Illinois State Freight ADVISORY COUNCIL

December 12, 2024

Illinois Department of Transportation

AGENDA

- Leadership Update
- ACE Hardware Supply Chain
- Trucking Industry and the Supply Chain
- Mississippi River Barge Congestion
- Freight Models and Tools
- IDOT Freight / Truck Parking Update
- US DOT Funding Update
- Round Table Discussion

Leadership Update

Secretary Osman,
Illinois Department of Transportation

ACE Hardware Supply Chain

Rick DiMaio
Executive Vice President
Chief Supply Chain Officer
Ace Hardware

Ace Hardware Supply Chain

Rick DiMaio – EVP, Chief Supply Chain Officer

Supply Chain

- Optimizing the network to maximize capacity for service, storage and logistics.
- How we are thinking of AI/ML.
- Automation – the need for automating work.
- Staying ahead of growth and industry consolidation – Kansas City.

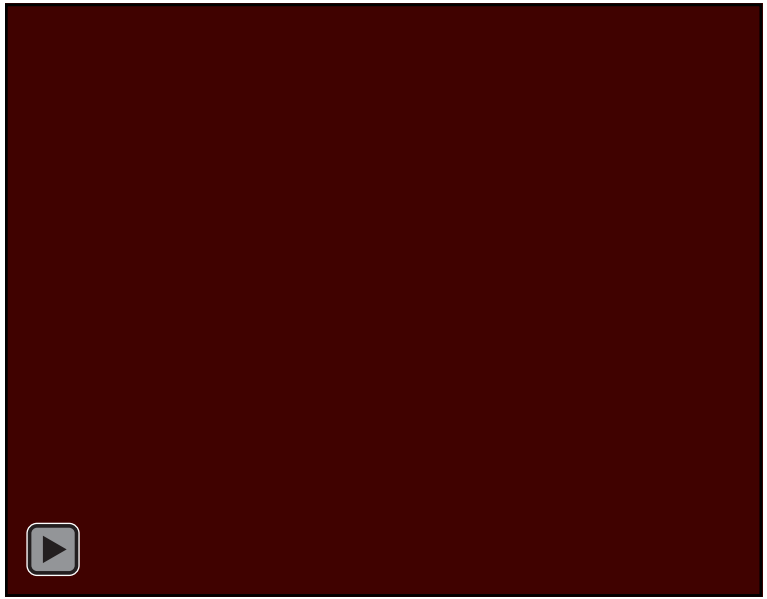
Network Design & Planning

Network Design Is A Strategic Process that Enables:

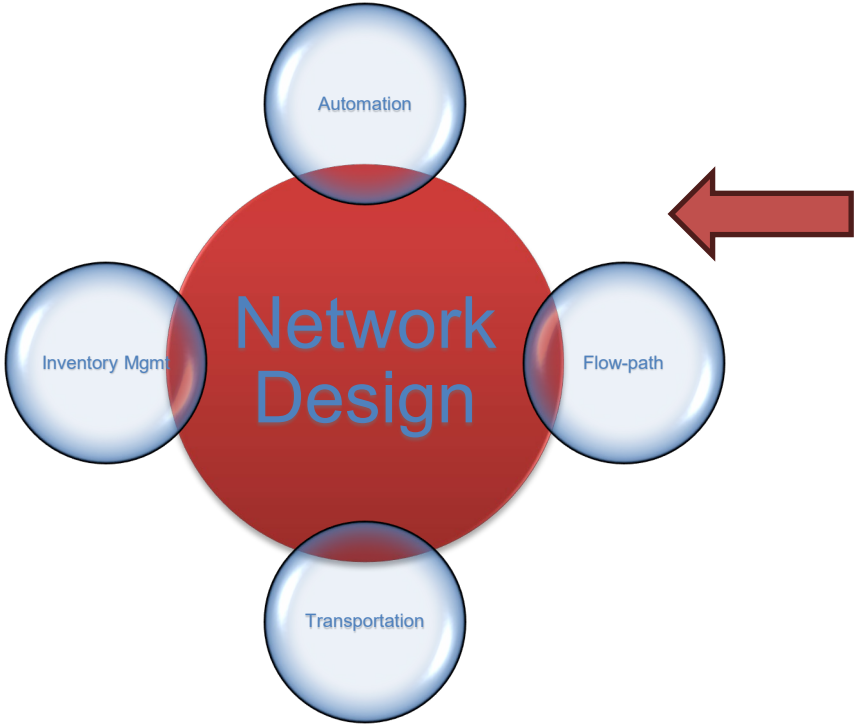
- Evaluating current and future distribution centers (DCs).
- Designing, analyzing, and optimizing the flow of goods
- Recommending optimal source DC locations for stores
- Running constraint-based "what-if" scenarios with cost implications surrounding any Changes

What's the Objective?

- **Be Cost-effective**: Managing constraints, product flow and customer sourcing cost effectively.
- **Be Customer-focused**: Position product in a manner that meets demand & service levels.
- **Be Balanced**: Considering Cost (trans, Labor, Working Capital), Service and operational constraints.
- **Better And More Informed Decisions:**



Why The Focus on Network Design?



1. **It's Core:** Network Design is Core and enables Several of Ace's Supply Chain Initiatives
   - Key Auto*mation Decisions*
   - *Flow-Path*
   - Inventory Positioning
   - Rising Transportation cost

2. **Limited Tools: Ace** Lacks the Tools and Resources
   - Power BI & Excel = Low response time

3. **Growth:** It supports our Growth and Expansion efforts into New Channels.

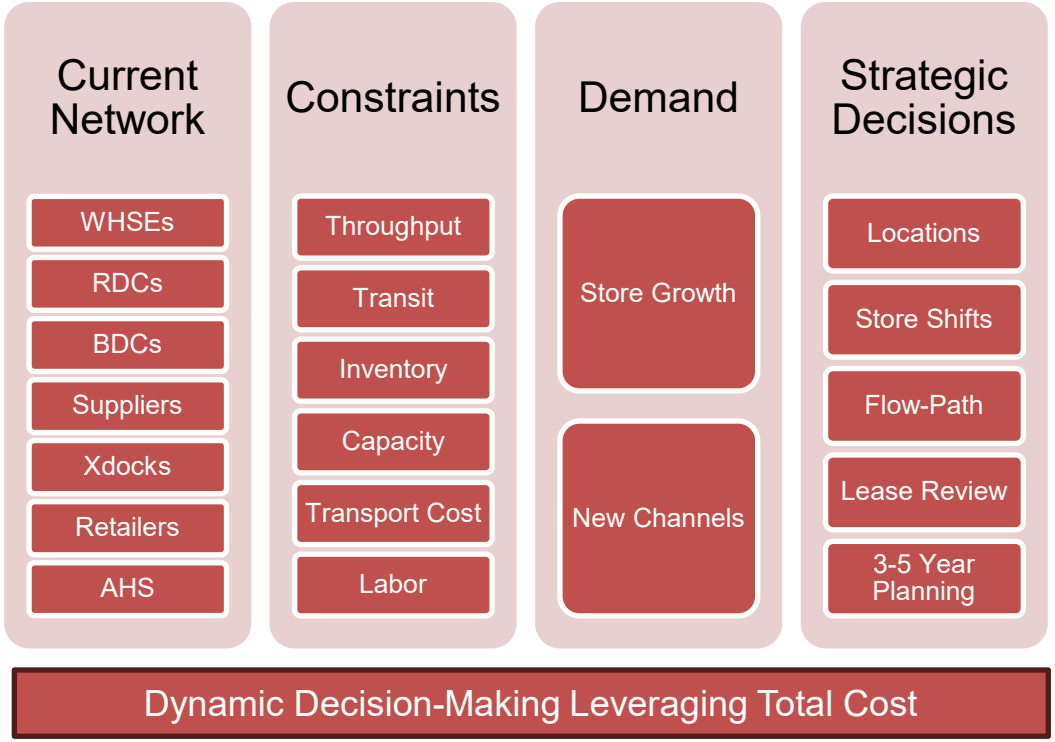
4. **Decision Driver:**
   Helps with Leveraging Ace's Working Capital
   - Shift, Add, Expand Existing Sites

