



What is Ladriss?

Ladriss' mission is to create a future in which every person on Earth is much less likely to die in a disaster or lose their homes, livelihoods, and natural resources to a disaster. The Ladriss software platform allows users to run evacuation simulations to understand total clearance time, traffic congestion, and chokepoints in the context of operational decision making such as evacuation sequencing, traffic control, and contraflow. It also allows for the forecasting of wildland fires and flood impacts, infrastructure changes, new developments, and other alterations to the built environment and tactical and strategic decisions surrounding disasters.

What is an evacuation simulation? How does the model work?

Ladriss' evacuation simulations use data intensive models and AI techniques to simulate and analyze the process of evacuating people from specific regions during an emergency or disaster. The Ladriss AI model runs a micro-scale simulation in which every human decision and route choice can be modeled.

What makes the Ladriss product different from other providers?

There are many nuances that make it different from other solutions, but here is an overview:

- Software utilizes near-realtime traffic data in order to calculate worst-case evacuation trip times and total clearance evacuation times.
- Software produces "Monte Carlo" simulations, a computational technique that uses random sampling to model the probability of different outcomes in an attempt to account for uncertain, random variables, that provides automated modeling across billions of potential starting conditions.
- Software provides a four-dimensional evacuation model with individual timesteps that can also integrate fire modeling in the same screen.
- Software is not limited to pre-defined evacuation zones, and instead allows for unconstrained geographic regions that can be modeled.

How long does it take to generate a simulation in Ladriss?

Once a user submits the required information, simulation results are typically available in less than 30 seconds, sometimes delivered in as little as 10 seconds or less.

What information will be displayed in a simulation result?

The modeling service produces a clear visualization of the results on a map. These results include total clearance time, worst case single vehicle trip time maximum and average single vehicle trip time, temporal geospatial data of the road network congestion during the evacuation simulation, and temporal geospatial data of the evacuated parcels over time.

Which data inputs can be adjusted for evacuation simulations?

Impact area – the user can specify the exact impact area using a circle, polygon, or pre-defined zones loaded into the platform.



Population Numbers – the user can specify exact population numbers by impact area. These numbers can be used to represent evacuation with reference to a high occupancy event, diurnal change, seasonal variation, and other scenario differences.

Heavy Vehicle Percentage – the user can specify what percentage of vehicles are considered 'heavy vehicles' (defined as anything larger than a pickup truck).

Roadway Free Flow Speeds – free flow speeds can be modified by road type to account for heavy smoke, fog, snow, or other factors.

Infrastructure – the Ladriss platform gives complete control of the road network including intersection types, lane count, road closures, and speed limits, as well as the creation of hypothetical roads and road networks. The platform also allows for complete control over the parcel data, including the ability to modify vehicle counts on individual parcels, remove parcels and add hypothetical parcels.

Roadblocks – the user can add roadblocks to simulate road closures due to disasters, car accidents, construction, or other scenario nuances.

What data does the platform use?

The platform uses a variety of data sources including road network data, address/parcel data, and population data. Many other datasets can be easily uploaded into the Ladriss platform for use in evacuation simulation.

Has the model been tested?

The Ladriss evacuation model has passed double blind comparison testing with a traffic engineering firm to validate Ladriss' contributions to the County-Wide Evacuation Study of Nevada County, CA. The fire model used by Ladriss has been tested against a series of major California fires in parallel to those actual events in near real time for the past year. Research efforts for advanced fire models by Ladriss, not yet in production, have also been validated by leading fire scientists.

Further, Ladriss has been evaluated by top academics at the University of California Los Angeles, the University of Utah and Old Dominion University, and has been repeatedly described as the current best commercially available approach to evacuation time modeling.

The software has been rigorously evaluated by sophisticated end users in communities including Woodside, Irvine, Truckee, and others across 8 states. Additionally, the software and underlying methodologies are in the process of funded, multi-year verification studies with top research universities in the field.

Does the program rely on census data?

