



NASCIO State IT Recognition Awards 2026 | Nomination

State: California

Category: Artificial Intelligence

Agency: California Department of Technology, on behalf of the California Department of Transportation

Project Title: From Hours to Minutes: Generative AI for California's Transportation Network

Project Dates: 05/2024 – 05/2026 (TMI production launch 08/2025; RSI production launch 11/2025)

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EXECUTIVE SUMMARY

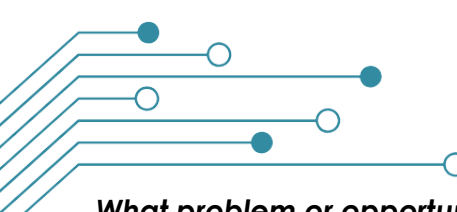
California's state highway network generates massive volumes of traffic, crash, and safety data. For years, that data lived in multiple separate systems. Engineers spent hours assembling traffic and safety pictures before analysis could begin, and safety investigations started only after crashes occurred.

Under Governor Newsom's Executive Order N-12-23 on Generative AI, the California Department of Transportation brought two production generative AI platforms into service. Traffic Mobility Insights (TMI), launched August 2025, unifies seven statewide traffic systems and nearly 1,500 vetted policy and operational documents into a single geospatial platform where engineers query 10 terabytes of roadway data and 33 billion mobility records in plain English. Road Safety Insights (RSI), launched November 2025, integrating more than 30 datasets to identify high-risk locations for pedestrians and bicyclists. One in four fatal or serious-injury crashes in California involves someone walking or biking.

TMI reduced statewide corridor analysis from hours to minutes, with 95 percent accuracy for station-level delay detection. In RSI's first two weeks, safety engineers across all 12 Caltrans districts generated 560 draft safety investigation digests. Each previously required 20 to 30 hours of manual compilation; the two-week total represents an estimated 11,200 to 16,800 hours of manual work avoided. Outputs cite published standards.

Both platforms serve headquarters and all 12 districts. Each completed risk and privacy review before deployment, and staff review every output before it informs a decision. Caltrans treated these as production systems, not experiments.

IDEA



What problem or opportunity does the project address?

The challenge was not a lack of data. The challenge was that the data California's transportation engineers needed for decisions lived across separate systems, documents, and workflows. That fragmentation cost staff time, delayed analysis, and made it harder to identify safety risks before harm occurred.

In traffic operations, critical data lived in seven statewide systems: Traffic Volumes and Speeds, Crashes, Lane Closures, Weather, California Highway Patrol (CHP) Incidents, Traffic Management Assets, and the State Highway Network. Answering a corridor question required extracting and reconciling data across tools. The work took hours, and results depended on who knew which system to query. Policy guidance existed outside the data workflow, disconnected from the analysis it was meant to inform. With 10 terabytes of roadway data and 33 billion mobility records spread across these silos, no single system could answer engineers' questions.

The safety challenge was equally fragmented. One in four fatal or serious-injury crashes in California involves a pedestrian or bicyclist. Identifying high-risk locations required manual compilation from more than 30 sources, from crash history and infrastructure to equity indicators, travel patterns, and pedestrian and bicycle volumes. A single safety investigation digest took 20 to 30 hours to assemble. The process was reactive: engineers reviewed crash records after harm occurred rather than identifying elevated-risk conditions before the next serious crash.

In both domains, engineers could not act on what they could not efficiently see. Staff time went to data assembly instead of engineering judgment.

Why does it matter?

California's state highway network serves nearly 40 million residents. When safety analysis starts only after crashes accumulate, engineers are always responding to harm that has already occurred. Every hour compiling data is an hour not designing improvements that prevent the next fatality.

