2020
Operations Program Annual Report

Oregon Department of Transportation

introduction

As I paused to reflect on 2020, I wondered what I could possibly write to summarize this year. The word "unprecedented" was thrown around a lot this year to describe the historic events we lived through – an ongoing global pandemic, social unrest across the US, and devastating wildfires in Oregon. These events have impacted us personally and have impacted our communities in ways that we would have never predicted a year ago.

While it is insightful to reflect on what we've been through, it is inspiring to think about what we accomplished during this most unusual year. So I simply want to say thank you to the men and women that work in and contribute to the Operations Program. You've had to adapt and deal with the unexpected, but you've taken on an "unprecedented" year with your usual professionalism and productivity in spite of the challenges. I find this remarkable.

I hope you enjoy reviewing this report highlighting the many accomplishments across the program in 2020. It represents much hard work, focus and dedication that was applied in order to meet our goals in the middle of some trying circumstances. I look forward with hope for a better 2021 and with anticipation for the important work that we have planned. Because of your unwavering commitment to excellence this past year, I have an even greater confidence in our ability to address whatever challenges we encounter. Thanks again for the work you do, and keep up the good work!

Galen McGill
Systems Operations & ITS Manager

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The Intelligent Transportation Systems Engineering team works on numerous projects in support of ITS and traffic signal operations including projects at the planning, engineering design and construction support stages.

ITS AND TRAFFIC NETWORK EQUIPMENT CONTRACT

ITS, Traffic and ISB Enterprise Technology have been working on establishing a 10 year price agreement contract for industrial roadside network equipment since April 2019. This contract will be for the supply of network routers, firewalls, switches and radios for ITS and traffic signal communications. ITS worked with OPO, ISB management, DAS, and OSCIO for assuring ODOT had procurement authority since the project included cooperative permissive terms so that local cities and counties can use the contract to purchase their own equipment.

The network radio was awareded to Western Pacific Signal for the supply of the EncomWireless products. And an intent to award was issued to Western Systems for the supply of Siemens-RuggedCom network equipment and services under a second contract.

I-84 SNOW ZONE SAFETY IMPROVEMENTS

The ITS Unit and Region 5 worked with a consultant to develop a transportation system management and operations (TSMO) plan for the Interstate 84 corridor from Pendleton to La Grande. As described in the 2018 annual report, the intent was to identify solutions to improve safety and operations along the I-84 and I-82 corridors in Region 5. This section of interstate poses challenges to motorists due to the terrain changing from desert to mountain passes with sections of sharp curves and steep drop-offs. Weather through Eastern Oregon creates additional challenges, with some sections experiencing snow or ice on the road for up to 60 days of the year.

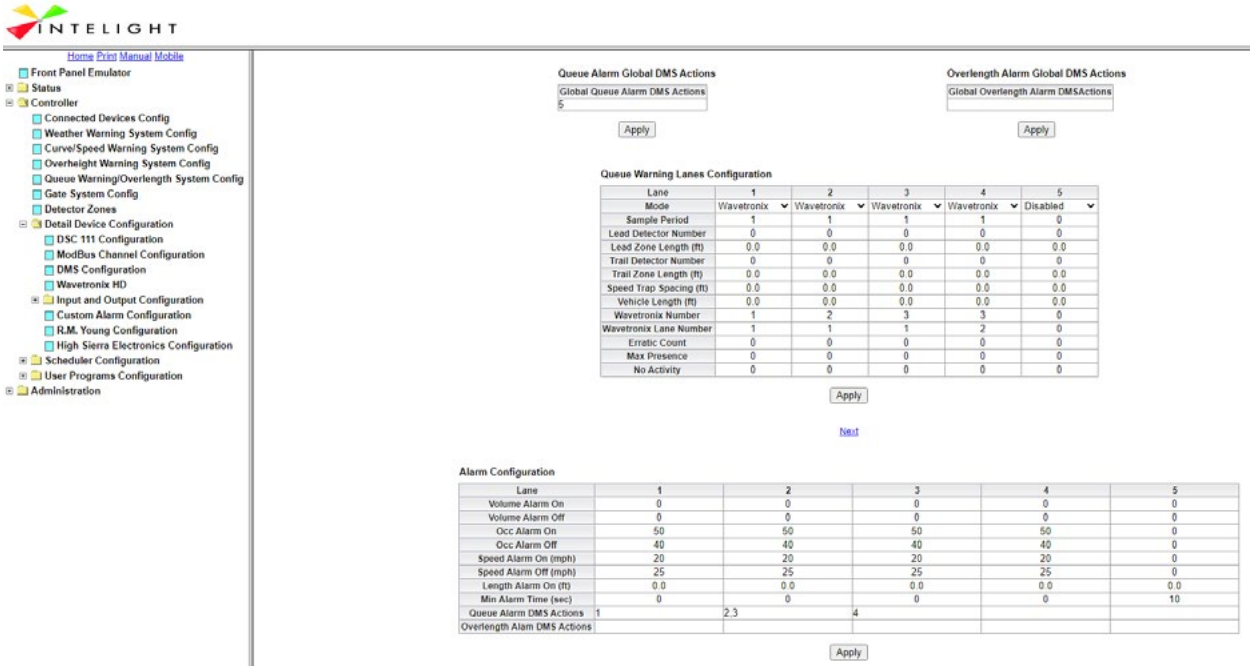
The I-84 Snow Zone Safety Improvement project that transpired in 2020 was from mile point 214 to 260 and consisted of a total of 23 sites comprised of 34 variable message signs, 9 traffic sensors, 23 cameras and 12 road and weather information stations. ITS advanced transportation management (ATM) software was used to automatically adjust posted messages on the VMS based on weather conditions where incident messages override weather warning message automatically using the response plan system (RPS) software.

The system is designed in such a way that will provide the capability of becoming a variable speed limit or speed advisory system if the Region decides that they have a need for it. Additionally, one of the main purposes of this system is to provide advanced incident and weather warning for vehicles on Cabbage Hill, a section of highway that separates and passes through a mountainous area with a large elevation change and steep drop offs. Due to the lack of utility power availability, ODOT installed, owns, and maintains 6 miles of utility medium level voltage power distribution line, which is not currently being done anywhere else in the state.

Project is constructed and configured in ODOT's ITS Advanced Transportation Management (ATM) software. ODOT ITS engineering is training R5 staff on the operation of the system and configuration. System is operational.

I-5 AURORA DONALD QUEUE WARNING

ITS worked with region 2 maintenance and operations staff and with the region 2 Electrical crew in installing two new variable message signs, two cameras for TripCheck.com, and two traffic sensor for determining the traffic queueing at the I-5 Exit 278 SB ramp and warning motorists of congestion spilling back onto the freeway. Region2 has experienced a high number of rear end collisions due these long queue lengths at the ramp backing motorists onto I-5. This effort is a temporary ITS solution as the longer term fix is to construct additional vehicle storage at the ramp that is currently being designed.



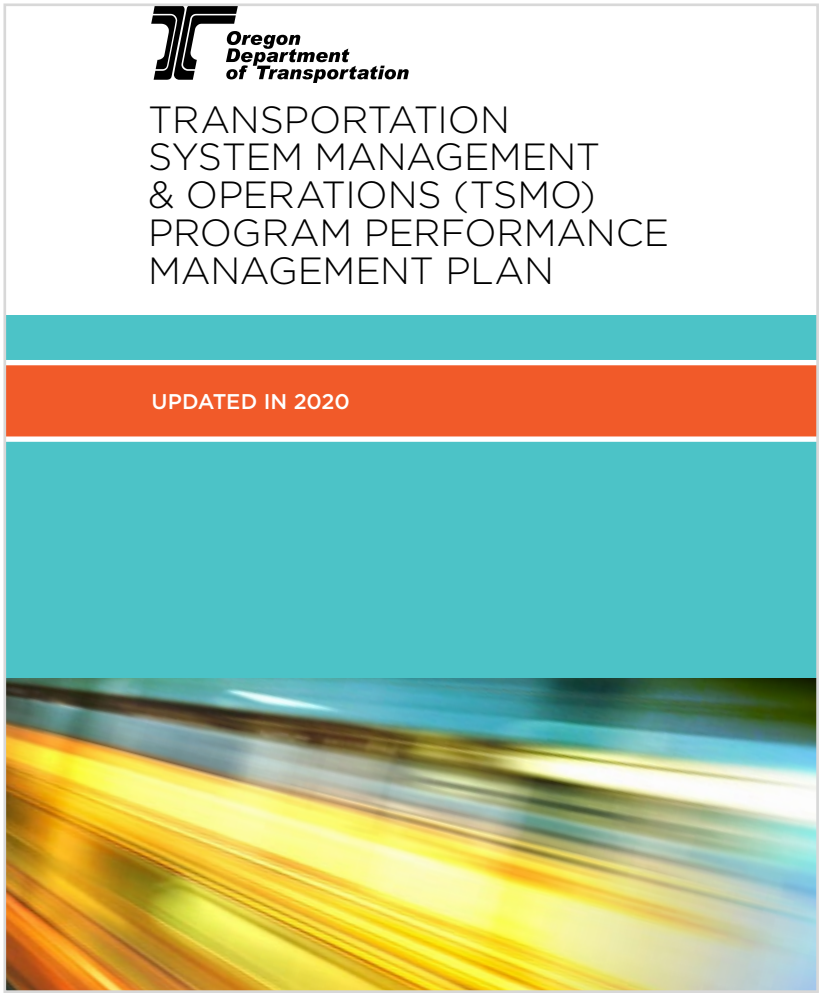
system operations performance measures

TSMO PERFORMANCE MEASURES PLAN

The Performance Measures Plan was first adopted in early 2017 after several years of self-assessments that started with a national scan of current practice and literature review surrounding Transportation System Management and Operations (TSMO). Areas that were assessed were mobility, traveler information, traffic incident management, transportation operation centers and traffic signals.

Since its implementation, much has changed across the areas of assessment, so we have been working on updating the plan. As of the end of the year, we have reviewed and updated over 80% of the report. The core measures for each section are being validated and updated with the goal of having the final updated report available in the first quarter of 2021.

Like the original rendition, the objective of this updated report is to continue to create and improve actionable performance measures that directly support the stewardship of Oregon's transportation system by improving the efficiency of the transportation system through operations and management strategies, actively managing transportation assets to extend their life and reduce maintenance costs, and actively managing program resources.



The Performance Management Plan is three years old and we are making great strides in providing meaningful measures in many program areas. We have better access to data, are adding new data and are making the reports more accessible to audiences who use the reports.

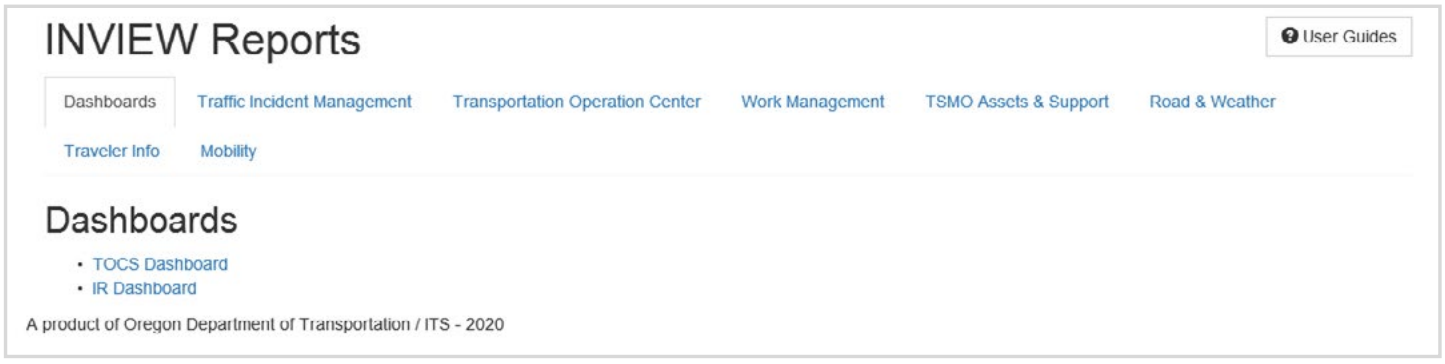
INVIEW GENERAL REPORTS

There have been numerous changes to the Inview general reports. Over the past year, the majority of the PowerBI and SSRS operations reports have been reworked to be more precise and user friendly by aligning them to match the format of the TSMO performance measures plan and its core performance measures. New category tabs such as Work Management and Mobility have been added as well as reports under the TIM and TOC tabs.

Some of the new reports include an ODOT hot spot map, dedicated IR event Traffic Incident Management (TIM) timeline, crash/fatal crash trends, the Response Plan System (RPS) report and traffic volumes and Portland travel time and volume report, just to name a few.

TO SEE IF ANY OF THESE REPORTS WILL WORK FOR YOU, PLEASE VISIT THE GENERAL REPORTS SITE.