No, although census data can be used to nuance the model if desired. The population estimates generated by the platform are derived from parcel/address data together with hand-collected car counts for all major points of interest and critical locations (schools, hospitals, airports, et cetera).



Is it possible to use the software to simulate the effects of a potential new road or housing development?

Yes! The Ladriss platform allows the user to represent new / hypothetical housing developments, roadways, and other infrastructure in the platform to study the impact on evacuation scenarios.

Save Lives. Save Property.

No One Should Die in a Disaster.

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What problem do we solve?

As the frequency and intensity of disasters increase, the need for advanced risk management solutions becomes more crucial than ever.



Model Evacuations Before a Disaster Happens



Key Evacuation Challenges to Address

- How Long
- Who and In What Order
- Impacts of New Developments
- Identifying Target Mitigation Projects
- Stakeholder Support for Mitigation Efforts
- Resident Education

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AI for Solving Evacuation Challenges

How will I know if I need to Evacuate?

Be situationally aware.

How do I know when to evacuate?

Evacuate before the disaster reaches you.

How and where do I evacuate?

Wherever is safest.

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Core

Ladris Core puts all public and private data that is or may become relevant to emergency management in one place behind a single pane of glass. One system, constant situational intelligence.

D.1

Fire

Find out when the disaster will hit using Core and Fire.

Core will forecast flooding and Fire will forecast fires.

Evac

Using Evac, forecast all possible evacuation scenarios and work through the options and tactics to identify the best evacuation outcome, and then implement that.

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Quantifying Roadway Hazards



**NEVADA
COUNTY**
CALIFORNIA

Challenge

- Nevada County needed a way to clearly quantify evacuation mitigation priorities for every road, neighborhood, and local community in the entire County, in compliance with AB747 and CA99.