5. **Savings:** Enable Savings & Cost Avoidance

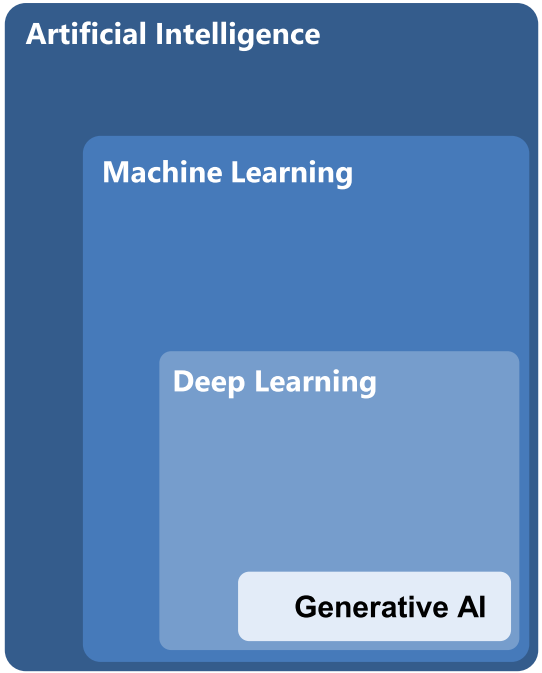
How Will Ace Leverage Network Optimization?

Areas of Focus:

- ❑ Store Assignments w/ Transit & Financial Trade-offs
- ❑ Capacity management (Throughput & Inventory)
- ❑ What if Scenario Assessments
- ❑ Evaluate Flow Path
- ❑ Customer Cost to Serve
- ❑ New locations: (RSC, RDC, BDC, Greenfield)
- ❑ 3- 5 Year Strategic planning



AI History, Terms and Definitions



1956

Artificial Intelligence

the field of computer science that seeks to create intelligent machines that can replicate or exceed human intelligence

1997

Machine Learning

subset of AI that enables machines to learn from existing data and improve upon that data to make decisions or predictions

2017

Deep Learning

a machine learning technique in which layers of neural networks are used to process data and make decisions

2021

Generative AI

Create new written, visual, and auditory content given prompts or existing data.

Retail Industry View and Adoption

Dynamic Pricing and Inventory Optimization

- Maximize profitability

Personalized Product Recommendation

- Enhance customer satisfaction

Enhanced Supply Chain Management

- Streamline operations

Customer Service and Chatbots

- Deliver seamless support

Creative Content Generation

- Engage customers across multiple channels

Augment Sales Processes

- Improve conversion

AI Initiatives at Ace

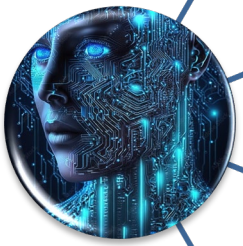
Candidate Considerations

Machine Learning
- HR Recruiting
- Marketing Personalization
- Supply Chain Forecasting
- Merchandising Pricing
- IT Code Development

AI Efficiency
- Retail Support
- Legal
- Finance
- HR
- Retail Operations

Domain Exploration
- Retail
- eCommerce
- Traffic
- AHHS

In Progress Pilots



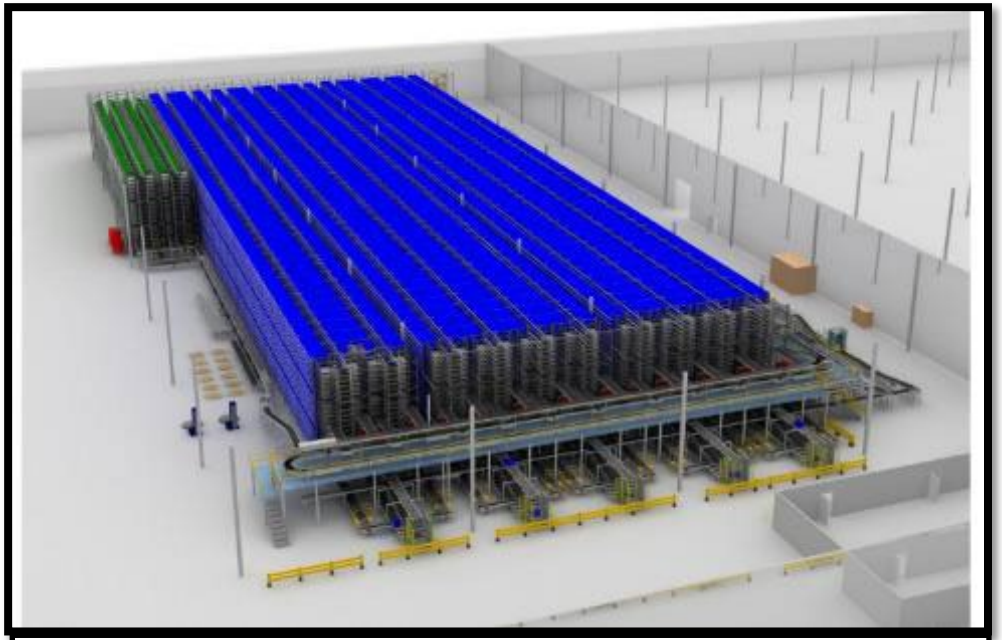
Product Content
- Attribute validation, augmentation, and normalization
- Romance text

Local Social Media
- Manage Reviews
- Create localized content
- Engage with social posts

Retail Hiring
- Job templates
- Conversational help
- Automated messaging
- Scheduling

Office 365 CoPilot
- Capture and summarize
- Content creation

ASRS Overview



ASRS design: 1 DMS aisle to 1 GTP Station. IAT is used to move inventory tote between GTP stations. IAT within Modulars only. No front-end sorter.

