Empowering Cities to Control and Optimize Multi-Mode Traffic Flow

A Coalition

May 9, 2024

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TNL Mobility, USA

SCAN ME

Booth 103 for Live Demo

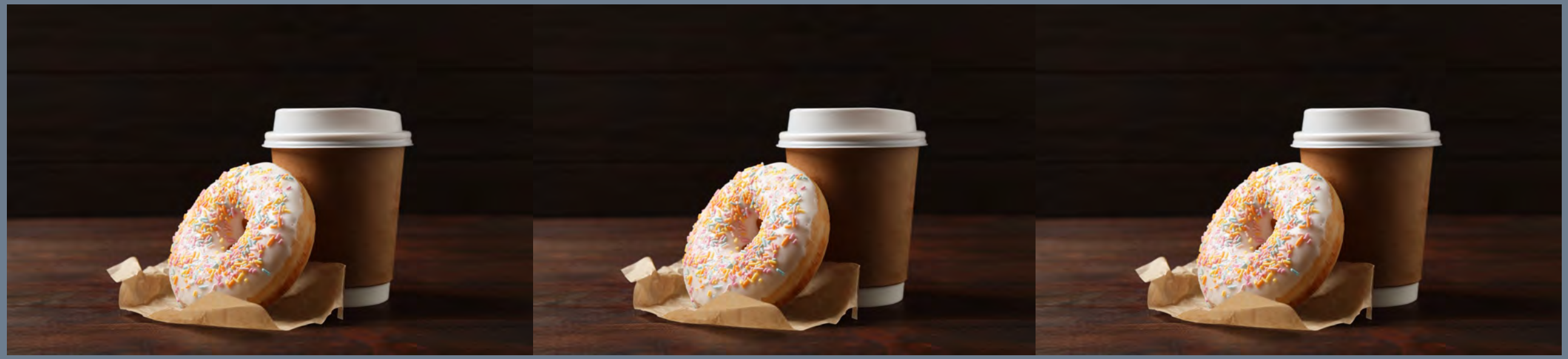
Scan for slides

Redefining solutions

1. I think we are doing well with the transit and transportation in our cities

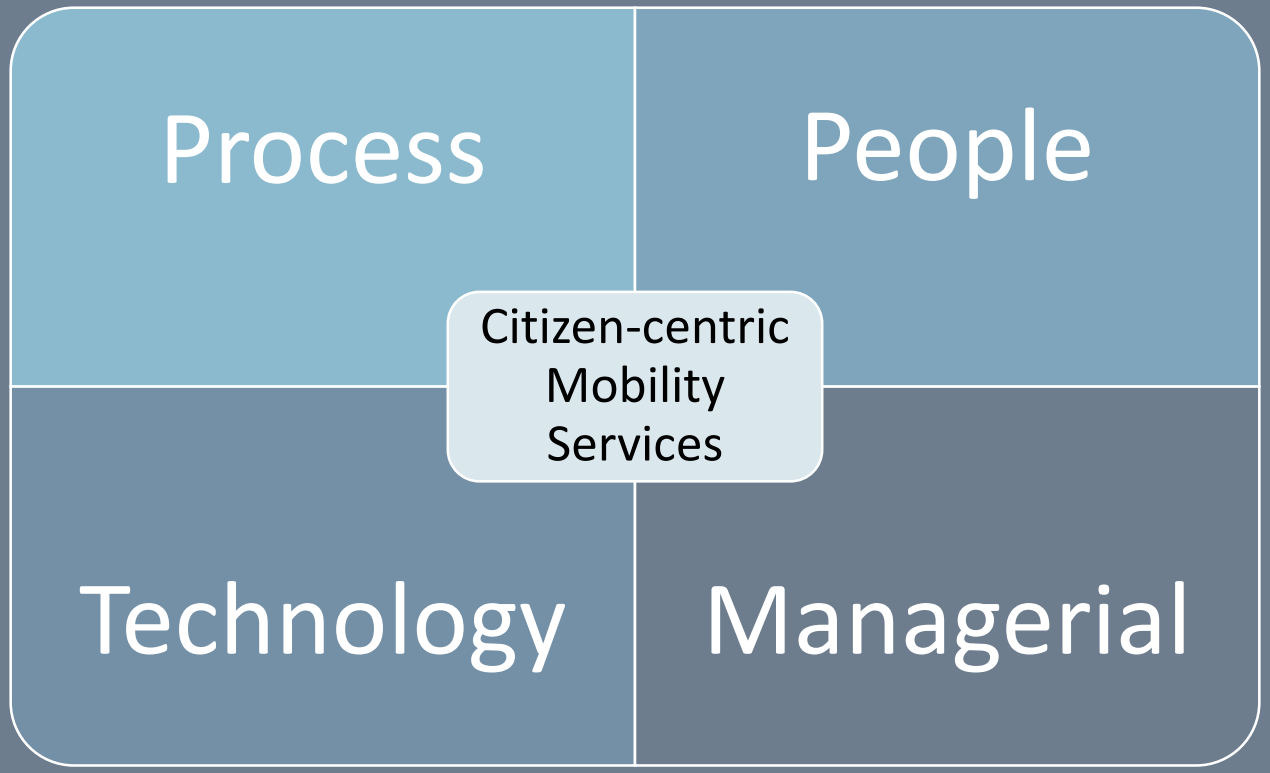
2. Overall, I am fairly satisfied and see the most value in smaller, targeted projects

3. I am very dissatisfied with how US cities serve citizens, visitors, and businesses with Transit and Transportation



3. I am very dissatisfied with how US cities serve citizens, visitors, and businesses with Transit and Transportation

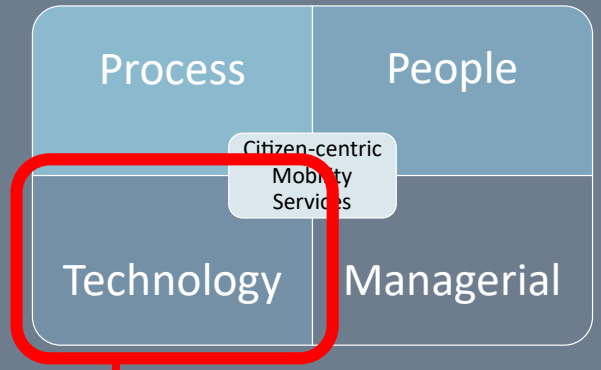
Service Components



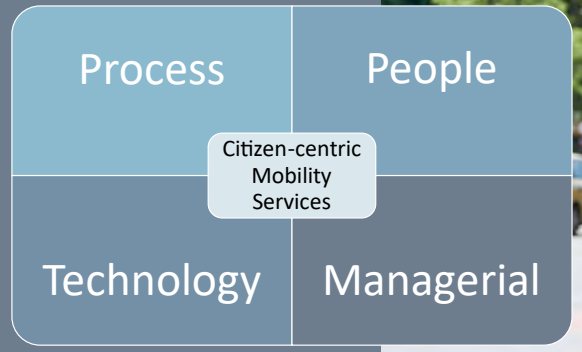
Schedule and Headway adherence are key drivers of customer satisfaction

Transit Agencies are highly dependent on Transportation Agencies

Transportation Agency



Transit Agency

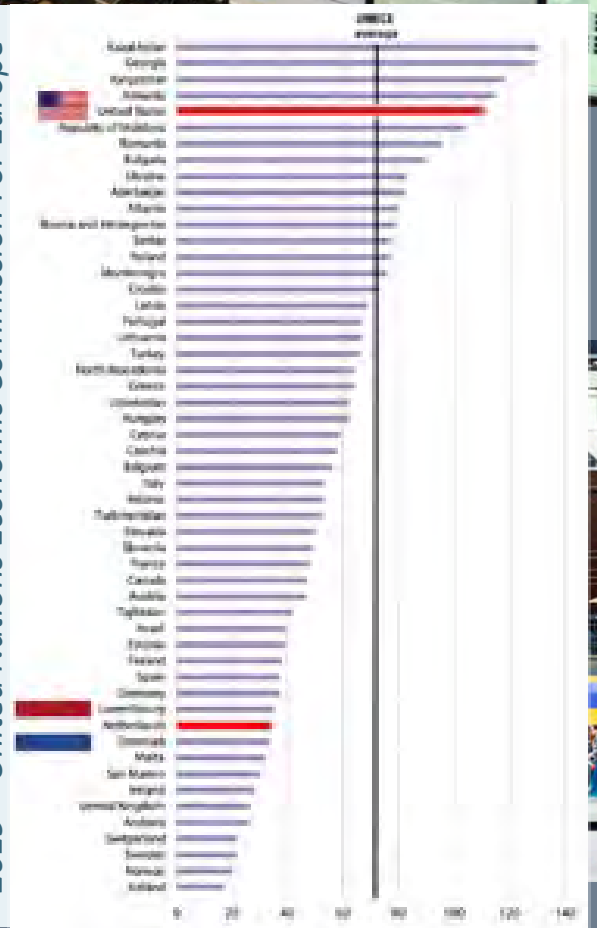


Dutch Traffic Engineers have significantly better tooling

Visit to The Netherlands, 2023

"The system is flexible to allow prioritization whatever the senior managers decide is important for their community"
Vincent Lau, Amsterdam City Sr. Transportation Engineer