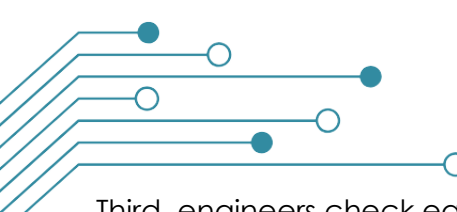
Across California's 52,000 lane miles, fragmented data delays freight routing for the state's ports, slows emergency response during wildfires and earthquakes, and forces corridor analysis to depend on knowledge that leaves with retiring staff. Generative AI provided the means to unify that fragmented data so engineers ask questions in everyday language and receive answers with source data behind them.

What makes it different?

Three design choices distinguish these platforms.

First, both are proactive rather than reactive. RSI identifies the infrastructure and exposure conditions associated with elevated crash risk so engineers can act before harm occurs. TMI's predictive bottleneck detection refreshes every 25 minutes, identifying where congestion will develop before it happens.

Second, both unify data at statewide scale. TMI brings seven statewide systems and the department's policy library into one environment; RSI integrates more than 30 datasets into a unified risk model. Engineers query complex data in plain English without knowing which system holds the answer.



Third, engineers check each output before acting. TMI links each answer to the source data and policy behind it. RSI's draft digests include suggested countermeasures and cite the department standards they draw from.

What makes it universal?

The problem Caltrans solved exists in every state. Staff need answers from complex data scattered across legacy platforms never designed to work together. Transportation agencies built data infrastructure system by system over decades; the fragmentation is shared nationwide.

Every state must move limited safety resources from reactive crash review toward earlier risk identification. RSI's proactive risk scoring embeds equity indicators and aligns with the federal Highway Safety Improvement Program. It offers a model other transportation agencies can adapt.

The broader model extends beyond transportation. Emergency management is the closest parallel, requiring the same multi-source data synthesis under time pressure, but the problem applies wherever agencies must turn fragmented data into timely professional decisions. The governance behind these platforms offers other states a path from proof of concept to production.

IMPLEMENTATION

What was the roadmap?

Both platforms were authorized under Governor Newsom's Executive Order N-12-23 on Generative AI. TMI reached production in August 2025; RSI followed on November 1, 2025, 18 months after proof of concept. Both platforms started under existing operational budgets, with success criteria and risk reviews defined before production. Successful proofs of concept advanced into production with defined service levels and cost tracking. To scale proven initiatives beyond initial budgets, Caltrans submitted a Budget Change Proposal for FY 2026–27.

Governance was built in parallel with the technology. In 2025, Caltrans chartered a GenAI Subcommittee with district, IT, legal, HR, and program members to evaluate use cases and guide adoption. A department-wide Data and AI Readiness Assessment established baseline maturity scores across five dimensions — Strategy, People, Process, Technology, and Data — and shaped the 2026–2028 Data and AI Strategic Plan. In February 2026, Caltrans appointed a permanent Chief Data and AI Officer, one of the first such roles at a state department of transportation, with accountability for AI strategy, governance, and data stewardship statewide. The governance structure, strategic plan, and readiness assessment were all operational before the permanent appointment, built in stages so the CDAO inherited a functioning framework on day one.

Who was involved?

The Caltrans Chief Information Officer sponsored the initiative. District safety engineers and traffic operations staff served as subject-matter experts throughout. For RSI, safety engineers developed the systemic safety scores; for both platforms, program staff validated outputs against district workflows before production. Five governance bodies support AI decision-making with defined charters, membership, and review cadence, including the cross-functional GenAI Subcommittee, Enterprise Data and Geospatial Governance Council, and IT Governance Council. The California Department

of Technology served as the enterprise technology authority, and this submission is filed with state CIO approval.

