Oregon State Department of Transportation

Operations Program Plan

August 14, 2018

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Transportation Challenges in Oregon

Oregon's transportation system is a complex, expensive collection of public and private assets that facilitates the safe and efficient movement of people and goods into, out of and around the state.[1]
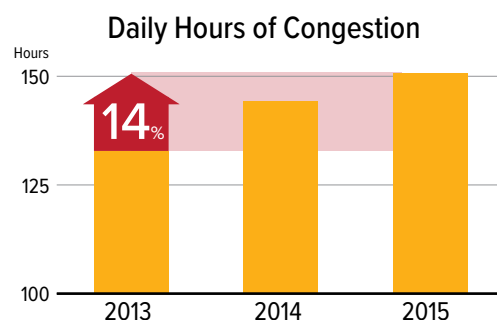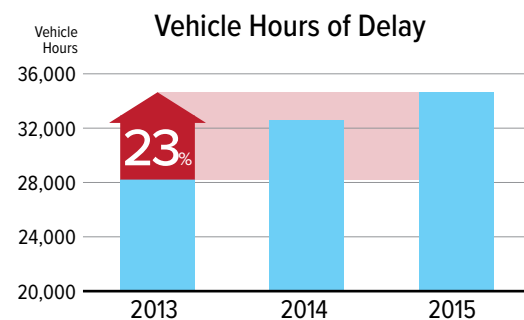
Oregon is at the forefront of several state-of-the-art systems to provide a safe and reliable transportation to all road users. However, with increased demands on the system coupled with increasing constraints on available funding, the current transportation system needs operations solutions that provide a cost-effective approach to meet the challenges.

The current transportation challenges in Oregon are listed below.

Transportation Challenges In Oregon

Congestion and travel time reliability

With rapidly growing population and an improved economy, total congestion has significantly increased on Oregon highways in the past few years. The Portland region alone experienced about a 23 % increase in vehicle hours of delay and a 14 % increase in daily hours of congestion from 2013 to 2015.[2]

Vehicle Hours of Delay

Vehicle Hours

36,000

32,000

23%

28,000

24,000

20,000

| 2013 | 2014 | 2015 |

Daily Hours of Congestion

Hours

150

14%

125

100

| 2013 | 2014 | 2015 |

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1   Oregon State of the System Report, 2016
2   Portland Region 2016 Traffic Performance Report, p. 9

Oregon highways are becoming less reliable due to a decrease in speeds and increase in travel times as a result of increased congestion levels. The Portland region alone experienced about a 4% and 8% increase in travel time during the AM and PM peak hours respectively from 2013 to 2015. The buffer time index has increased by 27% and 21% during the AM and PM peak hour from 2013 to 2015. (Buffer time is a reliability indicator that expresses the amount of extra time needed to be on-time 95 percent of the time, or late one day per month.)[3]

Portland Region Peak Hour Speeds

Portland Region Peak Period Travel Time and Buffer Time
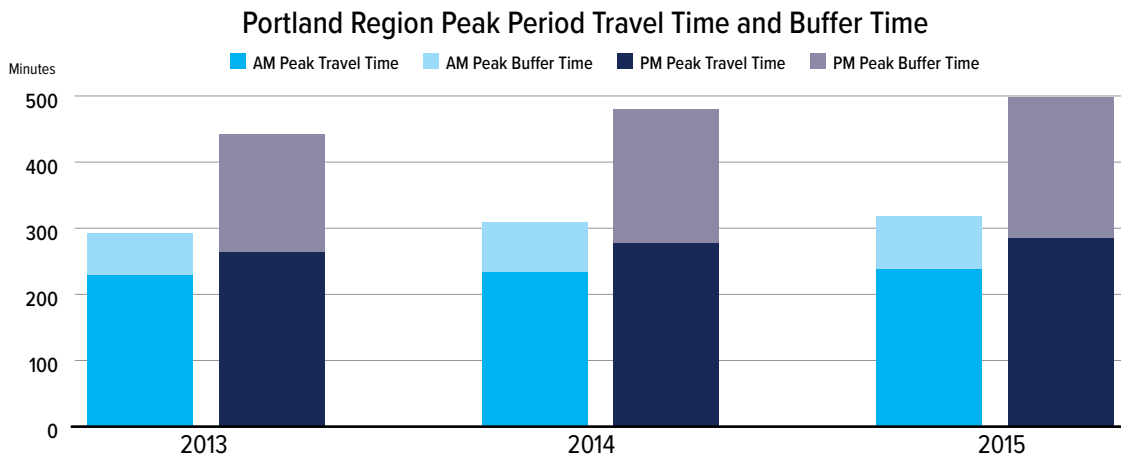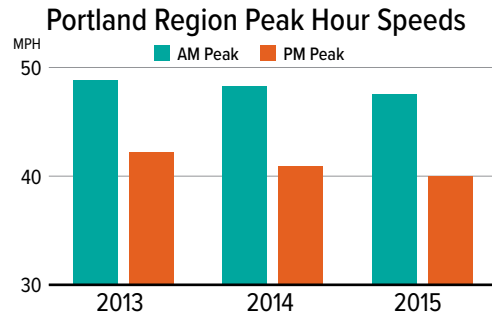