Road traffic fatalities per million inhabitants by country, 2019 – United Nations Economic Commission For Europe

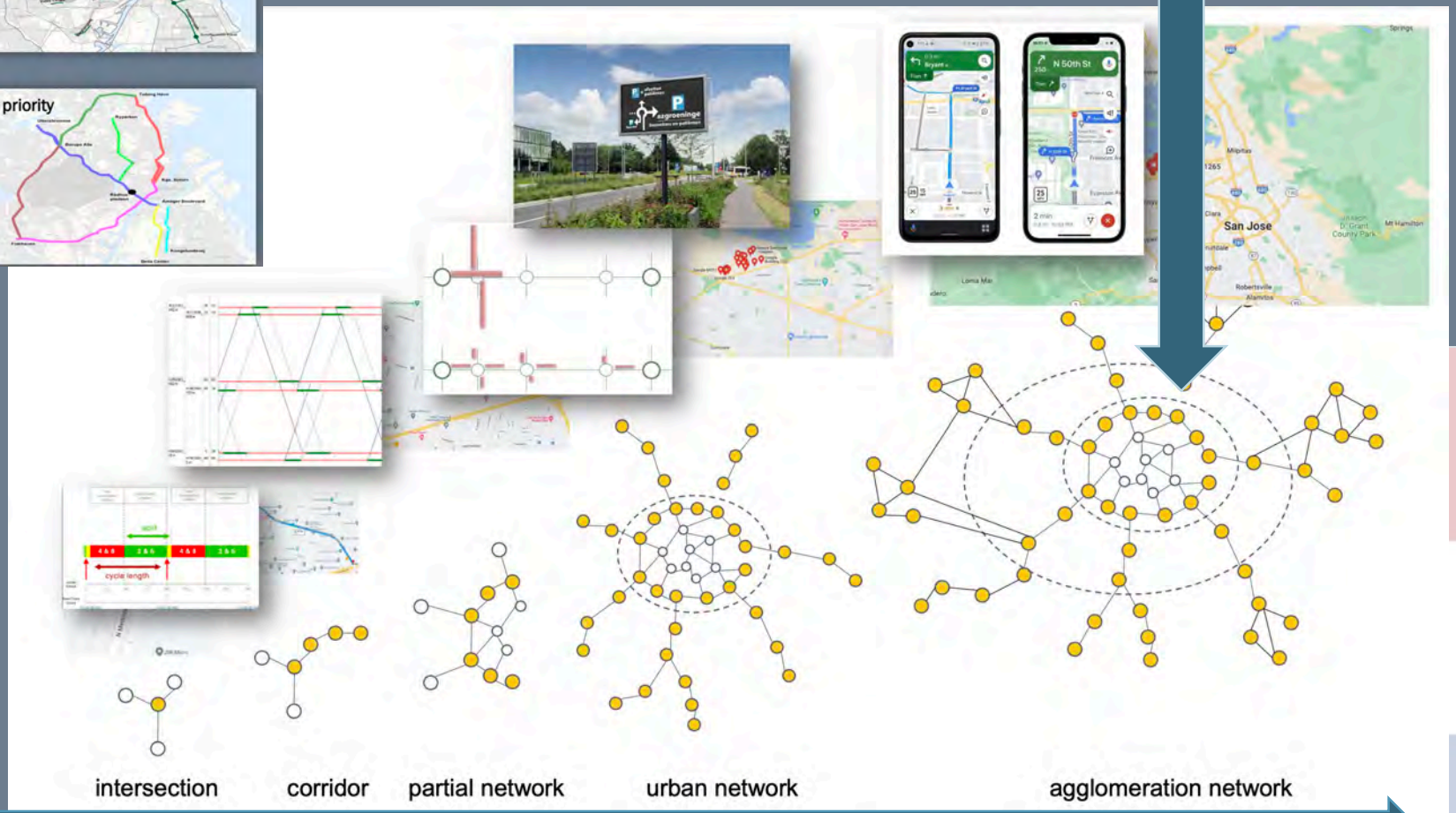


Numbeo Quality of Life Index

Index	United States	Netherlands
Traffic Index:	157.07	84.04
Time Index (in minutes):	33.90	23.54
Time Exp. Index:	414.36	23.54
Inefficiency Index:	260.82	137.50
CO_2 Emission Index:	7,510.71	1,928.70

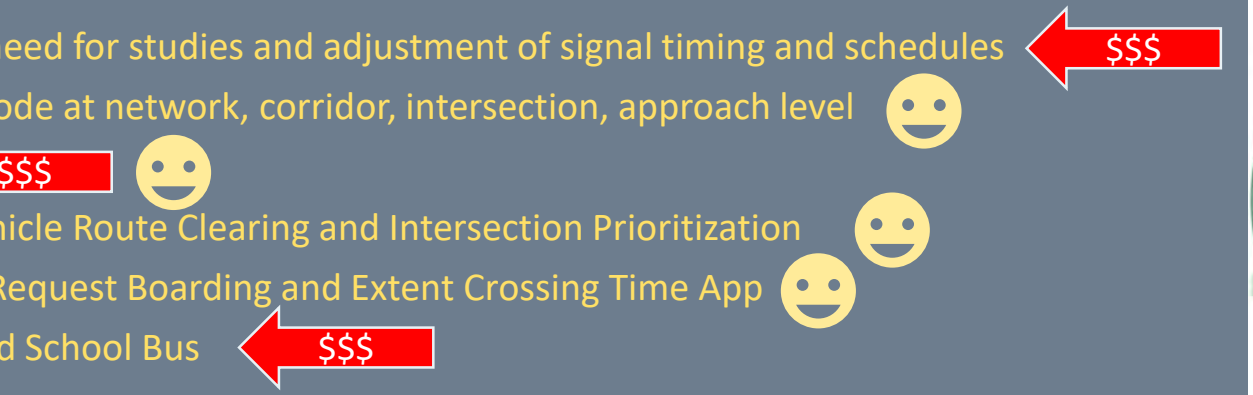
It took over 50 years for the Dutch to become world-class

Why not just start here?

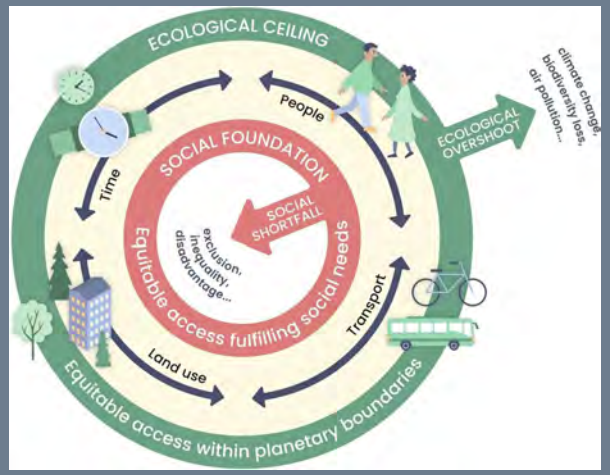


Integrated Tooling to Deliver Dynamic Multi-Mode Traffic Flow Optimization
Enabling Traffic Engineering

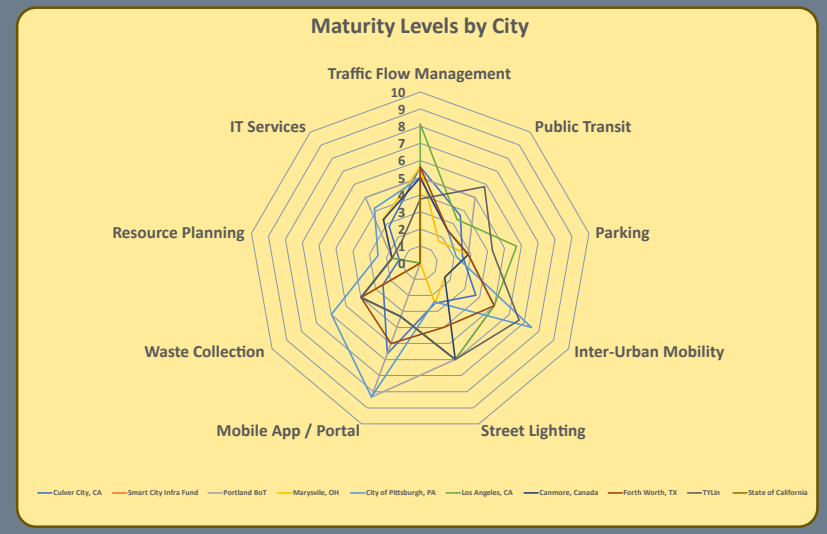
- Eliminate the need for studies and adjustment of signal timing and schedules
- Prioritize by mode at network, corridor, intersection, approach level
- Transit
- Emergency Vehicle Route Clearing and Intersection Prioritization
- ADA Support: Request Boarding and Extent Crossing Time App
- Para Transit and School Bus
- Event Support
- Freight Route and Waste Management
- Parking Guidance and Reservation
- School and Hospital Zones
- Dynamic Streets
- Freeway-arterial transition
- Dynamic Street Lights, Variable Message Boards
- Apple CarPlay and Android Auto integration
- Drones – Operational Management Airspace
- ITS Asset Management