Benefits

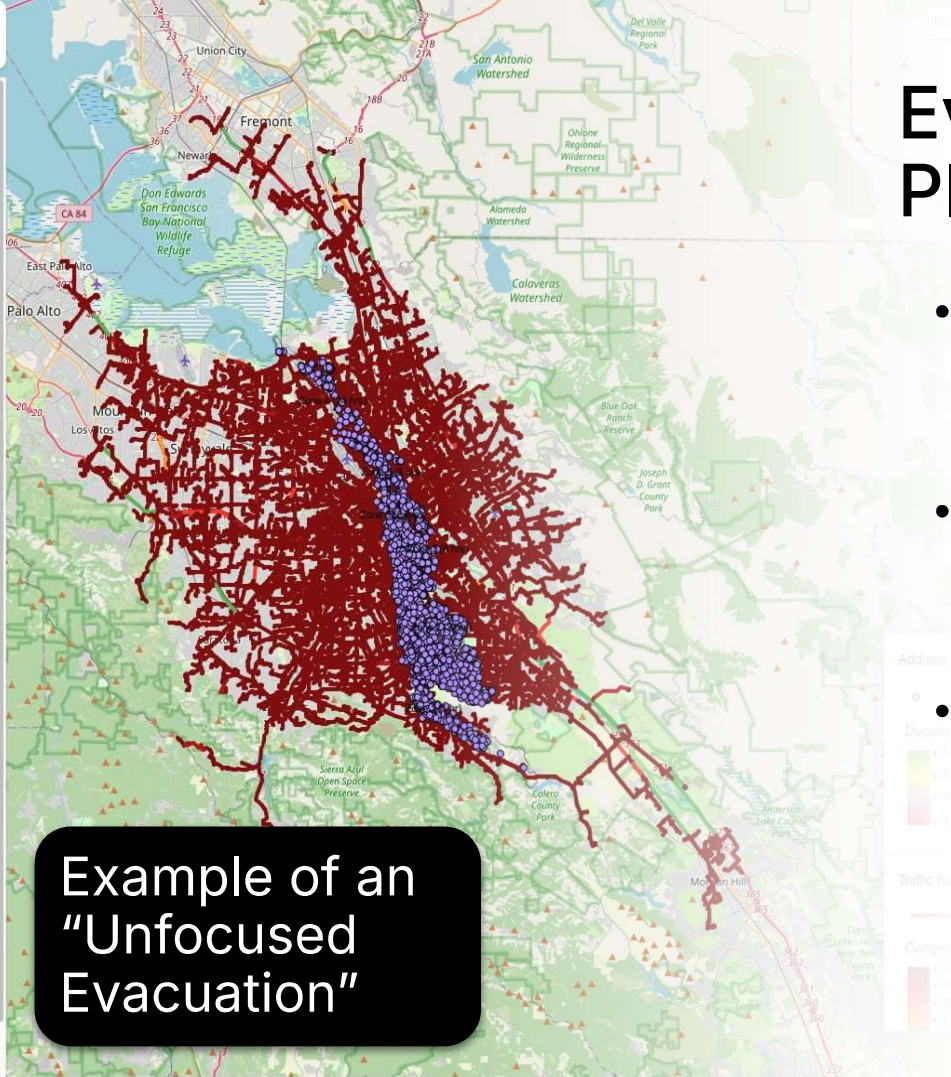
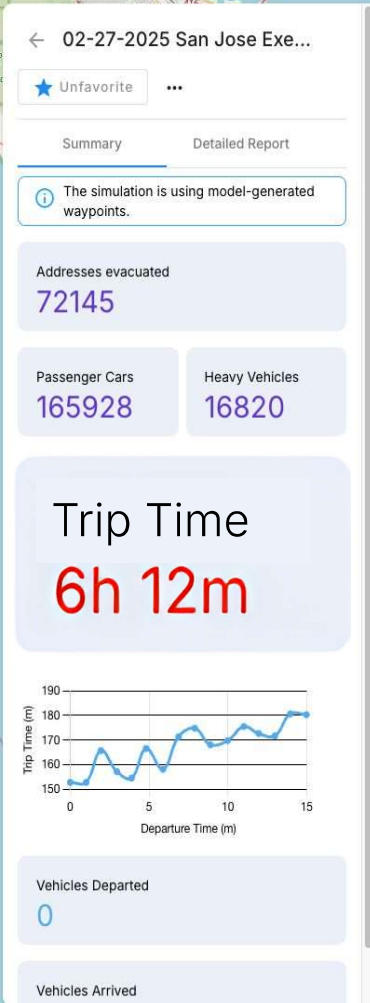
- **Ranked Roadway Hazard Priorities** Quantified the current egress risk for the top 13 neighborhoods, giving future mitigation efforts an obvious, measurable baseline from which to improve.
- **Local Knowledge Rapidly Scaled County-Wide** Answered within days a question that would have taken months using their previous approach.
- **Set Roadmap for Ongoing Mitigation Efforts** Transportation commission continues evaluating the potential impacts of additional state highway capacity & making the case for mitigation spend.