Safety

The statewide crash rate (crashes per million miles of travel) has increased from 2.45 in 2005 to 3.18 in 2015. The statewide crash rate observed a constant decrease from 2006 to 2009 most likely due to the economic downturn, however, the crash rate consistently increased from 2010 to 2015. Oregon's goal is to have zero fatalities, however, fatal crashes have increased significantly since 2013. In 2015, the Oregon fatality rate rose above the national average for the first time since 1998.[4]

Oregon Statewide Crashes Rate Per Million VMT
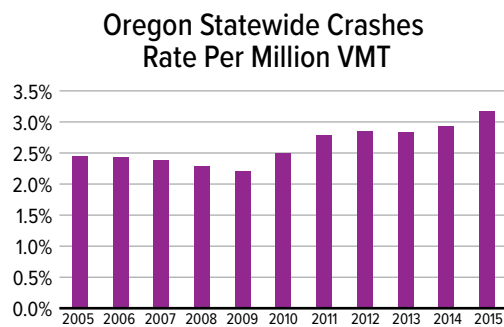
OR statewide fatal crashes and nationwide fatal crashes indexed to common starting point in 2005
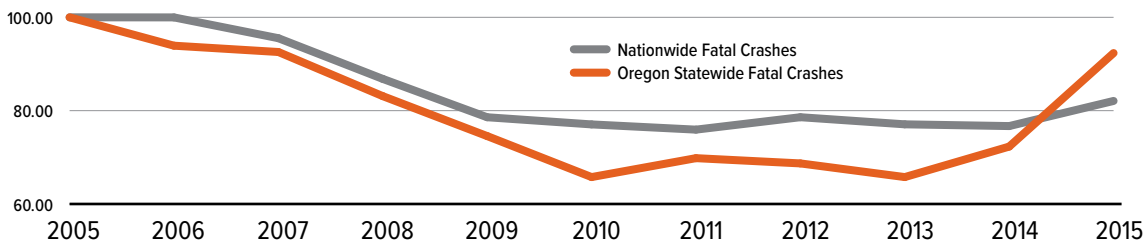
3   Portland Region 2016 Traffic Performance Report, p. 9
4   ODOT State Highway Crash Rate Tables, 2006-2015 (https://www.oregon.gov/ODOT/Data/Pages/Crash.aspx)

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Increasing population

An improved economy results in an increase in employment opportunities. Thus, Oregon has been attracting a significant number of new residents. Overall, there was a 5% increase in statewide population from 2012 to 2016, while vehicle miles traveled increased by 10% from 2012 to 2016.[5]

Oregon Statewide population, vehicle registration, VMT, and employment, indexed to common starting point in 2012