In addition to the reports in Inview, ODOT has recently implemented the Regional Integrated Transportation Information System (RITIS) platform. The arsenal of tools in RITIS include Real-time overviews, data archives and a Probe Data Analytics Suite (PDA). The PDA suite includes Trend Maps, Performance Summaries, Bottleneck tools and much more. All ODOT employees (and our contractors) have unlimited access to the RITIS tools and PDA platform, which are hosted by the University Of Maryland's CATT Lab. For more information, training tools, resources and instructions please visit the ODOT webpage Oregon Department of Transportation : Regional Integrated Transportation Information System : Data & Maps : State of Oregon



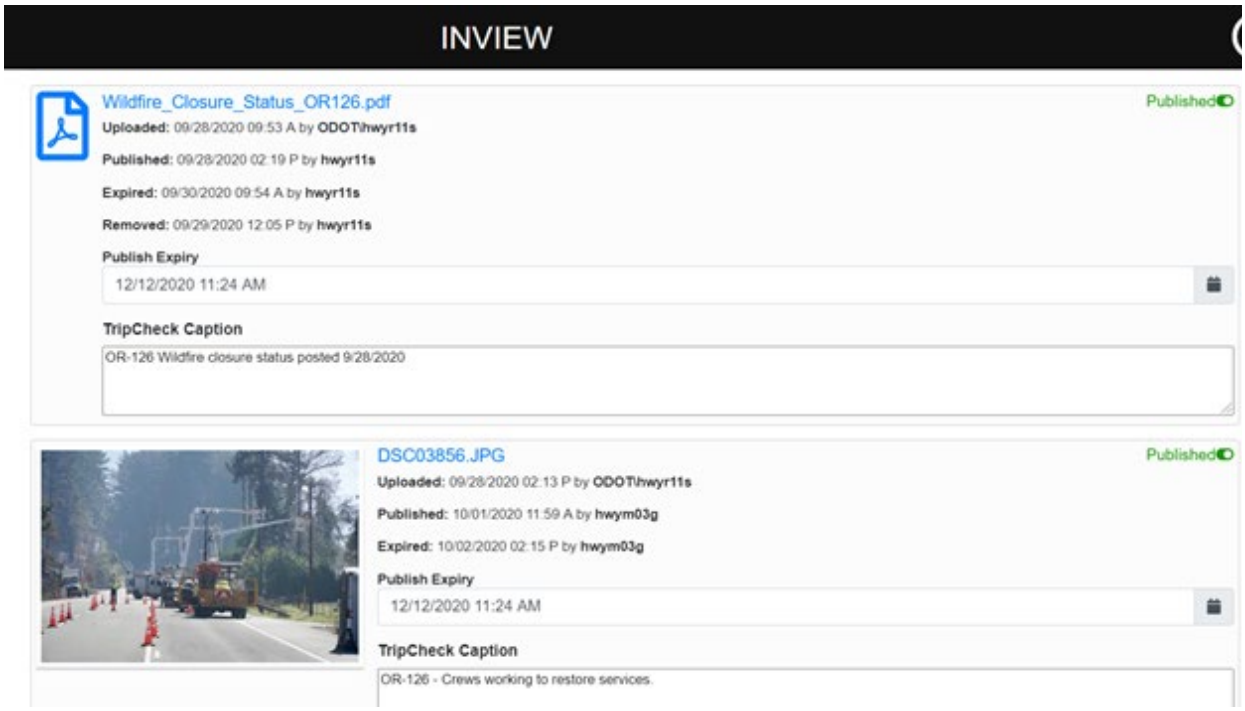
traveler information

Traveler information is more than TripCheck and 511. Included under the Traveler Information umbrella is TripCheck Local Entry (TLE) and TripCheck API (formerly TTIP). Both of these systems serve to enhance the traveler experience today and into the future.

2020 has been a significant year for traveler information. TripCheck.com had a busy year, and we've continued to make improvements to our traveler information systems.

RELEASE OF IMAGES AND FILES ON TRIPCHECK

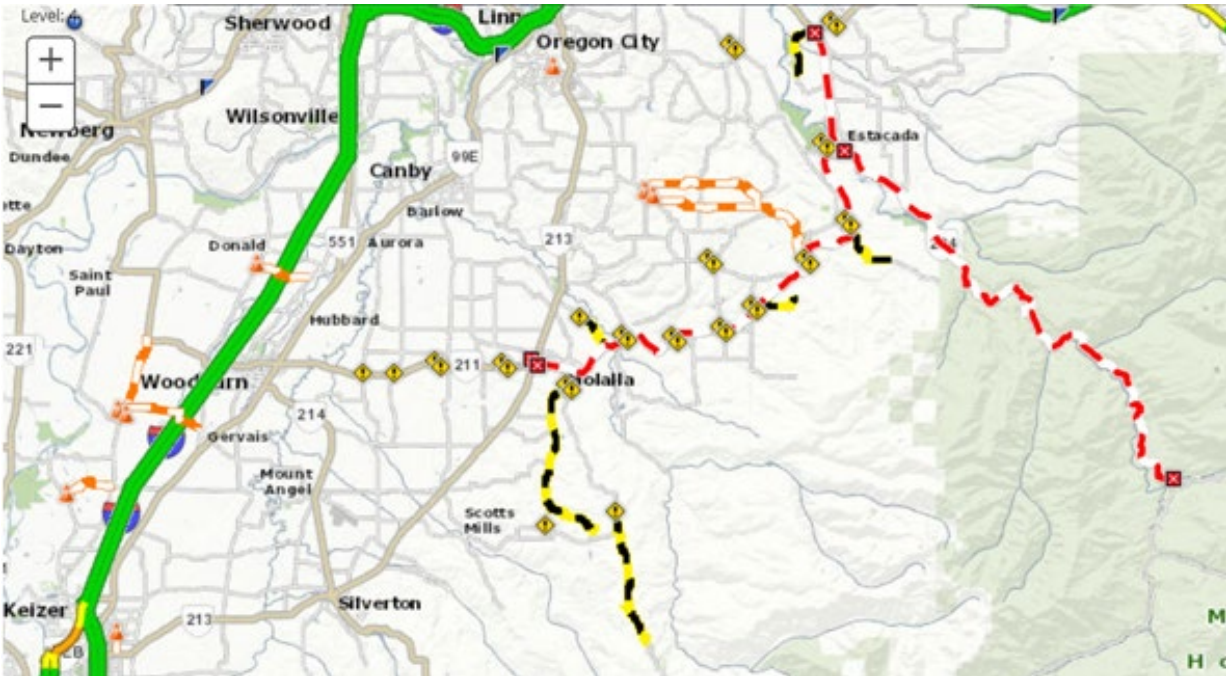
Images and Files on Tripcheck (IFT) was released for use on August 13th. This product allows certain Inview users to publish pictures and documents associated with an event into the TripCheck pop-up box. As they say, "a picture says 1000 words" and IFT now allows ODOT to share our story on TripCheck in a way we haven't in the past.

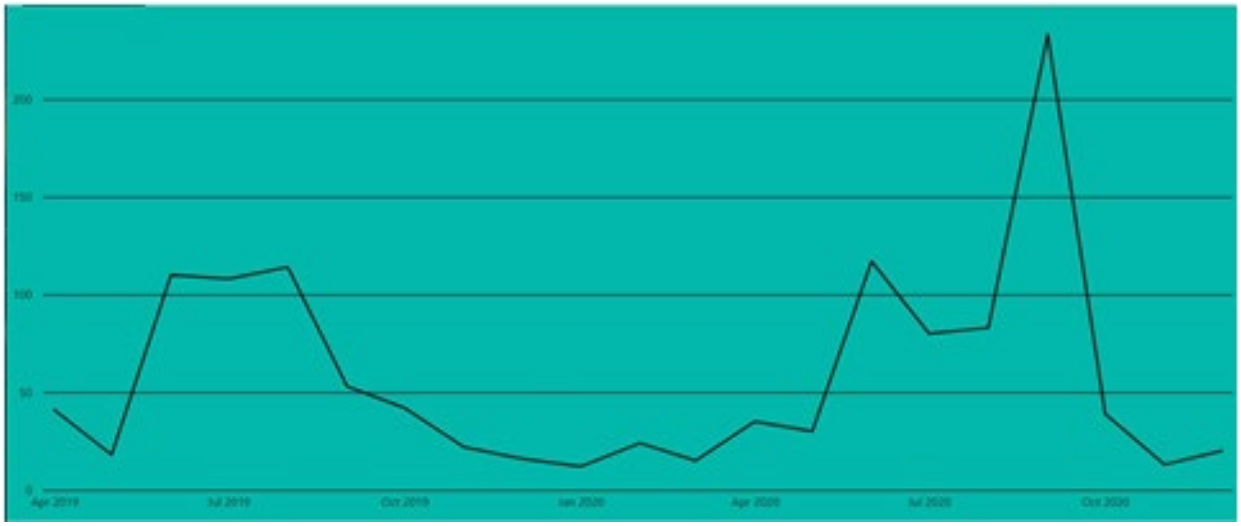


The devastating wildfires in September provided an immediate opportunity to put IFT to use. Pictures taken by frontline staff and ODOT's photographers were uploaded to TripCheck to provide our customers much more information than can be described in Traveler Information. We were able to show the dramatic impacts of the fires to the transportation system including the scope of the immediate recovery efforts.

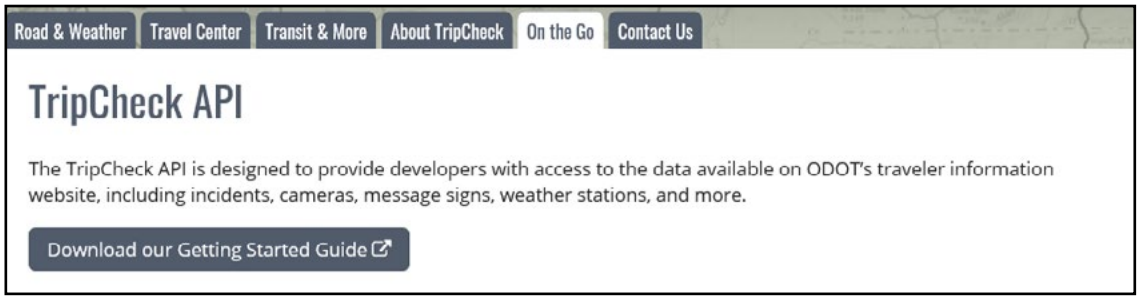
TRIPCHECK LOCAL ENTRY

During the 2020 Oregon wildfires, several cities and counties used TripCheck Local Entry to inform citizens of closures within their jurisdictions. TLE events on TripCheck were accessed nearly 640,000 times in September with approximately 229 events being input by 9 agencies, highlighting the value of our partnerships.





This chart shows TLE use by month since our roll out. 53 events in Sep. 2019 vs. 233 in 2020.



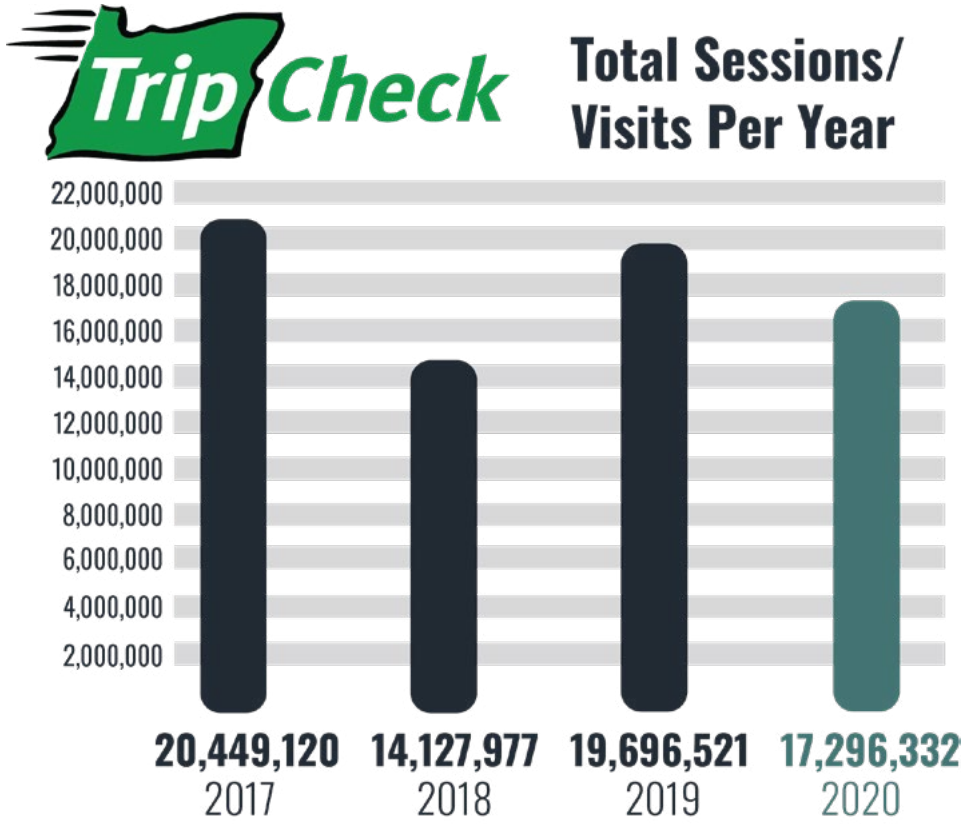
TRIPCHECK API

For the past decade, ODOT has provided subscribers with traveler information via a data portal called the TripCheck Traveler Information Portal (TTIP). In September we launched a new traveler information application programming interface or API to replace TTIP.

The TripCheck API project has modernized the way we share real time, operations data with data consumers. There are many data feeds in the API (click to view the data feeds available), from Incidents reported by our TOC's to camera images and dynamic sign messages, to name a few. Subscribers include; Here, Waze, Portland State University and many others. This data can be used in analysis, sharing real-time information on other platforms, or creating a traveler information app.

TRIPCHECK

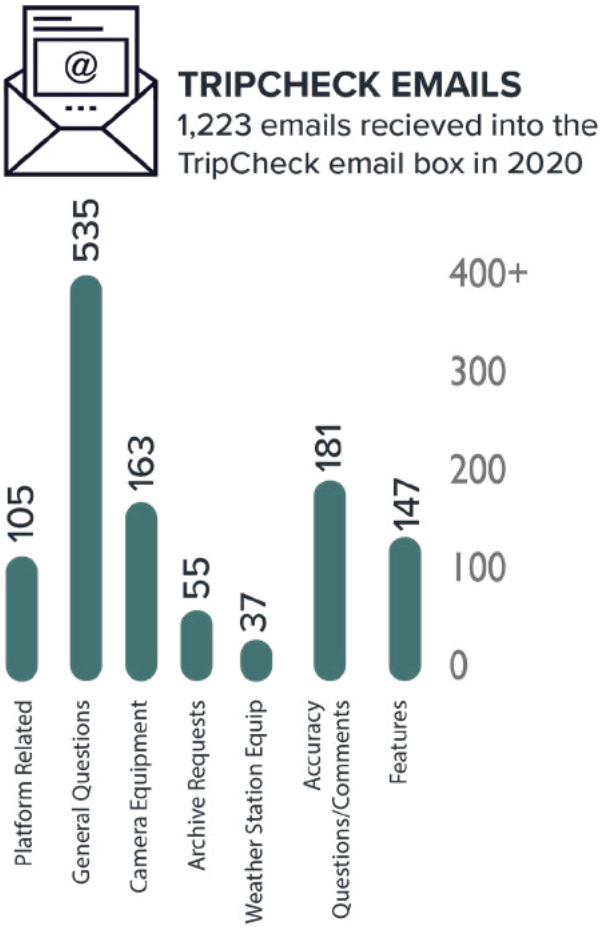
TripCheck had over 23 million page views in 2020. The peak use was during the wildfires in September where the peak day was September 9th with an astonishing 707,215 page views.

