

OCTOBER, 2025

FLOW LABS

# ROADS NEED CODE



# ROADS NEED CODE



## CONTENTS

---

1. WHAT WE BELIEVE

---

2. THE PROBLEM WITH TRANSPORTATION

---

3. THE AI REVOLUTION

---

4. ROADS NEED CODE

---

5. GOING HYPERSPEED

---





THE WORLD IS MOVING  
FASTER THAN EVER.  
BUT OUR TRANSPORTATION  
SYSTEMS CAN'T KEEP UP.

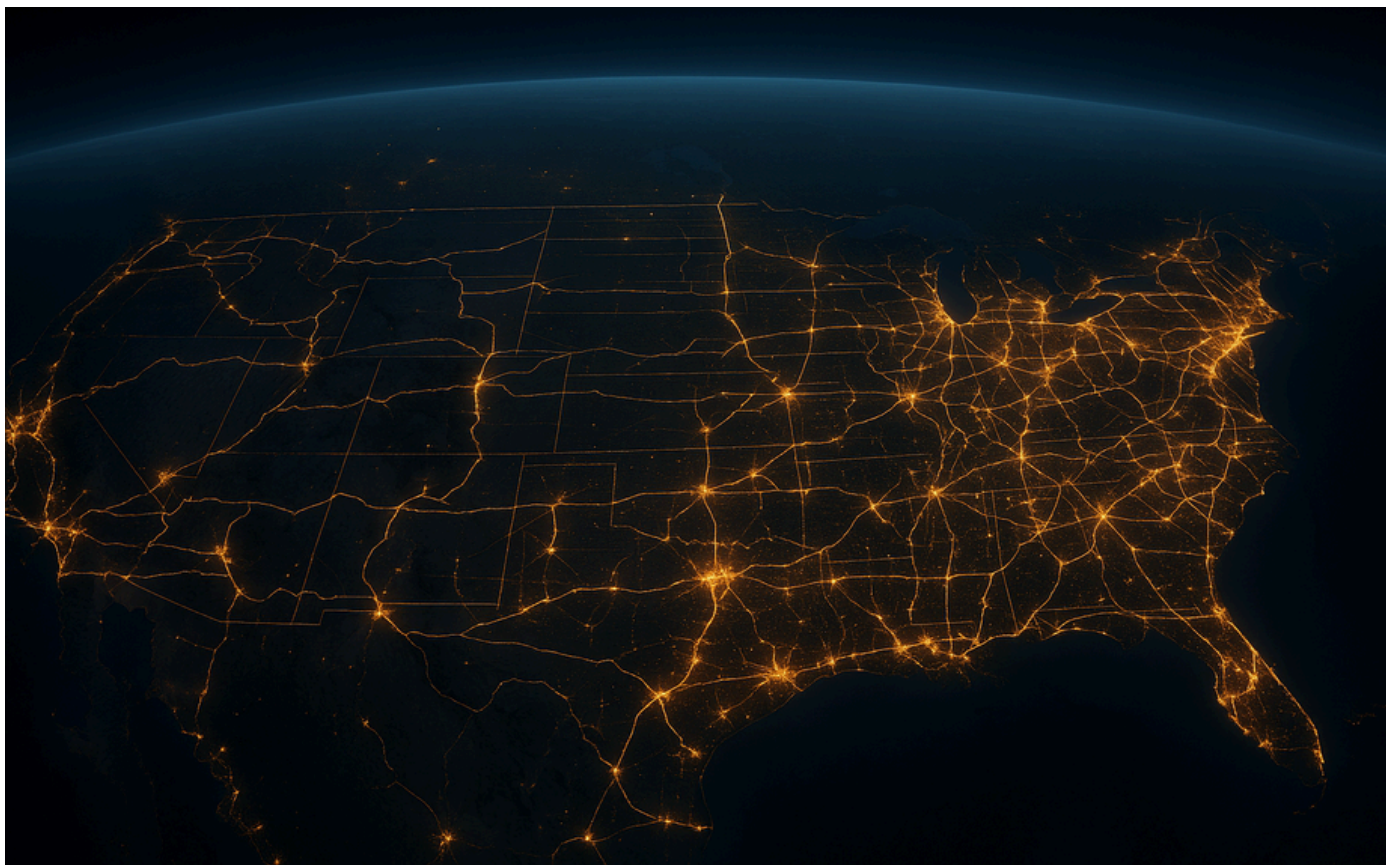


# 1. WHAT WE BELIEVE

The world is moving faster than ever, but our transportation systems can't keep up.

