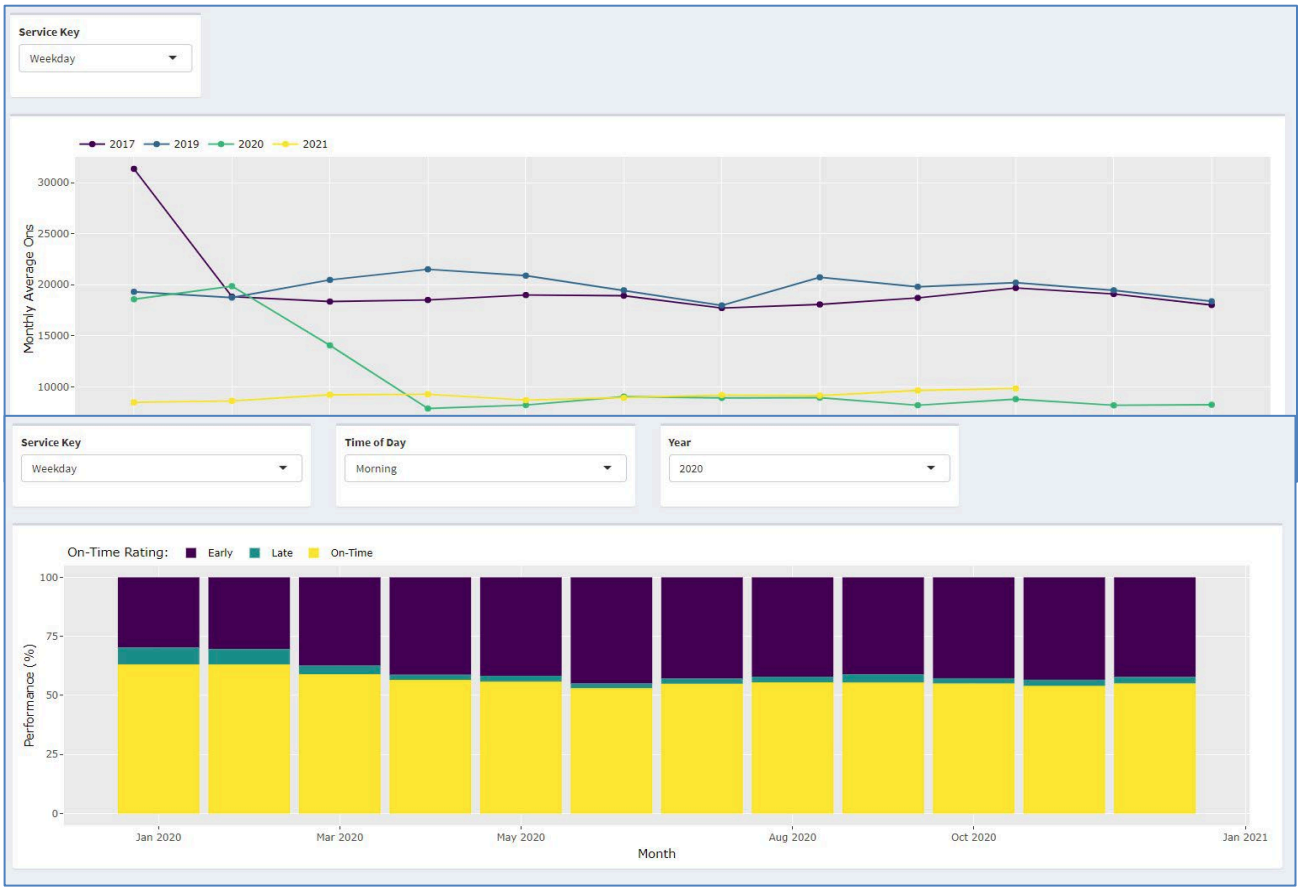
VAST agency collaboration and federal funding through RTC has also led to successful agency partnerships. The following examples demonstrate some of the more noteworthy efforts.