Storage

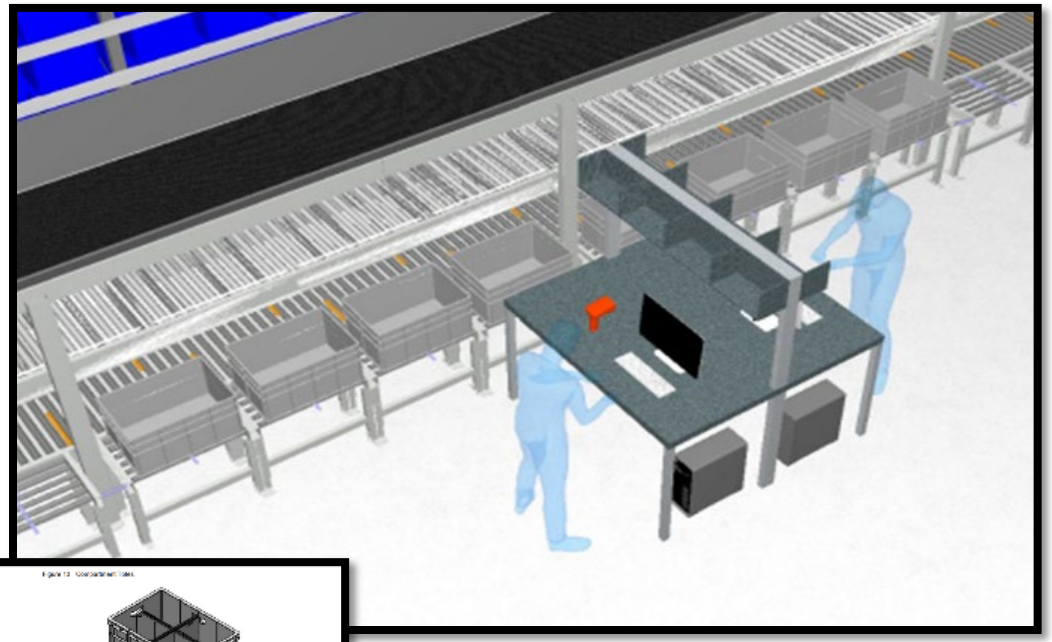
- 10 - Aisle Inventory Storage
  - 3 Module Design (4, 4, 2)
  - IAT (Inter Aisle Transfer)
  - 18 Level, Dbl Deep Storage
- 2 - Aisle Outbound Buffer
  - 18 Level, Single Deep storage

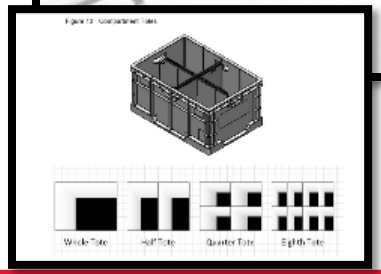
Operations

- **Inbound**
  - Decant Stations
- **Outbound**
  - Goods to Person (GTP)
    - 1:3 (1 Inventory to 3 Order Positions)

Aisle 9-10 complete, Aisle 1-8 pending Retrofit from 2:1

ASRS Overview





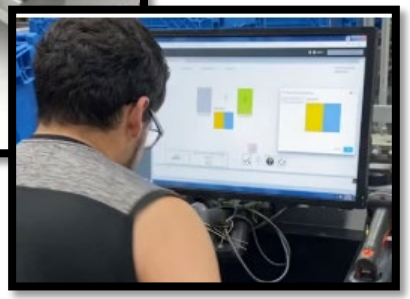
Putaway to ASRS - Decant Area

- Empty Inventory Tote positions with fixed user station for processing
- Design
  - Lowest - takeaway conveyor for finished storage totes
  - Middle - empty inventory tote conveyor
  - Upper - cardboard conveyor to compactor

Storage

- User interface indicates quantity and recommended tote configuration for product storage
  - Compartments 1, 2, 4, 8 per tote
- When full tote is pushed away to lower conveyor for storage
  - The tote moved to storage based on the department of the product (1 through 9)
  - Specific Depts are stored in each Module

ASRS Overview



GTP

- **Picking Operation**
  - Gray Inventory Totes arrive at station
  - User Interface touchscreen indicates pick from compartment, quantity and pick to position.
  - Product is scanned to confirm quality
  - Pick 2 Lite button to confirm product placement
  - Completed order totes travel to OB Buffer
    - Totes are closed with mechanical tote closer

Note: At GTP, Cycle Count and Inventory Consolidation activities are performed during non-pick operating windows

Trucking Industry and the Supply Chain

Matt Wells
Vice President
Mid-West Truckers Association

Trucking Update

MATT WELLS VICE -PRESIDENT
MID-WEST TRUCKERS ASSOCIATION

State of the Industry

- Rising cost of Insurance Premiums – P&C and worker comp
- Changing Labor Regulations – California Assembly Bill 5
- TIA reports 35,000 carriers have exited the industry in the past 18 months after the post pandemic surge in freight demand.
- Limited increase in freight movements for Q4 in 2024
- Little indication of increase in freight volumes for Q1 & Q2 in 2025

State of the Industry (Continued)

- A universal lull in demand. What sectors are hot – which are not?
- Generally slow during elections years
- Possible freight increase in Quarter 3&4
  - Dependent on new POTUS tariff & trade policies
  - Tariffs on Canada and Mexico could greatly impact freight movements in Illinois.

A Depressed Freight Market

Freight rates continue to retreat – shippers keeping inventories tight.

Truckers leaving the market but not fast enough for the post-pandemic change in supply strategies.

Carriers fighting profit squeeze – both big carriers and smaller operators ‘pinching’ pennies.

Excess inventory of rolling stock. The big buying binge for equipment has slowed as demand for trucks on the road slows.

Shift in retail business continues – delivery structure centers on warehouse to consumer.

Select markets see pullback in warehouse demand – vacancy rates nearing 6% nationwide.

BUT…experts predict an increase in freight demand later this year.

Greenhouse Gas Rule – Opposition Grows: California's "Advanced clean fleets"

Where do we start?

Biden administration approved strictest ever limits to GHGs from trucks – industry says goals are unattainable in present timetable of 2027-2032.

Truck manufacturers face a dilemma – how to reach the goals.

Rules Challenged: Senate Passes Disapproval Resolution (reg. 2125-AF99) on April 10 to override the regulation with D & R support.

States sue over the rule, calling it overreach by the executive branch.

President Elect-Trump not a strong supported of environmental issues.

Illinois and the CARB Bandwagon

HB 1634/SB2839 – Mandate Illinois' Adoption of California Air Resources Board (CARB) Standards

Rep. Edgar Gonzalez (D-Chicago). Sen Mike Simmons (D-Chicago) (Simmons does not have a drivers license, no car and rides a bike everywhere)

Would outlaw use of any truck model year 2010 and older

Bill would require Illinois to codify existing CARB regulations and any changes within 6 months of CARB action. Once bill is passed, Illinois is totally subservient to any CARB action. Members generated over 3,000 opposition slips against the bill. Held in committee. Gov. Pritzker says now may not be the best time to push such a proposal.

Proponents are now pushing implementation through rulemaking with the Illinois Pollution Control Board.