Every American feels it: the daily commute that lasts longer each year, the delivery that didn't show up on time, the emergency vehicle that loses life-saving minutes stuck at a red light. These aren't just random inconveniences; they're the signs of a network that is crumbling. Congestion and delay now drain more than \$332bn<sup>1 2</sup> from households and businesses every year in lost time and wasted fuel, while roadway crashes take more than 40,000 lives<sup>3</sup> away from families, and communities. We built our prosperity on motion; we are now taxing it with stagnation.

Infrastructure has slowly but surely become a political buzzword, a cliché, but it still remains the foundation of modern life - the operating system of a functioning nation. In 1956, President Dwight D. Eisenhower signed the Federal-Aid Highway Act<sup>4</sup> and launched the U.S. Interstate Highway System: a project so audacious that it redrew the economic geography of America. Forty-one thousand miles of limited-access roadway connected farms to markets, factories to ports, small towns to big cities, and families to opportunity. The Interstate made distance negotiable and commerce predictable; it turned a continent into a single working system. It became the quiet foundation of the fastest period of economic growth in American history—fueling the postwar boom, suburban expansion, and decades of industrial productivity that followed<sup>5</sup>. Generations later, it remains the backbone of a nation's mobility. Despite only comprising one percent of public road mileage it carries more than a quarter of all vehicle mileage and more than half of all freight miles. That is not just a feat of engineering; it's a feat of national will, proof that the United States can decide to build at a civilizational scale and then do it.





The challenge before us is no longer measured in cubic yards of concrete, but in intelligence. The 20th century was built on concrete and steel; the 21st century will be built on data and code. Eisenhower's generation built the physical network that powered the last century; our generation must build the intelligent network that will power the next. The raw material is already here. Every hour, our roads generate torrents of information from signals, controllers, detectors, connected vehicles, and GPS traces. Today, most of it evaporates in silos, unseen and unused. What the system lacks isn't inputs—it's intelligence. Our task is to build a network that understands demand, recognizes patterns, predicts congestion, and adjusts in real time; a system that detects risk and prevents failure before it happens; a system that coordinates the movement of people and goods across corridors and jurisdictions as one whole.

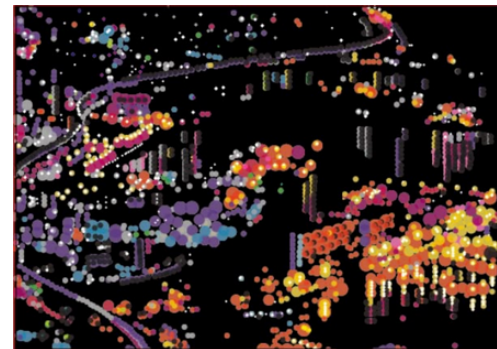
This modernization is not optional. The nations that integrate intelligence into their infrastructure first will set the pace for global commerce, safety, and sustainability. The benefits are measurable: fewer delays, faster logistics, lower emissions, and better use of taxpayer dollars. A transportation system that adapts dynamically to demand is not a futuristic vision—it's simply overdue. The next leap in national productivity will come not from laying more asphalt but from embedding intelligence in the systems that move us.

That's what we believe. And we're building it.

---

#### REFERENCES

1. Texas A&M Transportation Institute. (2023). 2023 Urban Mobility Report.
2. American Transportation Research Institute. (2024). Cost of Congestion to the Trucking Industry: 2024 Update.
3. National Highway Traffic Safety Administration. (2025, April). Traffic Safety Facts: Overview of Motor Vehicle Traffic Crashes in 2023 (Report No. DOT HS 813 705).
4. National Archives. (n.d.). National Interstate and Defense Highways Act (1956).
5. Federal Reserve Bank of Richmond. (2021). When Interstates Paved the Way: The Economic Impact of the Interstate Highway System.