Legend:
- Population
- Vehicle Registration
- Vehicle Miles Traveled
- Employment
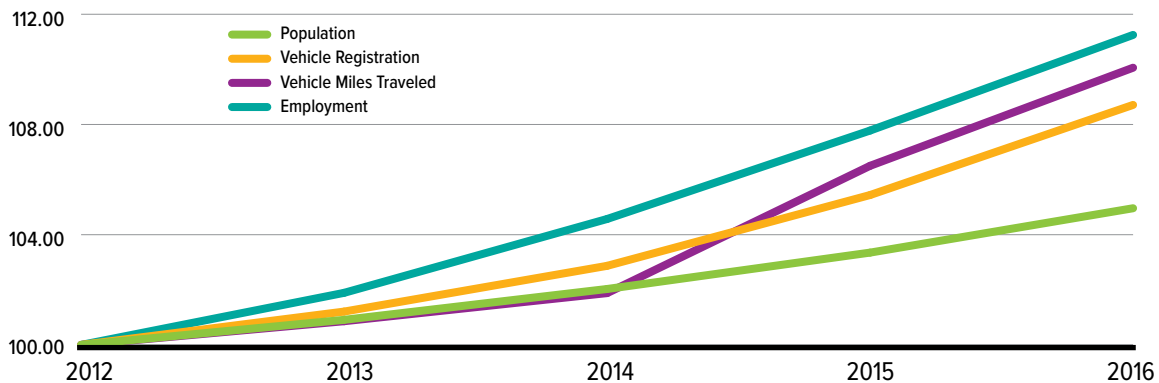
Disaster and emergency response

Disaster and emergency situations may pose a threat to the safety of the public and the transportation system. Thus, it is critical to ensure that there are adequate trained staff to perform the required functions. In addition, it's extremely important to coordinate with other agencies to keep everyone informed and to come up with disaster and emergency response plans that best suit local needs.

Growing emphasis on measuring performance and effectively monitoring the system

ODOT's goal is to clear 100 percent of all lane-blocking crashes within 90 minutes*. However, in the years 2016 and 2017 only up to 78% of events were cleared under 90 minutes.[6]

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5   VMT from ODOT State Highway Transportation Volume Tables (https://www.oregon.gov/ODOT/Data/Documents/TVT_Complete_2016.pdf) Population Statistics from Portland State University Annual Pop Report (https://www.pdx.edu/prc/file/orannualpopreport2017tablesxlsx) Vehicle Registration from ODOT DMV (https://www.oregon.gov/odot/dmv/pages/news/vehicle_stats.aspx) Employment Data from Bureau of Labor Statistics Occupational Employment Statistics Data (https://www.bls.gov/oes/tables.ht

6   The 90 minute goal comes from the Oregon Department of Transportation and the Oregon State Police Mutual Assistance Agreement

Long term funding challenges

While some projects have benefited from several state funding acts, Oregon continues to face long term funding challenges. The Keep Oregon Moving (HB 2017) initiative is estimated to produce $5.3 billion in total revenue over its first 10 years, however due to the rise in construction and maintenance costs, there may still be some long term funding challenges. Lack of sustainable long term funding might adversely affect the maintenance of existing transportation facilities and implementation of new innovative projects. Currently highway user fees, which are composed of vehicle registration fees, weight-mile taxes and motor fuel taxes, are the most significant sources of funds for transportation improvements in Oregon.

Innovation

It's challenging to incorporate innovation into projects that have already been scoped. However, lack of funding sometimes encourages looking into innovative solutions.