Illinois and the CARB Bandwagon

What does this mean for traffic in Illinois if enacted?

Geographical differences between Illinois and California

Does nothing to change the ‘pass though’ traffic in Illinois

Heavier power units when operating empty

More truck volume due to less load carrying capacity

Significant impacts on local power grids for power

Without significant investments (Billions) into IEPA enforcement power the goals of EV implementation of CARB in Illinois is futile.

Speed Limiter Mandates Slows Down

FMCSA continues work to adopt a speed limiter mandate for trucks with ONE top speed for the entire country.

65 – 68 MPH have been the favored talking points.

Would create split speed limits between cars and trucks in many states, especially hazardous on rural two-lane roads.

MTA part of national coalition (OOIDA, yes; ATA, no)to restrict FMCSA from moving forward on such a plan.

Truck Fatalities Up

NHTSA stats show traffic crashes involving large trucks (over 10,000 pounds) increased by 2%.

Overall, all motor vehicle crashes results in 1.7% fewer deaths, The fatality rate per 100 million vehicle miles decreased 3.6% from 1.38 to 1.33.

Truck crash fatalities rose from 5,821 to 5,936. Truck occupant deaths increased 8.5% to 1,097 fatalities.

MID-WEST
TRUCK &
TRAILER SHOW
February 7 & 8, 2025
Peoria Civic Center
Peoria, Illinois
www.midwesttruckers.com

Mississippi River Barge Congestion

Martin Hettel
Vice President of Governmental Affairs
American Commercial Barge Line

Inland Waterways Resiliency And Impacts On Agriculture Supply Chains

American Commercial Barge Line

Marty Hettel
VP of Government Affairs
American Commercial Barge Line

Economic and Environmental Benefits to a 12’ Navigation Channel Between Cairo, IL and Baton Rouge, LA.

FLOOD CONTROL ACT OF 1944

Act or Authorization	Work Authorized	Document
Dec. 22, 1944	Navigation channel 12 feet deep and 300 feet wide between Baton Rouge and Cairo; flood protection of Yazoo River Backwater Area in vicinity of Satartia, MS. Continue prosecution of channel improvement and stabilization program, $200 million.	H. Doc. 509, 78th Cong., 2d sess. Public Law 534, 78th Cong., 2d sess.

Statement of the Mississippi River Commission
Charting a Future Path Through Low Water
March 30, 2023

Most of the time, waterborne commerce is able to utilize 12-foot channel on the Lower Mississippi River. While Congress has already authorized a 12-foot channel on the Lower Mississippi River, the Corps of Engineers receives funding to maintain a 9-foot navigation channel only. The commission as received testimony in support of a 12' foot channel on the Lower Mississippi River, as well as the Red River and the Arkansas River.

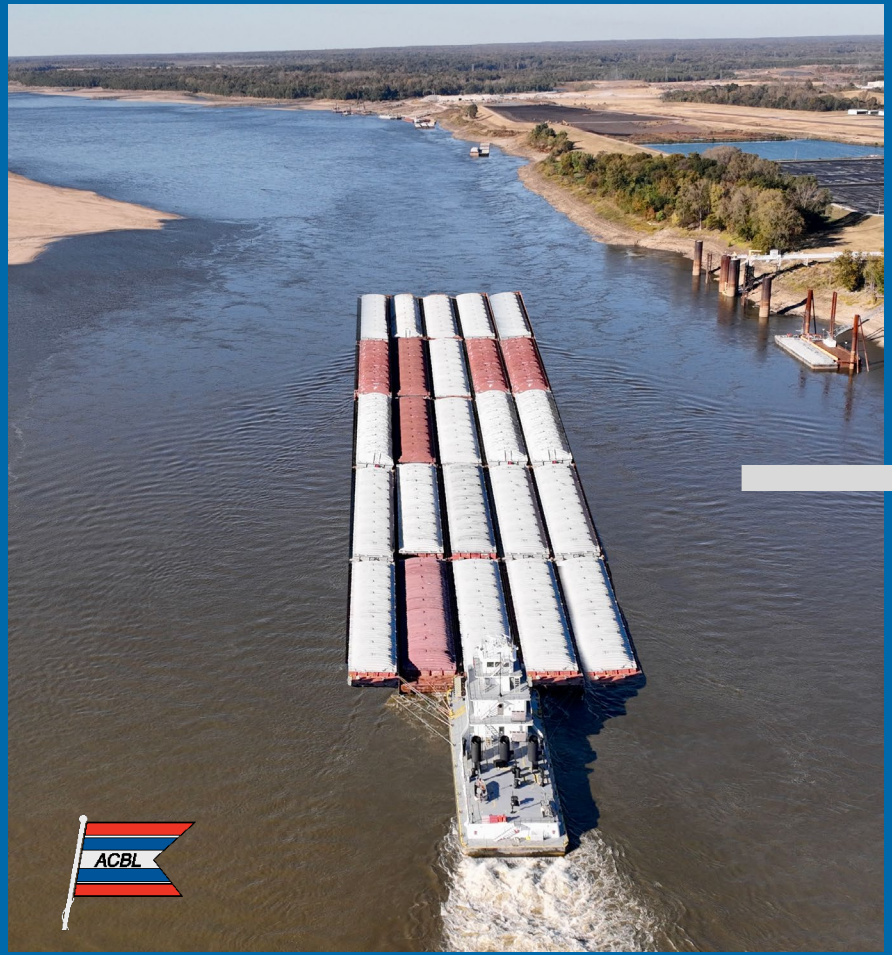
The Mississippi River Commission recommends that the Corps of Engineers explore the benefits, costs and policy implications of implementing the 12'foot channel on the Mississippi River below Cairo.

Economic Benefits of a 12’ Navigation Channel Between Cairo, IL and Baton Rouge, LA.

USACE St. Louis district can maintain a 9’0” Navigation channel between St. Louis and Cairo at **-7.1’** on the St. Louis river stage.

In 2022 the lowest River Stage in St. Louis was **-3.13’** which means we could have loaded our barges to 11’0” and still been able to transit between St. Louis and Cairo.

Unfortunately, with only a 9’0” Navigation Channel between Cairo and Baton Rouge we were leaving 300-400 tons per barge behind, for every barge that loaded in St. Louis.


ACBL

Economic Numbers of the Highest Freight Traded During the Drought of 2022

As a result of having only a 9’0” Navigation Channel between Cairo and Baton Rouge, it took more barges to move the same amount of cargo which utilized more capacity of barges right in the middle of Harvest Season.

Results of using up all this capacity were some of the highest freight rates for grain that we have ever seen.

The highest grain freight rate out of St. Louis traded for 3,000% of tariff. Base tariff rate in St. Louis is $3.99/Ton, so at 3,000% of tariff equates to $119.70/ton.

We saw the same on freight rates on the Ohio River. Grain Freight out of Louisville traded for 2,600% of tariff. Base tariff rate in Louisville is $4.46/ton which equates to $115.96/ton.