■ THE 20TH CENTURY WAS  
BUILT ON CONCRETE AND  
STEEL.  
THE 21ST CENTURY WILL  
BE BUILT ON DATA AND  
CODE.



# 2. THE PROBLEM WITH TRANSPORTATION

---

We just don't get things done anymore.

Once, this country built highways across continents, tunnels beneath rivers, and cities that touched the sky. We did it quickly, confidently, and with a sense of purpose that left no doubt about what we stood for. America used to move. Today, we hesitate. We study, review, and delay until the will to act disappears. We are the heirs of the builders who connected a nation, yet we live in a time when projects that should take two years now take ten<sup>1</sup>. Road or bridge projects average 7 years just to get permitting and approvals<sup>2</sup>. More than 650 infrastructure projects are currently awaiting federal permits, many of them stalled for multiple years<sup>3</sup>. Meanwhile, California's High-Speed Rail project—approved in 2008 with a \$33 billion budget and a 2020 completion target—has ballooned past \$100 billion and may not open until 2033<sup>4</sup>. Even small maintenance projects can become a multi-year process<sup>5</sup>.

Construction has become the only language we know. Every few years, another plan to “build our way out” of congestion appears. We spend billions on projects to widen roads, justified by false assumptions and manipulated forecasts that overstate demand, underestimate costs, and predict relief where none materializes. Decades of research show that these patterns are not accidental<sup>6</sup>. Even worse, we don't even measure the impact of projects and hold forecasters accountable. For most projects, there is no consistent performance evaluation after completion—no verified data on whether travel times dropped, safety improved, or emissions fell. Billions are spent each year without knowing if those dollars actually work<sup>7</sup>. In any other field, that would be unacceptable. In transportation, it's routine.



Software offers a different path. These tools deploy in weeks, not years and they deliver measurable results—shorter travel times, safer intersections, lower emissions, major cost savings—without adding a single lane of pavement. A city can spend millions to pour concrete for a new road, or thousands on software that makes that lane unnecessary. Yet software penetration in U.S. transportation remains well below ten percent of total operating expenditure<sup>8</sup>, compared to more than 30 percent in logistics<sup>9</sup>, 40 percent in manufacturing<sup>10</sup>, and 60 percent in finance<sup>11</sup> and energy<sup>12</sup>. Industries that move goods, power, and capital have been rebuilt around software. Transportation—the system that moves everything else—remains locked in an analog past.

Taxpayer money is being wasted on expanding systems that deliver less and less each year, whilst increasing the costs of maintenance and repair and saddling taxpayers with a massive “transportation debt”. This backlog has already skyrocketed past \$830bn and is quickly turning into a trillion dollar problem<sup>13</sup>. America doesn’t need to pay another generation of consultants to explain what went wrong. We need to build smarter. We need to make agencies faster instead of larger. We need to make technology work for people instead of the other way around. We need to measure success not by dollars spent but by minutes saved, crashes prevented, and lives improved. It is a moral imperative to do so.

The problem with transportation isn’t a lack of resources or talent or options. It’s a lack of belief—that we can still get big things done. But we can. And we must. Because a nation that can’t move can’t grow. And a government that can’t innovate can’t lead. The world is waiting for us to move again.

This is the worst time in history to stand still.