TNL Livable City Framework

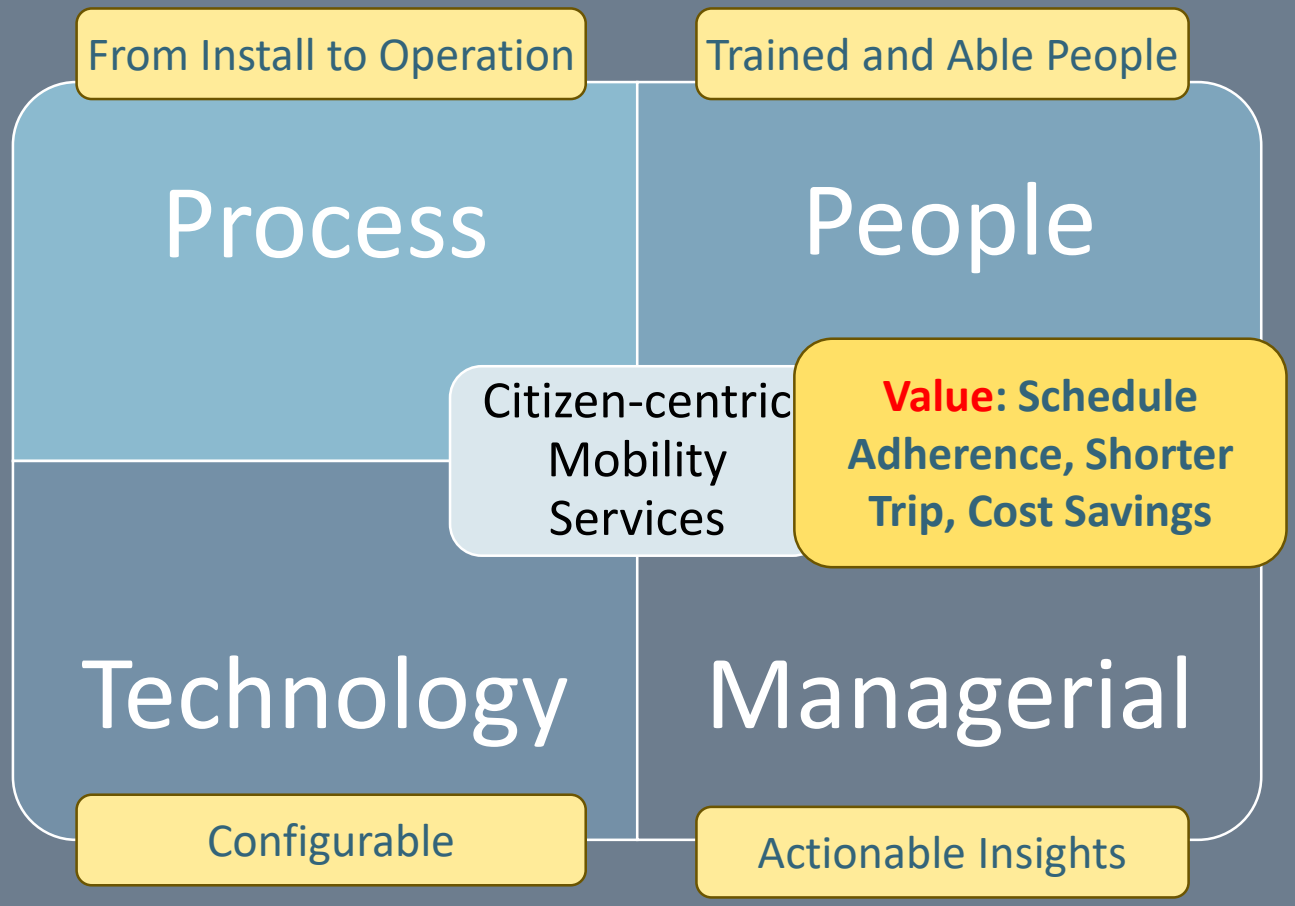


TNL Mobility Maturity Workshop Result



SFMTA Connected Corridor PoC Mission

Build a Service to improve the flow, safety, and climate for the people in the streets and in all vehicles



Design Principles

Scale

- Multi-jurisdiction
- Continuous optimization
- Leverage existing infrastructure
- Phased deployment

Transit

- Significant service level increase
- Cost reduction

Traffic Engineering

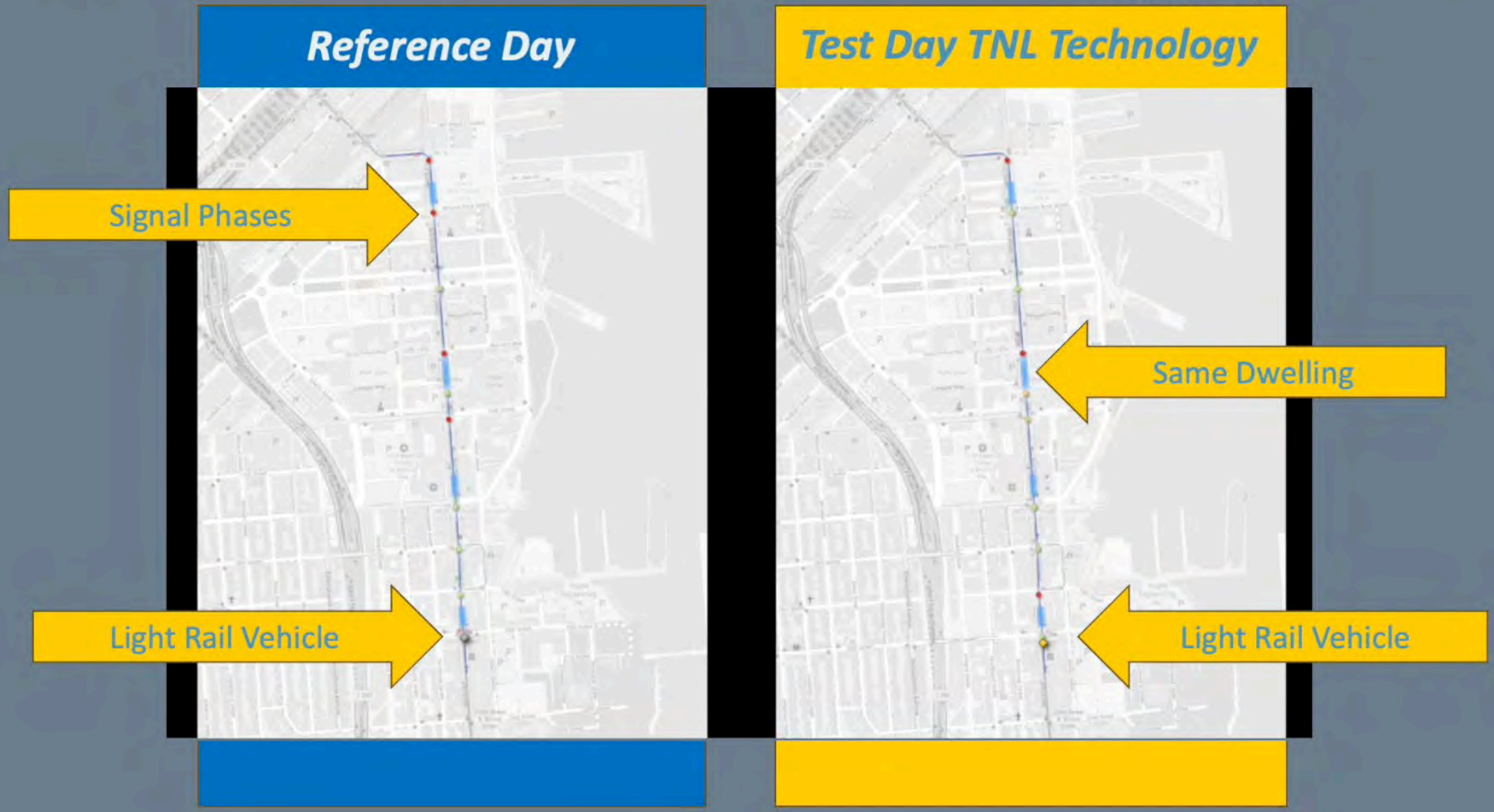
- Micro-management multi-mode and next generation Adaptive Flow Management
- Scenarios and rules
- The client owns all data