This also applied to the Illinois River. Grain Rate out of Hennepin traded at 1,955%. Base tariff is $5.07/Ton, which equates to $99.12/Ton.

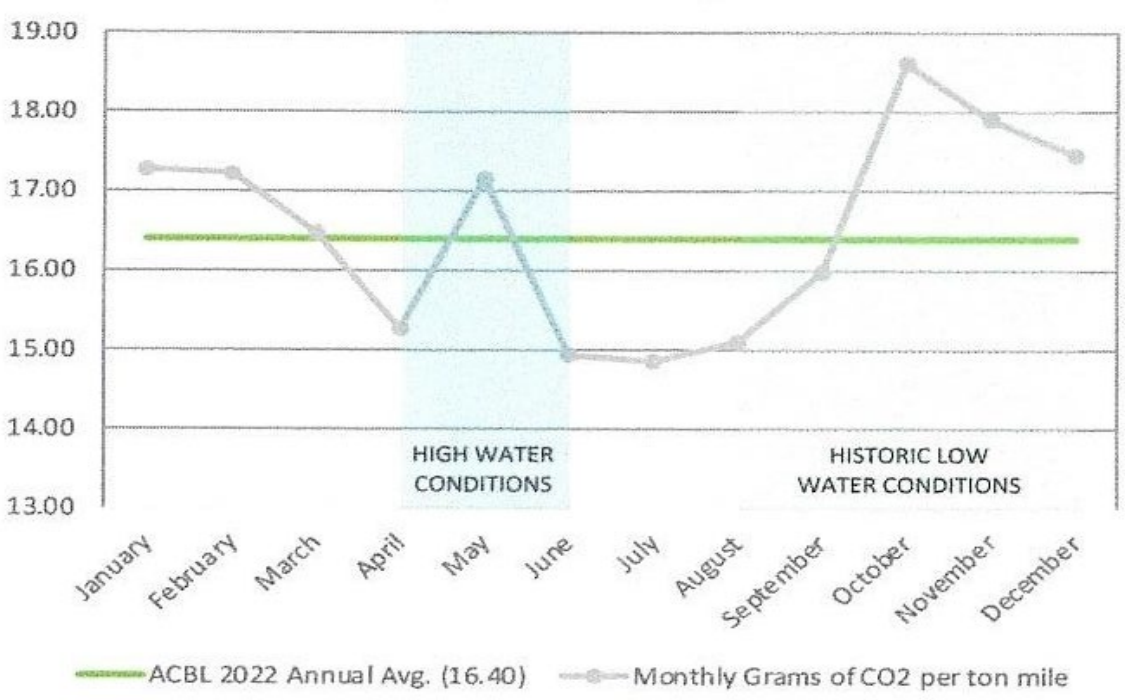
This certainly put our farmers and shippers at competitive disadvantage in the world marketplace.

ADVANTAGE OF A 12’ CHANNEL

2022 USACE Maintaining 9’ Channel	2023 USACE Maintaining 12’ Channel????
Record Low River Stage at Memphis **-10.81’**	Record Low River Stage at Memphis **-12.04’**
50 Days Memphis River Stage was below **-6.0’**	97 Days Memphis River Stage was below **-6.0’**
At **-6.0’** Barge drafts restricted to **9’0”**	At **-6.0’** Barge drafts restricted to **11’0”**

Environmental Benefits of a 12’ Navigation Channel Between Cairo, IL and Baton Rouge, LA.

2022 Monthly Grams of CO_2 / ton mile



Marty Hettel
Martin.Hettel@bargeacbl.com

ACBL American Commercial Barge Line

Freight Models and Tools

Yanfeng Ouyang, Ph.D.
Associate Director for Mobility,
Illinois Center for Transportation
University of Illinois (UIUC)

Integrated Intermodal Freight Models and Tools for Efficiency and Resiliency

Yanfeng Ouyang

Krambles Professor, and Associate Director of Illinois Center for Transportation

University of Illinois Urbana-Champaign

We support cheap, timely, and reliable freight with reduced emissions.

Team: *Strategic group of experts and industry advisors*

Expertise portfolio

- ✓ *Network & supply chain*
- ✓ *Logistic systems*
- ✓ *Traffic flow operation*
- ✓ *Safety*
- ✓ *Econometrics*
- ✓ *Freight*
- ✓ *Commodity flow*
- ✓ *Port logistics*
- ✓ *Sensor data analytics*
- ✓ *Intelligent systems*
- ✓ *Human-automated vehicle interaction*
- ✓ *Artificial intelligence*
- ✓ *Sustainability*
- ✓ *Renewable energy*
- ✓ *Resilient infrastructure*

Industry Advisory Board

Cummins, Uber Freight, Walmart Global Tech, tratics, Port of Long Beach, stv, Majestic Realty, moffatt & nichol, amazon, USC, VDOT, Port Authority NY NJ

Challenges in freight logistics systems

DATA VISIBILITY
Obscure and unlinked data tracking across transport modes

DECARBONIZATION
Lack of prioritizing zero emission goals

DISRUPTION
Lack of adaptable and resilient controls for disruptions and disasters

INVESTMENT
Mismatch in freight & energy infrastructure

ONE-STOP-HUB
Non-existent open platform for intermodal logistics planning and energy infrastructure support

BOTTLENECK
Increased volume plus shortage of chassis, labor, and warehouse

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Solution: *Make smart decisions based on data*

Multi

Modal
Scale
Data source

Intermodal logistics planning – web portal

Prototype **Data Hub**

Public sources for historical and real-time data

Intermodal Logistics **Decision-Making Tool**

How costly?

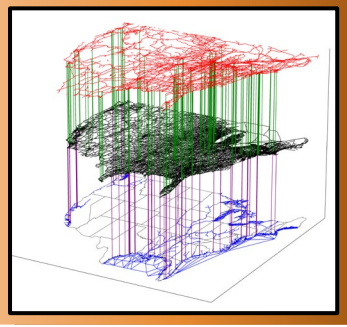
How fast?

How reliable?

How much emissions?

Optimal **Freight / Energy Investment** Alternatives

Which option is 'best' within your constraints?