---

## REFERENCES

1. Common Good. (2015). Two Years, Not Ten Years: Redesigning Infrastructure Approvals.
2. U.S. Department of Transportation. (2024). Permitting Dashboard: Average Environmental Review Times for Major Infrastructure Projects.
3. McKinsey & Company. (2025). Unlocking U.S. Federal Permitting: A Sustainable Growth Imperative.
4. California High-Speed Rail Authority. (2023, February). 2023 Project Update Report to the Legislature.
5. Common Good. (2015). Two Years, Not Ten Years: Redesigning Infrastructure Approvals.
6. Flyvbjerg, Bent; Holm, Mette K. Skamris; Buhl, Søren L. (2002). “Underestimating Costs in Public Works Projects: Error or Lie?” *Journal of the American Planning Association*, 68(3), 279-295.
7. Government Accountability Office (GAO). (2023). Highway Infrastructure: Federal Highway Administration Should Improve Its Assessment of Project Outcomes (GAO-23-105).
8. GovWin / OMB IT Dashboard. (2023). U.S. Department of Transportation FY 2023 IT Budget Request Highlights
9. McKinsey & Company. (2022). Digital Transformation in Logistics: Capturing the Value of Software Across the Supply Chain.
10. McKinsey Global Institute. (2021). The Future of Manufacturing: Software and AI as Productivity Engines.
11. Deloitte. (2023). The Software-Driven Finance Organization.
12. International Energy Agency. (2023). Digitalization and Energy Efficiency Outlook.
13. Federal Highway Administration. (2023). Status of the Nation’s Highways, Bridges, and Transit: Conditions & Performance (25th Edition).



# 3. AN AI REVOLUTION

---

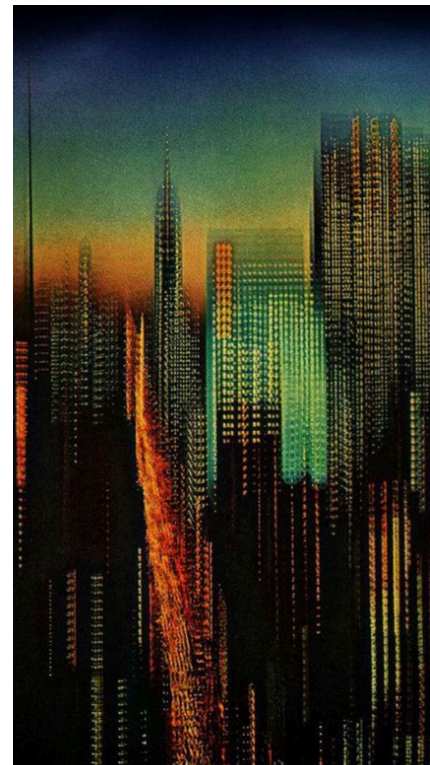
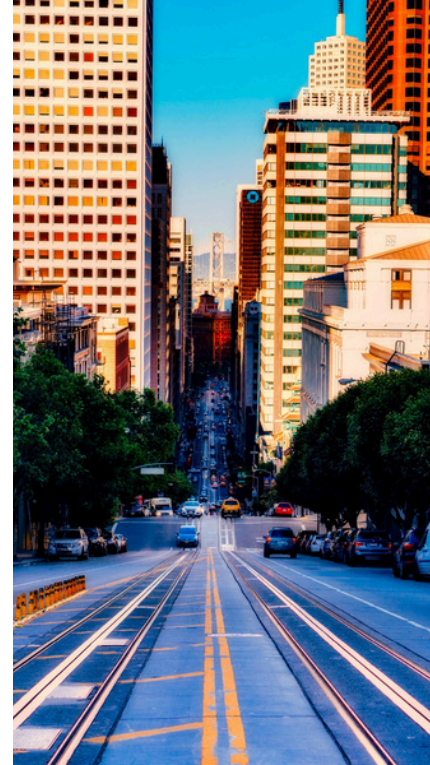
An AI revolution is unfolding around us. In only a few years, artificial intelligence has gone from experimental to essential—transforming how the world produces, moves, and decides. Energy grids forecast demand before it surges. Banks intercept fraud before it happens. Manufacturers prevent failures before they halt production. Healthcare systems detect disease earlier and treat it faster. Everywhere it's applied, AI delivers the same result: faster decisions, safer outcomes, and better performance.

No field stands to gain more from this revolution than transportation. It is the backbone of the economy, the system that connects every industry, and one of the few domains where progress saves both lives and dollars. AI can change that. Smarter traffic management means fewer crashes and faster emergency response. Intelligent systems mean shorter commutes, lower emissions, and stronger supply chains. Few opportunities promise a greater human and economic return than applying intelligence to the roads we all rely on.