HB 2017 Funds Distribution
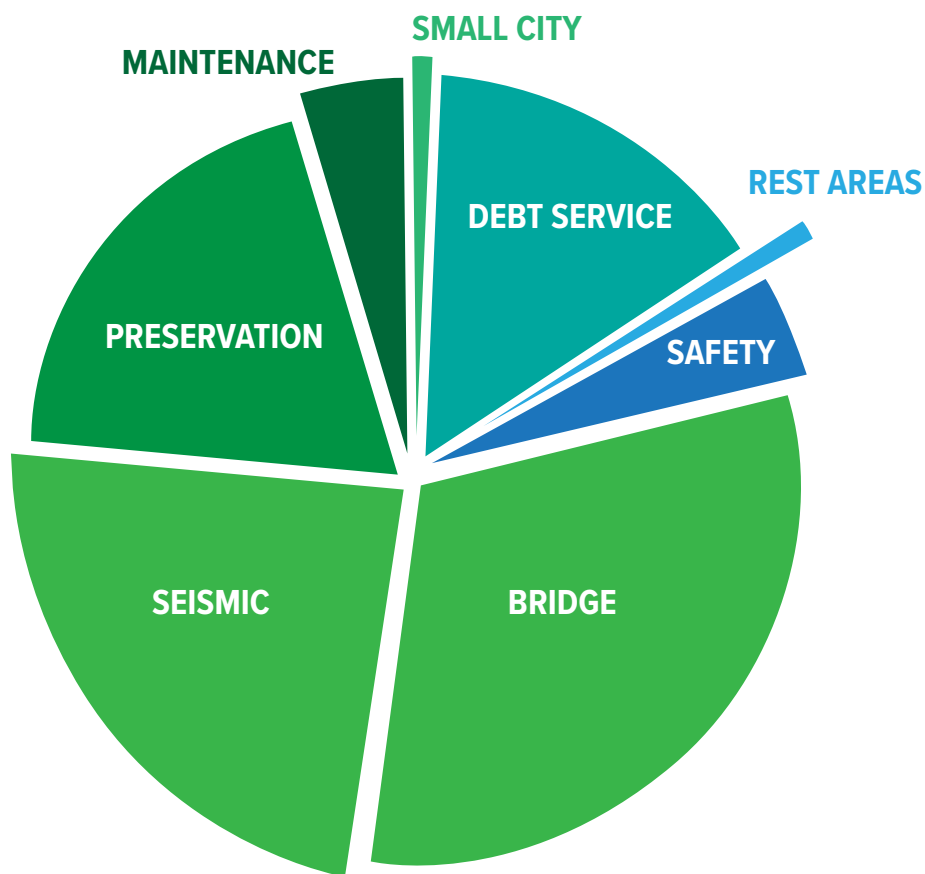
This Operations Program plan could potentially address some of these challenges with management and operations strategies. In addition, the policy context and the business case presented in the following sections strengthens the need to implement the Operations Program plan.

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Policy Context

Focus on Operations and Capability Maturity

The Federal Highway Administration has placed significant emphasis over the past decade on encouraging states to expand their application of operations strategies and improve their organizational capacity to successfully carry out TSMO activities and establish or bolster TSMO programs. In this manner operations programs become "mainstreamed" and on par with traditional construction and maintenance programs in terms of planning, prioritization, and resources.

National research sponsored by FHWA, AASHTO, and the Transportation Research Board identified a foundational framework for improving transportation agency operational effectiveness. The capability maturity model (CMM)—widely used in the IT industry—defines specific business process and institutional capacities agencies must have, as well as criteria and a structure for charting a path to improvement. This work led to development of AASHTO's official guidance on operations and a series of FHWA-sponsored state and regional workshops for agencies to self-assess their operations programs and identify actions for improvement. ODOT conducted two such CMM workshops, in 2014 and 2017, whose outcomes have fed directly into the development of this Operations Program Plan. Actions to improve ODOT's program align closely with the structure of the CMM assessment, which targets advancing six key "dimensions" of operations capability: business processes, performance measurement, organization and staffing, culture, systems and technology, and collaboration.

Operations Program Planning

One of the most significant conclusions reached from the vast majority of state DOTs participating in a CMM self-assessment process has been the need for agencies to strategically think through why and how it is improving its operations capabilities, strategies, and program. In response, many agencies are undertaking an operations program planning exercise to lay out an agency's need for improving operations (a business case), goals to achieve, and methodology to identify, prioritize, and track the requirements and actions necessary.