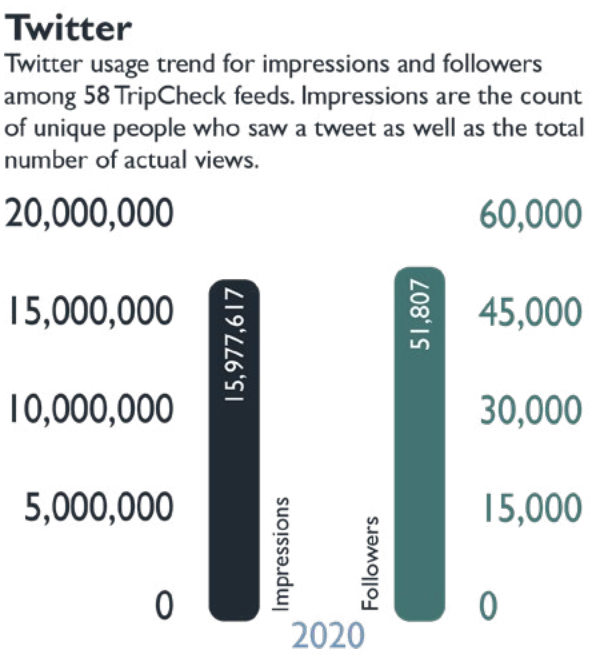


**Sessions are equivilent to all screen views.*

TWITTER

TripCheck uses Twitter to provide up to the minute information to its followers on specified sections of highway in Oregon.



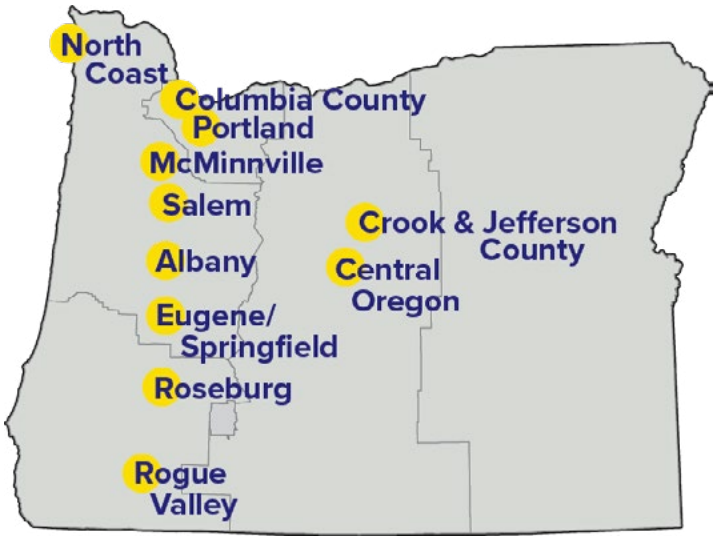


traffic incident management

The Traffic Incident Management team's goal is to promote 'Safe, Quick Clearance' of incidents through implementation of TIM strategies, delivery of training, and collaboration with other first response resources.

OREGON REGIONAL TIM TEAMS

Oregon has maintained numerous TIM Teams across the state for several years. In 2020, we added several new regional TIM teams resulting in having the majority of our north to south corridors covered. We had to transition to virtual meetings this year, but our regional TIM teams continue to be an important tool for building relationships among first responders, implementing TIM strategies and improvements, reviewing performance reports, and performing debriefs of major incidents.



OSP PILOT FOR S-UAS CRASH RECONSTRUCTION

S-UAS technology was deployed in early 2020 as part of the ATCMTD grant that ODOT received. Part of this grant was to purchase technology to expedite the opening of roadways after serious injury or fatality crashes. OSP had piloted and tested an S-UAS for some time prior to the receipt of this grant and it was the opinion of OSP and ODOT that there was significant return on investment for this project. The project required procuring, training the troopers, and deploying the drones, which the agencies together were able to do in the span of a couple months. The S-UAS systems purchased for OSP by ODOT have been deployed since March we are currently collecting data on the incident time reduction safety improvements.

TIM TRAINING

Training has been one of the most impacted programs within the Traffic Incident Management Program this year. Training slowed down when the COVID restrictions were implemented in March and we were no longer able to host in person trainings. As the year progressed we adapted the training program to be delivered virtually. This enabled us to continue to deliver crucial training to employees and stakeholders across the state.

PHOTOS TAKEN PRIOR TO COVID RESTRICTIONS IN OREGON

Oregon TIM Responder Training Program

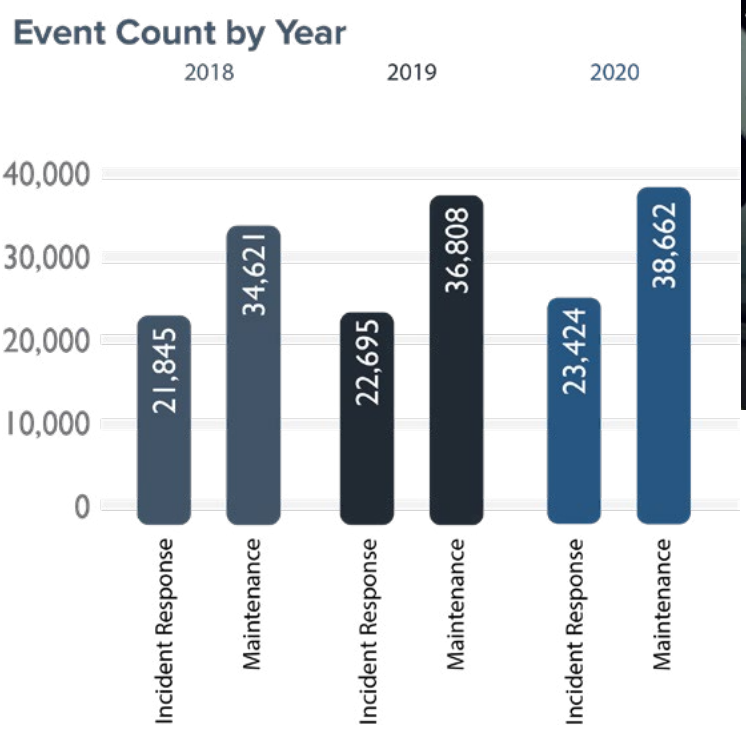
7,225 Total Trained

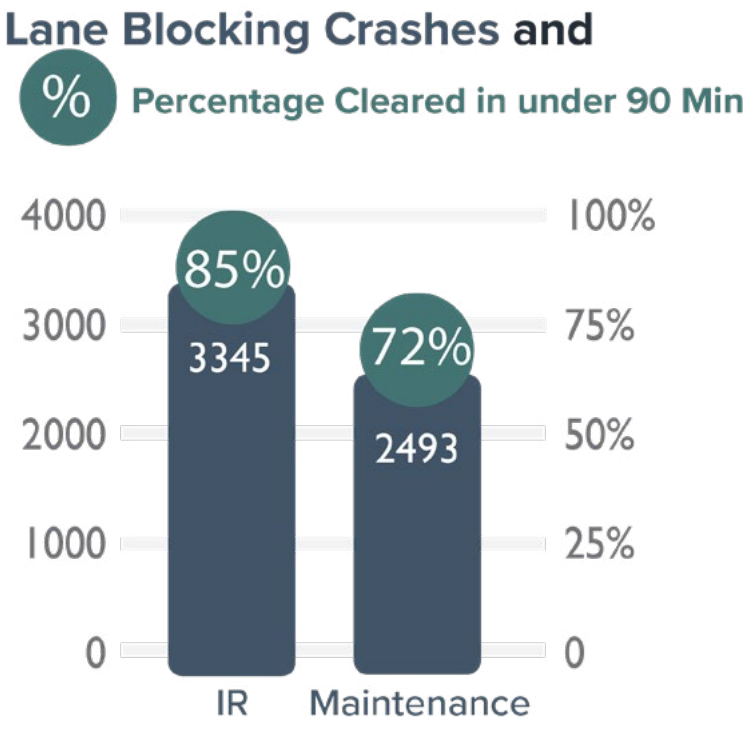
2018		2019	2020
679	FIRE/RESCUE	337	151
214	TRANSPORTATION & PUBLIC WORKS	10	0
160	LAW ENFORCEMENT	185	80
103	TOWING/RECOVERY	71	0
40	OTHER	11	0
4	ONLINE	0	0
3	EMS	2	0
1,203	**TOTAL TRAINED DURING THE YEAR**	**616**	**231**

332 SESSIONS DELIVERED TO DATE

DEDICATED INCIDENT RESPONSE (IR)

The dedicated incident response program has played a key role in congestion mitigation since its inception. The main purpose of a dedicated incident response team is to keep traffic moving and restore traffic flow is by utilizing traffic control to reduce secondary crashes and clearing incidents safely, quickly and efficiently. Additional the incident response (IR) program relieves maintenance crews from being primary incident responders allowing them stay focused on their primary work with fewer interruptions and increased efficiency.