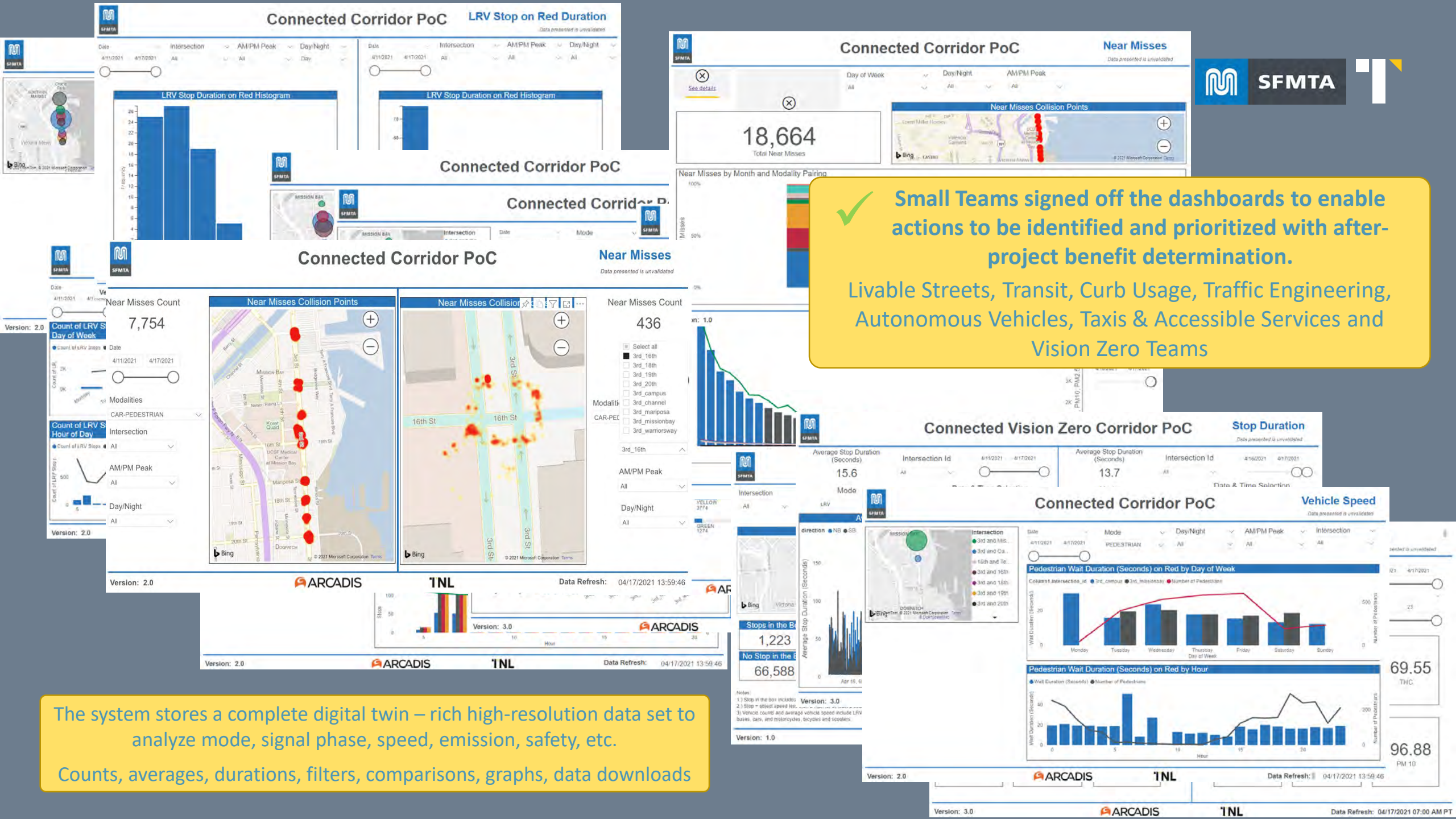
Technical Architecture

- All Connected Signal Controllers
- Open architecture
- Military-grade cyber security

Let's Race!

Simulation generated with SFMTA
PoC Connected Corridor Data
11am – 12pm



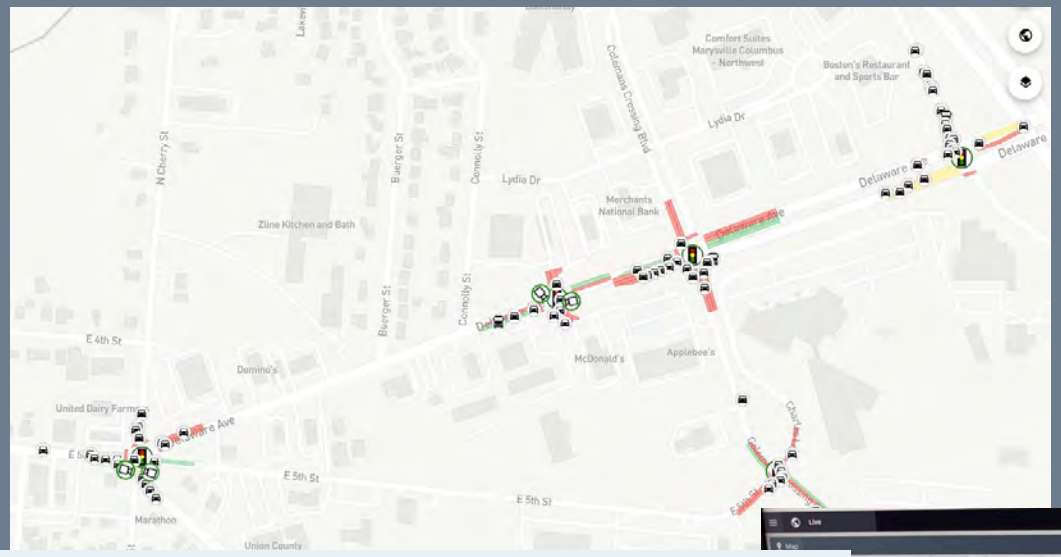


✓ **Small Teams signed off the dashboards to enable actions to be identified and prioritized with after-project benefit determination.**

Livable Streets, Transit, Curb Usage, Traffic Engineering, Autonomous Vehicles, Taxis & Accessible Services and Vision Zero Teams

The system stores a complete digital twin – rich high-resolution data set to analyze mode, signal phase, speed, emission, safety, etc.