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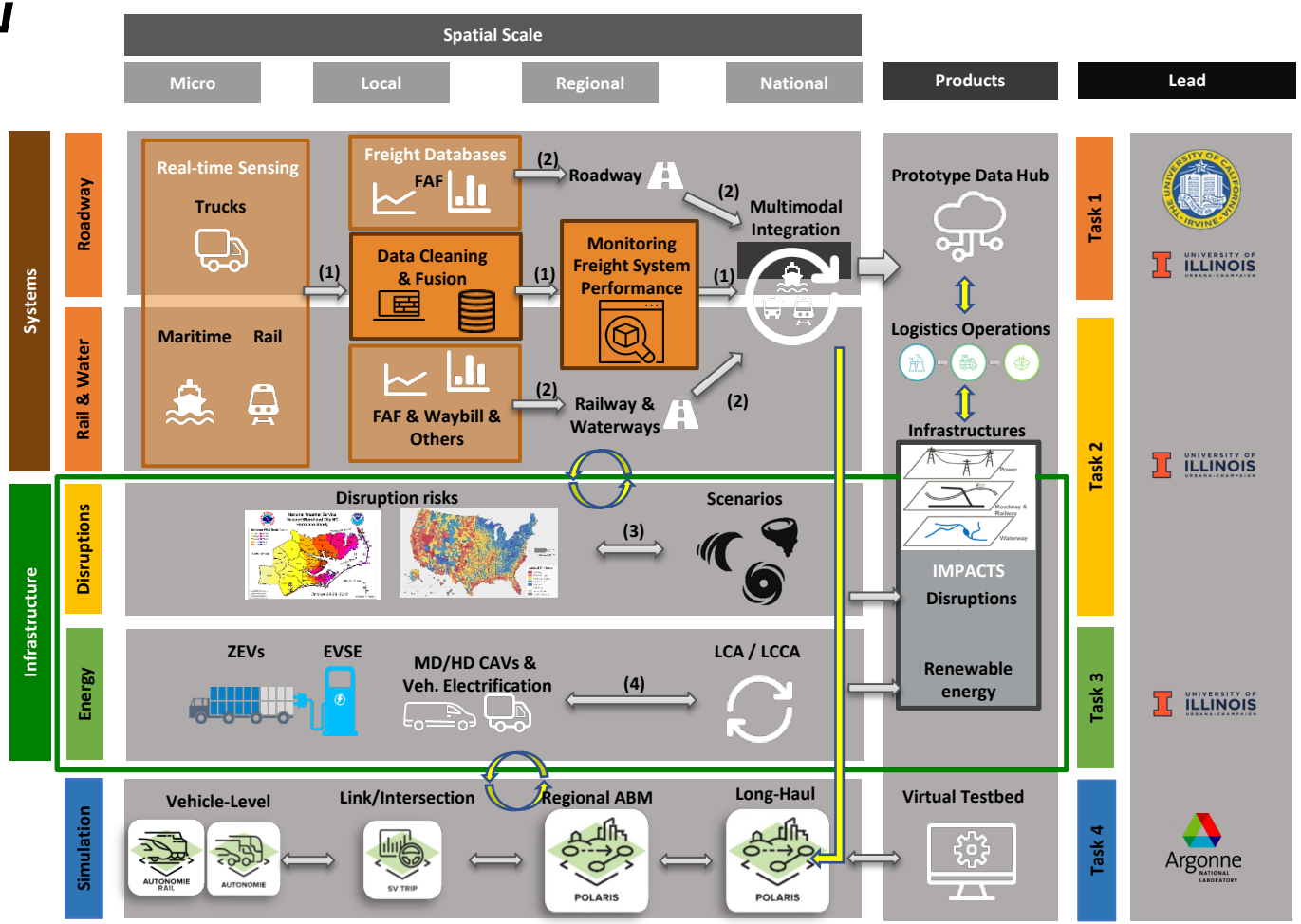
Tech Overview

- Multi-scale prototype data hubs
- Multi-modal network optimization
- Multi-layer computation and visualization
- Intermodal freight efficiency (cost & time), resilience and decarbonization



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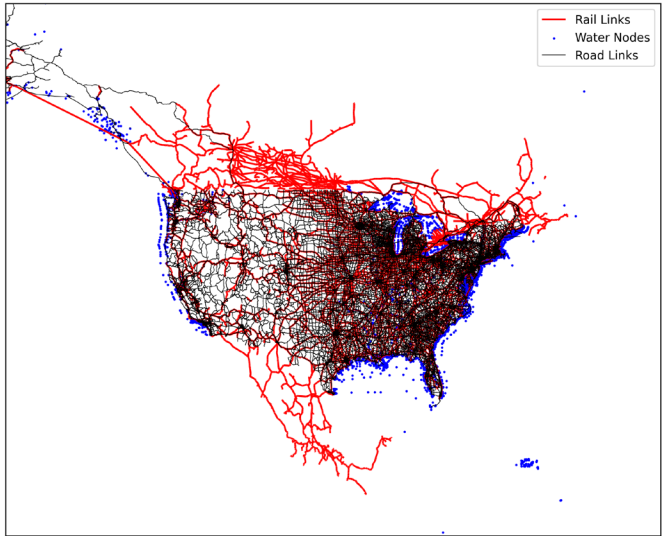
Multi-Layered Intermodal Net

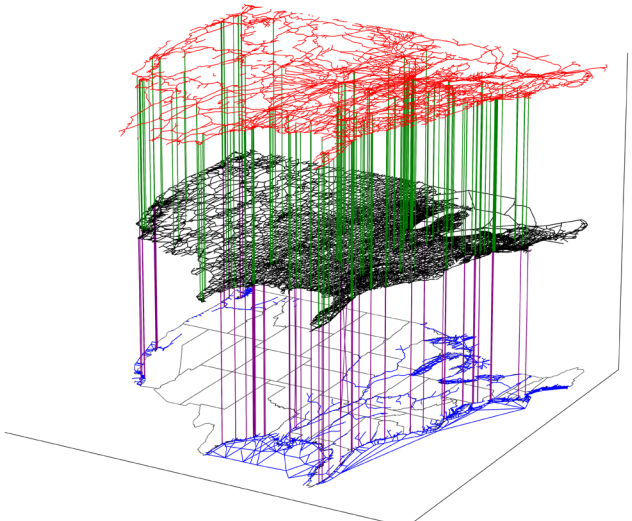
- **Roadway network**: Freight Analysis Framework 5 (FAF5) network, nodes, links and regions, about 348K Nodes, 487K links and 132 domestic regions
- **Waterway network**: Navigable Waterway Network, nodes and links, about 250K Nodes 303K million links
- **Railway network**: North American Rail Network (NARN), nodes and links, about 6K nodes 7K links

- **Highway-railway connection**: Intermodal Freight Facilities Rail TOFC/COFC, 241 links
- **Waterway-highway/railway connection**: Intermodal Freight Facilities Marine Roll-on/Roll-off, 84 links

- **Link/node capacity**: Travel Monitoring Analysis System Stations, historical AADT data

(Source: BTS)





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Highway & Rail Freight Activity Monitoring

- Time-stamped events of rail freight activity at instrumented sites
- Image-based sensor with locomotive and rail-car classification model
- Captures locomotive and rail car counts by freight-configuration
- Data can be aggregated to daily volumes of rail car counts by configuration
- Data to be transmitted from field systems to server using the Message Queuing Telemetry Transport (MQTT) message broker platform

Source: UCI's Freight Mobility Living Laboratory (FML2)