Yet most cities still run on decisions made years, even decades, ago. Traffic systems follow static routines that no longer reflect reality. Major investments are based on studies that take years to complete and are outdated before the ink dries. The world's most data-rich public system still behaves as if information were scarce. The AI revolution is transforming global industry, but the roads beneath our feet remain unchanged.

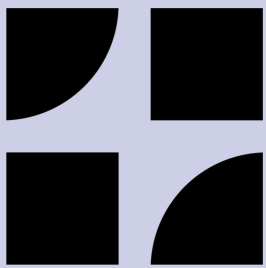
That's not because the tools don't exist—it's because we haven't applied them. Flow Labs estimates that every year, the U.S. roadway network generates more than 250 petabytes of data from sensors, signals, connected vehicles and devices. Hidden within that flood are the insights to reduce congestion, prevent crashes, and cut emissions. We already have the raw material of intelligence; what's missing is the system that can turn it into action.

And no nation is better positioned to do it than the United States. We invented the microchip, the internet, and modern artificial intelligence. We lead the world in computing power and data science. Our universities train the engineers who build the tools that power the global economy. The infrastructure for innovation is already in place—the only thing left is the decision to use it. America doesn't need to start over; it needs to connect what it already has.



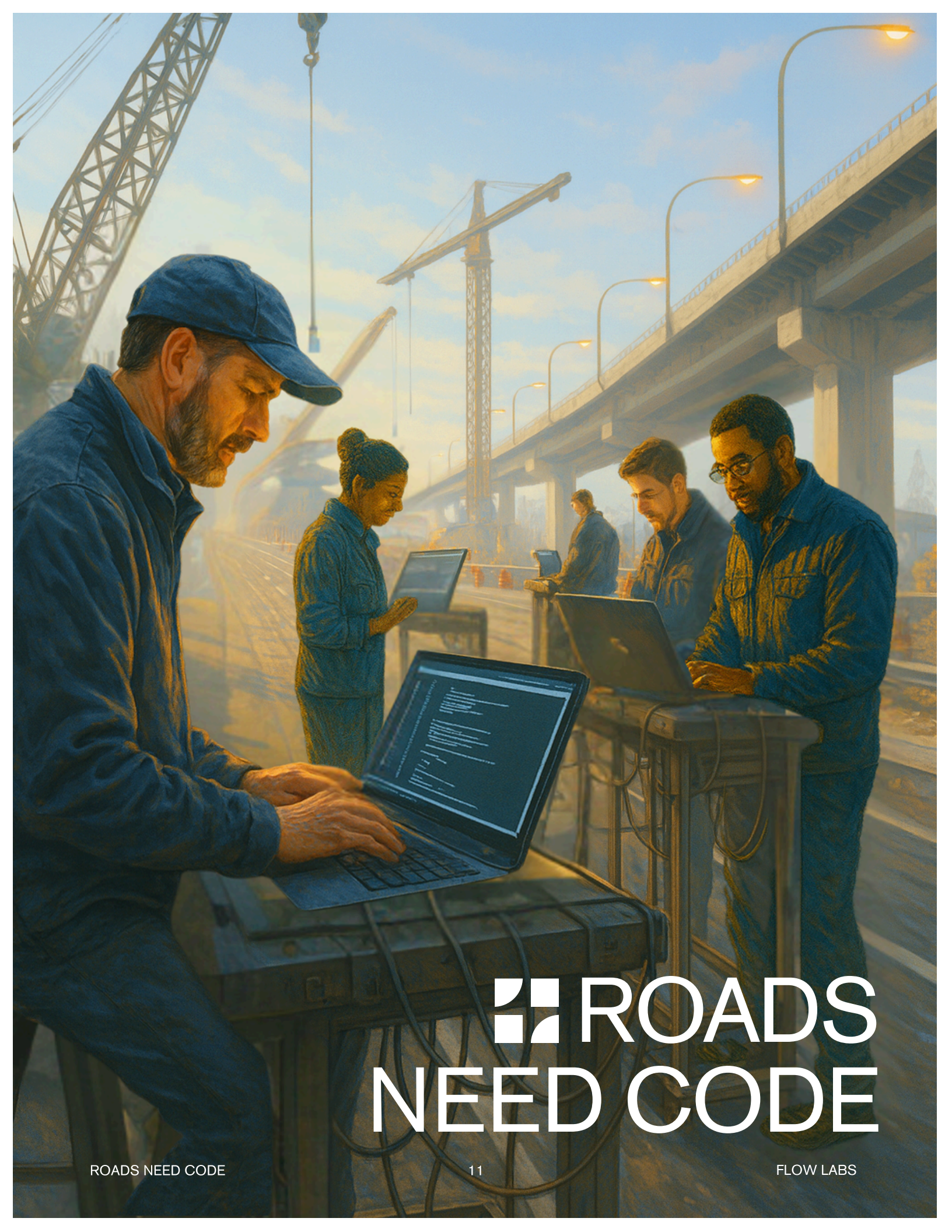
It's time to bring these ingredients together—to build the most connected, most intelligent transportation network in the world. Transportation doesn't need more reports; it needs systems that learn. Networks that adapt in real time. Safety programs that prevent crashes before they happen. Planning tools that use today's data, not yesterday's reports. These aren't futuristic ambitions—they're achievable right now with the technology we already possess.