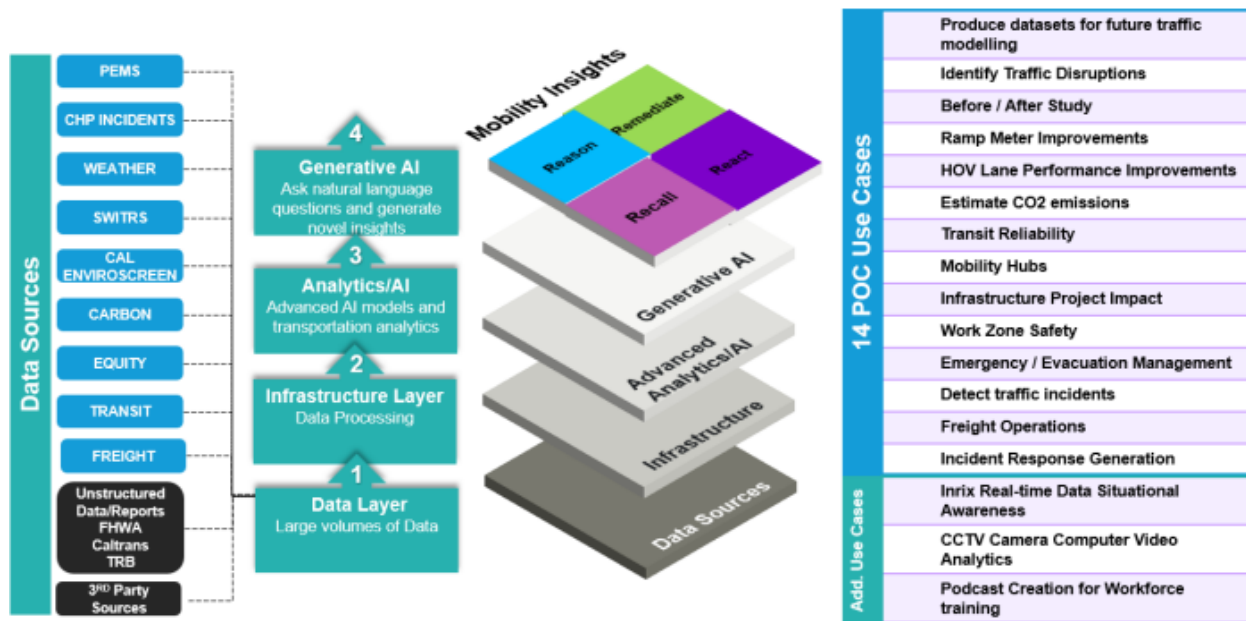
Leadership set a consistent message from the start: generative AI must support staff expertise, and its adoption remains tied to human oversight and operational readiness. That message moved from the department director and senior leaders through managers, enterprise data stewards, and district liaisons. Updates at CalSTA Executive Board meetings, the Statewide Transportation Leadership Summit, and the Caltrans intranet reinforced it. Pilots involved engineers and planners through hands-on use, shared results, and feedback before wider deployment. Role-based training and responsible-use guidance came with access; TMI and RSI training was developed with implementation teams and managed through Workforce Development.

When the platforms launched, engineers across every district began using them.

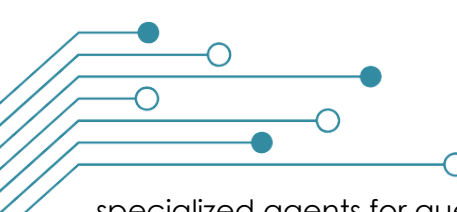
How did you do it?

Caltrans used existing budgets, paired program subject-matter experts with technical teams, and advanced successful capabilities through production phases with service tiers, cost tracking, and risk reviews. Four design decisions shaped outcomes.

First, data was integrated around existing workflows (corridor analysis, safety investigations, freight routing, evacuation planning) rather than built as a general-purpose analytics tool.



Second, both platforms provide natural-language access to unified data. Engineers and planners type questions and receive answers with source data behind them. TMI unifies seven statewide systems alongside nearly 1,500 vetted policy and operational documents. Staff can also apply computer vision to more than 3,000 live CCTV camera feeds for real-time traffic monitoring across the highway network. RSI integrates more than 30 datasets and applies AI models to street-view and satellite imagery to help investigators assess high-risk locations. An orchestrator coordinates



specialized agents for query parsing, data retrieval, insight generation, and geospatial risk mapping, while systemic safety scores developed by Caltrans engineers keep prioritization grounded in department expertise.