Performance Measurement

Performance measurement is a key dimension of operations capability, and like operations programs themselves, has been a growing national policy focus. Recent federal final rules established the framework for state DOT and MPO performance reporting and related planning on the federal-aid highway system, as required of federal MAP-21 legislation. Some of the general requirements associated with all MAP-21 performance reporting requirements include a focus on:

- Establishment of a formal performance measurement process
- Identifying measures and sample size
- Coordination between state DOTs and MPOs in selecting congestion-related performance targets
- Reporting performance and sample size
- Performance thresholds that indicate significant progress
- Integration of performance measurement into statewide and MPO plans
- Integration of performance plans into the planning process through demonstrated consideration of the anticipated effect of the congestion-related improvement and linkage of investment priorities to performance achievement
- Federal approvals of proposed state processes and target date for first report

State Policy

The state's long-range multi-modal transportation plan, the Oregon Transportation Plan (OTP) established a set of goals

for ODOT in 2006.[7] Every two years the State of the System report reviews Oregon's transportation system performance in relation to the OTP's goals. Operations directly supports three of the plan's goals and policies designed to direct how the department achieves the goals.

Oregon Transportation Plan Goals and Policies	How Operations Relates to the Goals and Policies
## Goal 2 – Management of the System To improve the efficiency of the transportation system by optimizing the existing transportation capacity with improved operations and management. ### Policy 2.1 – Capacity and Operational Efficiency It is the policy of the State of Oregon to manage the transportation system to improve its capacity and operational efficiency for the long term benefit of people and goods movement. ### Policy 2.2 – Management of Assets It is the policy of the State of Oregon to manage transportation assets to extend their life and reduce maintenance costs.	Operations' central objective is to maximize the capacity and efficiency of the existing system through technology, real-time management, and collaborative actions Operations is applied to all transportation system modes and users Plans and resources for ongoing maintenance of ITS assets is a key Operations program consideration Operations strategies reduce the need to add system capacity which would require additional maintenance resources
## Goal 5 – Safety and Security To plan, build, operate and maintain the transportation system so that it is safe and secure. ### Policy 5.1 – Safety It is the policy of the State of Oregon to continually improve the safety and security of all modes and transportation facilities for system users including operators, passengers, pedestrians, recipients of goods and services, and property owners.	Operational strategies are designed to improve safety by eliminating bottlenecks, reducing congestion, and responding to incidents more quickly and efficiently

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7   Oregon Transportation Plan. Adopted September 20, 2006.

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Oregon Transportation Plan Goals and Policies	How Operations Relates to the Goals and Policies
## Goal 7 – Coordination, Communication and Cooperation To pursue coordination, communication and cooperation among transportation users, providers and those most affected by transportation activities to align interests, remove barriers and bring innovative solutions so the transportation system functions as one system. ### *Policy 7.1 – A Coordinated Transportation System* It is the policy of the State of Oregon to work collaboratively with other jurisdictions and agencies with the objective of removing barriers so the transportation system can function as one system.	A key tenet of effective Operations is multi-modal and cross-jurisdictional collaboration and coordination since many operational activities occur in real-time and across agency and government boundaries

How Operations Can Address Challenges

Operations strategies and a mainstreamed Operations Program can effectively address Oregon's transportation challenges.

Operations can...	...to address...	...with actions/strategies such as...
Preserve and maximize existing capacity	Growing congestion, increasing delay, and reduced travel time reliability in urban regions	Freeway Operations Arterial Operations Active Traffic Management Traveler Information
Enhance safety	Rear-end and weaving crashes due to congestion Incident-caused secondary crashes due to slowed or stopped traffic and exposure risk to incident responders Disaster and emergency risk	Traffic Incident Management Transportation Operations Center resources and training Active Traffic Management
Promote mobility and customer outreach	Need to maximize use of alternate routes and modes to increase system efficiency	Traveler Information
Improve reliability for commuters and freight	Growing congestion, increasing delay, and reduced travel time reliability	Freeway Operations Commercial Vehicle Operations Road Weather Management Traveler Information
Manage bottlenecks	Location-specific delay, unreliability, and increased crash risk	Active Traffic Management Managed Lanes Ramp Metering

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Operations can...	...to address...	...with actions/strategies such as...
Effectively manage incidents	Incident-caused delay and secondary crashes due to slowed or stopped traffic; exposure risk to incident responders	Traffic Incident Management
Effectively respond to emergencies	Emergency-caused delay and safety risks to travelers and emergency personnel	Emergency Management
Monitor performance	Need to understand and communicate system conditions and operational outcomes to make resource-efficient decisions and obtain public and decision-maker support	Performance Management Automated Traffic Signal Performance Measures
Be implemented quickly at relatively low cost	Need to invest available funding as effectively as possible and address challenges in the near-term	All Operational Strategies