The AI revolution is already here. It's time our transportation systems caught up.



THE AI REVOLUTION IS  
ALREADY HERE.  
IT'S TIME OUR  
TRANSPORTATION  
SYSTEMS CAUGHT UP.





# ROADS NEED CODE



# 4. ROADS NEED CODE

---

Flow Labs is building the intelligence layer for the transportation system.

A real-time software platform that connects the data, systems, and people who move the world. Our mission is simple: modernize how mobility operates. Of the 250 petabytes of transportation data generated each year, about half of that sits inside public agencies, and much of the rest inside corporations—automakers, fleets, insurers, and logistics firms. It's one of the richest but least-used resources in the U.S. economy, information that could make travel faster, cleaner, and safer but instead lies idle. Flow Labs is putting it to work.

Through partnerships with states, cities, and industry, we've connected more operational transportation data than has ever been assembled in one place. We've used AI to build powerful models alongside software tools that can harness them to manage networks in real time. Our technology doesn't replace infrastructure; it activates it. Roads don't need to be rebuilt—they need to be connected.

We've started with three domains where the old approach is too slow, too costly, and too disconnected from how people and goods actually move.



## ■ TRAFFIC SIGNALS

Almost all of the 350,000 traffic signals in the US run on preset timing plans calibrated manually by engineers. Retiming can take up to 70 hours of manual effort per signal, a process that involves engineers counting vehicles on the road, and driving up and down corridors to measure travel times.

Flow Labs has automated this entire process. By using data streamed from hundreds of millions of vehicles on the road, and thousands of intersections across the US, our platform continuously measures signal performance—volumes, travel times, delay, stops, and queue lengths—without deploying a single sensor or field crew.

Our AI simulates thousands of traffic scenarios and optimizes signal timings, generating new plans in seconds. The impact is measurable. Cities using Flow Labs have reduced travel times by up to 24%, cut vehicle emissions by 21%—all without touching hardware. Projects that once required months of fieldwork and installation are now completed in minutes, entirely by software, at an order of magnitude lower cost.





## ROADWAY SAFETY

Safety is the single most important goal in transportation, but the processes meant to prevent road deaths are built on crash report data that arrive months, even years late. Today's strategies react after tragedy, not before.

Every vehicle is a sensor. The Flow Platform captures vehicle telemetry at scale, analyzing driver behavior as cars move through the network. We detect high-risk patterns—speeding, harsh braking, aggressive acceleration—and our AI models recognize the signatures of crashes themselves, identifying collisions without waiting for reports.

Instead of unreliable year-long studies, entire regions can be scanned in seconds, pinpointing high-risk locations before incidents occur. AI models combine live behavior data with the latest research and regulations, recommending targeted interventions—signage improvements, speed limit adjustments, road layout changes—tailored to each site's risk profile.

The result is a safety process that is proactive, not reactive. What once took months of manual analysis can now happen in seconds. Agencies are closing the gap between risk detection and intervention, saving lives while saving time. This is what AI should do: turn data into prevention.