Counts, averages, durations, filters, comparisons, graphs, data downloads

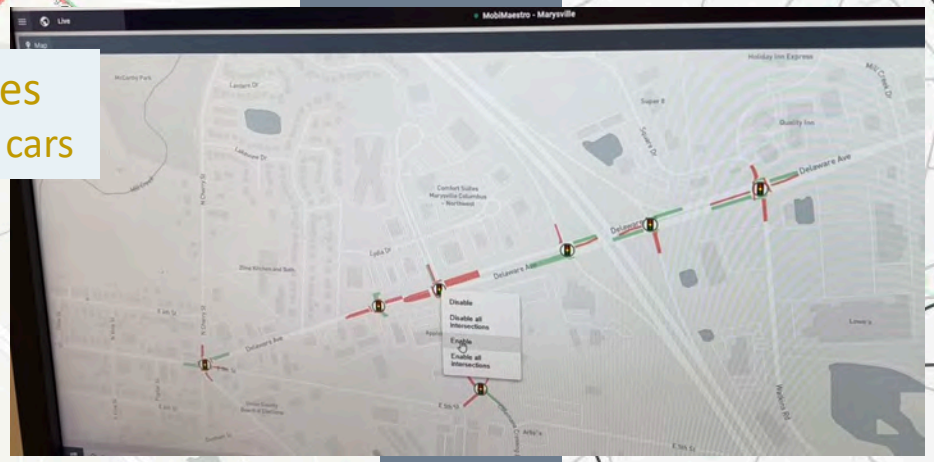


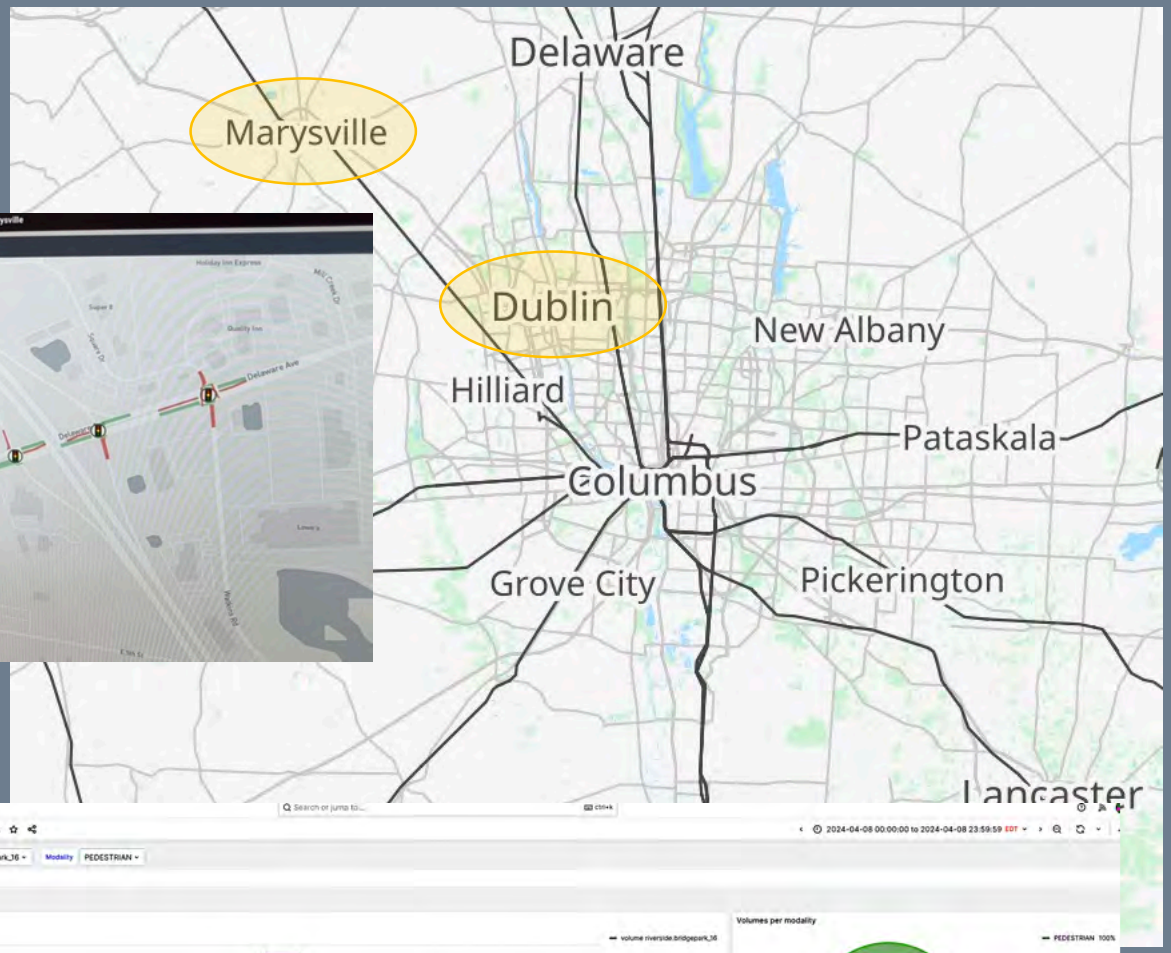
CITY OF marysville

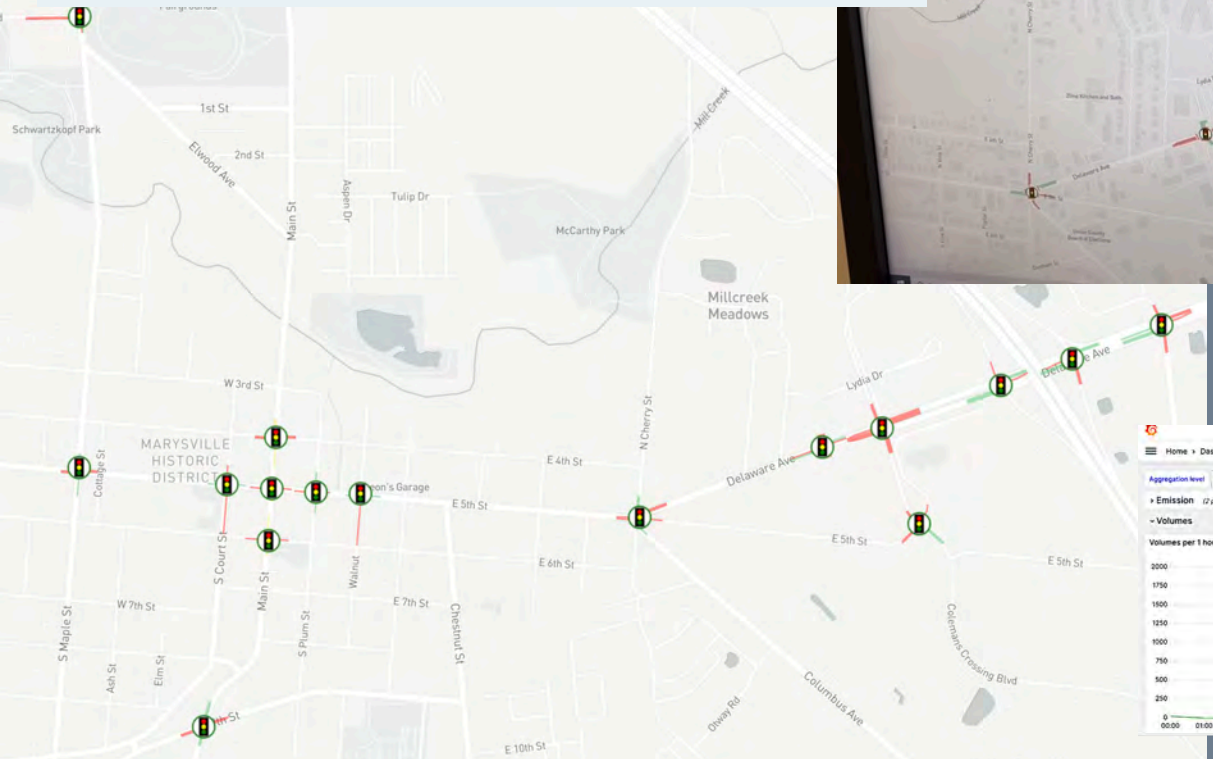
City of Dublin OHIO, USA

NETWORK Optimization of five modalities

Emergency, Snowplows, Trucks, Pedestrians, cars

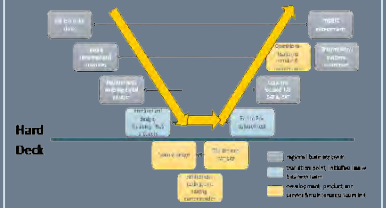




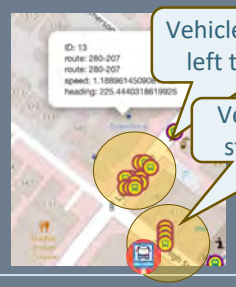


From PoC to Service – Empowering Traffic Engineering

Implementation Methodology



Transit Waste Assessment



SFMTA
samTrans
CONTRA COSTA transportation authority
Santa Clara Valley Transportation Authority

Kingdom of the Netherlands

Liveable City and Mobility Maturity Workshop

Colorado State University

"Intersection in a Box"

SFMTA

Operationalize and harden the algorithms and technology

Empowering Cities

Client Trust

Process | People | Technology | Managerial

Citizen-centric Mobility Services

Paper ID: 1226690

TRB Transportation Research Board

Use Case Engine

Visit to The Netherlands

"As we rethink transit and transportation, this trip provided not only a great overview of proven approaches but also real-world examples and conversations with practitioners. It brought a valuable perspective to the conversation in California," Mark Tollefson, Under Secretary Transportation California State