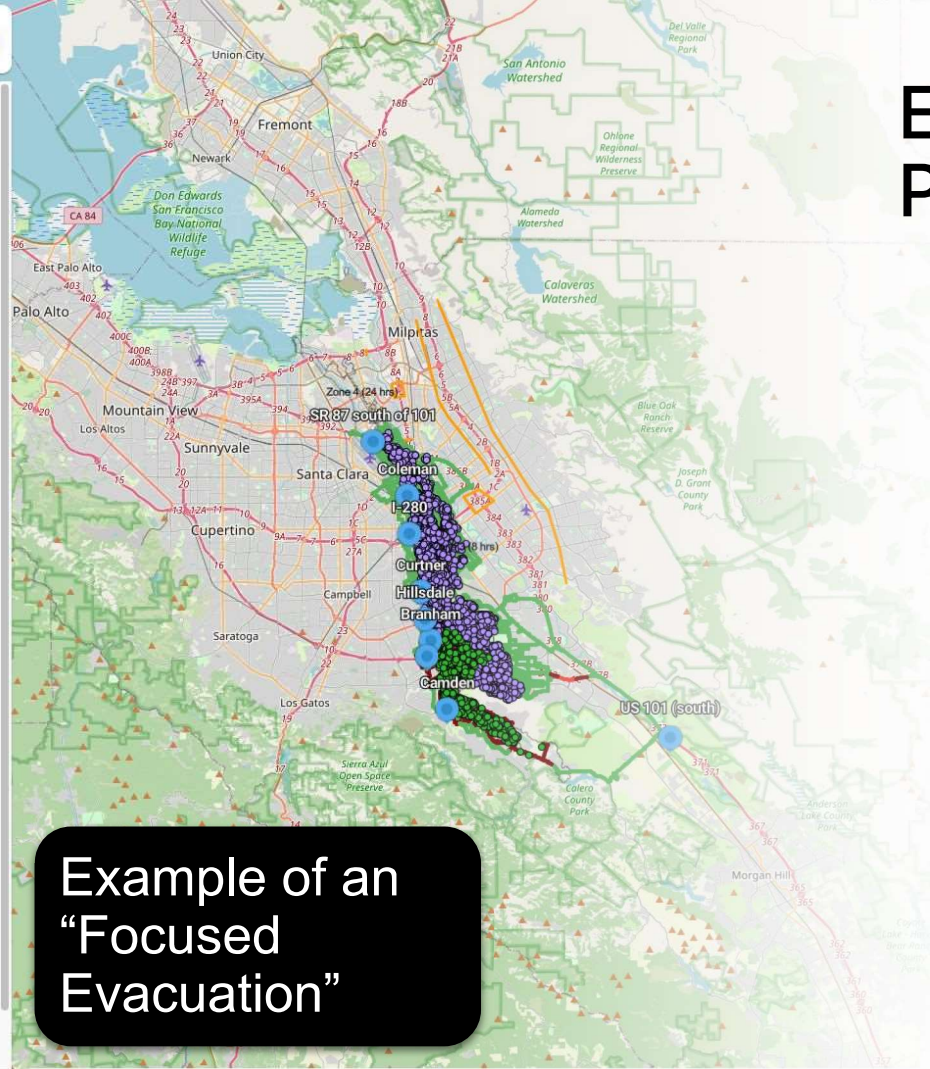
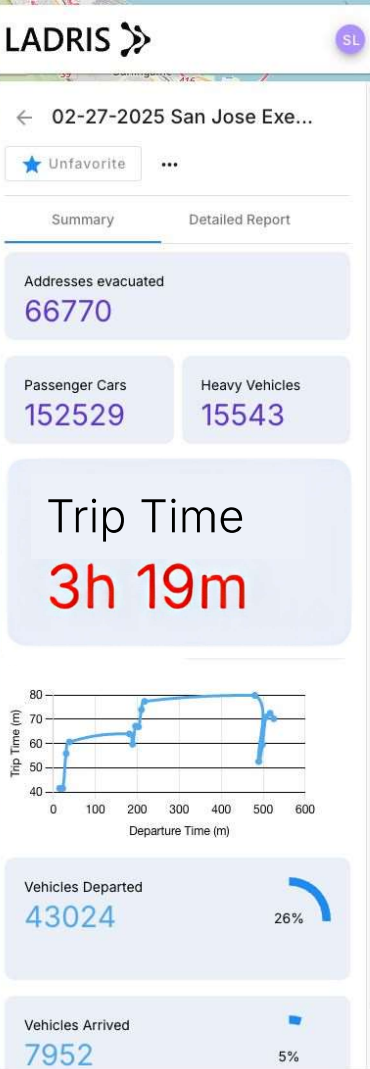
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Evacuation Route Planning Today

- Everyone leaves at the same time without pre-planning
- Likely worst case trip time (*time to safety*) is 6 hrs and 12 mins
- There is significant gridlock throughout the evacuation period

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Evacuation Route Planning w/AI

- Ladriss EVAC-1, an AI tool, allows for focused evacuation planning
- Using data-driven points of safety and a staggered evacuation sequence, decreases worst case trip time (*time-to-safety*) by 50% to 3 hrs and 19 mins
- Gridlock is reduced significantly



Thank you!



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