

Connecticut Department of Transportation HOC Performance Dashboard



By Connecticut DOT

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Overview

The Connecticut Department of Transportation (CTDOT) partnered with Arcadis to build the Highway Operations Center (HOC) Performance Dashboard, a centralized, role-based decision-support platform that consolidates eight statewide operational datasets — incident data, travel time and reliability metrics, roadside device status, workload tracking, and Traffic Incident Management (TIM) training among them — into a single Power BI environment. The dashboard replaced static, manually produced monthly reports with dynamic, continuously updated views tailored to executive leadership, operations staff, Advanced Traffic Management System (ATMS) teams, and TIM trainers. The impact has been substantial: before-and-after analyses that once took up to two hours now finish in under 30 seconds, automated reporting saves roughly 2.5 hours per report, and CTDOT has added 26 new performance measures spanning more than 90 corridors. By making consistent, actionable performance data available agency-wide, the HOC Dashboard establishes performance measurement as an active, sustainable component of CTDOT's Transportation Systems Management and Operations (TSMO) planning.

In this case study you will learn:

1. How CTDOT consolidated eight fragmented operational datasets into a single, role-based Power BI decision-support platform.
2. Why designing role-based views around executive, operations, ATMS, and TIM user groups drives transparency and accountability.
3. How replacing static monthly reports with dynamic dashboards cut multi-hour analyses to under 30 seconds and freed staff for proactive operations.

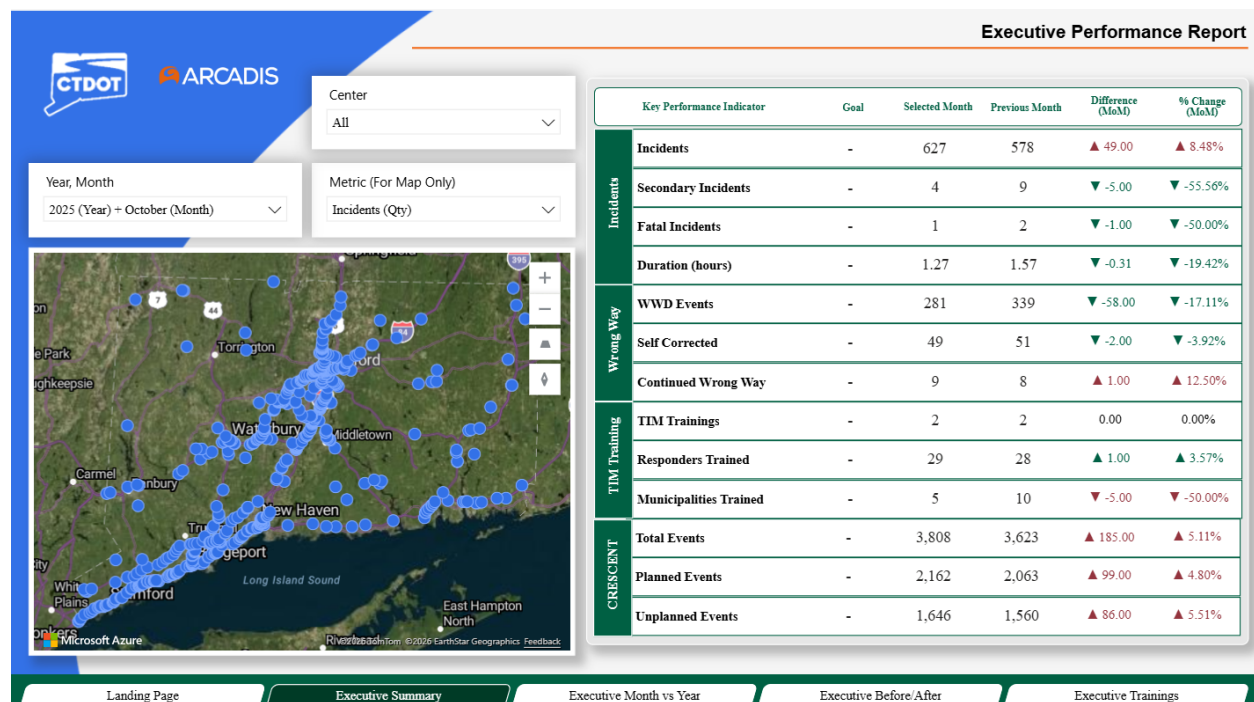
BACKGROUND

Over the past several years, the Connecticut Department of Transportation (CTDOT) has expanded its Transportation Systems Management and Operations (TSMO) programs to improve safety, reliability, and system efficiency statewide. As these programs matured, CTDOT increasingly relied on performance data to understand system conditions, evaluate operational strategies, and support decision-making at the executive, managerial, and operational levels.