TNL AI Edge Sensor *FlowCubes*

24/7 Support and Maintenance

Cyber Security Audit Trail

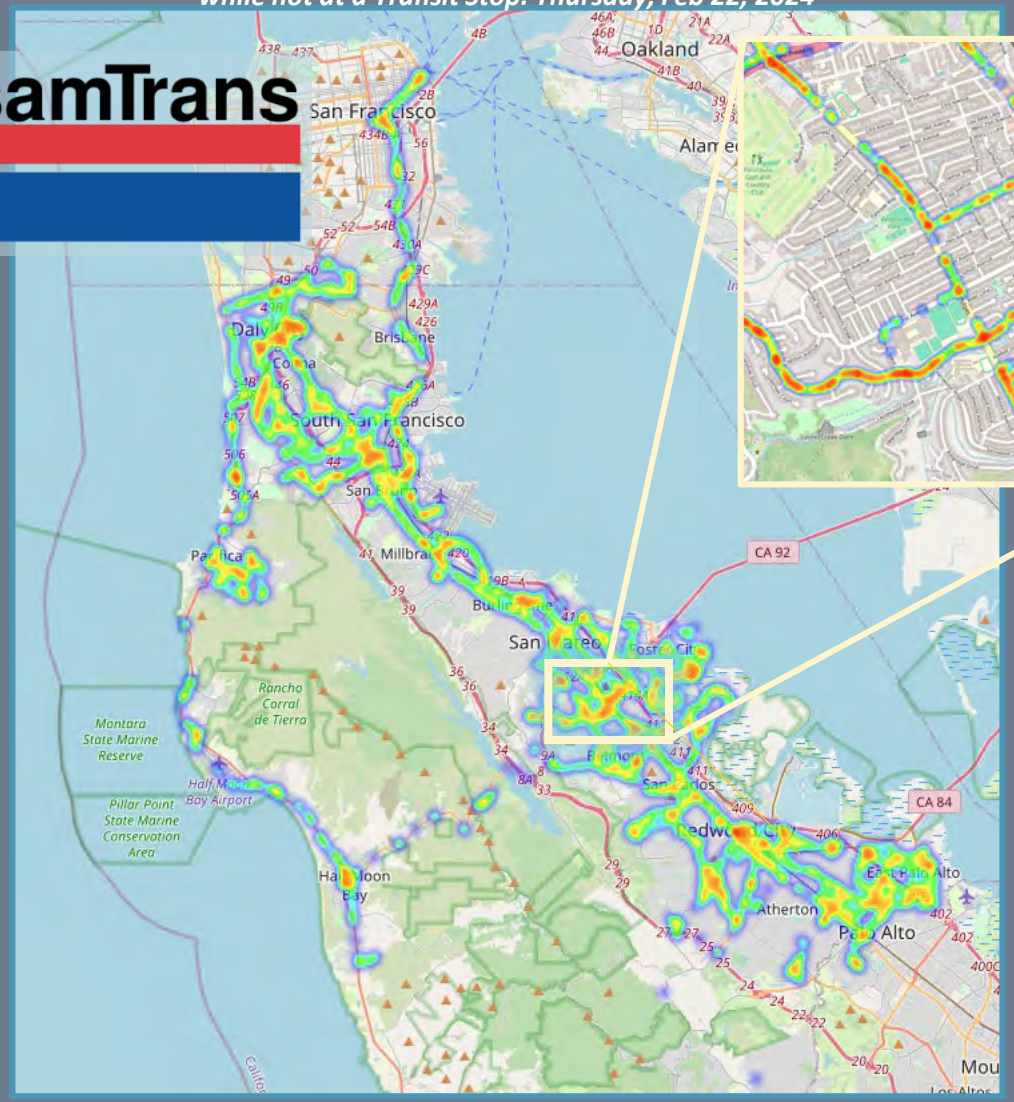
Multi-sensor object detection

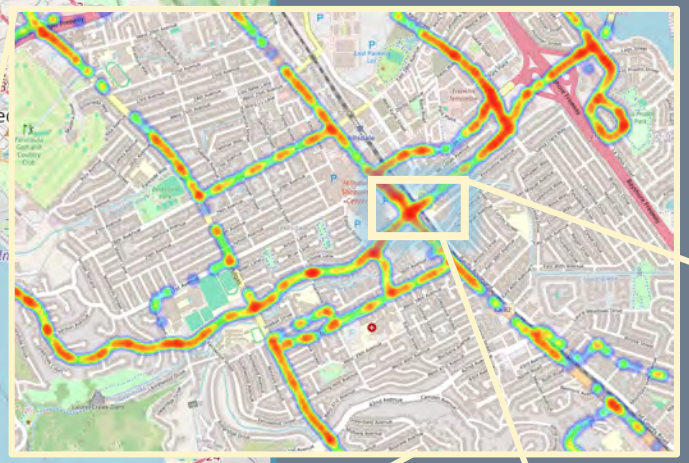
The Hedgehog principle (vs the fox)

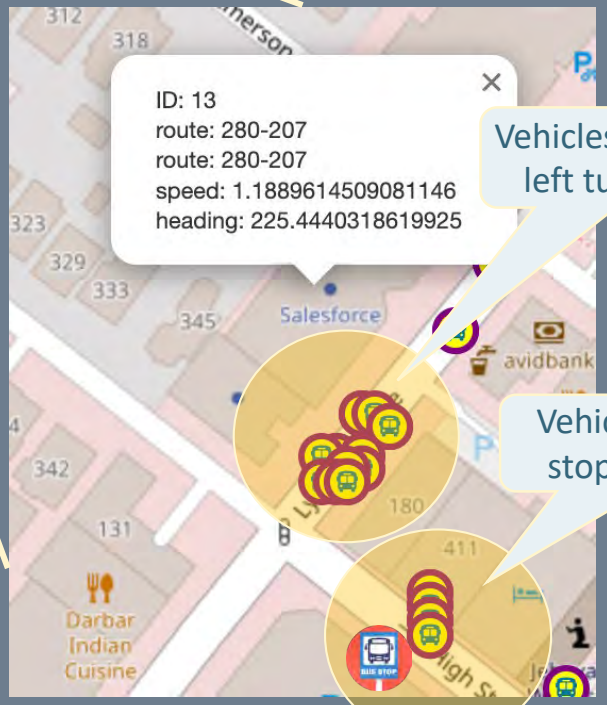
Do one thing really well

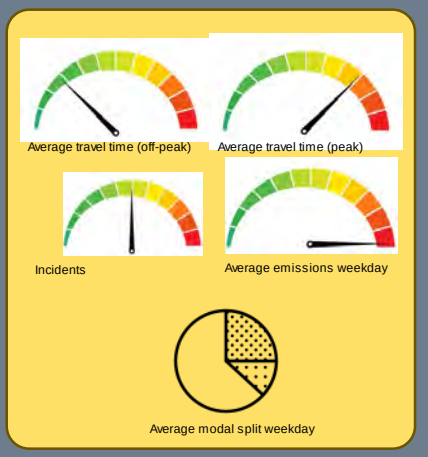
Continue till there is no Red left

Count of buses travel with speeds <15mph while not at a Transit Stop. Thursday, Feb 22, 2024





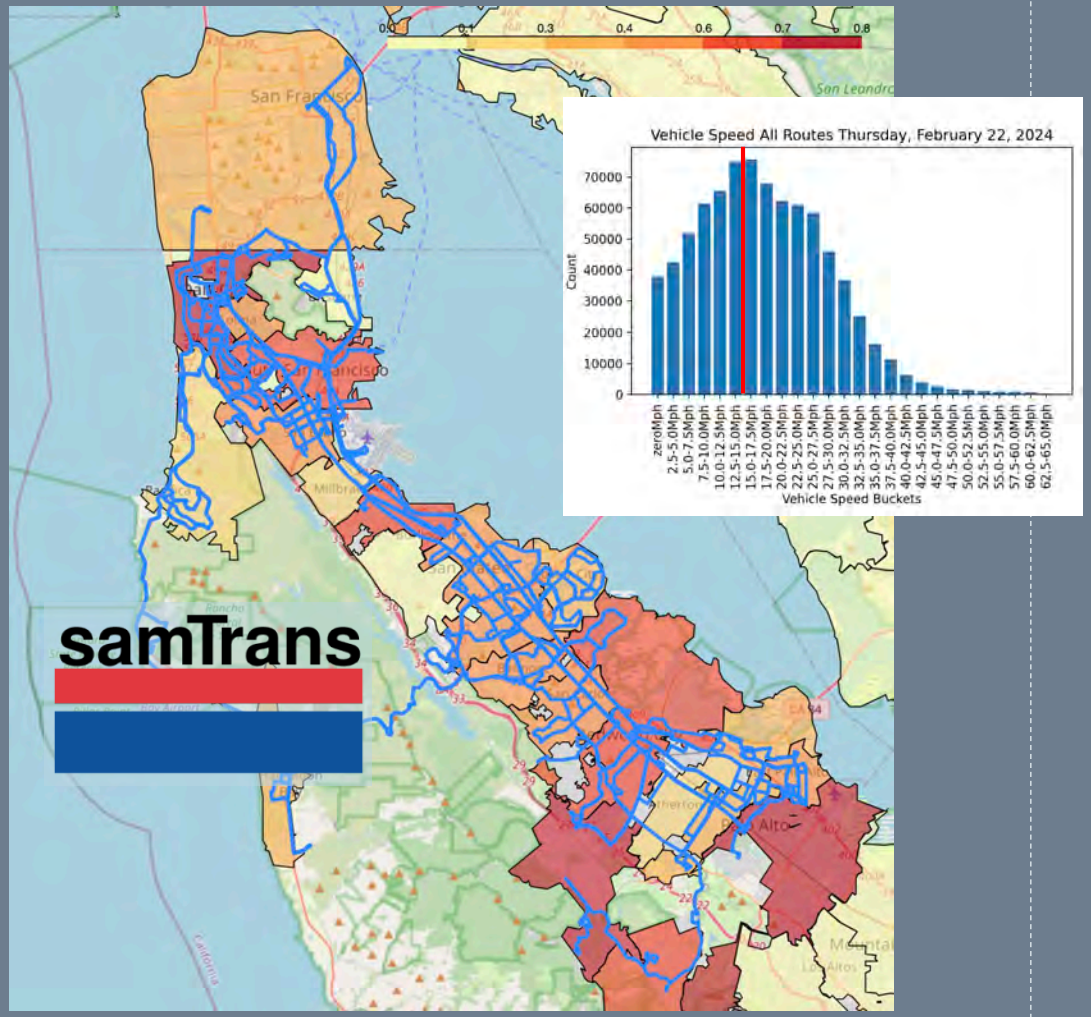




Rely on benefit to fund the next project, not external

Operational Expenditure

47.4% of buses travel with speeds <15mph while not at a Transit Stop. Thursday, Feb 22, 2024