Examples of operations strategies

Active Traffic Management

Traveler Information

Transportation Operations Center

Ramp Metering

Traffic Incident Management

Arterial Operations

Operations Program Gaps

While operational strategies can help address Oregon's transportation challenges, the capabilities of ODOT's Operations Program plays a large role in the extent, efficiency, and sustainability of its capacity to carry out these strategies. ODOT must advance the effectiveness and maturity of its program to keep pace with existing and new transportation challenges. ODOT should continue to strive for more efficient, effective outcomes and ensure that existing program investments align with future needs.

ODOT's Operations Program has a demonstrated history of success, and there is a broad understanding of the benefits. However, an assessment of the program identified a number of areas for improvement focused on business practices and processes.

Specifically, the assessment found program "gaps" or "unmet stakeholder expectations" in areas such as; project planning and development, utilization and communication of performance measurement data, workforce, and program communication and outreach. These gaps tend to limit the effectiveness of the program and the efficiency of its delivery.

Therefore, ODOT and its customers would benefit from addressing these gaps through the Action Items identified in this plan. Expected outcomes include the following.

PLANNING AND PROJECTS

Greater benefits of proven Operations activities and services—both their magnitude and extent—can be achieved if operations solutions are more consistently considered in planning efforts and project scoping.

ORGANIZATION

Similarly, greater awareness of Operations concepts and how the program functions organizationally would improve operational outcomes and the scope of where they can be applied effectively.
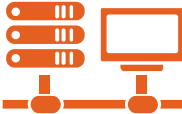
TECHNOLOGY

Staying on top of developments in rapidly advancing technology and sharing innovative operational practices would strengthen and expand the Operations Program's benefits.

WORK FORCE

Addressing workforce issues such as recruitment, retention, training, and succession would ensure the program's sustainability and increase its effectiveness over the long-term.

COMMUNICATIONS AND OUTREACH

Communication and outreach on the Operations Program will increase awareness of program activities, help to move away from reliance on champions, and ultimately achieve better consistency and coordination in program services.

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Oregon's Operations Program

ODOT's Operations Program is a coordinated, multidisciplinary approach to ensure safe and efficient multimodal travel by
(1) optimizing the performance of existing infrastructure,
(2) mitigating the causes and impacts of congestion and delay; and
(3) reducing and eliminating exposure to safety risks.

Reduce and eliminate exposure to safety risks

ODOT Operations Program

Optimize the performance of existing infrastrucutre

Mitigate the causes and impacts of congestion and delay
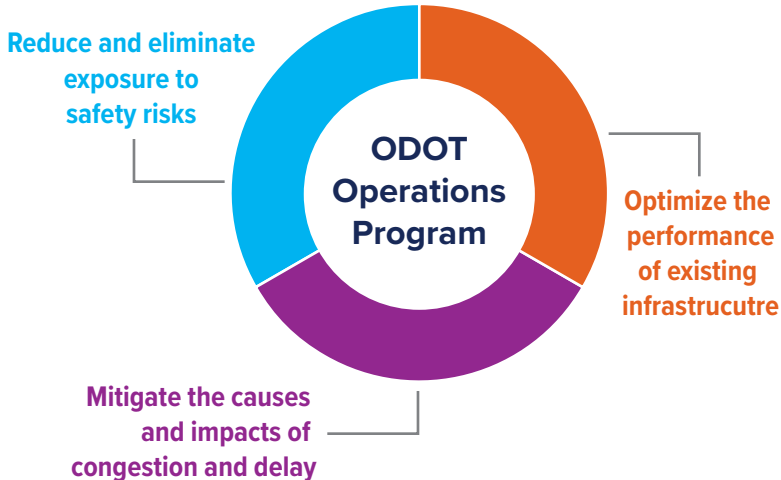
List of functions to achieve the above objectives