Despite the availability of substantial operational data, CTDOT's performance measurement capabilities were constrained by fragmented tools and processes. Incident data, planned maintenance and construction activities, roadside device information, Traffic Incident Management (TIM) training records, workload tracking, wrong way driving system activations, and travel time data were maintained in separate systems. Performance reports were typically developed as static monthly documents, created independently by different staff members and stored in separate locations. While effective for

individual needs, this approach limited integrated analysis, delayed responses to emerging operational questions, and made it difficult to consistently link TSMO strategies to measurable system outcomes.

In 2025, CTDOT recognized the need for a more integrated and agile approach to performance measurement. Increasing operational complexity and demand for rapid, data-driven responses to incidents and disruptions highlighted the importance of consolidating performance data into a single, trusted platform. Leadership and operations staff identified the need for a tool that could support real-time operational awareness while enabling longer-term evaluation of TSMO strategies. To address these needs, CTDOT partnered with Arcadis to implement a unified performance measurement platform using Power BI. The project was designed to consolidate real-time and historical operational data from disparate sources into a centralized, role-based decision-support tool accessible to users ranging from executive leadership to frontline operations staff.



TSMO PLANNING, STRATEGIES, AND DEPLOYMENT

In 2025, CTDOT advanced performance measurement as a core element of TSMO planning through the development of the Highway Operations Center (HOC) Dashboard. The dashboard was conceived as a centralized, scalable decision-support platform aligned with agency-wide operational objectives while supporting the distinct needs of executive leadership, operations staff, Advanced Traffic Management System (ATMS) teams, and TIM trainers.

To ensure stakeholder input and buy-in, CTDOT conducted a series of workshops involving representatives from multiple functional groups. Each workshop focused on identifying user groups, key questions, operational needs, and success indicators. Participants collaboratively prioritized the most critical performance measures, which directly informed dashboard development and sequencing. The dashboard design emphasizes role-based views and workflows that deliver the most relevant information to each user group while maintaining a shared performance framework across the agency. A defining feature of the design is that top-level system performance metrics identified by senior leadership are displayed not only on executive pages, but also on relevant staff-level pages. This approach promotes transparency, clarifies accountability, and ensures teams understand how their performance contributes to agency-wide outcomes.

The platform enhances analysis through interactive geospatial mapping, time-series trend visualization, and comparative performance metrics. These tools enable users to assess system conditions, identify trends, and evaluate the effectiveness of TSMO strategies. Streamlined data collection and export capabilities further accelerate reporting cycles, replacing static, manually produced reports with dynamic, continuously updated information.

Scalability and efficiency were central to deployment. When new operational questions arise, the performance management team evaluates existing dashboard capabilities, identifies overlapping needs across business units, and seeks opportunities to consolidate analyses. Rather than developing one-off reports, related questions are addressed through flexible, reusable views. This approach reduces development time and cost, prevents dashboard proliferation, and ensures the platform can evolve alongside changing TSMO strategies and performance needs. Overall, the HOC Dashboard represents a significant shift from static, manual reporting practices and establishes performance measurement as an active, sustainable component of CTDOT's TSMO planning and deployment framework.

COMMUNICATIONS PLANNING AND EXECUTION

From the outset, CTDOT designed the HOC Dashboard as both a communications platform and a performance management tool. The communications strategy emphasized transparency, accessibility, and consistent interpretation of performance measures across organizational levels and functional areas. User-group pages follow a consistent layout while presenting data tailored to specific roles. Each view typically includes:

- A summary page highlighting key metrics for the user group
- A month-versus-year page showing month-over-month and year-over-year trends
- A before-and-after page enabling comparison of selected metrics across custom time periods
- Additional specialized pages, such as a TIM training map or operations workload tracker