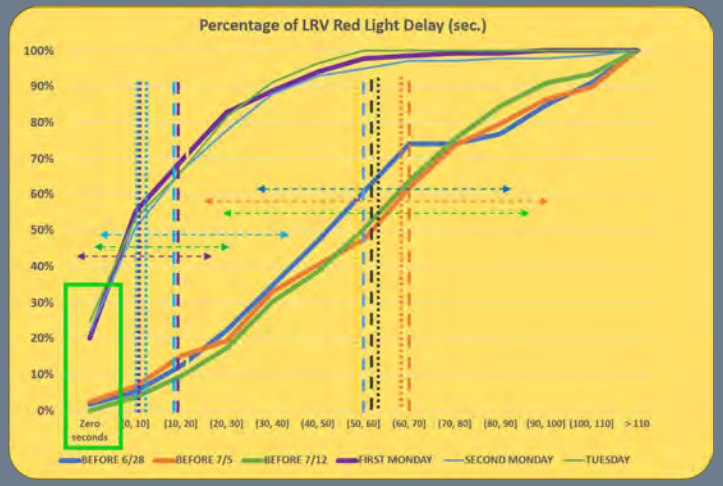
SFMTA

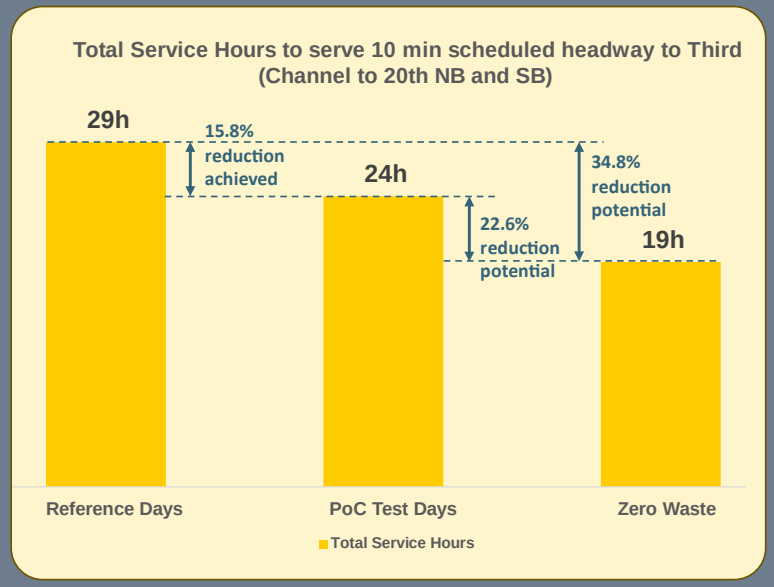
T-Line Current

- 12-14 LRVs
- 80 min travel

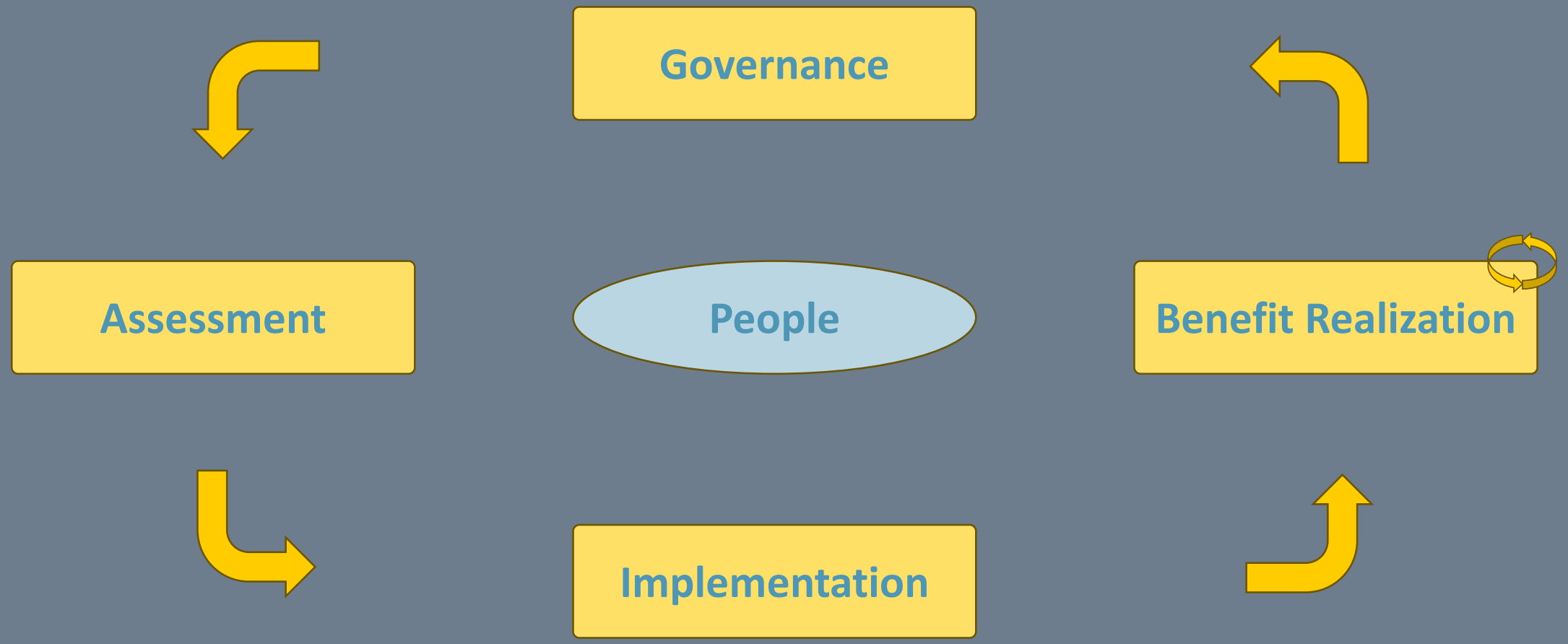
Projected

- 8-11 LRVs
- 60 min travel





Service Improvement Framework



Bridging the Financials

One of the options besides Grants, etc. - PPP

SCIF SMART CITY INFRASTRUCTURE FUND

Sponsors

apg All Pensions Group

PATRIZIA MANAGING PARTNER

- Institutional investment vehicle that enables cities to unlock financial and societal benefits and a rapid transition towards low-carbon, resource-efficient, and inclusive communities.
- Smart City Infrastructure Fund is backed by a leading European pension fund to invest in the scale-up of integrated Smart City infrastructure projects.

Investment size	>$10million
Investment term	10-year minimum
Structure	Public private partnerships (PPP/P3), concessions sale & lease back
Eligible Funding	Common equity in individual assets, preferred equity, and acquisition of receivables

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www.smartcityinfrafund.com

Physical Layer of Digital Infrastructure

Target back-bone infrastructure investments for the development of digital networks and smart city **use cases** *in the energy, transport and water & environmental* **services.**

Long Term Equity Investments

Underpinned by a lease arrangement or **concession** *model with public and private entities. Project risk transfer to private sector and deconsolidation off public budget.*

Global Scale Up Strategy

Partnership approach with best-in-class industry players offering scale-up support for their smart city program. Minimum investment size is as low as $10 million, where there are expected to be future replicable opportunities.