Third, users can see the data behind each answer and check it before acting. These architectures make each step visible, letting investigators verify results against relevant standards. This auditability requirement shaped the technical design from the start.

Fourth, governance was built into deployment from the start. Both platforms completed the state's SIMM 5305-F Generative AI Risk Assessment — including equity evaluation, bias review, and applicable privacy assessments — before deployment.

IMPACT

What did the project make better?

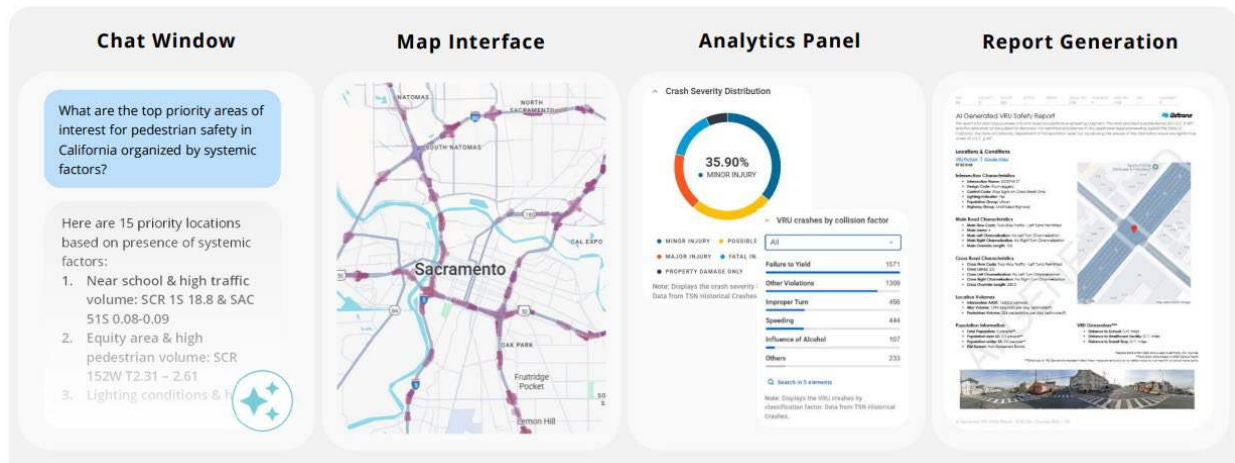
Before these platforms, two parallel problems defined daily work for Caltrans engineers across the state.

Traffic operations engineers who needed a complete picture of conditions along a highway corridor had to extract and reconcile data from seven separate systems. The work took hours, produced results dependent on individual knowledge, and disconnected analysis from the policy documents meant to inform it. During emergencies — wildfires, earthquakes, bridge closures — assembling a picture from multiple sources introduced delay when speed mattered most. Institutional knowledge lived in the heads of experienced staff and left when they did.

Safety engineers investigating a high-risk location compiled data from more than 30 sources manually. Each safety investigation digest required 20 to 30 hours to assemble. The process began only after crashes accumulated, keeping engineers in a reactive cycle and delaying the countermeasure design that prevents the next fatality.

TMI collapsed seven fragmented data systems into a single environment. Corridor analysis that took hours now takes minutes. Predictive bottleneck detection identifies where congestion will develop before it happens. Freight routing and truck permitting for California's ports draw from the same environment that supports congestion management, evacuation planning, and policy consultation. Institutional knowledge is embedded in a searchable platform, giving newer engineers a faster path to the guidance and context that experienced staff carry. For engineers who spent the first hours of every analysis assembling data, unified access and responses in under 45 seconds mean analysis starts immediately.