Regional Transportation Data Archive: RTC and the VAST agencies have an ongoing partnership with Portland State University to support the regional transportation data archive known as Portal (http://portal.its.pdx.edu/home/). The Portal archive contains, in a single location, historical and real-time transportation data from agencies in the Vancouver-Portland region. This information warehouse is used by researchers, planners, traffic engineers, and the public to look at multimodal transportation performance throughout the region.

2021 efforts have focused on improving the quality and usability of the existing data. Some of the improvements consisted of adding improved functionality of the freeway data to ease retrieval of stations upstream/downstream and by direction. The travel time function is also integrated between Washington and Oregon, allowing a user to do a single travel time calculation for a corridor covering both states.

A transit data feed has been in place over the last four years, consisting of transit ridership, on-and-off stop data, and on-time performance from C-TRAN. C-TRAN, PSU, and the VAST Committee have been collaborating closely on ideas for representing the transit data in Portal, which is available on the Portal web page and is the primary feature enhancement since last year.

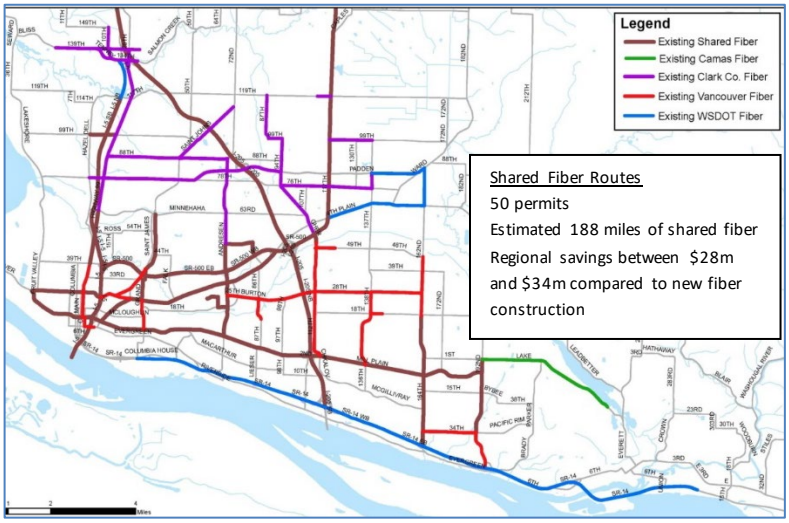
Portal Data: C-TRAN Weekday Ridership and On-time Performance