- Management and operations of assets including ITS, traffic signals, signs, illumination, pavement markings, and traffic structures
- Management and operation of IT infrastructure including software, servers, and communications/network infrastructure
- Operation of ODOT's Transportation Operations Centers (TOC)
- Development and operation of TripCheck and other traveler information systems and tools
- Development and implementation of effective Traffic Incident Management strategies

Typical Operations projects and services in Oregon

Projects currently included under the STIP Operations Program
- Traffic signals
- Signs
- Roadway lighting
- Intelligent Transportation Systems (ITS)
- Landslide and rockfall mitigation
- Operations related IT projects
- Other projects not funded by other funding programs

Funded by the Operations Program
- Transportation Operations Centers
- ODOT's dedicated Incident Response staff
- Maintenance & Management of operations related IT systems
- Maintenance and operations of ITS infrastructure
- Services such as the TripCheck traveler information system

Funded by Special Programs
- Signal operations
- Traffic investigation

Funded by Maintenance
- Incident management by Maintenance
- Emergency operations
- Signal and roadway lighting maintenance
- Sign maintenance

Possible actions or services for the future

- Truck traffic signal priority
- Managed lanes (including transit and freight options)
- Congestion pricing strategies that encourage shifts to off-peak periods (with electronic toll collection and automated enforcement)
- Freeway/arterial integrated corridor management (ICM)
- Connected and automated vehicle programs

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The process to develop the Operations Program

01		02		03		04		05		06
Online survey on the Operations Program	▶	Stakeholder interviews	▶	Identified gaps or unmet stakeholder expectations	▶	Developed definition, mission, and goals	▶	Identified operations program actions	▶	Develop operations program plan

1. Sixteen questions were included in an online survey.

2. Seven stakeholder interviews with various teams within ODOT were held in Salem, Oregon.

3. Gaps or unmet stakeholder expectations were identified through stakeholder engagement and during the TSMO Capability Maturity Reassessment Workshop held in May, 2017. The gaps were organized by TSMO capability "dimension" that indicated the business practice or process, or institutional arrangement in need of improvement.

4. The common threads and gaps identified through the stakeholder input process are:

Operations Business Processes Planning & Programming

» Need to better integrate operations concepts into planning and project delivery.
» Prioritize and fund small improvements.

Operations Performance Measures

» Many Operations Performance measures exist but most are immature.

Operations Organization & Staffing

» Succession planning is very limited.
» Fine tune existing organizational structure issues

Operations Workforce and Training

» Recruiting continues to be a challenge.
» Operations program training needs improvement.
» Grow troubleshooting skills.
» Develop an Operations Academy to orient new employees to the Operations program

Operations Roles & Responsibilities

» In general, better documentation and training on the Operations Program roles and responsibilities and goals

Operations Culture

» Much of the focus is on the project delivery process.
» The Operation program is still largely champion-driven and dependent upon these for success.

Operations Communications

» General communications related to the operations program needs enhancement.
» Program goals, objectives and accomplishments needs to be more clearly defined and frequently communicated within the operations program and with operations program stakeholders.
» ODOT needs to work on clearly defining ways to communicate about the various program definitions while reducing the variations in the way that the program is defined.

Operations Systems & Technology

» ODOT finds keeping up with the rapidly changing technology environment challenging.

Operations Collaborations

» Although there is strong collaboration within the Operations program and with many outside partners, staffing and time constraints will continue to make ideal collaboration a challenge.

5. Develop action plan. Based on the gaps identified through the stakeholder engagement process, a set of proposed actions to close those gaps were identified and were presented to the project core team. A set of final action items listed below were then finalized in coordination with the project core team.

6. Develop Operations Program Plan

The feedback received from the online survey, interviews, and discussion with the Core Team members, observations from peer agency practice as well as a complete assessment of the current Operations Program Plan lead towards the development of an Operations Program Plan. The goal is to continue to advance the effectiveness and maturity of the program:

By creating an Operations Program definition that 1) clearly and succinctly states what TSMO or operations means across the entire department and 2) incorporates a definitive list of what operational systems and services (strategies, tools, and projects) are included.