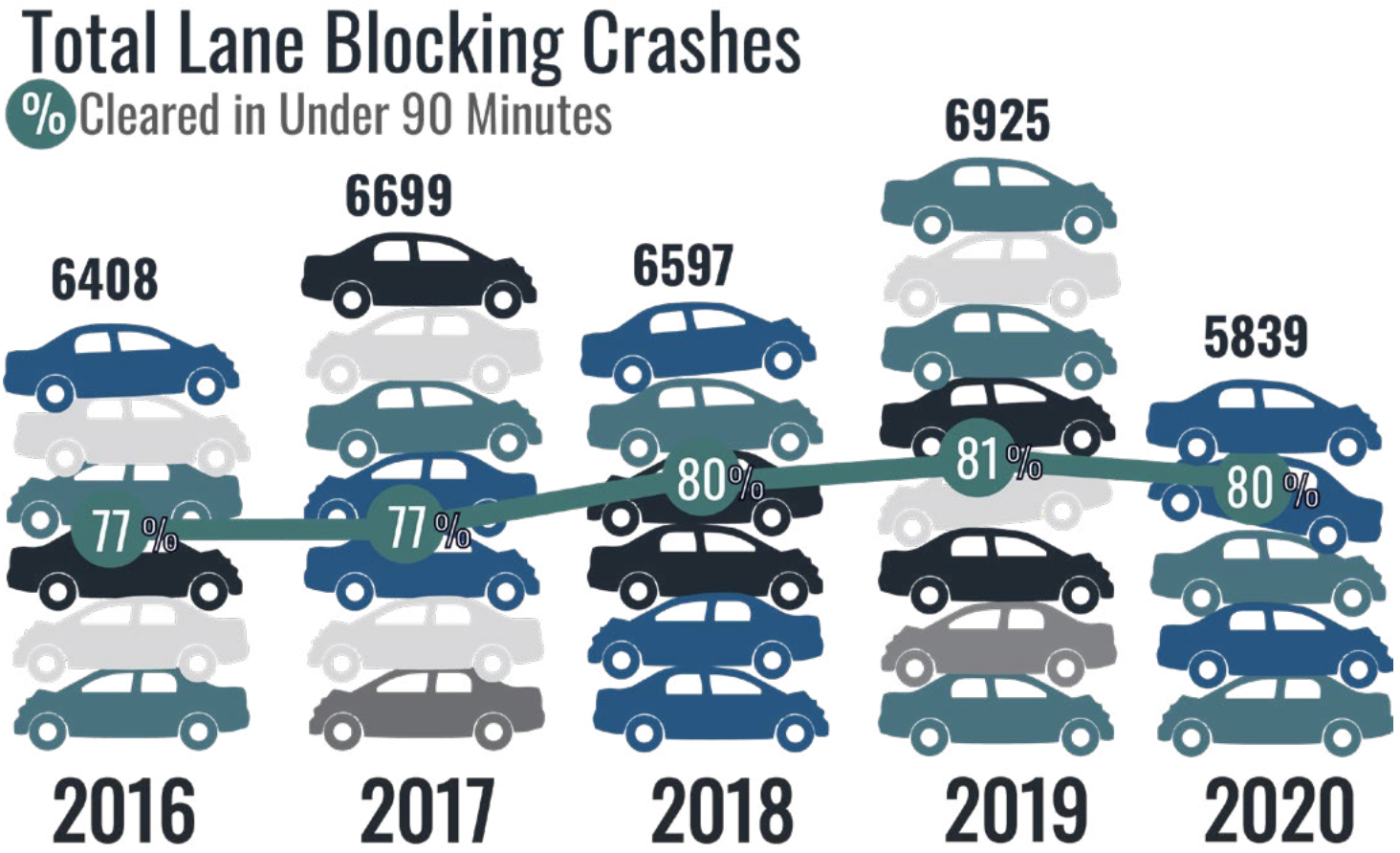


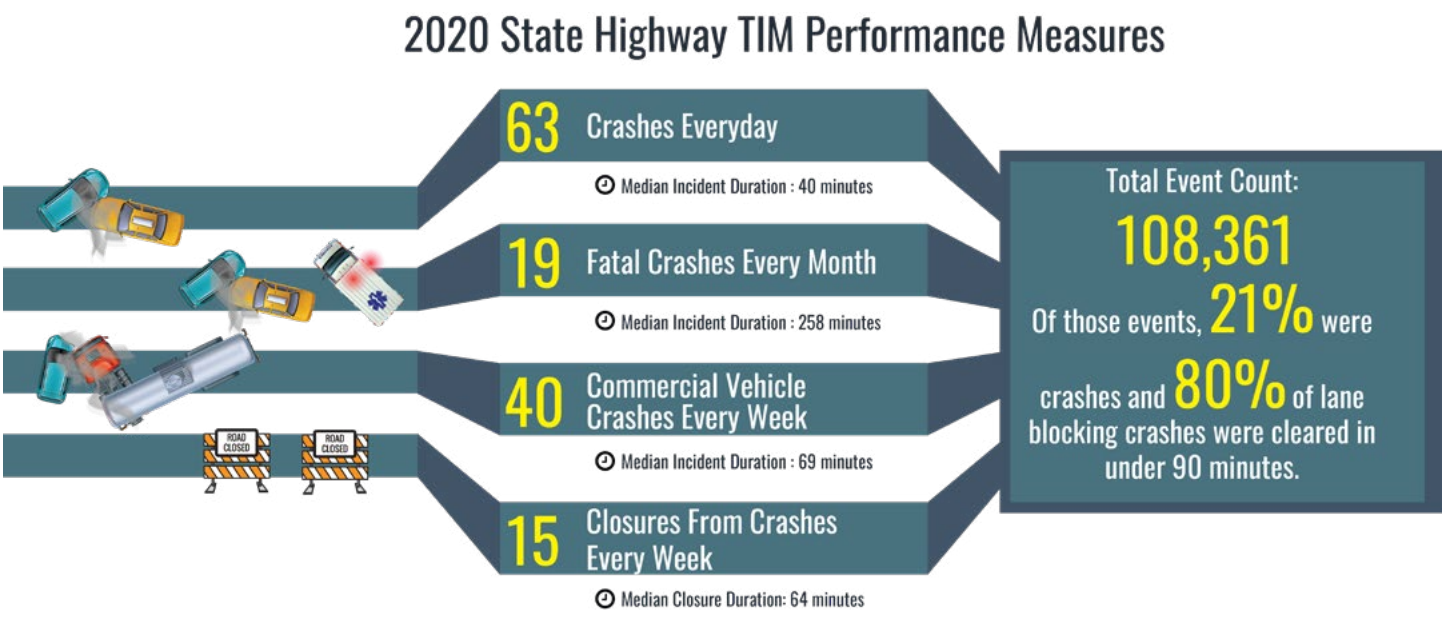


PERFORMANCE MEASURES

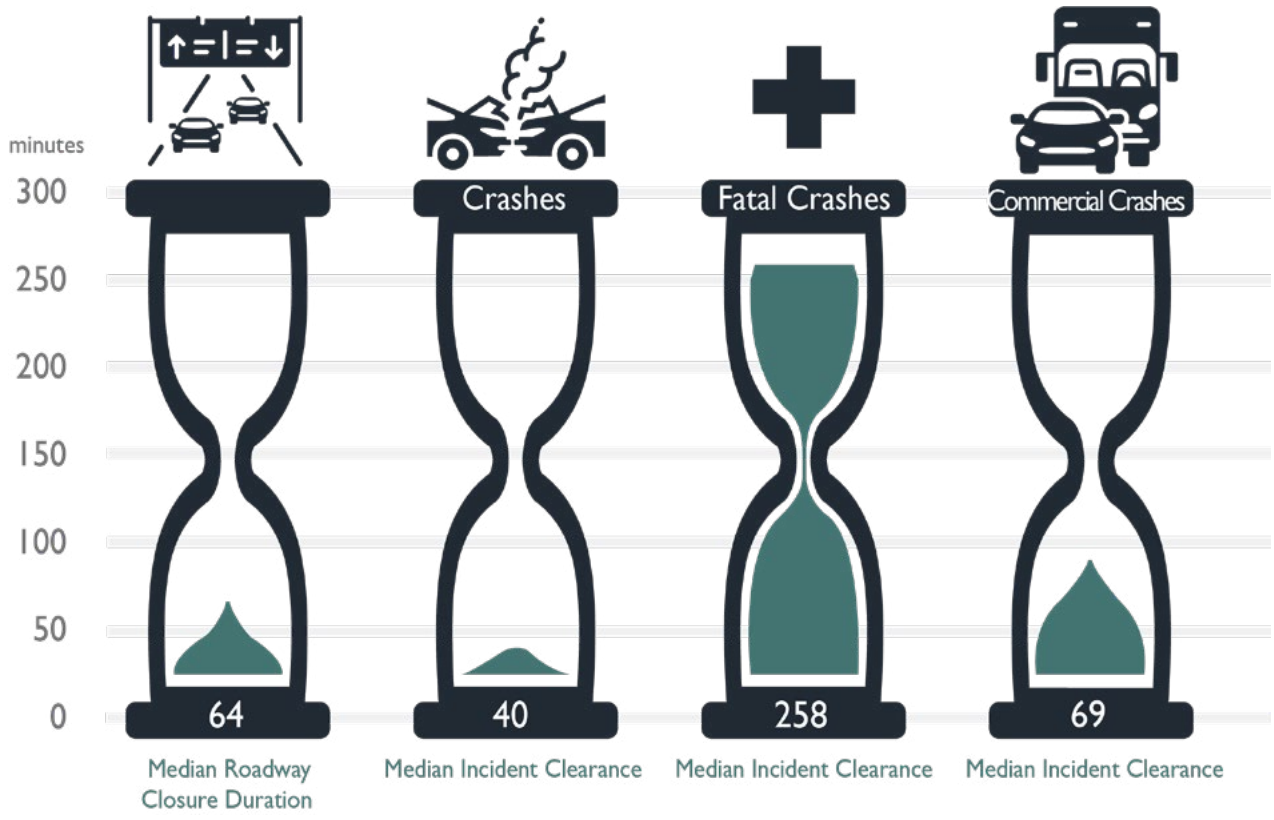
TIM performance measures enable us to identify trends, prioritize program activities and resources and set realistic goals.

One of ODOT's key performance measures is the percentage of lane blocking crashes that are cleared in 90 minutes or less - with a goal of 85% clearance. A snapshot of 2020 Oregon State Highway incidents performance measures is shown here.





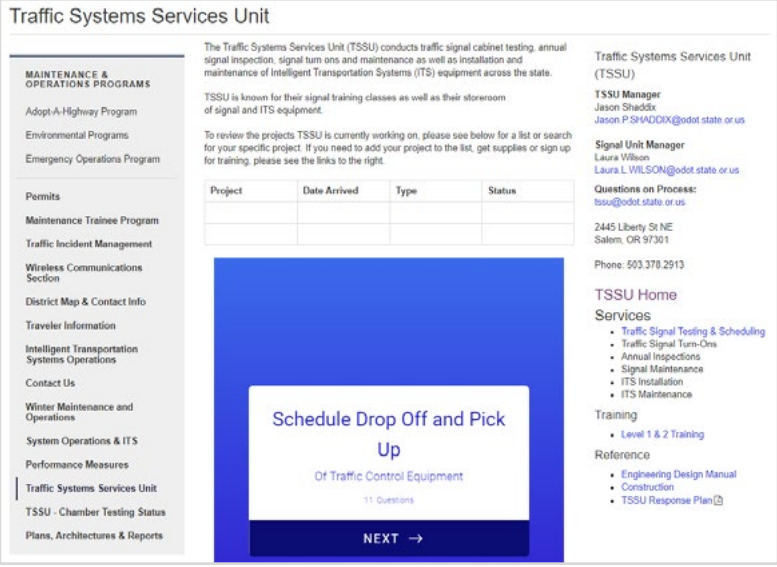
2020 STATE HIGHWAY TIM KEY PERFORMANCE MEASURES

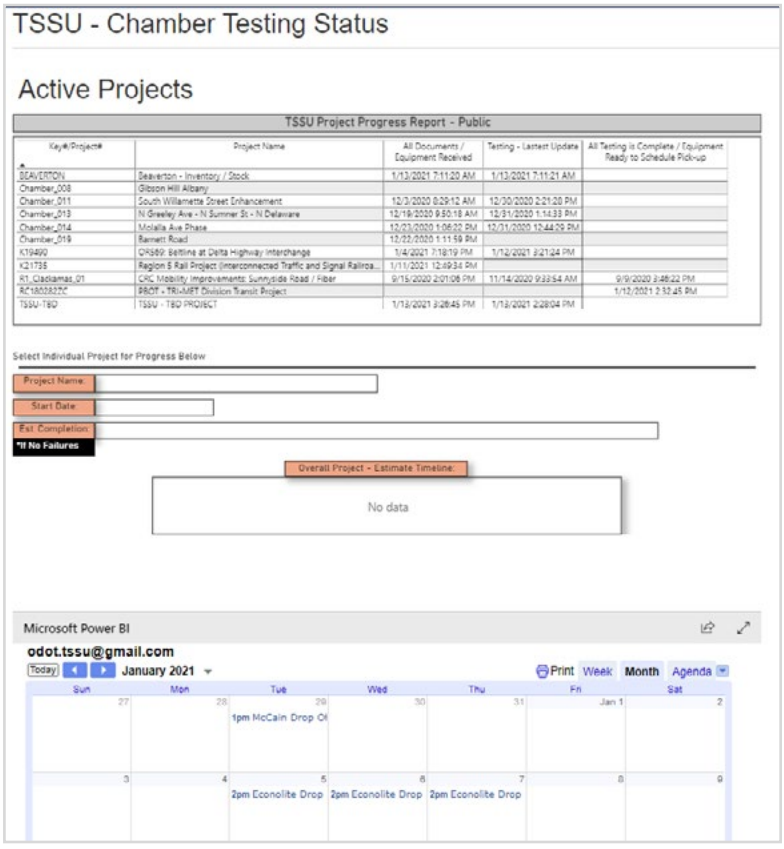


traffic systems services unit

The Traffic Systems Services Unit works with the electrical, traffic and signal timing staff to ensure new signals and cabinets are tested properly, installed to code and existing systems are inspected annually. In every corner of the state, they have completed a significant amount of work in 2020.

The Traffic Systems Services Unit (TSSU) has diligently been working to improve many aspects of their work; including efficiency, service and facilities.





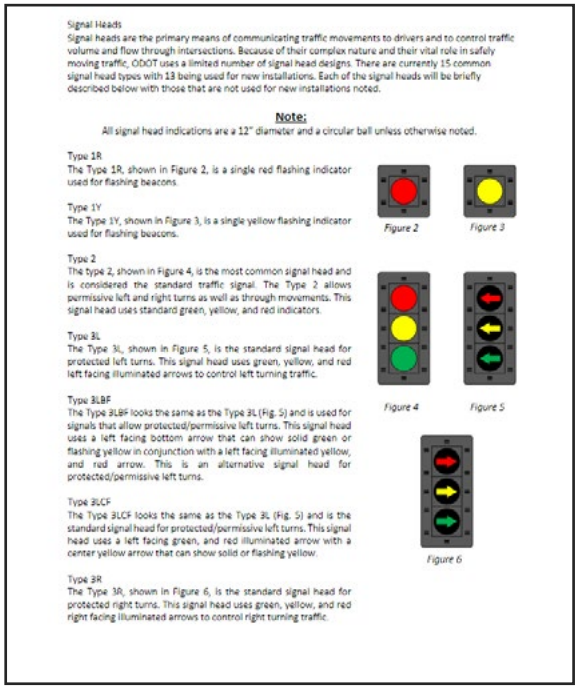
EFFICIENCY

Being efficient comes in many forms, including an updated website which helps TSSU manage a number of construction related issues, chamber testing process and results and general communication to vendors, contractors and other ODOT staff. Through a series of software programs, TSSU collects project data which assists them in scheduling equipment pickups and drop offs and any disperses necessary project related communication.

SERVICE

Service is at the heart of what TSSU does. One of the most important services TSSU offers is training. This year, TSSU embarked on a substantial training overhaul, specifically for the ITS program. To facilitate technician training and onboarding, TSSU has developed a training program for the core ITS asset classes in 2020. Training guides for VMS, RWIS, and camera systems have been completed and we will be working to providing the training in 2021.

In addition to ITS program training, confirmation of the proper operation of traffic signal conflict monitoring is probably the most important aspect of the inspection and turn on services TSSU provides. We have focused efforts on a comprehensive three level training course, completing nearly 75% of it in 2020 with a final completion date in 2021.



Signal Heads

Signal heads are the primary means of communicating traffic movements to drivers and to control traffic volume and flow through intersections. Because of their complex nature and their vital role in safely moving traffic, ODOT uses a limited number of signal head designs. There are currently 15 common signal head types with 13 being used for new installations. Each of the signal heads will be briefly described below with those that are not used for new installations noted.

Note:

All signal head indications are a 12" diameter and a circular ball unless otherwise noted.

Type 1R
The Type 1R, shown in Figure 2, is a single red flashing indicator used for flashing beacons.

Type 1Y
The Type 1Y, shown in Figure 3, is a single yellow flashing indicator used for flashing beacons.

Figure 2 Figure 3

Type 2
The type 2, shown in Figure 4, is the most common signal head and is considered the standard traffic signal. The Type 2 allows permissive left and right turns as well as through movements. This signal head uses standard green, yellow, and red indicators.

Type 3L
The Type 3L, shown in Figure 5, is the standard signal head for protected left turns. This signal head uses green, yellow, and red left facing illuminated arrows to control left turning traffic.

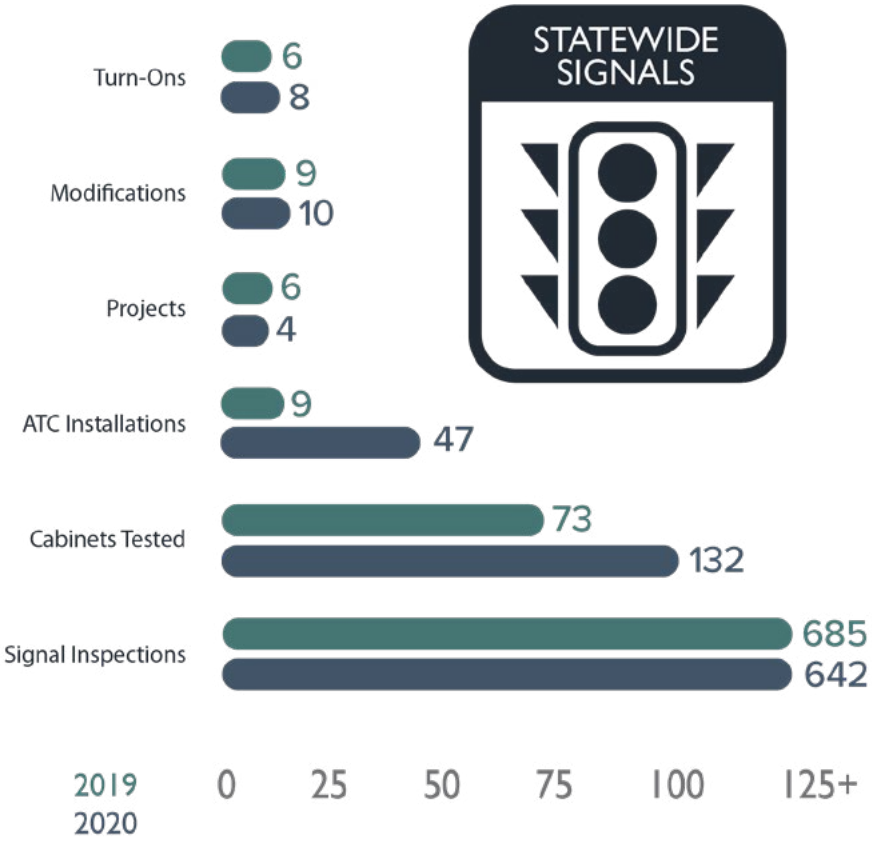
Figure 4 Figure 5

Type 3LBF
The Type 3LBF looks the same as the Type 3L (Fig. 5) and is used for signals that allow protected/permissive left turns. This signal head uses a left facing bottom arrow that can show solid green or flashing yellow in conjunction with a left facing illuminated yellow, and red arrow. This is an alternative signal head for protected/permissive left turns.