Shared Communications Fiber

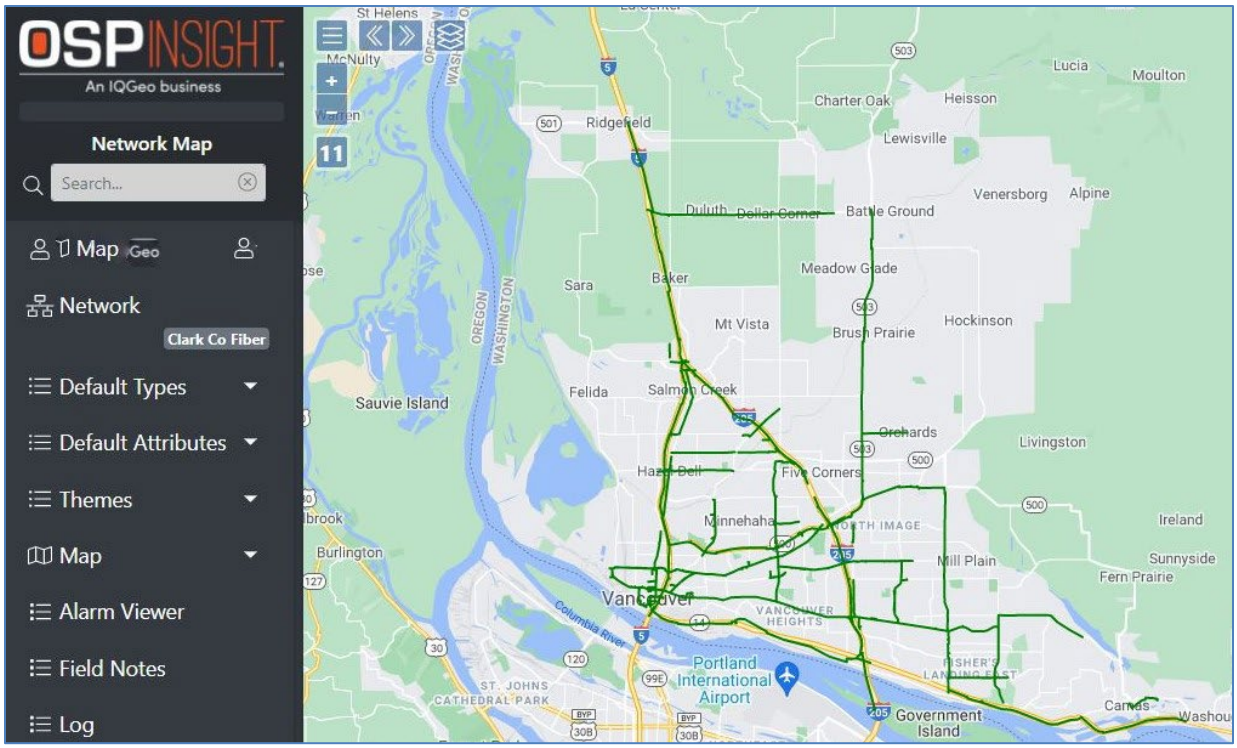
VAST agencies have had a Communications and Interoperability Agreement in place since July 2006, which authorizes agencies to enter into fiber asset sharing permits. The agreement has led to better use of existing fiber and communication equipment by sharing available capacity among agencies.

VAST Agency Fiber by Ownership and Shared Routes



Asset Management: The VAST agencies are using a shared GIS mapping cloud database (OSPInSight) that displays communications fiber and equipment, as well as their detailed attributes. This asset management tool facilitates and supports fiber sharing among partner agencies and also allows them to manage their own assets more effectively. While the software has been a valuable tool for tracking and sharing fiber assets, it has been difficult to access it from outside the County network, where the database is located. The VAST partners migrated to a full web-based cloud interface that seamlessly allows any approved user to easily view information such as fiber and communications network, fiber ownership, capacity, and availability.

OSPInSight Map of VAST Agency Fiber and Devices



EMERGING PROJECTS and TRENDS

The TSMO plan identifies current and emerging operations issues and trends that are impacting the direction of transportation systems management and operations in the region. The following is a partial list of trends identified in the Plan and how the region and VAST agencies have responded with associated projects, programmed initiatives, and planned activities. These issues will need to be revisited periodically because of the evolving nature of transportation technology and will be reviewed by the VAST members in the next year both to acknowledge recent and future strategy implementations in the region and to consider potential changes to technology and communications.

Emerging priorities	Discussion
Multi-discipline coordination	• Increased importance of multi-discipline coordination to deliver TSMO strategies, both within organizations and among agency partners. • Need internal buy-in within an organization (cultural) as well as operational coordination between agencies to deliver regional solutions (e.g., deploying shared signals, jointly-operated TMC)[i].
Asset management	• Increased need for asset management/construction activities tracking, which support keeping partner agencies and the public informed about work activities.
Private Sector mobility data service delivery	• Recognizing private sector mobility data providers and capabilities of the services they provide (e.g., systems, data, managed services) while avoiding public sector duplication where feasible. Discussion is underway to replace Bluetooth field devices with private sector mobility data to benefit regional transportation agencies.
Partnering with the private sector Mobility Providers	• Identifying opportunities to partner with private sector service providers to deliver mobility solutions where such opportunities are aligned with the Region's TSMO vision.
Connected, Automated, Shared, Electric (CASE)	• Adapting to and identifying opportunities related to emerging CASE technologies: ○ **Connected**: Impacts to operations, specifically around communications infrastructure (network security, reliability) and roadside technology. ○ **Automated**: Impacts to planning, considering automated vehicles' impact on future travel demand patterns and road and curb space needs. ○ **Shared**: Impacts to policy and planning, considering how best to allocate street and curb space and balance the public and private provision of mobility services. ○ **Electric**: Emerging area, considering internal fleet and public vehicle charging solutions, planning, design, deployment, emerging standards.
Broadband and 5G	• Increased importance of broadband communications and continued expansion of 5G, enabling connected vehicles (CV) and related technologies and opportunities for PPPs to build out fiber for agency use.