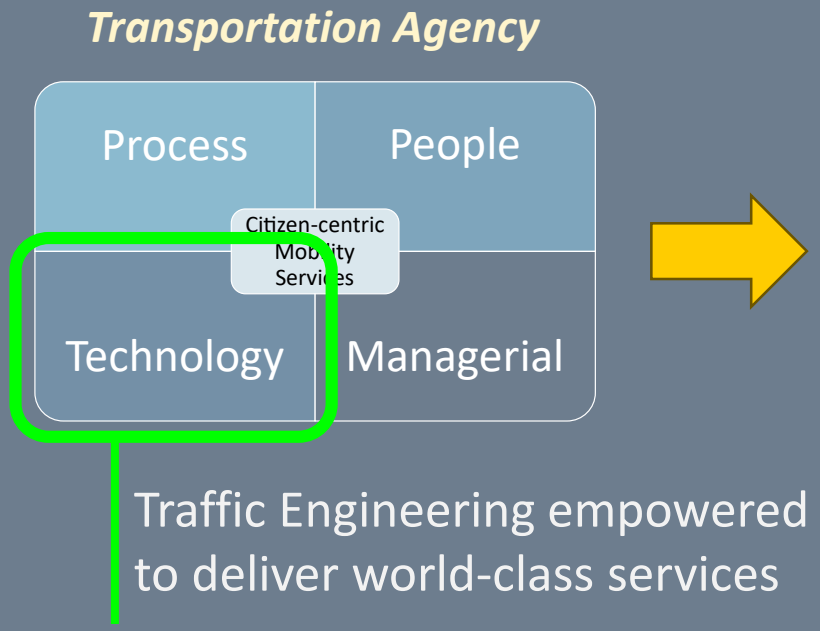
Competitive Funding Cost and Upside Sharing

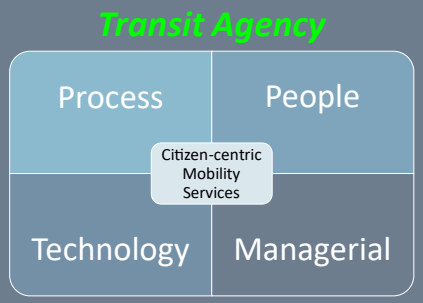
Attractive risk-adjusted returns to match the low risk profile of the infrastructure backbone. Revenue sharing on the development of future smart city **use cases** *and* **services.**

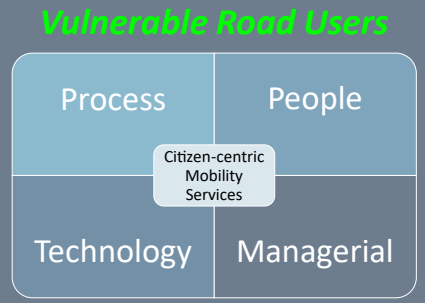
US Investment Portfolio*

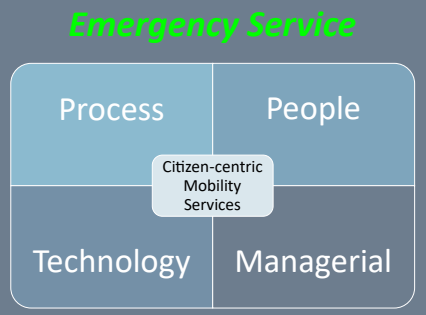
City	Investment Date	Population Size	Invested Amount
Fullerton, CA	April 2019	135k	US $72m
Salem, MA	October 2020	41k	US $31m
Placentia, CA	April 2021	51k	US $39m
Simi Valley, CA	October 2021	131k	US $85m
Rancho Cordova, CA	January 2022	75k	US $64m
Kenosha, WI	October 2023	99k	US $98m

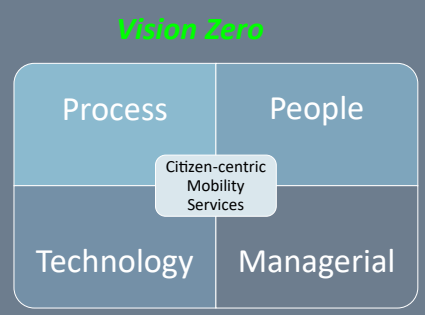
*Investments are for open access fiber network build-outs

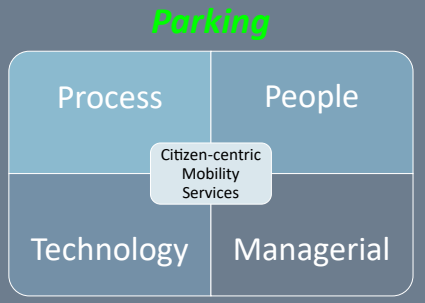

Transportation Agency
Process
People
Citizen-centric Mobility Services
Technology
Managerial
Traffic Engineering empowered to deliver world-class services

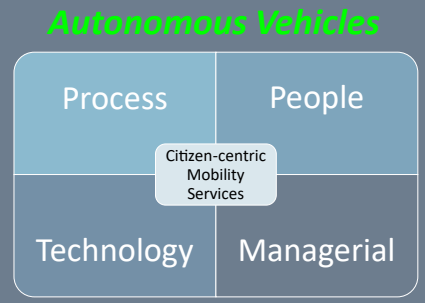

Transit Agency
Process
People
Citizen-centric Mobility Services
Technology
Managerial

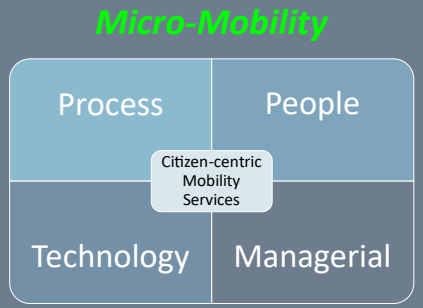

Vulnerable Road Users
Process
People
Citizen-centric Mobility Services
Technology
Managerial

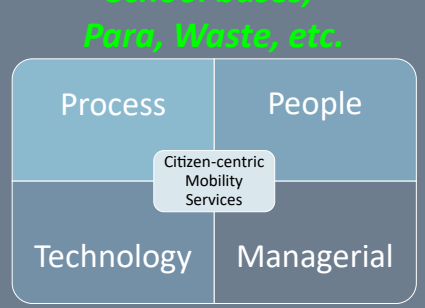

Emergency Service
Process
People
Citizen-centric Mobility Services
Technology
Managerial


Vision Zero
Process
People
Citizen-centric Mobility Services
Technology
Managerial


Parking
Process
People
Citizen-centric Mobility Services
Technology
Managerial

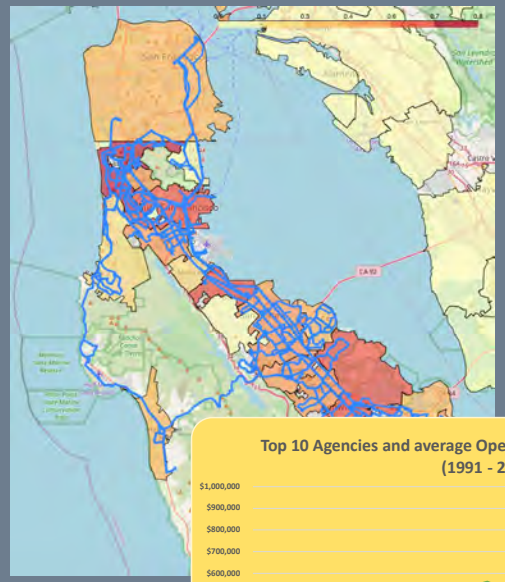

Autonomous Vehicles
Process
People
Citizen-centric Mobility Services
Technology
Managerial

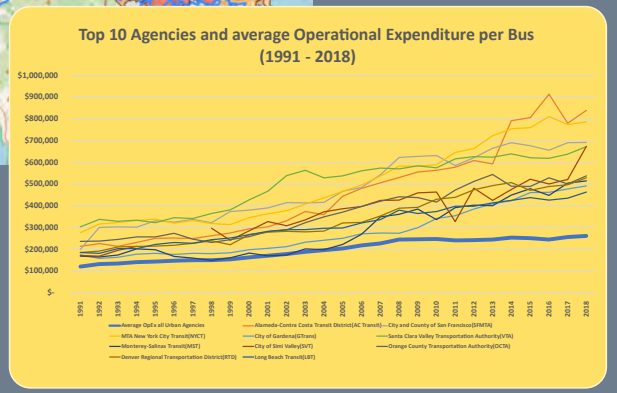

Micro-Mobility
Process
People
Citizen-centric Mobility Services
Technology
Managerial


School buses, Para, Waste, etc.
Process
People
Citizen-centric Mobility Services
Technology
Managerial

For those dissatisfied…

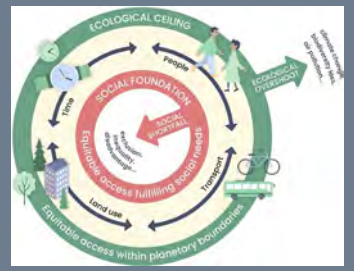
1 *Determine your opportunity increase service levels and reduce OpEx*



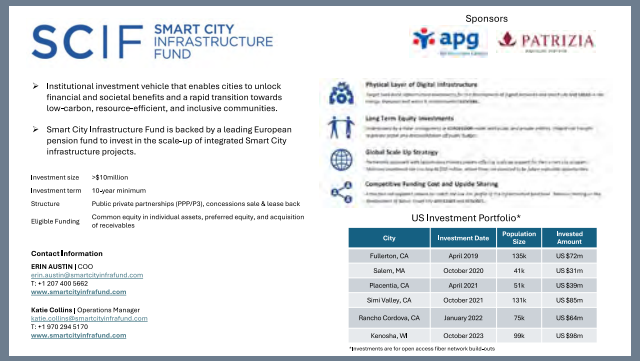


2 *Set your course*

TNL Livable City Framework



3 *Fund*



4 *Enable your Traffic Engineers*

SCAN ME

Redefining **solutions**

TNL