Type 3LCF
The Type 3LCF looks the same as the Type 3L (Fig. 5) and is the standard signal head for protected/permissive left turns. This signal head uses a left facing green, and red illuminated arrow with a center yellow arrow that can show solid or flashing yellow.

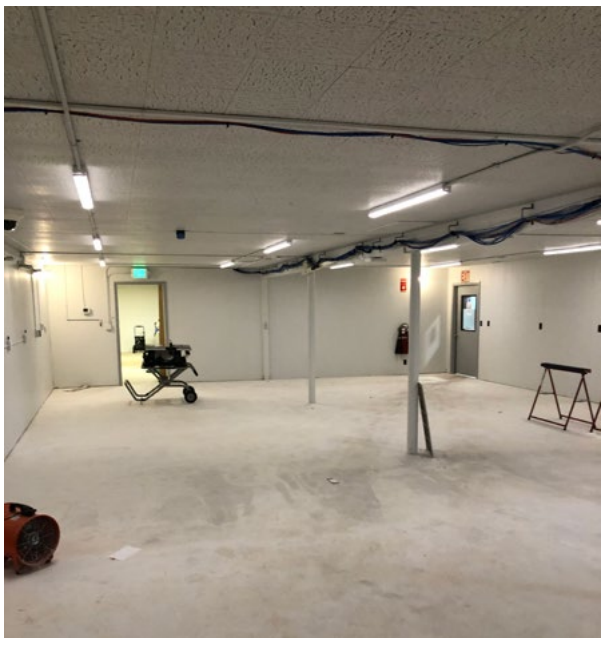
Figure 6

Type 3R
The Type 3R, shown in Figure 6, is the standard signal head for protected right turns. This signal head uses green, yellow, and red right facing illuminated arrows to control right turning traffic.



FACILITY IMPROVEMENTS

Updates have been made to the crew area in an effort to focus on the training TSSU provides. The room is being converted into a training room and lab area and will allow TSSU to provide on site training that was previously performed at local offsite conference areas. These updates will allow us to create lab and training spaces we can use for internal and external training efforts. Additionally, we made updates to the chamber office transforming it into the new crew room, with a new external door. Both rooms will have updated floors, ceilings, and lighting.



its central systems

Behind all of our roadside equipment are approximately 44 software systems that monitor road conditions, process data and take action 24/7, 365 days per year. The Central Systems Team monitors and maintains these systems and associated hardware to keep them in peak operating condition.

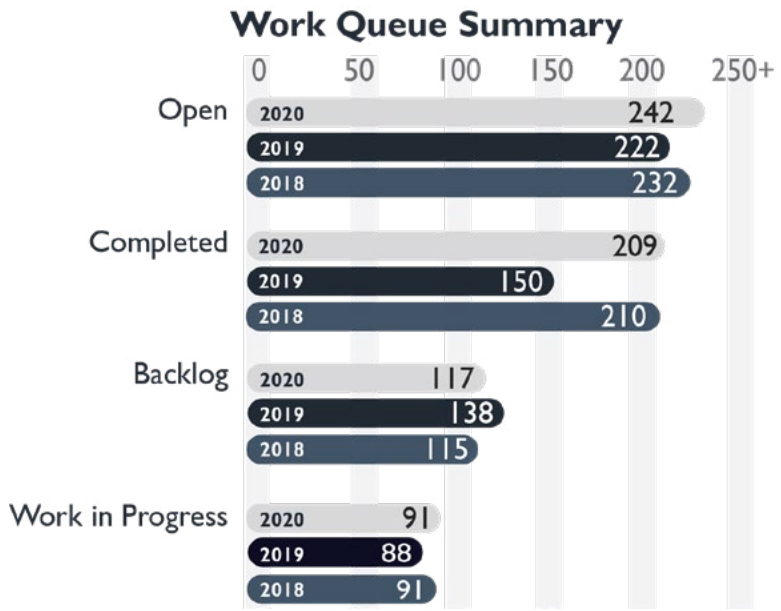
The ITS central systems team is the like a wizard behind the scenes. You never see them but they keep our operations software running on a 24x7 basis including holidays and weekends.

PROGRAM IMPROVEMENTS, INCLUDING:

- Helped define agency governance processes for Microsoft Azure APIM - a cloud based management platform for APIs - that can be used agency wide, but is part of the solution to expose APIs that are hosted internal to the network that resides on services used for TripCheck and allows those exposed APIs to be migrated to another web server.
- Defined new "Backlog Triage" process to standardize the way TOCS/INVIEW bugs and enhancements are evaluated and prioritized for resolution
- Developed a Server Quality Plan & Processes, centering around process failure points and opportunities for improvement. This includes validation processes, tracks ET/SAIT build processes and checkpoints throughout.
- Developed a Server Visualization Road Map

SYSTEM SOFTWARE ACCOMPLISHMENTS:

- Reworked Data Publisher Incidents publication to use TOCS Updater, which allows more detailed event info (e.g., event subtypes) to appear on TripCheck
- Replaced 511/HAT phone system with solution from new vendor
- Released the Road Weather Sign Automation and 2020 Spring Maintenance projects, which added features to RPS and TOCS for Chain Condition Events - making it easier for dispatchers to use the RPS plans and making TOCS system aware if a particular reporting station has signs associated with it and if it does, passes the reporting station ID and chain condition to RPS again making it easier for the dispatcher to post messages and restrictions quickly with out location research.
- Implemented the new "TripCheck API" to replace legacy TTIP portal.



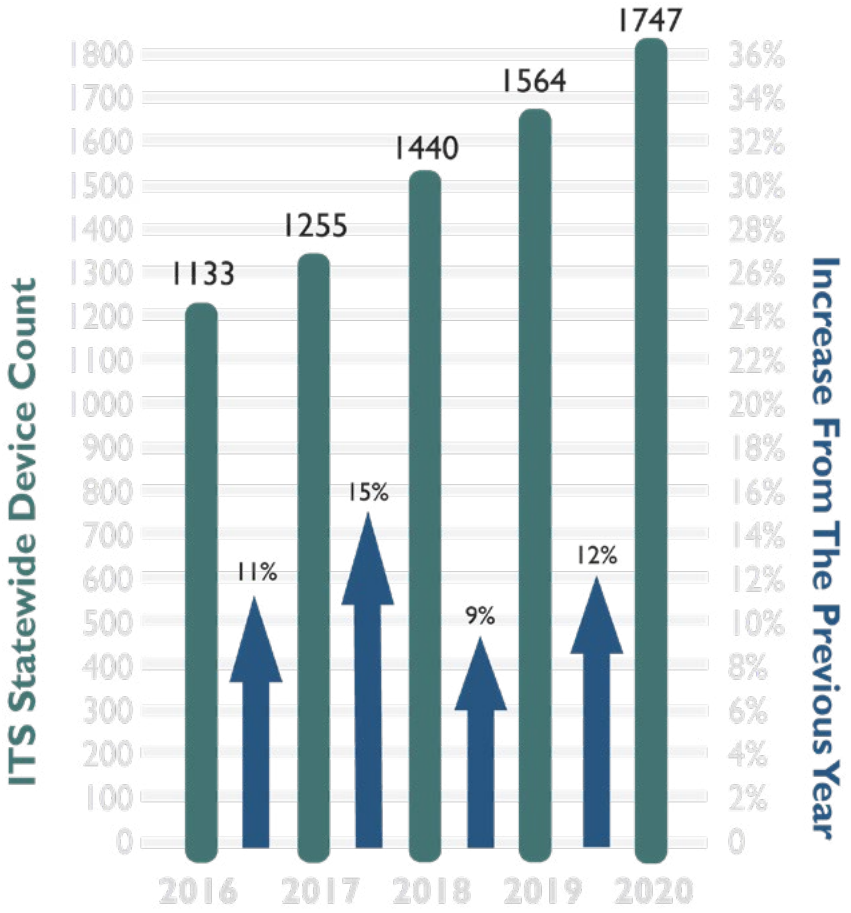
its field maintenance

Our ITS Field Maintenance team consists of technicians in each region that are responsible for keeping our growing inventory of ITS equipment in good working condition. They also support network communications for traffic signals and provide construction support for installation of new ITS equipment.

ITS DEVICES

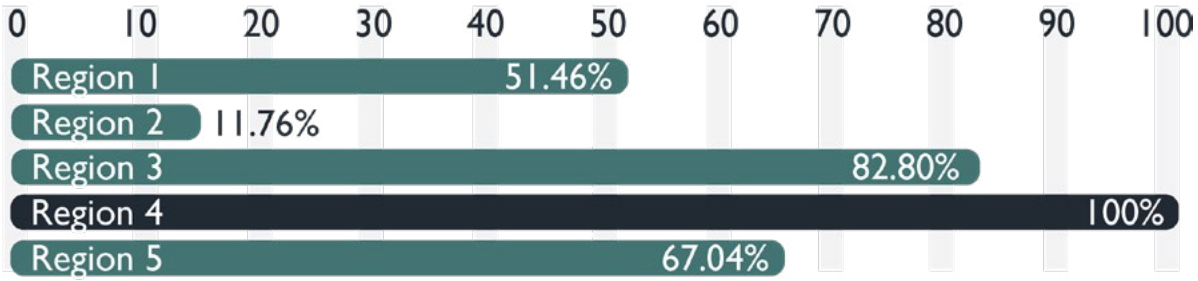
The ITS device growth trend continued in 2019. ITS devices are the backbone of many System Operations strategies such as TripCheck, Traffic Incident Management and Active Traffic Management.

While much of our ITS inventory is fairly new, some of the early ITS equipment is reaching the end of it's design life. The Asset Beyond Design Life Percentage graph shows what would happen to the percentage of equipment beyond design life if no investment is made to replace.

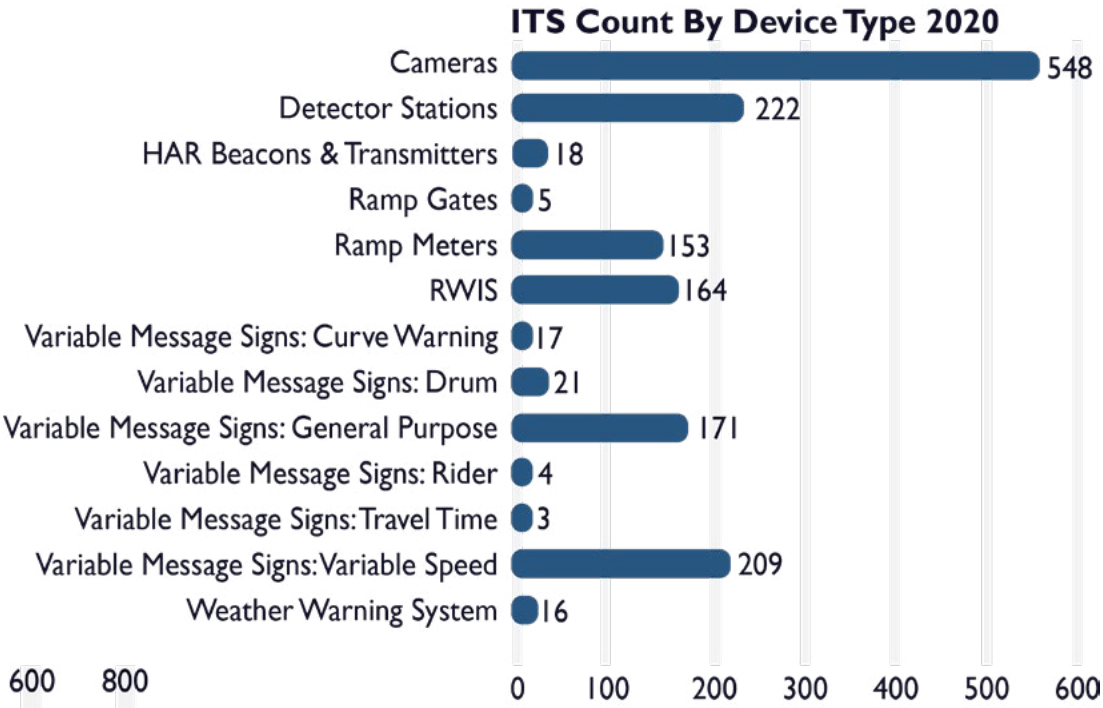


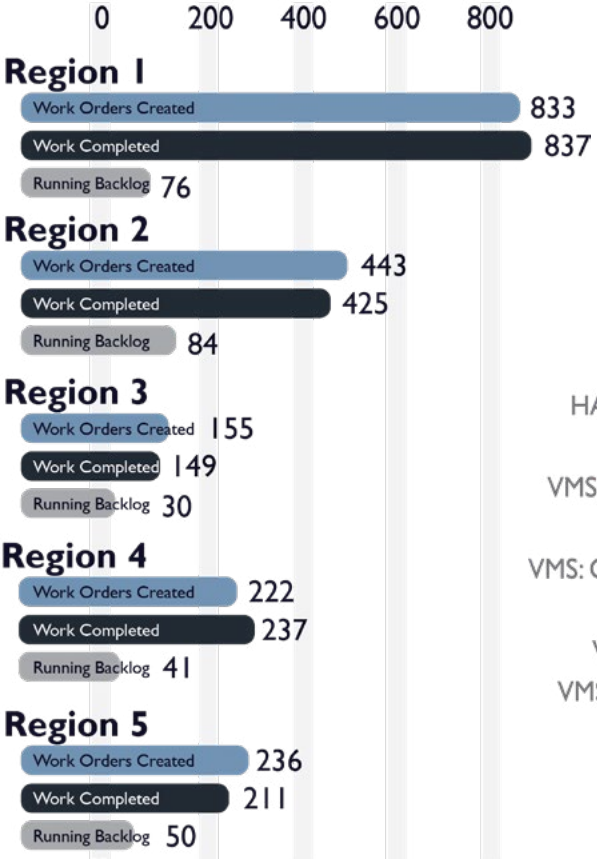
WORK ORDERS AND PREVENTATIVE MAINTENANCE

Separated by Region, each section shows work orders created and completed along with the running back log for 2020. Numerous retirements and vacancies combined with a high level of construction support and the addition of support for Commerce and Compliance, ITS equipment impacted ability to keep up with preventative maintenance.