TSMO EARLY ACTION PLAN

The early action plan, developed as part of the Regional ITS Architecture Update, builds on the 2016 TSMO Plan. While the TSMO Plan guides the implementation of operational strategies and supporting Intelligent Transportation Systems (ITS) technologies for Clark County in Southwest Washington, it focuses on the strategic framework for accomplishing transportation system management objectives. The Action Plan identifies near-term actions over the next two to three years to advance ITS and TSMO strategies in the region.

It is also consistent with the 2016 TSMO Plan for the development of a coordinated and integrated operation of the regional transportation system, as described in the TSMO Vision Statement below. TSMO programs and investments in Clark County use innovative and proactive operational strategies to maximize the transportation system efficiency. It focuses on lower cost operational and multimodal strategies that are regionally coordinated in an effort to better utilize existing transportation facilities.

> ***TSMO Vision for Clark County***
>
> Transportation System Management and Operation (TSMO) strategies promote more efficient and cost-effective use of the existing transportation system, providing increased accessibility, reliability, and safety for people and freight

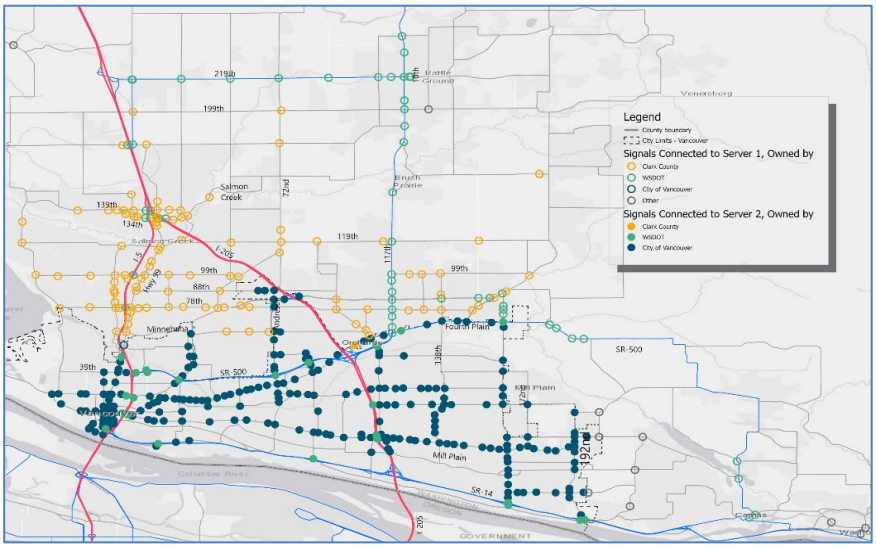
TSMO provides options to address transportation needs where conventional transportation investments may be cost prohibitive, infeasible, or undesirable. In this way, TSMO is highly complementary to other regional transportation strategies and should be considered an integral part of the Region's toolkit to address existing and future needs.

2021 HIGHLIGHTS

Shared Central Signal System Study

The Shared Central Signal System (SCSS) Study was initiated cooperatively between RTC and WSDOT. It defines user needs and the concept of operations and system requirements for WSDOT's Regional Signal System Expansion (RSSE) Project.

The purpose the study was to evaluate the existing and future central traffic signal systems in the Southwest Region of Washington and develop a solution to actively manage the traffic signals across the jurisdictional (and central system) boundaries and share signal operations resources between WSDOT, Clark County, City of Vancouver, and the small cities.