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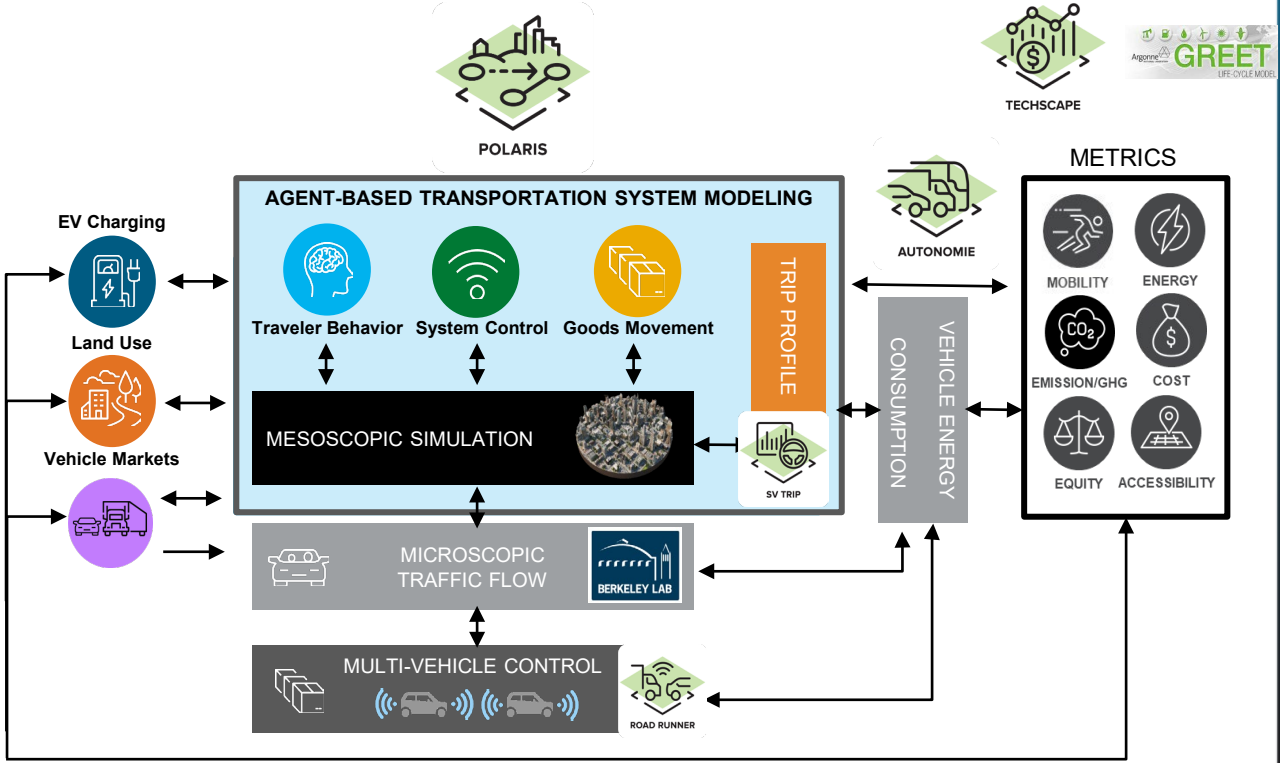
Transportation System Simulation

POLARIS

- Full-featured **activity-based** model
- Includes **freight** shipments & local deliveries
- High-fidelity **vehicle energy** consumption
- **Integrated** demand, network assignment and traffic flow
- **EV charging** and grid integration
- Connection to **UrbanSIM** land use
- **Traveler behavior** impacts across many choices



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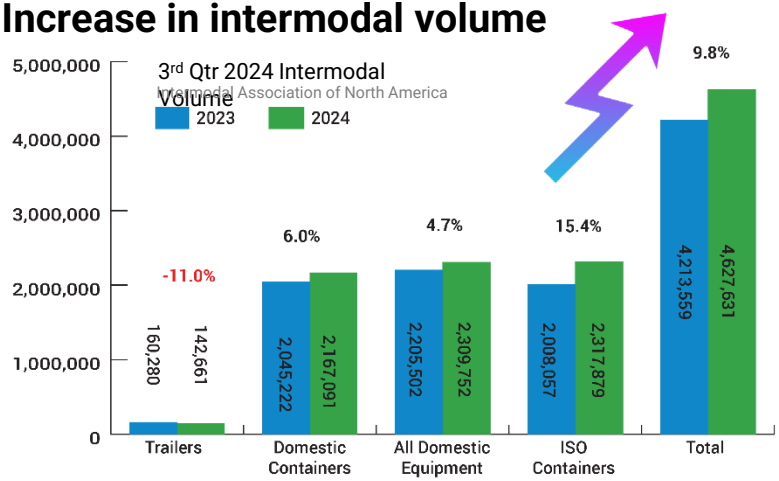
Market: *Invest in intermodal logistics*

Increase in intermodal volume



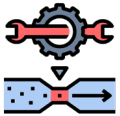
Users for logistic planning web tool

Direct: shipper & carrier

Indirect: public agency & researcher

Leverage Industry Advisory Board network to build user trust

Opportunities



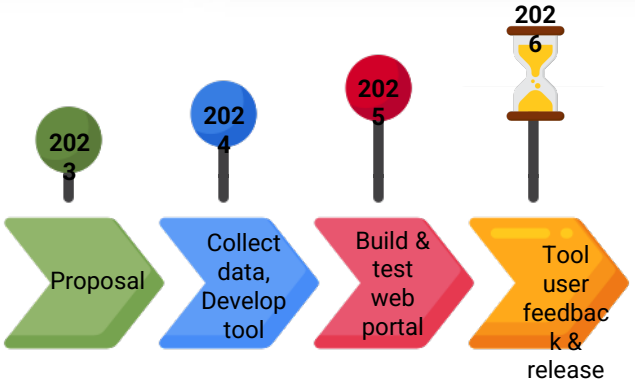
Congestion cleanup

Resilient recovery

Flexible planning

(volume volatility)

Efficient ops + automation



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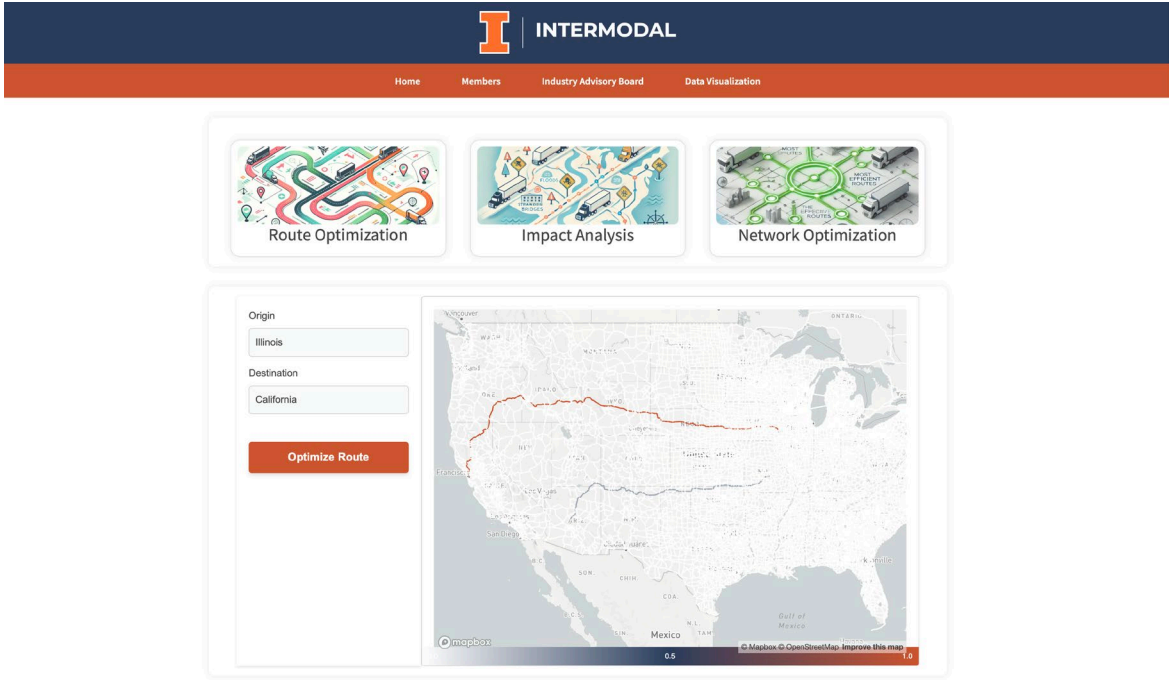
Milestone in progress- Web Portal