Preventative Maintenance Completed by Region 2020



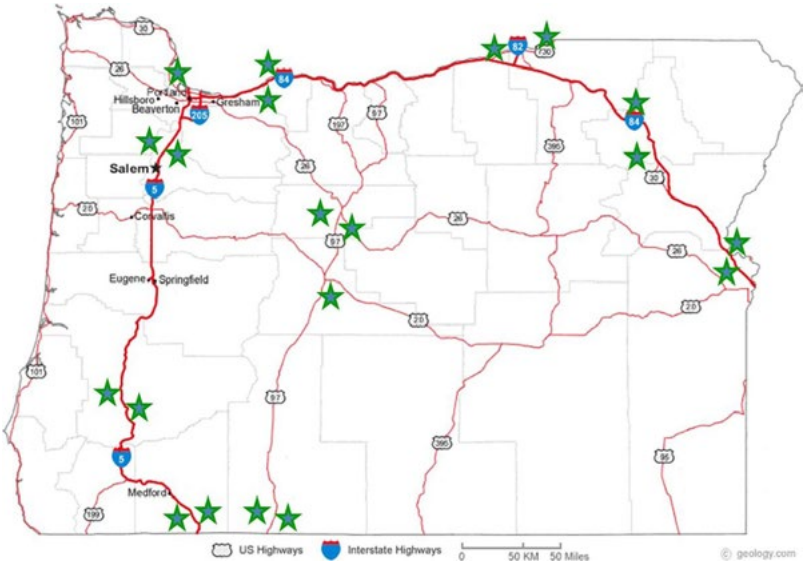


Asset Beyond Design Life Percentage

	2021	2022	2023	2024	2025	2026	2027	2028
Cameras: Fixed	0%	0%	0%	0%	0%	0%	0%	1%
Cameras: PTZ	31%	37%	40%	49%	56%	59%	61%	61%
HAR Transmitters	86%	86%	100%	100%	100%	100%	100%	100%
RWIS	15%	16%	16%	19%	24%	25%	26%	27%
VMS: Curve Warning	0%	0%	0%	13%	13%	13%	13%	13%
VMS: Drum	33%	33%	33%	38%	38%	38%	38%	38%
VMS: General Purpose	5%	6%	9%	12%	13%	16%	17%	22%
VMS: Rider	0%	0%	0%	0%	0%	0%	0%	0%
VMS: Travel Time	0%	0%	0%	0%	0%	0%	0%	0%
VMS: Variable Speed	0%	0%	0%	0%	0%	0%	0%	0%

commerce and compliance

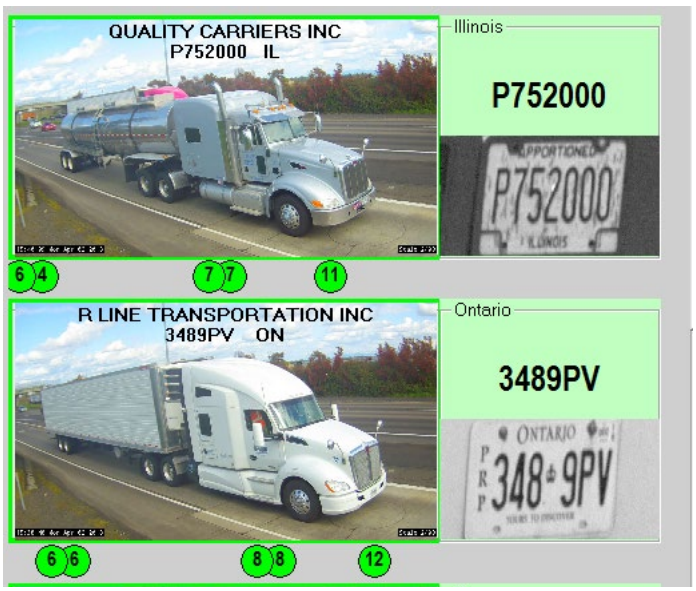
CCD-ITS WEIGHT-IN-MOTION



ITS has partnered with the Compliance Division (CCD), to support the weigh-in-motion (WIM) and other roadside ITS technology roadside infrastructure used for weigh station and port of entry operations. The purpose of these WIM locations are to automatically detect information about commercial vehicles to ensure that the vehicles are compliant with highway requirements.

Motor carrier, now called commerce and compliance helps move goods across the state safely and efficiently.

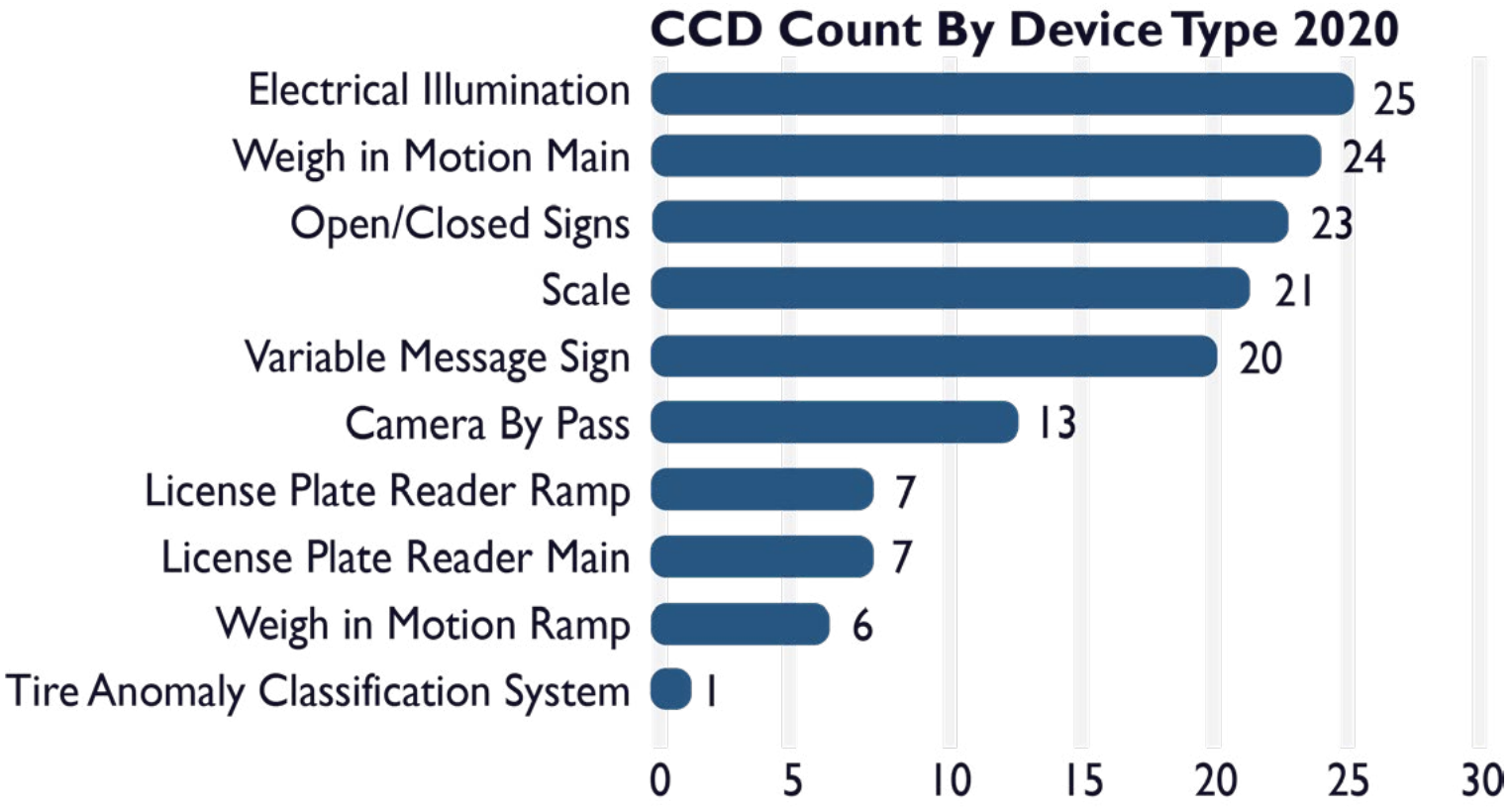
Commercial vehicles with Green Light transponders will receive either a green light allowing them to bypass the weigh station or a red light requiring them to report to the weigh station. The WIM stations reduce the amount of vehicles that have to report to the weigh stations, which in turn reduces highway congestion and keeps the commercial vehicles on schedule.



A service level agreement between Commerce and Compliance Division (CCD) and ITS covers the provision of maintenance assistance to support the existing and future ITS infrastructure. In 2020, ITS worked with CCD to initiate the process of upgrading aging infrastructure at the 23 weigh-in-motion facilities statewide. Currently, two sites have been completed and 6 other site updates are being designed for bid in early 2021.

Additionally, to replace an expiring contract ITS has finished drafting a request for proposal (RFP) for WIM materials as well as a second RFP for ITS maintenance services to assist in the maintenance support of WIM and other ITS facilities.

ITS Maintenance has completed 85 work orders to keep these WIM sites functioning this year.

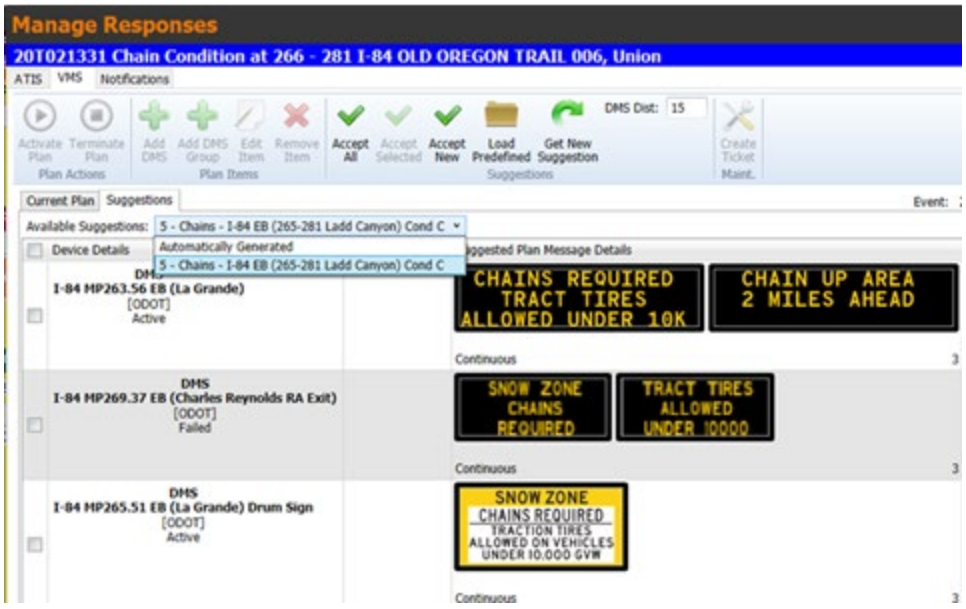


ODOT's four Transportation Operations Centers play a vital role in keeping both ODOT staff and travelers safe. The TOCs help our responders be more effective and safe in the field, and each center offers communication and resources that play a major role in keeping roadways safe and clear and informing Oregonians about incidents and road conditions.

ROAD AND WEATHER AUTOMATION

The Road and Weather Automation project streamlined the process of posting chain condition messages by automatically generating the appropriate plan(s) associated with a weather reporting station. Prior to this, dispatchers would have to sort through a large statewide list of 200 plans.

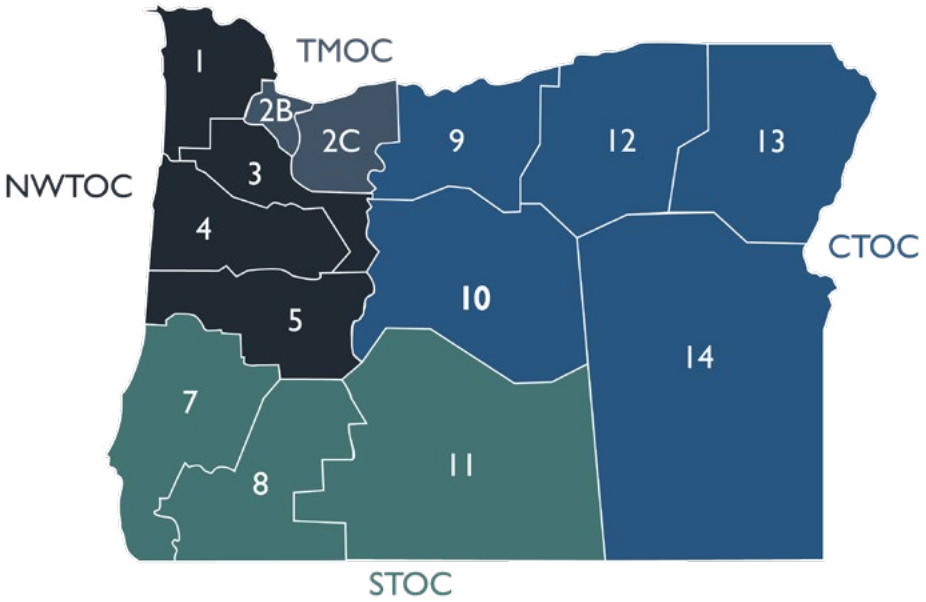
Automation has proven to save dispatcher time, minimize the risk of incorrect plans being used and quickly and accurately post of chain condition messages to improve safety on Oregon's roadways.