RSI reverses the reactive safety cycle. Engineers identify the infrastructure and exposure conditions associated with elevated crash risk and act before harm occurs. Draft digests are generated in minutes, with countermeasures linked to department standards that investigators can verify. Equity indicators are embedded in risk scoring, so safety investments reflect community vulnerability, not only crash frequency. Districts move faster from identification to improvement, directing resources where vulnerability is greatest.



How do you know?

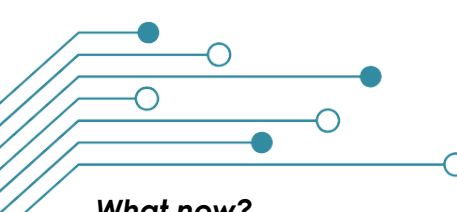
RSI's adoption was immediate. Within two weeks of the November 1, 2025 launch, nearly 60 safety engineers across all 12 districts submitted 1,161 unique prompts and generated 560 draft digests. That averaged 40 per day. Each digest previously required 20 to 30 hours of manual data compilation; RSI generates them in minutes. Those 560 digests represent an estimated 11,200 to 16,800 hours of manual work avoided in 14 days. That time now goes to validating findings and designing countermeasures that advance safety recommendations toward construction. RSI gained traction because it solved a daily workflow problem, and the usage pattern showed practical pull from the field in every district.

One district safety engineer described the change:

"Before RSI, I could spend a couple of days just getting the data together with crash records, roadway characteristics, bike and ped counts, all from different systems. That's time I should be spending on figuring out what to fix. Now I have a starting point in minutes and can focus on the countermeasures."

TMI, in production since August 2025, transformed how traffic engineers work with corridor and mobility data. Statewide corridor analysis that previously required hours of manual reconciliation across seven separate systems now draws from a single platform covering 10 terabytes of roadway data and 33 billion mobility records, with most queries returning in under 45 seconds. Station-level delay detection runs at 95 percent accuracy. Predictive bottleneck detection refreshes every 25 minutes across a network fed by more than 39,000 in-ground detectors and more than 3,000 cameras. During wildfires and earthquakes, incident teams previously waited on data from multiple sources before they could identify safe routes. TMI now generates evacuation routes from one environment, accounting for bridge closures and real-time highway conditions, so that response begins from a shared operational picture rather than fragmented data.

The work has drawn national attention, including the 2025 ITS World Congress Hall of Fame Award, two Public Sector CIO Academy Awards, and the Center for Digital Government's AI 50 list.



What now?

TMI's next phase adds incident clearance time calculations and segment-level risk profiling while broadening the data foundation with new traffic, freight, and crash sources to close coverage gaps. Further out, the department has proposed using TMI to assess how infrastructure projects change traffic patterns and how climate conditions affect highway operations.

RSI is extending the risk-identification approach beyond pedestrians and bicyclists to cover all roadway users. The platform is expanding its evaluation of ramps, intersections, and transit stops. Proposed additions include identifying highway corridors where crews can quickly deploy protections such as striped lanes and physical barriers, and evaluating how completed projects affect safety conditions.

Sustaining the investment takes more than technology. The permanent Chief Data and AI Officer holds executive authority over AI strategy and data stewardship. The 2026–2028 Data and AI Strategic Plan sets measurable targets, including a 15 percent reduction in decision cycle times by June 2028, a 20 percent increase in staff reporting that AI improves their effectiveness, and finalization of the Responsible AI policy by December 2026. A formal use case prioritization framework has identified more than 100 AI opportunities across 11 categories, each scored for alignment, feasibility, and impact before investment. The same oversight structure ensures initiatives are judged by results, with underperforming efforts retired or redirected.

Eighteen months ago, Caltrans had two generative AI proofs of concept. Today it has two production platforms across headquarters and all 12 districts, a permanent CDAO, five governance bodies, and a strategic plan with measurable targets. RSI was adopted across every district within two weeks of launch. What began as two platforms has become a repeatable model: start with mission-critical problems, build on trusted data, govern deployment through risk review and human oversight, and measure results.