## CONGESTION MANAGEMENT

Congestion is a problem of demand and supply, but most agencies can't see either clearly. They don't know how many vehicles are on each road, where they're coming from or going, or where bottlenecks are forming until people start complaining. The data that guides major planning decisions still comes from household travel surveys conducted once a decade. To measure traffic volumes, engineers rely on field counts—manual tallies or short-term sensors that capture a few days of data and are outdated the moment they're collected. Billion-dollar investments are made with partial data, outdated studies, and guesswork. Flow Labs gives agencies the visibility those decisions have always lacked. By processing real-time data from millions of connected vehicles, our software measures traffic volumes across every roadway, identifies congestion as it develops, and predicts how it will spread. It transforms static planning into a continuous feedback loop—seeing what's happening, testing responses, and verifying results.

For the first time, transportation agencies can understand demand as it unfolds, not long after. It's not a study. It's a live picture of how the system works—and how to make it work better.

These capabilities aren't experimental—they're deployed. Agencies and companies across the country are using the Flow Platform to reduce congestion, improve reliability, and prevent crashes without adding a single lane. What used to depend on hardware now runs on data. Projects that once took years are live in weeks. The benefits are measurable: shorter commutes, safer intersections, lower emissions, and stronger returns on every public dollar. The data has always been there, waiting for a platform capable of using them. The results are clear: timing plans generated in minutes, safety risks mitigated before crashes, and planning cycles compressed from years to weeks.

A quiet revolution has been underway inside transportation. For years, we built quietly, proving what's possible. Now the results are impossible to ignore—and getting louder.



# 5. GOING HYPERSPEED

---

The systems are working, the results are measurable, and the next step is scale. The time for pilots and studies is over; the era of deployment has begun. Flow Labs is moving from transforming intersections to transforming the nation—taking the intelligence already improving signal operations, safety, and mobility in cities across America and scaling it to every last mile of infrastructure.

We are building the fabric that links data, decisions, and outcomes. Our models are learning and expanding with every new dataset and every new connection, strengthening the intelligence of the platform. What started with a handful of cities now spans states, corridors, and freight routes. Each new integration adds resolution and predictive power. The more data the system sees, the more capable it becomes. This isn't an upgrade; it's the acceleration of a national capability.

Among the new capabilities we're developing is a generation of large-scale infrastructure models trained on unprecedented volumes of transportation and vehicle data. Our latest model, Prometheus, uses transformer models to learn how the nation moves—how signal timings, vehicle demand, and driver behavior interact across space and time. These models can forecast congestion, anticipate safety risks, and evaluate policy or investment decisions with precision that was unimaginable just a few years ago. Prometheus is an early example of what's coming: national-scale intelligence that helps the entire network run as one.

That intelligence will extend far beyond traffic management. It will support vehicles that plan routes dynamically, fleets that coordinate automatically, and businesses that can anticipate and avoid disruption before it happens. Emergency responders will move through corridors that clear as they approach it.



Shippers will route cargo around congestion hours before it forms.

The physical network will stay the same, but its behavior will change completely—roads performing with the speed, predictability, and efficiency of a digital system.

This transformation is technological, economic, and moral. Infrastructure defines a nation's capacity to act, and ours is lagging behind. A country that leads the world in AI research should not tolerate public systems that operate slower than its own phones. We have the capability to make every road, every intersection, and every journey faster, safer, and cleaner. To delay that progress now would not just be inefficient—it would be irresponsible.



Flow Labs exists to ensure that doesn't happen. We're scaling intelligence across the transportation network, compounding impact with every new dataset, partner, and deployment. The result is a transportation system that learns, improves continuously, and becomes the backbone of national growth.

This is what going hyperspeed means: connecting the physical and the digital so that the system never stops getting better. Once, progress was measured in miles of pavement poured; now it will be measured in intelligence deployed. The United States built the greatest physical transportation network in history. We can build the next one—an intelligent network worthy of the country it carries.

The revolution has already started. Now we're stepping on the accelerator.



# **ROADS NEED CODE**