PUBLIC NOTIFICATION OF EVENTS

A key function of the TOC is to ensure that the traveling public is notified of events and hazardous weather to avoid travel delays and dangerous conditions. Federal regulations in 23 CFR 511 require states to make information about lane blocking crashes available within 20 minutes in rural areas and within 10 minutes in metropolitan areas. ODOT and OSP have a joint policy statement in the ODOT - OSP Mutual Assistance Agreement that states:

It is the policy of ODOT and OSP to provide information using Variable Message Signs, the internet, 511, the media and HAR where applicable. The target is to update information within 10 minutes of a condition change.

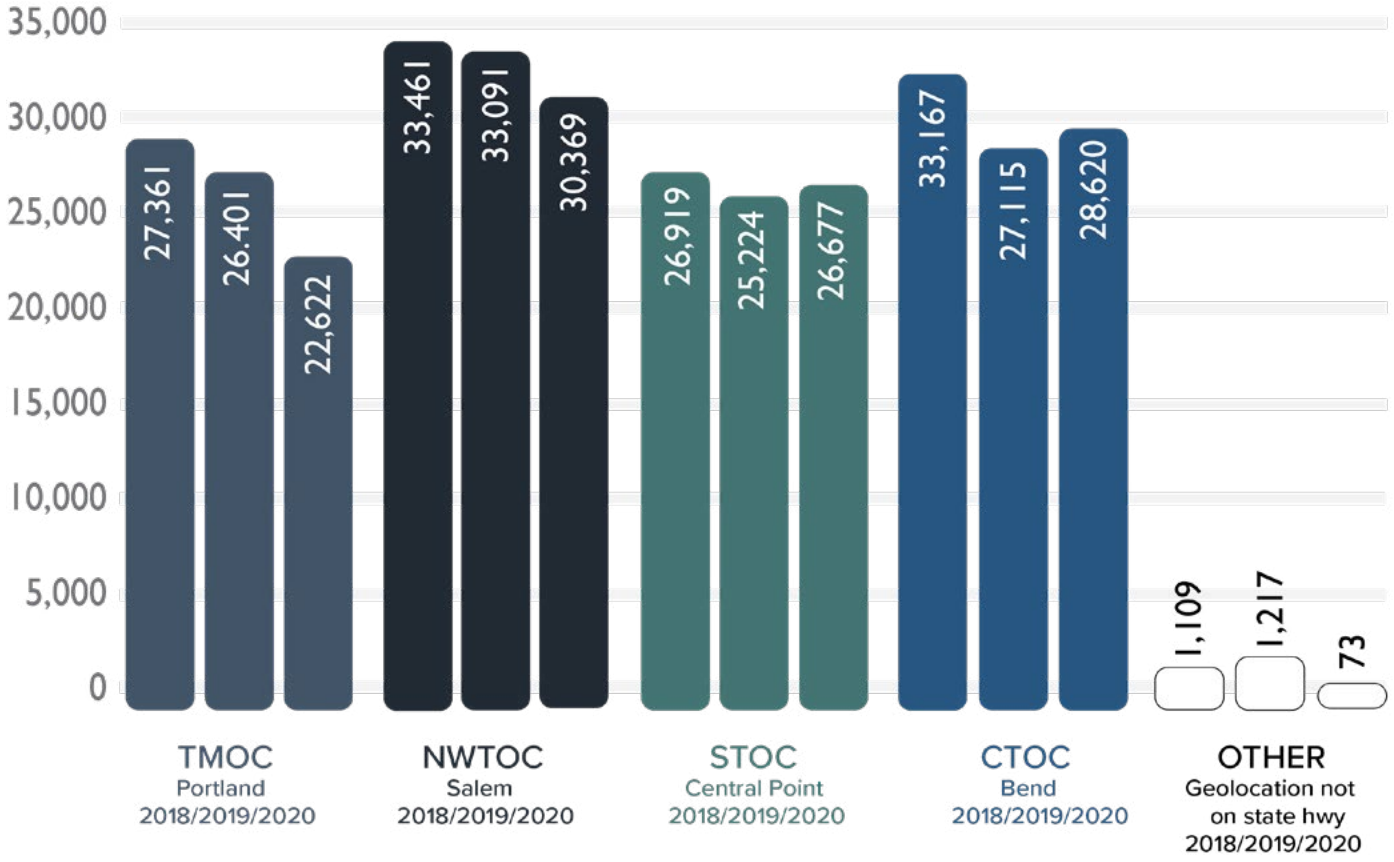


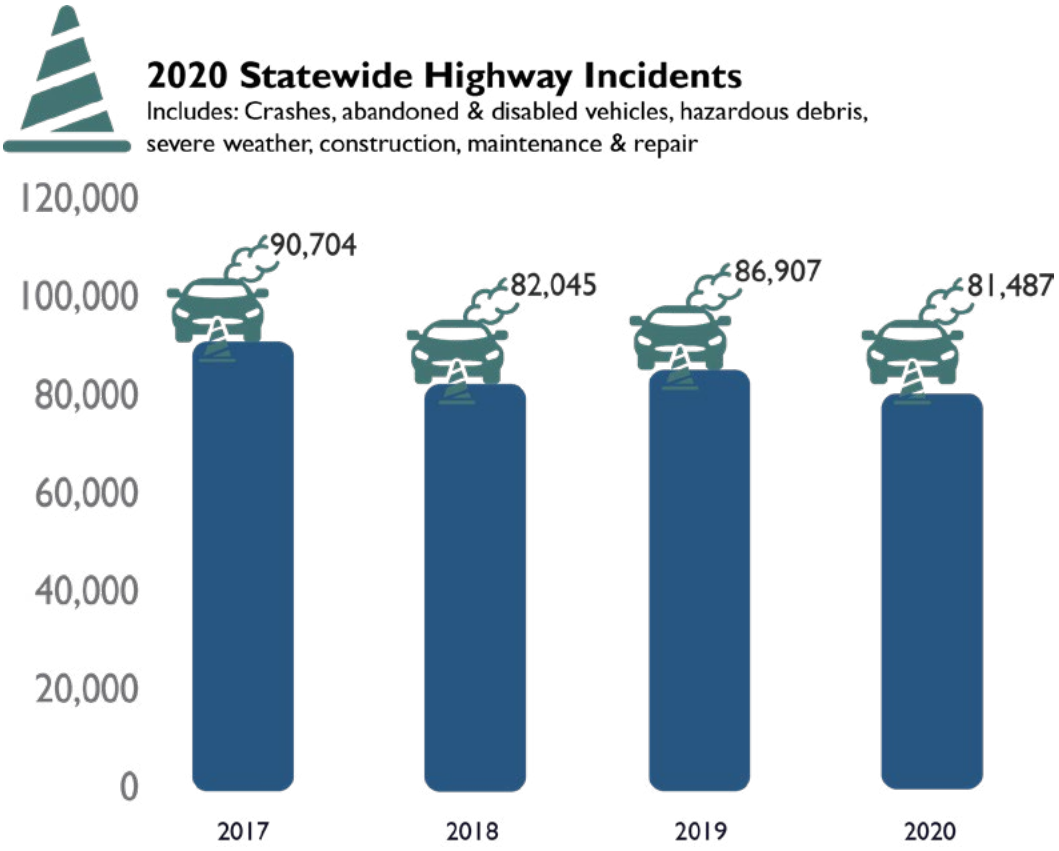
Public Notification of Events by TOC

Median time from entry of incident to posting traveler information.

EVENT COUNT BY TOC

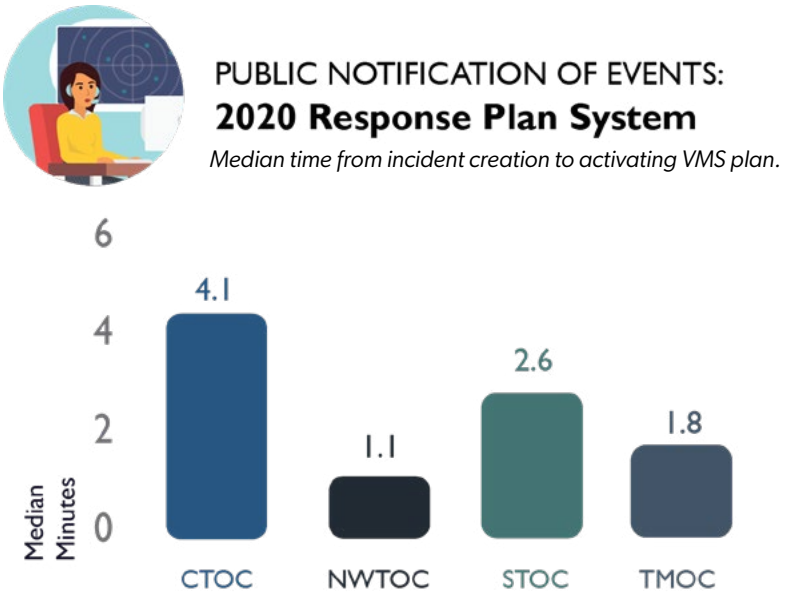
Total event count by each TOC totaled 108,361 in 2020. Events consist of crashes, disabled vehicles, equipment repair, fatal crashes, fire, hazardous debris, landslides and rockfalls, road construction, road maintenance and operations, severe weather and abandoned vehicles.





RESPONSE PLAN SYSTEM (RPS)

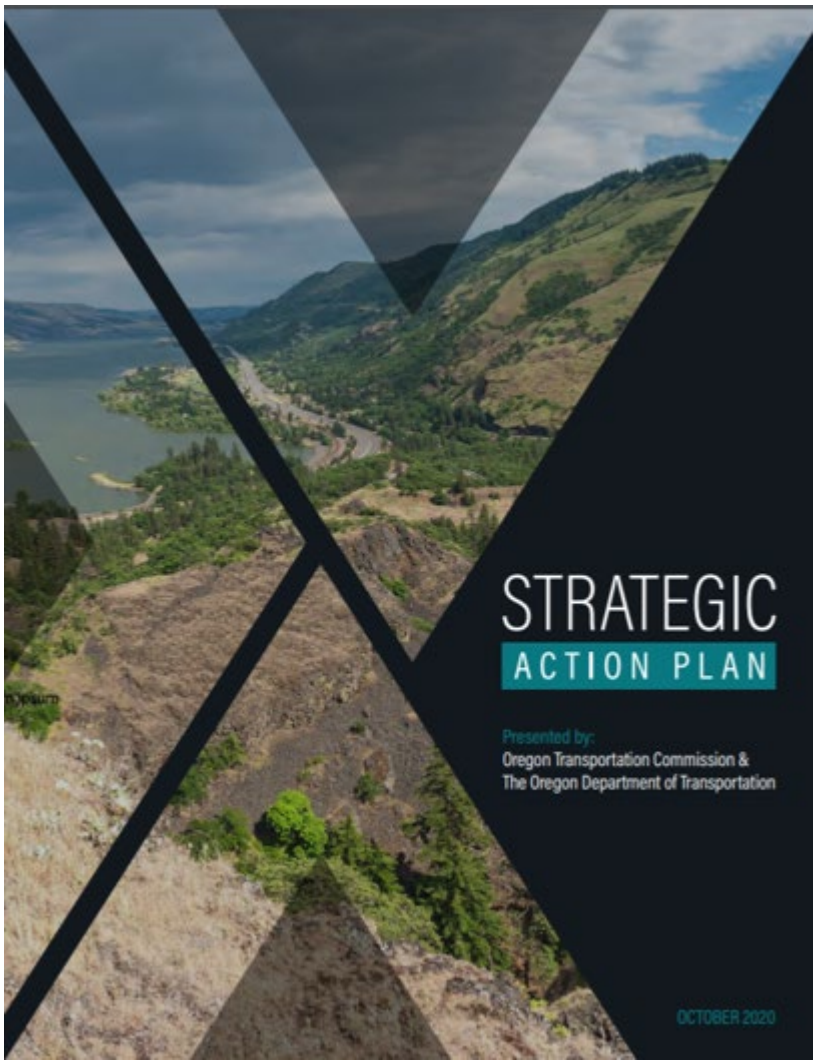
Response Plan System (RPS) interfaces with the Transportation Operation Center Software (TOCS). Based on incident parameters, RPS generates sign plans which contain the appropriate signs and message. Once a plan is reviewed and activated, RPS uses a message queue manager (MQM) to post messages based on message priority.



OTC strategic action plan

In October 2020, the Oregon Transportation Commission approved the ODOT Strategic Action Plan. The plan focuses on short term actions (between now and 2023) that ODOT needs to take to prepare for the future of transportation in Oregon. The plan outlines three high level goals focused on equity, a modern transportation system, and sufficient and reliable funding. Under each of these goals are specific strategic outcomes supported by implementation actions that will help ODOT make progress towards these goals by 2023.

What does this mean for the Operations Program? Of course the broad set of implementation actions will have impacts across the agency, but there are two specific strategic outcomes under the modern transportation system goal where the Operations Program will play a key role. The first is under the reduce congestion in the Portland region outcome. The identified implementation actions include operations solutions such as bus on shoulder and expansion of active traffic management solutions. Under the Implement Transformative Technologies outcome, there are four implementation actions that all have strong connections to the Operations Program.