The project team aims to utilize the website as a portal to communicate the findings of the project with interested parties.

- Data Visualization and Sharing

The website also includes features expected from a research website.



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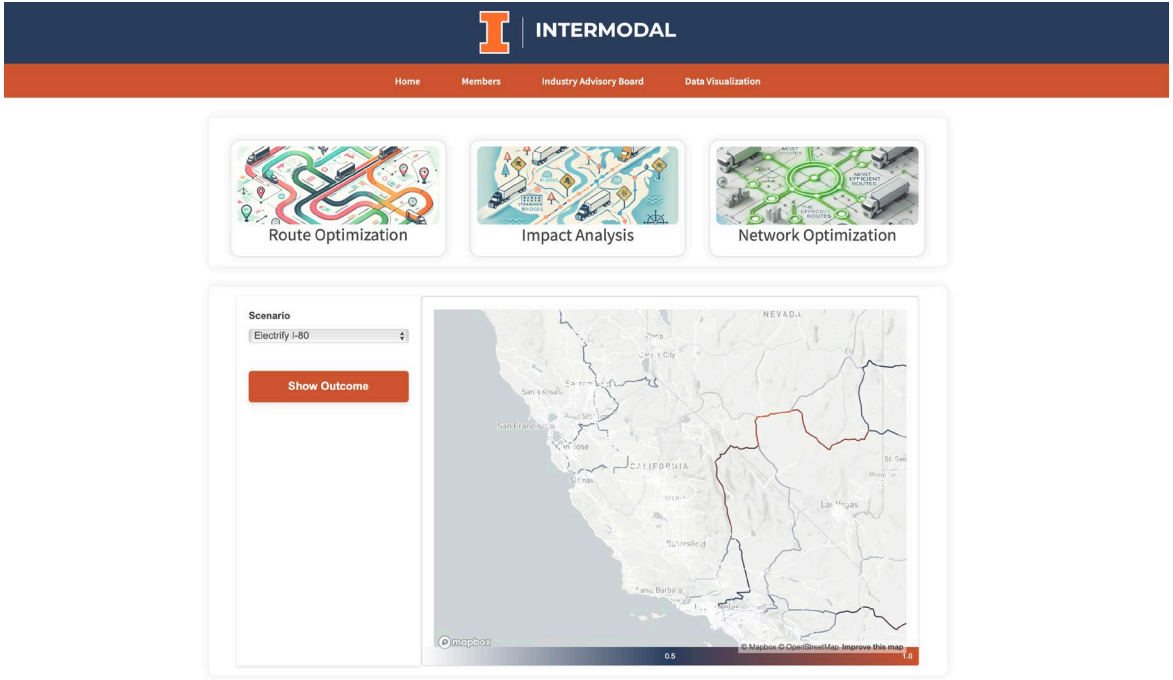

Industry Advisory Board (IAB)

Transportation

Hoseinali (Ali) Borhan
Manager of Connected and Intelligent Systems Research
Cummins

Mazen Danaf
Staff Applied Scientist & Economist,
Uber Freight

Jing Huang
Director of Applied Science, Applied AI
Walmart Global Tech

Nderim Rudi
Founder & CEO
Tratics

Kamalesh Somani
Research Science Manager
Amazon

Masoumeh Taslimi
Technical Director, Advanced Analytics, Operations Research and Data Science at CSX Technology

James Brooks
Sr. Researcher
Independent consultant

Federal & State Agencies

Monique Stinson
Freight Estimation, Forecasting, and Analysis Manager
USDOT - Bureau of Transportation Statistics (BTS)

Lori Pepper
South/Central Mobility Technology Solutions Leader
STV (former Deputy Secretary for Innovative Mobility Solutions,CalSTA)

Holly Bieneman
Deputy Secretary
Illinois DOT

Fran Inman
Senior Vice President of Majestic Realty
Former Chair of the California Transportation Commission

Eric Shen
Adjunct Professor at USC
Former Director of Transportation Planning, Port of Long Beach

Robert Martinez
VP Freight & Economic Development, Moffatt & Nichol
Former Virginia Transportation Secretary

Stephan Pezdek
Transportation Planning Manager
NY/NJ Port Authority

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IAB Privileges and Responsibilities

Intermodal freight data sources and access

Guide project activities and objectives

Try out web portal platform throughout its development

Join quarterly virtual (or in-person) meetings

Please email yfouyang@illinois.edu if you are interested in joining our IAB!

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Freight / Truck Parking

Adam Gabany
Intermodal Planning Unit Chief
Illinois Department of Transportation

COMPETITIVE FREIGHT PROGRAM

2018 Progress

- 13 projects Completed
- 10 projects in the process

2023 Progress

- 3 Projects have started and more are starting this spring.

Competitive Freight Map

- Updating Data and adding new layers

TRUCK PARKING COMMITTEE

ISFAC

Progress

- Determined Plan and Direction
- Created vision, goals, and objectives
- Truck Parking Website
- Building resources and information
- Statewide Line Item for 2026 and on
- Working on development of action items

TRUCK PARKING COMMITTEE

ISFAC

Next Steps

- Finalize action items
- Analyze areas of highest need
- Determine locations for potential improvements.

ILLUSTRATIVE PROJECT LIST

Platform for agencies to submit potential projects for IDOT support by being added to the Freight Plan

- Google Form
- Basic Project Information
- Submitted to IDOT for review

Illinois 2023
State Freight Plan

MOVE ILLINOIS LRTP LONG RANGE TRANSPORTATION PLAN

Progress Update

- Determining Objectives and Strategies
- Technical Memo
- Coordination with other plans
- www.moveillinois2024.com

Federal Partners

U.S. Department of Transportation

Federal Highway Administration

THANK YOU!

For questions or to be on the schedule during an upcoming meeting, email:

DOT.ILFreightPlanning@illinois.gov