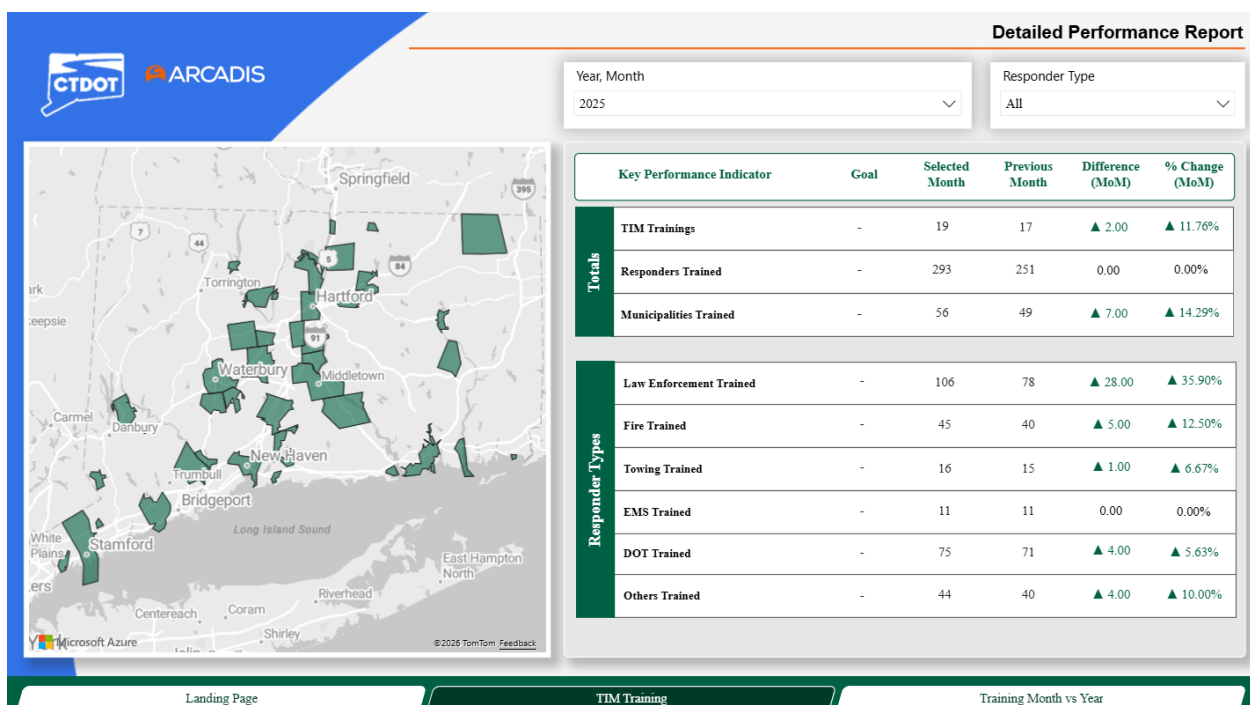
The dashboard delivers substantial time savings by simplifying access to performance

information. Running a report now requires only selecting the desired metrics and timeframes from dropdown menus, eliminating manual data compilation. While role-based pages provide efficient access to relevant data, all users can view every group's pages, supporting cross-functional awareness and a shared understanding of system performance. For example, executive leadership can examine TIM training effectiveness in detail, while operations staff can see how daily activities contribute to broader agency goals. Users also have access to all-data views and ad-hoc analysis tools. When analyses extend beyond dashboard capabilities, a built-in data export function provides access to clean, integrated datasets across the organization. To support timely communication, the dashboard replaced static monthly reports with a dynamic, continuously updated system. Depending on the data source and use case, information is refreshed daily, weekly, or monthly. All performance measures are presented through a single, consistent interface, reducing confusion and increasing confidence in shared information.

OUTCOMES, BENEFITS, AND LEARNINGS

Prior to the HOC Dashboard, CTDOT performance reporting relied on static monthly documents developed independently by different teams and stored in separate locations. This approach limited data integration, delayed analysis, and constrained the agency's ability to respond quickly to operational questions. The HOC Dashboard replaced this model with a centralized performance management platform integrating eight statewide operational datasets, including incident data, travel time and reliability metrics, roadside device status, workload tracking, and TIM training information. These datasets are now available within a single environment using shared analytics tools.

The platform has significantly reduced the effort required to evaluate operational strategies. Before-and-after analyses that previously required up to two hours to compile, clean, and synthesize data can now be completed in less than 30 seconds. This improvement enables rapid responses to leadership inquiries and time-sensitive public communications while allowing staff to focus on proactive operations and system improvements.



Since implementation, CTDOT has expanded performance measurement beyond legacy metrics by introducing 26 new performance measures. These include incident metrics across more than 90 corridors, 10 system reliability indicators, and geographic performance trends. The dashboard now supports 18 active users across executive leadership, operations, ATMS teams, and TIM trainers, all accessing consistent performance metrics through role-based views within a unified framework.

Additional capabilities include ad-hoc analysis tools; geographic data exports for incidents, travel time, and roadside devices; and an integrated data download function. Automated reporting has reduced manual data extraction and yielded average time savings of approximately 2.5 hours per report. Increased transparency for key performance measures strengthens accountability and supports data-driven planning, future deployments, and operational improvements.

Beyond efficiency gains, the dashboard has strengthened CTDOT's ability to align daily operations with agency-wide goals. Performance measures now directly support safety, reliability, and customer service objectives; inform resource allocation; refine training programs; and guide future enhancements. By improving transparency, reducing manual effort, and enabling consistent, agency-wide access to actionable performance data, the HOC Dashboard positions CTDOT to continuously improve operations while delivering tangible public benefits, including faster incident response, improved travel time reliability, and more efficient use of public resources.