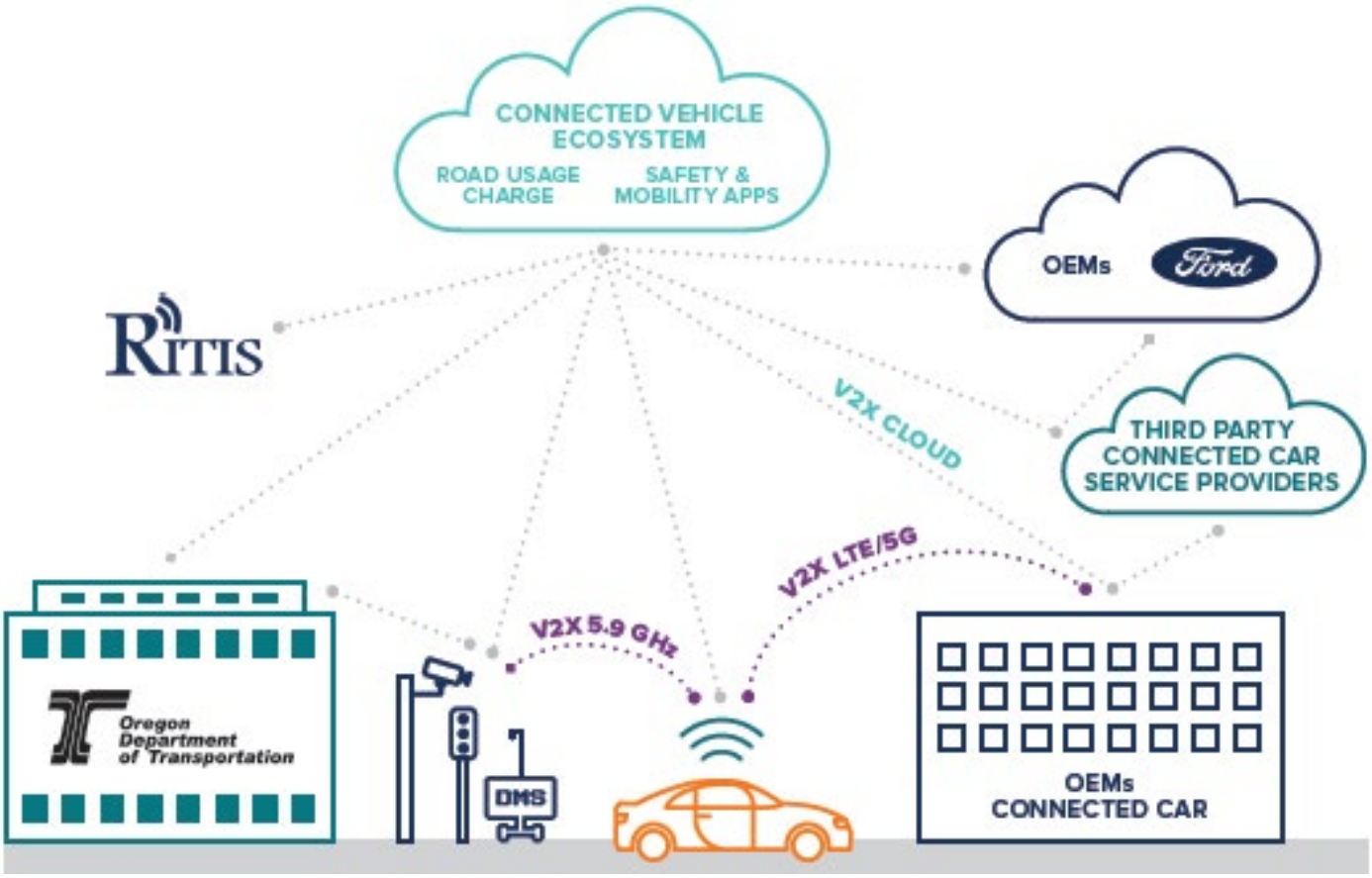
- Connected Vehicle Ecosystem Project - The Connected Vehicle Ecosystem project will enable implementation of large-scale road usage charging, improve driver and pedestrian safety and improve traffic management.
- Upgrade ODOT Traffic Signal Controllers to the Advanced Transportation Controller (ATC) – Implementing ATCs for traffic signals prepare for future connected vehicle technology, reduce delays for drivers, and allow for improved performance monitoring and signal operation.
- Develop a Broadband Strategy. Access to broadband technology is a key building block for a modern transportation system. A first step toward expanding access to this technology is to create overarching broadband strategy for ODOT.
- Automated Permitting System – While this is primarily a CCD project to modernize the Over-Dimension permitting process which will reduce permit processing times, improve efficiency and on-line service options, it will require integration with operations data related to road restrictions and closures to work effectively.

See the OTC web page on the Strategic Action Plan for more details, and watch for updates as these transformational projects move forward.

CONNECTED VEHICLE ECOSYSTEM

The future of transportation is increasingly data-driven and depends on reliable, and standardized information about roadway conditions. And, connected vehicles (CV) are rapidly becoming more common. As of 2019, there were approximately 49 million internet-connected cars on U.S. roadways. In some states, internet-connected cars represent as much as 10-20 percent of traffic. ODOT is working towards building a technology agnostic connected vehicle ecosystem (CVE) that provides a common platform to gather and distribute data from CVs, roadway infrastructure, and other data sources. The goal is to allow for public agencies to gather data and insights on the transportation system to improve planning, management and operations, and significantly reduce crashes, improve travel times, and lower greenhouse gases. This project is a joint effort with the Office of Innovative Funding. This system will also be beneficial for implementing a road usage charging system at a larger scale.

The proposed CVE platform, illustrated in Figure 1, will support multimodal data sharing using open data standards that will enable CV safety and mobility applications that are shared over the Internet and via roadside units with connected cars.



traffic signals and signs

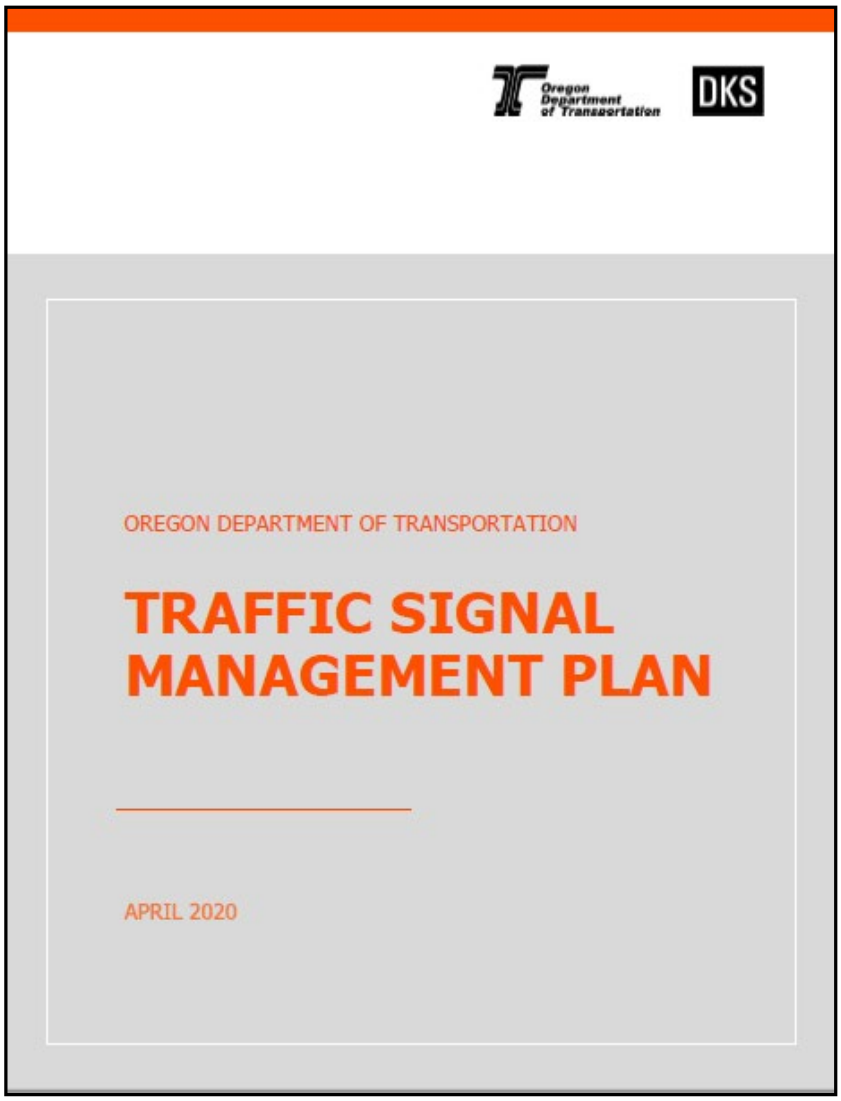
TRAFFIC SIGNAL MANAGEMENT PLAN

Completed in April 2020, the Traffic Signal Management Plan was finalized and is one of the implementation actions identified in the OTC Strategic Action Plan. It's the first step in making progress to update traffic signal controllers to modern controller technology by creating a framework for the management of the traffic signal system and serves as the statewide guide for traffic signal system management activities that support the mission and goals of ODOT, while operating in a regional/local context.

The purpose of the Traffic Signal Management Plan is to:

- Describe how the traffic signal system supports the transportation and mobility goals of ODOT and partner agencies.
- Identify typical operational situations and objectives for varying context-based scenarios.
- Provide a framework to sustain and advance the design, operations and maintenance of the traffic signal system.
- Provide a basis for funding operations resources.
- Provide a basis for succession planning.

If you'd like to review the plan in it's entirely please visit the Engineering documents section of traffic standards.



Modernized and well-managed traffic signals are essential to a high-functioning transportation system. The outdated technologies currently in place are costly to maintain and contribute to poor signal timing, accounting for a significant amount of delay and user frustration.

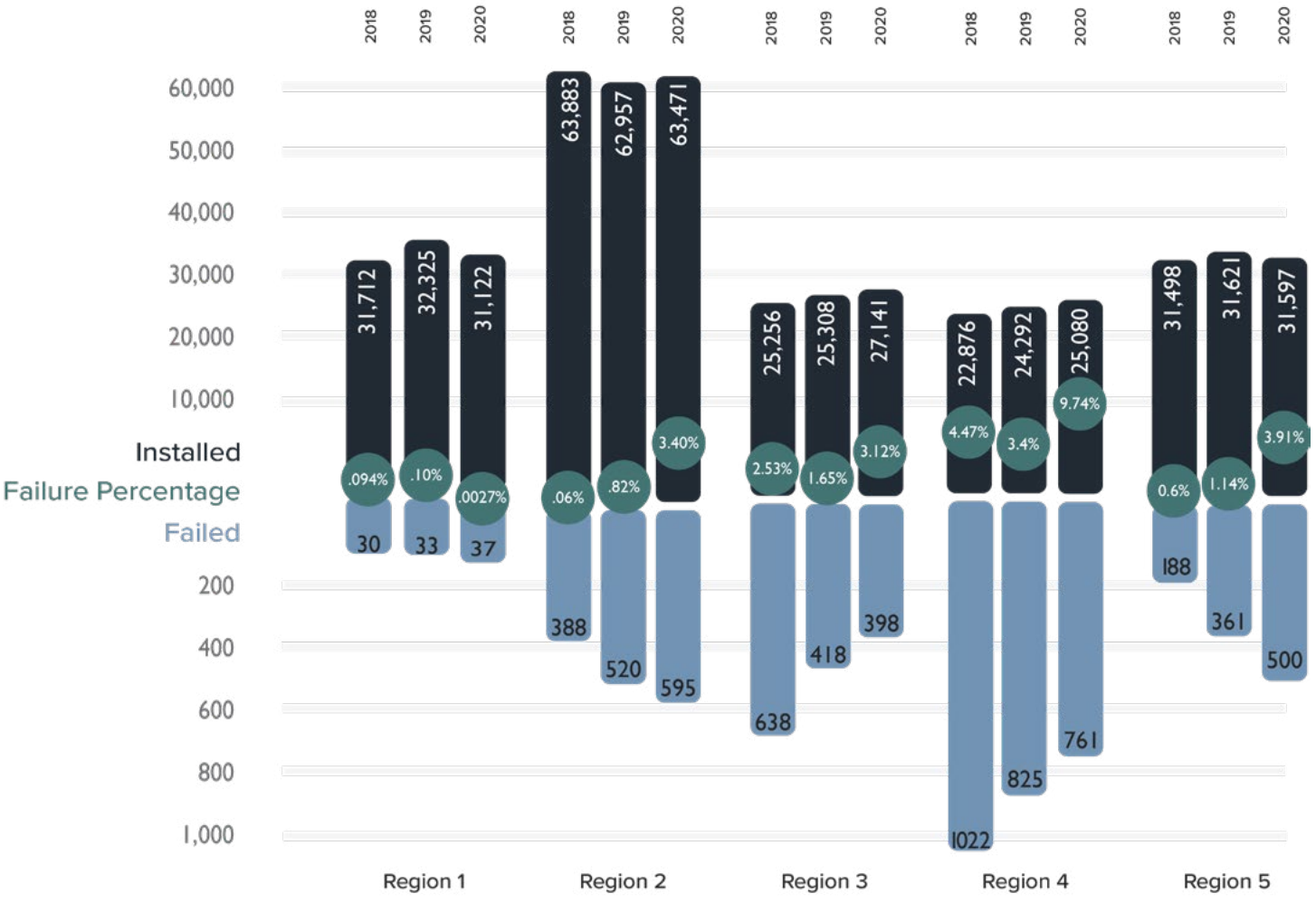
CURRENT ODOT SIGNAL RATING

2020 marks the fourth year of tracking condition rating methods for traffic signals. This chart shows the current status of our traffic signal inventory.

**Beginning in 2019, condition rating for assets maintained by ODOT but owned by cities or counties are no longer tracked.*

SIGN RETROREFLECTIVITY

ODOT's inventory of signs, like any asset, has a life-cycle. As signs are the largest communication device to the traveling public, keeping them in tip-top shape is vital. Below are the installed signs as well as the percentage failed for each Region.



TRAFFIC STRUCTURES

ODOT's inventory traffic structures also has a life-cycle. On a regular cycle, both sub and super structures of our major traffic structures are reviewed to assess their condition. Here are the ratings of these structures statewide.

Maintenance and Operations Branch
Systems Operations and ITS Section
455 Airport Rd SE, Bldg K
Salem, OR 97301

Engineering and Technical Services Branch
Traffic - Roadway Section
4040 Fairview Industrial Dr SE
Salem, OR 97302