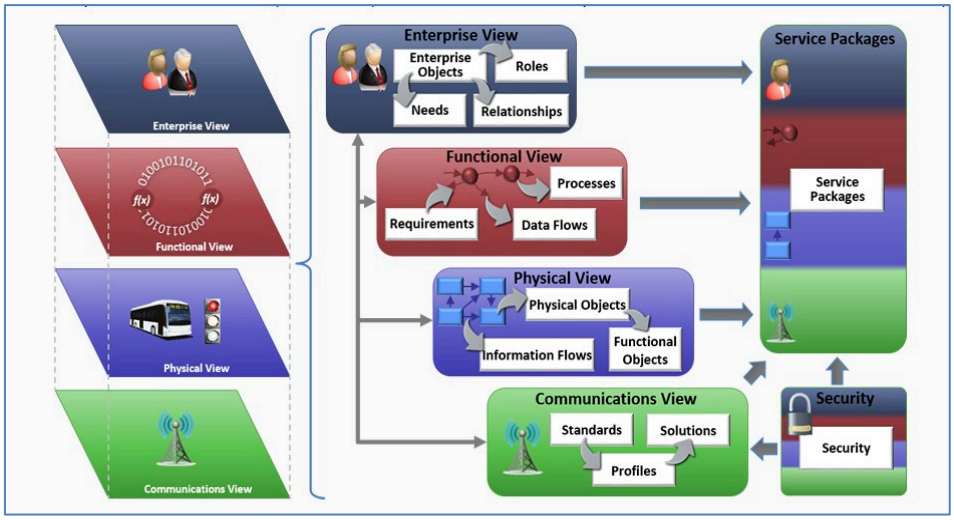
The outcome of the SCSS will provide information needed for the partner agencies to share signal system information and to actively manage transportation corridors to improve real-time operations. It also supports design and implementation of WSDOT's Regional Signal System Expansion Project. In addition, the RSSE will be completed in parallel to WSDOT's 24/7 Joint Operations Center.

The improved signal system will help minimize delay, balance congestion, smooth traffic flow, and further enhance the Region's capability to implement operations and maintenance strategies that maximize safety, efficiency, and reliability of the traffic signal system.

In addition to providing the initial system's engineering documents of the future Shared Regional Signals System project, the study also includes an operations playbook, which provides guidance to staff on special operations for traffic signal timing plans that respond to conditions outside standard plans that may require changes to WSDOT, Clark County, and/or Vancouver traffic signals. Responding to traffic incidents in real time, for example, could be conducted by WSDOT's Joint Operations Center.

Regional ITS Architecture Study

Significant changes have occurred since the last update to the VAST regional ITS Architecture in 2016, including emerging and new technologies, as well as the structure of the ITS Architecture database as developed by the USDOT. The Regional ITS Architecture (RITSA) Study utilizes the new ITS Architecture tools, including ARC-IT, to ensure the Region is compliant with USDOT's ITS Architecture requirements. The Study process included interviews with VAST partner stakeholders (WSDOT, City of Vancouver, Clark County, C-TRAN, and RTC) to document existing conditions and assess future needs. A key element was to document programmed and planned projects from the VAST partners to add into the RITSA architecture update.



The VAST ITS Architecture is the framework for planning, defining, and integrating ITS within the VAST region.

The ITS architecture is a regionally focused summary of all the ITS strategies, systems, and connections operated and/or planned by the VAST region's agency partners and provides a framework for understanding and simplifying more complex relationships between the transportation agencies that share information and technologies to operate and maintain the transportation system.

The architecture update enables VAST partner agencies to support the Region's vision, mission, and values within an interoperable context that maximizes the return on ITS investment. ITS involves the application of advanced technologies and proven management techniques to support many goals and objectives, particularly related to managing congestion, improving reliability, providing services to travelers, enhancing safety, reducing greenhouse gas emissions, supporting equitable mobility goals, and assisting transportation system operators with management techniques. The Study is available for download at: Regional ITS Architecture Study.