By developing a new program mission statement and goals

By developing a program action plan

Program Mission and Goals

Mission: Move people and goods safely and efficiently

Goals:

Integrate Operations into appropriate agency projects, policies, plans and procedures

Optimize the efficiency and safety of the existing multimodal transportation system

Be agile and innovative in identifying, adopting, and accommodating effective operations technology and strategies

Promote safe and efficient travel through communication of accurate and timely transportation system status information and collaborationwith public and private partners
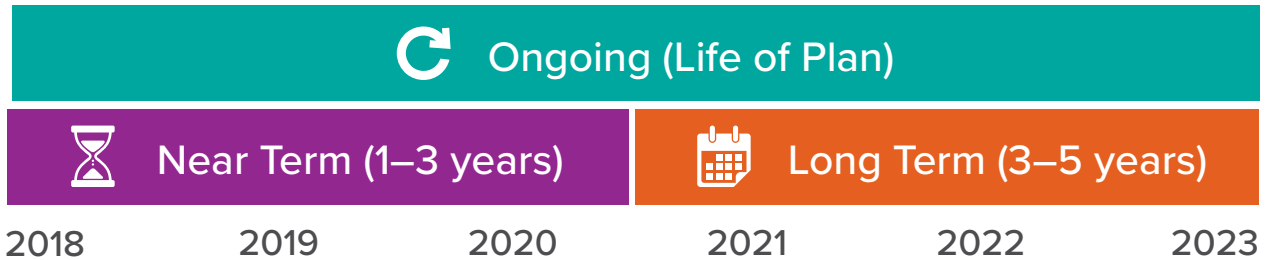
Utilize performance base startegies to drive operations planning and decision making

Achieve a sustainable Operations Program supported by good asset management practices

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Action Plan

Plan Life Cycle

⟳ Ongoing (Life of Plan)	
⧗ Near Term (1–3 years)	📅 Long Term (3–5 years)

2018   2019   2020   2021   2022   2023

Action Items

Business Processes/ Planning and Programming

⧗ 1. Develop a funding program to handle Operations projects that are too big for local region/district budgets but are not "big enough" to go through to STIP process.

⧗ 2. Create an "Operations Guide" that clearly identifies and defines the Operations Program leadership structure, decision making authority, role and responsibilities, and key processes.

📅 3. Coordinate with TDD and planning staff leadership to develop a course of action that will raise the awareness and understanding of Operations concepts among Planning staff.

📅 4. Integrate ITS plans into Regional Transportation Plans.

Performance Measures

⟳ 5. Continue implementation of actions identified in the Operations Performance Measures Plan.

⧗ 6. Develop a Traffic Signal Management Plan to set clear targets and goals related to signal operations.

Organization and Staffing

📅 7. Develop a structured process to analyze, understand and balance the priorities that Regional Operations staff are placing on Project Delivery Tasks compared to Operations tasks.

Organization and Staffing

8. Create an Operations Program Training Plan. Examine the current training that is supplied for all Operations positions, identify strengths and deficiencies. Develop a strategic approach that sustains and expands our strengths and addresses the deficiencies.

9. Develop a Recruitment and Retention strategy for Operations Program positions initially focused on the following difficult-to-fill positions:
   - Electrical Engineering positions
   - Signal Operation positions
   - IT positions
   - ITS Maintenance Technicians and Electrician positions

Culture

10. Develop an Operations Program Communication Plan placing particular emphasis on:
   - Ongoing development and distribution of the Annual Operations Program Report
   - Broad, ongoing communication of Operations Program successes
   - Clear documentation and communication of Operations Program processes and process changes
   - Development of Operations Program Internet/Intranet content

Systems & Technology

11. Improve information sharing on innovative strategies/projects as they occur in Oregon or other states.

12. Maintain and update an IT technology strategic plan for the Operations Program.

Collaboration

13. Implement stakeholder collaboration actions identified in the Oregon Traffic Incident Management (TIM) Strategic Plan.

14. Integrate Operations Data initiatives with ODOT strategic data initiatives. Improve collaboration and data sharing with other ODOT programs and with other public partners.

15. Collaborate with the private sector on Operations data. Share agency data and monitor continued improvements in private data sources and tools for program use.

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Transportation System and Operations (TSMO) Program Plan